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FACULTY OF HEALTH SCIENCES

Improving patient experience and safety in National Health Service (NHS)
hospital wards through a ward based clinical accreditation scheme (CAS): an
exploratory trial and process evaluation

by

Helen Victoria Wharam

Doctor of Philosophy

March 2015

Word count 66,847

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF HEALTH SCIENCES

Doctor of Philosophy

IMPROVING PATIENT EXPERIENCE AND SAFETY IN NATIONAL HEALTH SERVICE (NHS) HOSPITAL WARDS THROUGH A WARD BASED CLINICAL ACCREDITATION SCHEME (CAS): AN EXPLORATORY TRIAL AND PROCESS EVALUATION

by Helen Victoria Wharam

In response to local and national drivers for improvements in quality of hospital nursing care an acute care NHS Trust developed an innovative ward based Clinical Accreditation Scheme (CAS). The scheme aims to assure quality of care and encourage quality improvements.

This study aimed to identify changes in the quality and outcomes of care associated with the CAS, to explore the contextual factors and processes by which any effect is achieved and explore how the CAS is embedded into routine clinical practice by examining key participant perspectives on the feasibility and utility of the CAS. A controlled before-and-after study design explored outcomes from three matched pairs of adult general medical and surgical wards over a twelve month period.

The Hospital Survey on Patient Safety Culture and Nursing Practice Environment Scale were administered to all study ward staff at study commencement and as follow up at study end. There was no evidence of an association between participation in the CAS and a change in ward culture. Statistical process charts were used to identify changes over time for rates of hospital acquired infections, pressure ulcers and falls but no clear trend emerged. Findings from staff interviews suggest that staff value the assurance and sense of recognition the accreditation process gives. The process of preparing for self-assessment has potential to promote immediate quality improvements but a number of dysfunctional effects and behaviours, and contextual factors such as constant change, were identified as hindering embedding of the process into routine practice.

This study provides new knowledge demonstrating how an accreditation scheme is operationalised at the microsystem level. The scheme appears to assure quality of care and promote short term quality improvement but it is a resource intensive scheme and a number of structural changes are required to promote ongoing participation in quality improvement activities.

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DECLARATION OF AUTHORSHIP

I, Helen Wharam, declare that the thesis entitled

“Improving patient experience and safety in National Health Service (NHS) hospital wards through a ward based clinical accreditation scheme (CAS): an exploratory trial and process evaluation”

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission
- Signed:

Date:.....

Acknowledgements

I would like to express my sincere thanks and gratitude to all those who helped me complete this research study.

To begin with I would like to thank Professor Peter Griffiths and Dr Michael Simon for awarding me the studentship without which it would not have been possible to undertake study for a doctorate. I would also like to thank them, in their capacity as my research supervisors, for their support, guidance and patience, throughout this course of study. Thanks are also due to Professor Cathy Pope who filled a supervisory gap towards the end of this study and provided the much needed boost to scale the final hurdles of this research study.

Thanks are also due to the Trust who hosted this research study and the numerous members of staff who worked in a variety of capacities to support this study. Thanks are particularly due to the study ward staff who shared their valuable time and experiences of the CAS with me.

Finally, I would like to thank my family and friends who have provided me with the support that ensured I reached the finishing line.

Definitions and Abbreviations

ACHS	Australian Council of Healthcare Standards
AHRQ	Agency for Health Care Research and Quality
ANCC	American Nurses Credentialing Center
CAS	Clinical Accreditation Scheme
CI	Confidence interval
CL	Centre line
CQC	Care Quality Commission
CQD	Clinical Quality Dashboard
DoH	Department of Health
EPOC	Cochrane Collaboration for Effective Practice and Organisation of Care Group
EQulP	ACHS Evaluation and Quality Improvement Program
HSCIC	Health and Social Care Information Centre
HSoPSC	Hospital Survey on Patient Safety Culture
ISO	International Organization for Standardization standards for quality systems
JC	Joint Commission
LCL	Lower control limit
MRC	British Medical Research Council
NDNQI	National Database of Nursing Quality Indicators
NHS	National Health Service

NHSI	NHS Institute for Innovation and Improvement
NPT	Normalisation Process Theory
NRES	National Research Ethics Service
OECD	Organisation for Economic Cooperation and Development
PES-NWI	Practice Environment Scale of the Nursing Work Index
RCT	Randomised controlled trial
RCN	Royal College of Nursing
SD	Standard deviation
SCPC	Society of Chest Pain Center
SPC	Statistical Process Control
UCL	Upper control limit
UK	United Kingdom
US	United States of America
WHO	World Health Organisation

1. Introduction

This thesis sets out to present a study that sought to identify the changes in the quality and outcomes of UK (United Kingdom) National Health Service (NHS) acute hospital ward based nursing care associated with implementation of an innovative quality assurance and improvement scheme. The background to the development of this scheme is introduced below.

1.1 Quality in healthcare

High quality safe and effective healthcare with improved patient outcomes is now an international objective for many of the world's healthcare organisations. This reflects a growing evidence base indicating a clear rationale for improving the quality and safety of healthcare. First, from a clinical perspective, the Institute Of Medicine landmark report *"To Err is Human: Building a Safer Health System"* concluded that in 1997 at least 44,000 hospitalised Americans were dying each year as a result of medical errors (Kohn et al. 2000). Many such adverse events are preventable with satisfactory standards of care (Vincent et al. 2001). Furthermore, factors such as effective communication and support for surgical patients have been shown to hasten recovery and promote well-being (Shulldham 1999) whilst anxiety and fear have been shown to delay wound healing (Weinman et al. 2008).

Second, from a marketing perspective, funding arrangements for many healthcare services often entails the demonstration of high performance standards within a competitive market in which patients, as healthcare consumers, are exercising increasing choice. In instances where NHS patients have a referral choice good previous experience, waiting times and quality of care have been shown to be key factors in determining choice of hospital (Dixon 2010). Finally, from a financial perspective, an overall global trend of increasing population size, longevity and changing consumer expectations is placing a substantial requirement upon healthcare services to sustain growth in capability and capacity to meet these demands within increasing financial constraints.

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However, there continue to be instances, both nationally and internationally, in which delivering high quality safe, effective and efficient care remains problematic. For example, substantial variation in the quality of care between NHS Trusts, and significant failings in the quality of nursing care in some NHS Trusts, and between wards within hospitals, have been evidenced (Care Quality Commission (CQC) 2011, Francis 2010). Consequently, many international, national and local organisations are increasingly participating in a wide range of programmes and projects aimed at assuring and improving the quality of healthcare (Cummings 2009, Department of Health (DoH) 2011b, Organisation for Economic Cooperation and Development (OECD) no date, World Health Organisation (WHO) no date).

1.2 Measuring healthcare quality

Understanding of the benefits of delivering high quality services stems from the work of industrialists such as Deming, Juran and Crosby in the 1950s: their work in manufacturing and service organisations demonstrated enhanced service quality was associated with increased productivity and reduced error rates and costs, increased customer satisfaction and market share (Omachonu & Ross 2004). This led to the emergence of key principles and approaches relating to the planning, organising and controlling for, and management of, quality; a key concept being that of the process of measurement (Omachonu & Ross 2004).

Initial approaches to the measurement of healthcare quality were guided by the seminal work of the theorist Donabedian (2003) who articulated three measurement dimensions. Measures of *structure* relate to human resource and organisational factors most often associated with cost effectiveness; measures of *process* primarily assess the delivery of healthcare interventions in relation to factors associated with evidence based clinical effectiveness and acceptability; measures of *outcome* are the changes arising as a result of the healthcare intervention such as changes in health status (Donabedian 1996). Understanding of issues relating to quality of healthcare have subsequently further evolved and concepts such as patient centred care, empowerment, public and patient involvement have developed. Consequently, the concepts of safety, patient experience and effectiveness are now identified as being key

dimensions in the measurement of healthcare quality (Agency for Health Care Research and Quality (AHRQ) 2003, Health and Social Care Information Centre (HSCIC) 2013a, WHO 2009).

Safety is defined as freedom from adverse events or complications arising from medical intervention (Kohn et al. 2000). Key safety outcomes include, for example, the occurrence of medication error, surgical site infection and equipment failure (Kohn et al. 2000). Potential management strategies include implementation of safety practices or systems of improved organisational/clinical practices such as infection control programmes. Patient experience is considered by the WHO in terms of health system responsiveness: that is, the manner and environment in which people are treated when seeking healthcare (Valentine et al. 2003). It incorporates the domains of respect and dignity, autonomy to participate in health related decisions, privacy and confidentiality, prompt attention, adequate quality of basic amenities, communication, access to social support networks, and choice of medical providers (Valentine et al. 2003). Effectiveness relates to the evidence base for treatments provided and the outcomes of that care (RCN no date).

Identification of quality measurement dimensions has supported the increasing development and use of healthcare indicators by a range of organisations (AHRQ 2003, HSCIC 2009, OECD no date). Healthcare indicators provide evidence based measures, or data, against which quality of care can be quantified and described (Griffiths et al. 2008). Box 1 provides examples of such indicators.

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Box 1: Examples of hospital indicators

Safety: *structural* measures such as the availability of hand washing facilities; measures of *process* such as rates of screening for MRSA; *outcome* measures such as hospital acquired infection rates, pressure ulcer rates, or birth and obstetric traumas, mortality rates

Patient experience: *structural* measures such as access and waiting times; measures of *process* such as being treated with dignity and respect; *outcome* measures such as reported satisfaction with elements of care received and overall reported satisfaction

Effectiveness: measures of *process* such as receipt of beta-blockers or aspirin after myocardial infarction; *outcome* measures such as readmission rates and complication rates following surgery

1.3 Assuring and improving healthcare quality

The collection of indicator data provides a tool by which healthcare organisations can monitor and assess performance against predefined quality standards (Donabedian 2003). A standard is “.. *an explicit, predetermined expectation set by a competent authority that describes an organization’s acceptable performance level* ..” (Rooney & van Ostenberg 1999 p9). The setting of expectations, or standards, and collection of associated indicator data enables comparison, or benchmarking, of performance against best practice. This may occur within a system/organisation or between similar systems/organisations. This is a strategy increasingly employed at international, national and local levels to assure, monitor and improve safety, patient experience and effectiveness.

The International Organization for Standardization (ISO 9000 series), for example, is a process of certification that provides formal recognition of compliance with standards focusing on the maintenance of quality control systems such as in radiology and laboratory services (Shaw 2000). In contrast, standards for the European Foundation for Quality Management provide a quality assessment of leadership and management systems (Donahue & Van

Ostenberg 2000) whilst the European *visitatie* system focuses on an individual's professional standards (Heaton 2000). The aim of such performance assessment strategies is to directly bring about change in situations where standards are not being achieved and to encourage continuous participation in quality improvement activities (Moullin 2002).

Within the UK, healthcare services operate within a regulatory framework which is linked to a process of statutory external assessment and review of hospital level indicator data: the primary purpose being to ensure adherence to minimum standards (DoH 2011a). Yet, a recent review of the quality of care provided by a number of NHS hospital Trusts concluded hospital level aggregation of indicator data has potential to obscure significant failings in care at the ward level (Keogh 2103). A number of additional drivers for quality improvement activities have recently evolved in the UK. First, payment systems are being increasingly linked to financial sanctions for poor performance and financial rewards for delivery of care in line with specified standards; second, the presence of independent competitors is increasing. Yet, substantial variation in levels of engagement in quality assurance activities in NHS Trusts has been demonstrated (CQC 2011).

It was against this background that an acute care NHS Foundation Trust engaged with the processes of quality assurance and improvement to develop the intervention explored in this study. There follows a description of the key local features underpinning development of this intervention.

1.4 The local situation¹

This study is set in a large acute University Hospital NHS Foundation Trust with approximately 65 wards covering a range of specialisms such as trauma and orthopaedics, cancer care, critical care, paediatrics, neurosciences, ophthalmology, obstetrics and gynaecology.

¹ To maintain Trust confidentiality the reference for the paper upon which information in this section is based has been withheld

1. Introduction

In 2007, in response to the drivers for quality improvement activities highlighted above, this Trust developed a series of strategic objectives *“focused on investing in clinical and academic excellence improving management capacity and capability, and seeking to engage key staff in driving forward our vision”*. A Patient Improvement Framework, setting organisational priorities for safety, patient experience and outcomes supported development of a Patient Improvement Action Plan. Leadership roles for the safety and patient experience agendas were given to Associate and Deputy Directors of Nursing and a Service Improvement team was developed. A key aim was to develop the service improvement skills and capabilities of clinical teams. Trust wide quality assurance and improvement activities targeted at wards and clinical teams, seeking to align the strategic plan’s goals and objectives across all systems levels, are continuous and ongoing.

1.5 The intended improvement

Nurses, in forming the greater part of the healthcare workforce, have a significant role to play in determining the quality of direct patient care. Measurement and assessment of ward safety and patient experience was well established via government mandated collection of clinical quality indicator data. Indicator performance feedback occurred via ward based clinical quality dashboards (CQD). CQDs are designed to provide ward staff with an easily accessible visual display of up-to-date data from locally selected and defined clinical indicators. Potential benefits arising from the use of CQDs include targeted decisions to improve quality of care (NHS Connecting for Health 2012). A wide range of additional activities to assess and monitor quality of ward care, such as accreditation of infection control practice, pharmacy accreditation, intentional rounding² for falls and pressure ulcers, and a matron peer review programme, were also occurring on a regular basis.

The need for a single intervention encompassing the above activities was identified by clinical nurses. They recognised that effective communication of expected standards of ward care was challenging due to the eclectic nature of

² Process used to support staff to reduce rates of falls and pressure ulcers in vulnerable patients

these wide ranging systems of performance assessment and measurement. Hence, an innovative intervention was developed by a Working Group of Trust clinical nurses and nurse managers. Their aim was to provide a method by which ward quality of care could be comprehensively assessed, and expectations communicated, in a standardised fashion. This would assure both staff and patients about quality of ward care. An additional aim was to provide a framework that enabled and motivated frontline staff to engage more effectively with the range of performance assessment and measurement data currently gathered; consequently, stimulating ward based quality improvements in line with the Patient Improvement Framework.

Implementation of the intervention on all wards was intended. Development of the intervention was championed by the Trust senior nursing management team and support was provided by the Service Improvement team. The intervention subsequently developed was a ward based healthcare accreditation scheme.

1.6 Healthcare Accreditation

Healthcare accreditation is an external quality assessment system which is receiving growing international attention.

Definitions of healthcare accreditation include:

“.. a formal process by which a recognized body, usually a non-governmental organization, assesses and recognizes that a health care organization meets applicable pre-determined and published standards ..” (Rooney & van Ostenberg 1999 p3)

“.. initiatives to externally assess hospitals against pre-defined explicit published standards in order to encourage continuous improvement of the health care quality ..” (de Walcque et al. 2008 p13)

Healthcare accreditation schemes vary in their approach and purpose according to local political, economic, social and historical factors (Shaw 2000). However, the above definitions demonstrate that a scheme's overall goal is

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that of quality assurance and quality improvement underpinned by a process of monitoring and assessing performance against predefined standards.

The concept of accreditation stems from the rapid growth of public sector institutions in the early years of the twentieth century and consequent early attempts to define and apply minimum common standards. The earliest model is that of the United States of America (US) Joint Commission (JC no date), formerly known as the Joint Commission on Accreditation of Health Care Organizations, which evolved from The Minimum Standard document adopted by the American College of Surgeons Board of Regents in 1919 (American College of Surgeons 2006). The early JC model subsequently underpinned the development of programmes such as Accreditation Canada in 1958 (Accreditation Canada no date), the Australian Council of Healthcare Standards in 1974 (ACHS no date) and European programmes in the 1990s (Scrivens et al. 1995, Shaw 2006). In 2000 36 national healthcare accreditation programmes were identified (WHO 2003) whilst 18 European national programmes were identified in 2009 (Shaw et al. 2010). A number of accreditation schemes now operate at a global level, for example, the Joint Commission International.

In contrast, there was a significant decline in UK accreditation activity between 1998 and 2008 (Shaw et al. 2010). The management of quality in the NHS originally revolved around a process of self-assessment by hospital auditors against risk based standards and intermittent verification by the Audit Commission (DoH 1998). This was accompanied by the development of external independent schemes such as the Trent Accreditation Scheme which was established in 1992 to accredit small and community hospitals (Hurst 1997). In 2003, the newly created Healthcare Commission and a system of NHS performance Ratings replaced the role of the Audit Commission in verifying healthcare standards (Paskavitz 2004). In 2009 the Healthcare Commission subsequently evolved into the CQC (DoH 2008a).

Introduction of the CQC, with a mandated requirement for hospital registration and participation in the assessment of compliance against minimum standards, may have underpinned the closure of schemes such as the Trent Accreditation Scheme. However, a recent review of lessons to be learned from significant failings in the quality of care in the NHS concluded that the current NHS regulatory system is complex, confusing and prone to omissions:

consideration of an alternative model of non-government accreditation of healthcare organisations similar to that of the JC was recommended (National Advisory Group on the Safety of Patients in England 2013).

At present the UK has a pluralistic and small scale model of healthcare accreditation with schemes operated and owned by a number of professional and independent bodies. For example, the Royal College of Psychiatrists operates a clinical service accreditation programme for a range of mental health services (Royal College of Psychiatrists 2012); accreditation of services such as imaging and clinical pathology is operated by the UK Accreditation Service (UK Accreditation Service no date); CHKS accreditation services, originally established as the King's Fund Organisational Audit (Vidall 1998), offer accreditation to a range of primary and secondary care services including acute hospital services (CHKS 2012); the Centre for Practice Development accredits the delivery of evidence based practice in health and social care units (University of Bournemouth 2014). The accreditation scheme presented in this study was termed the "*Clinical Accreditation Scheme*" or the CAS.

1.7 Development of the CAS

A CAS Working Group, comprising a wide range of nurse managers and clinical nurses, oversaw the development of the CAS. Early consultation processes included facilitation by members of the CAS Working Group of a number of focus groups involving a range of staff and service user representatives. Participants were asked to identify issues and concerns with ward based nursing and to identify priorities for 'success' criteria, or measures of quality of care, for the scheme. This consultation process accorded with the statutory requirement for NHS organisations to embed the involvement of patients, carers and the wider public in the planning, delivery and evaluation of health and social care services (DoH 2008b).

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A panel of service users and lay people drawn from the Local Involvement Network Group³, The Trust Members' Council⁴ and local hospital patient panels also formed a Project Reference Group. Development of the CAS occurred in conjunction with regular and ongoing consultation with the Project Reference Group. Existing nursing forums were utilised to continuously disseminate information to and obtain feedback from ward staff.

The need for pilot testing of standards to determine their feasibility and applicability is highlighted in a study by Bukonda et al. (2002) of the development of a national hospital accreditation programme. The CAS was piloted on four wards in order to determine the overall feasibility and acceptability of the scheme. Pilot wards were chosen to reflect a range of organisational, staffing and patient characteristics (paediatric surgery, respiratory medicine, coronary care and care of the elderly). Reflective workshops were held with pilot ward staff. Whilst the CAS accreditation standards were determined to be feasible and applicable a requirement for a number of minor revisions, details of which are outlined in Appendix 1, was identified and actioned. This study explored the implementation of the accreditation model adopted following the pilot study.

1.8 The CAS model of accreditation

The four key components comprising the CAS model of accreditation, as demonstrated in Figure 1, may be briefly summarised as follows:

1. Enrolment in the CAS occurs when predefined standards, which seek to measure performance and monitor quality of ward nursing care, are applied to ward activities.
2. Wards participate in a periodic review process in which they conduct a self-assessment against the predefined standards and undergo a peer review

³ Government mandated networks of individuals, organisations and groups that gather and represent the public's views on local healthcare services

⁴ Anyone living in the local community, all members of staff and anyone who has been a patient at the hospital can opt to become a participant in their NHS Foundation Trust's Members' Council. The council works closely with the Trust's Board of Directors to influence decision making and strategic planning

process. The peer review process comprises a desktop review of the ward self-assessment and an inspection of the ward. Participants in the process include senior nurses, nurse managers and service user representatives. This process assures ward quality of care.

3. Successful wards are awarded full accreditation status whilst less successful wards may be required to make immediate improvements prior to receipt of full accreditation status. Award of accreditation status is time limited and wards must undergo a periodic re-review of their accreditation status.
4. The cyclical and ongoing nature of participation in the CAS seeks to stimulate continuous participation in activities to improvement quality of care.

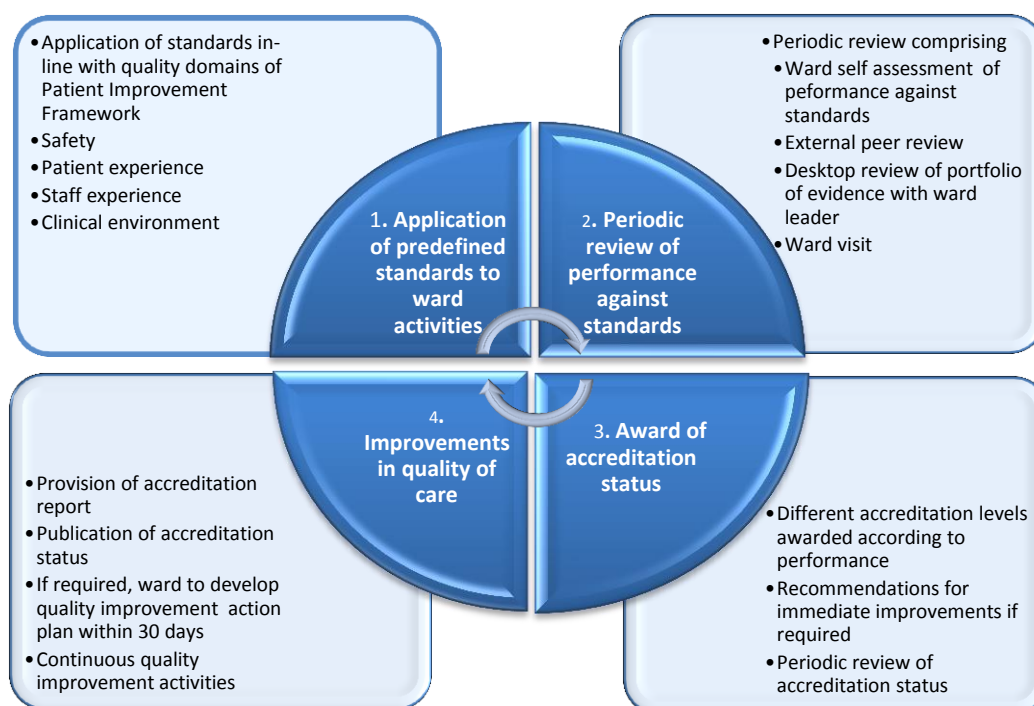


Figure 1: The CAS model

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1.9 Summary

The key points thus far are that:

- many countries around the world are adopting healthcare accreditation as a means by which to assure and improve quality of care
- healthcare quality in the UK is assured via the activities of the CQC
- a recent review of failings in quality of care in the NHS recommended that consideration be given to adoption of accreditation as an alternative model of healthcare assurance
- the CAS, in operating at the ward level and targeting nurses delivering frontline care, offers an innovative approach to healthcare accreditation
- the key components of the CAS model are:
 - application of predefined standards to ward activities
 - periodic review of ward performance against standards
 - award of accreditation status
 - improvements in quality of care
- the CAS model involves a range of key participants

The following chapter provides a fuller explanation of each of the key components of the CAS model and explores each component in relation to relevant empirical, theoretical and conceptual literature.

2. The CAS model and supporting literature

2.1 Purpose

Literature reviews evaluating complex interventions traditionally focus upon the quantitative research evidencing effectiveness⁵. Yet, Dixon-Woods et al. (2006) argue the utility of this approach is limited given the exclusion of the wide range of literature exploring influential intervention elements such as the range of processes, participants and intended outcomes identified in the prior discussion of the CAS model (Section 1.8). Exploration of influential intervention elements, combined with evidence of effectiveness, supports a more detailed understanding of how and why an intervention works (Pawson et al. 2005).

Therefore, the key components of the CAS model were employed as a framework by which to identify and review literature with potential to answer the following questions:

- How do the different components work?
- For whom do they work?
- In which circumstances do they work?

2.2 Methods

Pawson (2006) asserts that, in order to answer the above questions, all forms of literature are relevant. Consequently, relevant empirical, theoretical and conceptual work and existing systematic literature reviews were sought in order to provide a broad overview of each key component of the CAS model. Key empirical literature was identified via two existing systematic reviews of healthcare accreditation research (Alkhenizan & Shaw 2011, Greenfield & Braithwaite 2008). Forward searching from the most recent review end date was employed to identify newly published English language literature. The

⁵ A systematic review of quantitative research reporting associations between healthcare accreditation and patient outcomes is presented in Chapter 3

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search strategy employed by Greenfield and Braithwaite (2008) was followed. Thus, the key words “Accreditation” and “Joint Commission on Accreditation of Healthcare Organizations” were employed to forward search the Cochrane library, Medline and CINAHL databases. The keywords “Magnet hospital” were also added to the search strategy⁶.

The above systematic search strategy was combined with an iterative search of the literature to identify supporting theoretical and conceptual work and systematic literature reviews. Key words such as “performance indicators” and “public reporting” were employed. The areas of literature in which searches were conducted included innovation, diffusion and implementation studies, organisational studies, sociology and psychology. Literature providing the “best fit” to support the discussion of each CAS component was sought. Thus, selection was limited and judicious. This approach accords with that recently utilised in a number of reviews of quality improvement programmes (Aveling et al. 2012, Dixon-Woods et al. 2012). No formal assessment of the quality of studies was made but a table of core data extracted for each empirical study (aim, design, sample, methods and results) may be found in Appendix 2.

Findings for each of the CAS components are presented below.

2.3 Application of predefined standards

The application of externally developed predefined standards to service activities is the first component of the CAS and is a fundamental component of an accreditation scheme (Braithwaite et al. 2010).

2.3.1 The CAS domains

The framework developed for the CAS standards comprised the domains of “*Safety*”, “*Patient experience*”, “*Staff and team experience*” and “*Our ward*”. The domains, which concur with the Trust Patient Improvement Framework and those generally employed in healthcare accreditation schemes, were identified via the consultation process previously discussed in Section 1.7. The collection

⁶ The Magnet Recognition Program® was established in the 1980s to accredit organisations for excellence in nursing care

and monitoring of safety data is considered to be a key global strategy in improving hospital quality of care (Isaac & Jha 2008) and sets of standards assessing safety are now a core component of hospital accreditation schemes. Performance of a pre or post discharge patient experience survey using a prescribed instrument is also a requirement of several accreditation schemes (Auras & Geraedts 2010). The “*Staff and team experience*” and “*Our ward*” domains accord with the framework employed by the Magnet Recognition Program® which includes standards evaluating the components of transformational leadership, structural empowerment, exemplary professional practice, new knowledge, and innovation and improvements (American Nurses Credentialing Center (ANCC) 2008). Aspects of the nurse practice environment are now US National Quality Forum endorsed quality indicators (National Quality Forum 2013).

The breadth of domains selected for the CAS accords with the suggestion by Donahue and Van Ostenberg (2000) that accreditation schemes focus on service delivery within a comprehensive framework of standards. This contrasts with alternative standards based approaches, such as the previously introduced ISO and European Foundation for Quality Management models (Section 1.3 paragraph 2), which have a narrower focus. The alignment, such as that exhibited between the CAS domains and those included in the Trust Patient Improvement Framework, is suggested to have potential to increase staff motivation and commitment to participate effectively in quality improvement interventions (Gill 2006).

2.3.2 The CAS standards

There is no clear consensus of opinion regarding the best choice of standards for an accreditation scheme. Local factors dictate which aspects of the healthcare system are given priority (Scrivens 1997). Hence, considerable variation exists between the standards adopted by different schemes (Shaw et al. 2010). Identification and development of the CAS standards followed the proposed best practice in developing and setting healthcare accreditation standards, that is, by a consensus process involving a range of persons including healthcare experts and consumers (Shaw 2004).

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Feasibility of the standards was dependent upon data requirements being met from existing sources. Consequently, a range of qualitative and quantitative measures already routinely collected by the Trust wards were selected to become CAS standards. Synergy between internal/external performance measurement processes, such as that exhibited between the CAS standards and the existing Trust performance measurement processes, has been suggested to increase system capacity for implementation of quality improvement initiatives (Potter & Borough 2004). All selected measures were deemed by members of the CAS Working Group to be directly attributable to ward quality of care. CAS standards were developed through the assignment of an agreed level of performance for each selected measure. Table 1 provides examples of the CAS standards.

Table 1: Examples of CAS standards			
CAS domain	Description	Target	Measurement method
<i>Safety</i>	MRSA bacteraemia	0	CQD data
	Acuity care audit	95%	Trust SPADE database
	Infection prevention accreditation	Pass	Trust certificate of accreditation
<i>Patient experience</i>	Patients reporting being treated with privacy and dignity	95%	Picker data
	Complaints	Reduction from baseline	CQD data
	Staff receiving training in Customer Care	100%	Trust mandatory training registers
<i>Staff and team experience</i>	Staff appraisal rate	85%	Trust appraisal register
	Percentage of staff vacancies	<3.6%	CQD data
	Uniform and professional appearance	Compliant	Review panel ward visit
<i>Our ward</i>	Mattress and pillow audits	100%	Ward environment folder
	Sign posting and display of information	Consistently good	Review panel ward visit
	Arrangements for confidential discussions	Available and used appropriately	Review panel ward visit

Standards identified within the CAS domains of “*Patient experience*”, “*Staff and team experience*” and “*Our ward*” related to factors such as leadership, culture,

organisational support, staff training and education, interdependence of care team to meet patient needs. These are contextual factors that have been shown to be associated with an effective clinical microsystem⁷ (Kosnik & Espinosa 2003, Mohr et al. 2004). Not all of these standards have a clear evidence base or an objective measurement method.

Standards identified with the CAS “*Safety*” domain also included a mixture of government mandated rates based and sentinel event standardised performance indicators e.g. rates of falls, hospital acquired pressure ulcers and infections. Each ward already received monthly performance feedback for these standardised indicators via the CQD. The linkage between national and local priorities is suggested to increase the likelihood of successful implementation of quality improvement interventions in NHS organisations (Dixon-Woods et al. 2014).

A number of accreditation schemes also incorporate either mandatory (JC 2012b) or voluntary (ACHS 2012) collection of similar standardised performance indicator data as a further method by which to assess quality of care; the recently revised Magnet accreditation model includes a new component of empirical outcomes (ANCC 2008). The ACHS Evaluation and Quality Improvement Program (EQuIP) provides regular performance feedback and comparative reports with peer groups of hospitals (Collopy 2000). A recent review of healthcare accreditation research concluded evidence indicates the use of data for internal and external benchmarking is one of the main mechanisms responsible for promoting organisational change (Hinchcliff et al. 2012). Furthermore, evidence suggests that performance feedback and comparative reporting have potential to support improvements in safety and effectiveness (Merle et al. 2009) and hospital patient experience (Schwappach et al. 2003).

Yet, whilst performance indicators are being increasingly incorporated into accreditation schemes, a literature review exploring the body of evidence

⁷ A clinical microsystem is a group of clinicians and staff working together to provide care for a specific population of patients e.g. a hospital ward providing coronary care

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reporting the effect of indicators on outcomes revealed inconsistent findings (de Vos et al. 2009). Furthermore, the literature indicates continuing debate surrounding many facets of performance indicators. For example, there does not appear to be a clear consensus regarding which types of indicators (structure, process or outcome) are the most useful for quality improvement initiatives (Mant 2001, Rubin et al. 2011). Research into the validity, reliability, specificity and sensitivity of hospital performance indicators, and the composition of a balanced indicator set, is ongoing (Klazinga et al. 2011). Concerns have been raised regarding the scientific rigor of safety indicators (Perneger 2006) and the degree of validity and reliability of standardised patient experience surveys (Drain & Clark 2004). The analytic challenge of adjustment for risk/confounding and the potential negative impact upon the validity of inferences that may be drawn is widely reported (Holzer & Minder 2011, Loeb 2004, Mant 2001).

2.4 Periodic peer review against performance standards

The process of initially joining the CAS entails both the application of predetermined standards and assessment for accreditation award. Continuing participation in the CAS comprises a process of periodic review of award. This is the second fundamental component of a healthcare accreditation scheme (Rooney & van Ostenberg 1999). The award, or periodic re-review, of CAS accreditation status and any ensuing recommendations comprises the following processes.

2.4.1 Ward self-assessment

The first stage of the CAS accreditation process entails completion by the ward of a self-assessment tool which measures compliance against the CAS standards. This process of self-assessment is a common component of healthcare accreditation schemes (Rooney & van Ostenberg 1999).

Findings of case studies exploring participation in the French ($n = 1$ hospital) (Pomey et al. 2004) and Canadian ($n = 5$ hospitals) accreditation schemes (Pomey et al. 2010) suggest the process of self-assessment associated with preparing for an accreditation review may realise a number of benefits. For example, a phase of self-reflection may be promoted. This may prompt

identification of problem areas and the setting of priorities and acceleration of procedures to implement changes. In preparing for Magnet accreditation this process is frequently associated with organisational and cultural transformation and is referred to as the “Magnet® journey” (Whitelaw et al. 2011).

Equally, findings from interviews with clinical staff ($n = 30$) at an Australian hospital also suggested staff valued the opportunity for learning and validation provided by participation in the ACHS EQUIP accreditation survey (Greenfield et al. 2011). However, findings of a cross-sectional survey of senior clinical and managerial staff ($n = 200$) at a single Australian hospital participating in the ACHS EQUIP scheme suggested that staff also found the process burdensome, to require considerable human resources, and to result in lost clinical care time (Fairbrother & Gleeson 2000). Likewise, a qualitative study utilising focus groups to examine staff perceptions of implementation of the Australian Baby Friendly maternity hospital accreditation initiative found additional resources were required to support staff learning requirements associated with the scheme (hospitals $n = 6$, staff $n = 31$) (Walsh et al. 2011).

2.4.2 Accreditation survey

The second stage of the CAS accreditation process entails an accreditation survey in which a panel of external peer reviewers assess the ward's compliance against the CAS standards. In conducting the accreditation survey members of the peer review panel perform the following activities:

1. Appraisal of the completed ward self-assessment
2. Interview with relevant members of the ward senior nursing team
3. Visit to the ward to enable:
 - a. environmental review
 - b. interview with ward staff and a small number of ward patients

The processes employed in the CAS accreditation survey accord with the triangulation of multiple methods, such as documentary analysis, staff interviews and observation commonly applied in accreditation surveys (Greenfield et al. 2009). Research into the reliability of accreditation surveys is

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limited (Greenfield et al. 2007c). However, a single study utilising a combination of interviews, focus groups and questionnaires identified that key ACHS accreditation scheme stakeholders ($n = 139$) perceived the surveys to be reliable (Greenfield et al. 2009).

Recent innovations in some schemes, such as the JC (2012c), include the introduction of short notice surveys and the use of patient tracer methods. Short notice surveys enable observation of typical practice as opposed to advanced notification surveys which have potential for modification of practice prior to an accreditation visit (Greenfield et al. 2012b). Examination of the sequential steps of a patient's care, that is, use of patient tracer methods, supports identification of discrepancies between standards and quality of care given (Amonoo-Larson & de Vries 1981).

Greenfield et al. (2007b) in their systematic review of literature exploring these methods concluded little empirical evidence was available to support their use within accreditation programmes. Furthermore, a subsequent trial of short notice surveys for a randomly selected stratified sample of hospitals ($n = 20$) that were in the self-assessment phase of the ACHS process concluded their overall value has yet to be demonstrated (Greenfield et al. 2012b).

Additionally, a trial of patient tracer methods in the ACHS accreditation survey ($n = 17$ hospitals) produced equivocal findings (Greenfield et al. 2012a).

However, findings from interviews ($n = 18$) and questionnaire surveys ($n = 40$) with healthcare professionals ($n = 28$) and surveyors ($n = 9$) participating in the same study found considerable stakeholder support for the inclusion of patient tracer methods (Greenfield et al. 2012a).

2.4.3 Peer review panel

The CAS accreditation review is a peer review process. Peer review is defined as a "*continuous, systematic, and critical reflection by a number of care providers ... on colleagues' performance, using structured procedures, with the aim of achieving continuous improvement in the quality of care*" (Grol 1994 p147). Findings from a number of studies suggest that the influences of respected peers can bring about change (Grol 1994). This process of external peer review is also a key attribute of an accreditation scheme (Shaw 2004). Table 2 details the composition of the CAS review panel.

Table 2: Peer review Panel Composition

Essential panel members	Associate Director or Deputy Director of Nursing or Divisional Head of Nursing from another area
	Matron from another area
	Service user representative
Optional panel members	Specialist nurse from either tissue viability or infection prevention
	Medical or Allied Health Professionals

There is little evidence to guide the composition of an ideal peer review panel. The CAS review panel includes senior nurse managers and senior clinical staff. This accords with the argument by Shaw (2004) that the selection of surveyors⁸, with current or recent working experience as a healthcare professional at a senior level, is crucial to the credibility and sustainability of an accreditation scheme. Greenfield et al. (2008), following an observational study of an ACHS accreditation survey of a single Australian hospital, identified that surveyors may adopt “*interrogator*”, “*explorer*” and “*discusser*” surveyor styles.

The CAS peer review panel also includes a service user representative. This reflects the increasing recognition of the validity of the views and suggestions of service users and carers in informing decision making about services and improving experiences of care (DoH 2004). Service user involvement can occur on a continuum of levels from indirect involvement to directly engaging in and influencing healthcare activities (Arnstein 1969). Inclusion of a service user representative on the peer review panel, provided partnership working between all members of the panel occurs, represents a high level of service user involvement. Evidence from a study by O’Connor et al. (2007) of Irish Health Services Accreditation Board stakeholder perceptions of the value of including service users/carers as review panel members suggests this has potential to

⁸ Surveyors are called peer reviewers/peer review panel members in the CAS

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occur. Findings from a combination of focus groups (details not given), interviews ($n = 3$ accreditation board staff members) and questionnaire surveys ($n = 191$ hospital staff from $n = 7$ hospitals, response rate = 29% and $n = 30$ surveyors, response rate = 53%) suggested that service user involvement was considered to increase survey credibility and objectivity.

2.5 Award of accreditation status

The third fundamental component of an accreditation scheme is that of performance feedback together with reward or refusal of accreditation status (Rooney & van Ostenberg 1999). Performance feedback and award of an accreditation category, in the form of a peer review panel written report and accompanying recommendations, following the accreditation survey occurs in the CAS. CAS accreditation categories are:

- Exemplar Status
- Full Accreditation (no conditions)
- Full accreditation with conditions
- Refer-working towards Accreditation

The process of healthcare accreditation is cyclical and ongoing (Braithwaite et al. 2010): award of CAS accreditation status is time limited with the period for which accreditation is awarded varying between categories. This concurs with the approach adopted in other accreditation schemes, such as the JC (2012c), where high levels of compliance result in greater time between surveys (18-36 months); Magnet recognition requires a full hospital review every four years (ANCC no date).

2.6 Improvements in quality of care

2.6.1 Supporting mechanisms/processes

The generation of improvements in quality of care from participation in accreditation schemes is not a straightforward process. First, there is a requirement for organisations/healthcare professions to uptake the knowledge generated by participation in processes such as the accreditation survey. Second, there is a requirement that this knowledge is then translated into

activities that promote behaviour change. These processes are subject to the influence of social factors such as individual motivation, engagement and choice. Consequently, Pawson (2006) suggests supporting resources, that act as causal levers influencing people to use the scheme resources as intended in order to make changes, are required.

The CAS employs a number of mechanisms with potential to support improvements in quality of care. For example, the CAS “*Full accreditation with conditions*” and “*Refer-working towards Accreditation*” accreditation categories are intended to promote immediate improvements in quality of care: formulation of an action plan addressing recommendations is required and short timescales for a re-review are set. Where higher levels of performance concerns are raised (“*Refer-working towards Accreditation*”) greater nursing management input into the action plan is expected. Other schemes, such as the JC, seek to achieve immediate improvements through withholding the accreditation decision until evidence of compliance has been submitted (JC 2012c).

The CAS accreditation category of “*Exemplar Status*” seeks to promote participation in continuous quality improvement activities. This reflects a principal ideal attribute of an accreditation scheme: that is, inclusion of both threshold (minimum) and better practice (higher) standards with achievement of better practice standards proposed to lead to the highest possible quality of patient care (Rooney & van Ostenberg 1999). This is an approach common to other accreditation schemes. For example, the French Accreditation College requires that hospitals demonstrate the ability to ensure continuous improvement in quality of patient care (Daucourt & Michel 2003).

Findings of some studies, such as the multiple case study of Canadian hospitals ($n = 5$) by Pomey et al. (2010), suggest accreditation recommendations can be an effective tool in stimulating change. Conversely, other studies, such as the cross sectional survey ($n = 39$ hospitals, $n = 728$ health professionals, $n = 41$ surveyors participating in the Thai national accreditation programme) by Pongpirul et al. (2006) indicate that successful utilisation of accreditation feedback can be problematic.

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Publication of ward accreditation status, occurring via reporting of accreditation outcomes to the Trust Board and display on the ward of the accreditation certificate, is a further potential support mechanism utilised by the CAS. Recent years have seen widespread demand from a range of bodies, including regulatory authorities, employers, consumers, legislators and insurers, for the public disclosure of outcome data from hospitals (Lindenauer et al. 2007). Commentaries on public reporting indicate a wide variety of ways in which the data may be used: as a regulatory tool, and to facilitate informed consumer choice, encourage the control of costs, promote greater accountability, and promote quality improvement (Marshall et al. 2004, Marshall et al. 2000). Hence, public disclosure of periodic accreditation survey reports and regular reporting of participants' indicator performance is increasingly common; the JC has made accreditation data public since 2004 (Hafner et al. 2011). Yet, concern about the release of public data has been identified in a cross sectional survey ($n = 299$ randomly selected hospital administrators, 92% response rate) as one of the primary reasons for US rural hospitals not participating in the JC accreditation process (Brasure et al. 2000).

A recent Cochrane review concluded the value of public reporting has yet to be consistently demonstrated (Ketelaar et al. 2011). However, a further review concluded a small body of research suggests there is a limited impact upon consumer decision making and evidence of effect upon clinical outcomes is mixed but quality improvement activity may be stimulated (Fung et al. 2008). Concerns regarding the scientific rigor of the process, particularly in relation to the use of data for comparative reporting, are raised in a number of commentaries (Gross et al. 2000, Lilford et al. 2004, Scott & Ward 2006). A single study has explored factors associated with the public disclosure of hospital accreditation data: findings from a cross sectional survey of all hospitals that received the Japan Council for Quality Health Care accreditation in 2003 ($n = 817$ hospitals, 67% response rate) found evidence of a positive correlation between public disclosure and accreditation scores (Ito & Sugawara 2005).

Yet, evidence also suggests that additional strategies are required to support positive behavior change associated with performance measurement via indicator data (de Vos et al. 2009) and performance feedback in general

(Jamtvedt et al. 2006). A wide range of potential supporting activities for quality improvement initiatives, targeted at a number of audiences, are reported. These range from the use of provider reminder systems (Nguyen et al. 2007), generalised dissemination strategies (Hickey et al. 2004), feedback at ward rounds and peer review meetings (Brand et al. 2009) through to provider education (O'Brien et al. 2001) and provision of local opinion leaders (Doumit et al. 2007). Nonetheless, overall evidence indicating effectiveness is equivocal and in relation to accreditation schemes is sparse. The CAS provides a number of resources including access to a scheme facilitator, a CAS resource file and an evidence based 15 Steps environmental assessment tool (NHS Institute for Innovation and Improvement (NHSI) 2012) for use in the process of preparing to become accredited (for details see Appendix 3).

2.6.2 Contextual influences

The CAS seeks to assure and improve quality of care at the microsystem or ward level: this is significant given a growing body of evidence now suggests that a causal chain exists between contextual factors associated with nurse practice environments and nurse outcomes (Aiken et al. 2008), nurse quality of care (McCusker et al. 2004), patient satisfaction (Aiken et al. 2012) and adverse events (Lucero et al. 2010). Context comprises the characteristics or unique factors of the organisation's surroundings and setting, such as external national policy and constraints, organisational structures and processes (Øvretveit 2011). Contextual factors associated with the nursing practice environment have become a focal point for exploring and explaining quality of care and patient safety (Lake 2007).

Pawson (2006) argues the intervention context influences the uptake of intervention resources; intervention outcomes, such as the outcomes of the CAS, are consequently determined according to this causal relationship. This accords with the finding of a multiple case study by Pomey et al. (2010) ($n = 5$ Canadian hospitals) which concluded that the context in which accreditation takes place determines the ways in which institutions use the accreditation process. Contextual factors operating at the clinical microsystem level that have been shown to be critical determinants for successful implementation of

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quality improvement activities include health professionals' knowledge, motivation, perceived behaviour control and social pressure (Berg et al. 2005, de Vos et al. 2010, Koh et al. 2008, Korettisto et al. 2010), attitude (de Vos et al. 2010), leadership (Davis & Adams 2012), access to resources (Koh et al. 2008) and time (de Vos et al. 2010). Insufficient staffing has been shown to negatively impact upon implementation of quality improvement activities associated with participation in an accreditation scheme (Pongpirul et al. 2006).

However, positive impacts upon the context have also been identified. For example, a study by Choi and Boyle (2009) explored nursing survey data (2011) from the National Database of Nursing Quality Indicators (NDNQI). Nurse responses to the Practice Environment Scale of the Nursing Work Environment (PES-NWI)⁹ survey were aggregated to unit level ($n = 5,322$ nursing units in $n = 519$ US acute care hospitals). Findings from regression analysis, controlling for hospital size, teaching status, Magnet accreditation and geographical location, concluded there was a statistically significant positive association between units with Magnet accreditation and a more favourable nursing practice environment. Findings of a further cross sectional survey ($n = 58$ hospitals, $n = 1,968$ nurses, response rate = 75.5%) suggested that nurses perceived participation in the Lebanese accreditation programme as having improved teamwork and productivity (El-Jardali et al. 2008).

Furthermore, Balogh and Cook (2006), in their case study of an acute NHS Trust preparations for Magnet accreditation identified a range of positive contextual impacts including improved networking, resource utilisation and sharing of good practice. Equally, findings from telephone interviews ($n = 8$) with staff leads for wards ($n = 16$) participating in the Royal College of Psychiatrists Accreditation for Acute Inpatient Mental Health Services Programme suggested that participation in the scheme resulted in improved communication and power to negotiate for resources (Baskind et al. 2010). Finally, a study of a random sample of $n = 19$ hospitals (stratified by size,

⁹ For details of the PES-NWI see Section 4.6.2. Four subscales and the overall composite measure were analysed in this study; the "Nurse participation in hospital affairs" subscale was excluded from the analysis

location, sector and jurisdiction) participating in the Australian EQulP accreditation scheme found that overall accreditation performance was significantly positively correlated with both organisational culture and leadership (Braithwaite et al. 2010).

A qualitative study by Urden and Ecoff (2013) of registered nurses' perceptions of the Magnet® journey ($n = 8$ focus groups in $n = 1$ US community hospital and $n = 1$ US healthcare system (9 units)) also found evidence of effects such as improved relationships with leaders and professional development. However, they also coined the term "Magnet slippage" in relation to their finding that not all of these positive changes were maintained post accreditation. Finally, Salmon et al. (2003) utilised a before-and-after questionnaire survey to explore nurses' perceptions of the effects of a South African accreditation scheme ($n = 922$ nurses 1st administration and $n = 942$ nurses 2nd administration, $n = 10$ hospitals, response rates not given). In contrast to the above studies, non-significant findings were found in relation to nurses' perceptions of the impact of becoming newly accredited upon teamwork and cooperation.

The CAS, through inclusion of safety standards, is also a safety practice intervention. A key determinant of the effectiveness of safety practice interventions is safety culture (Taylor et al. 2011). Culture comprises the values, rules, norms and learned beliefs that are common to a group of people (Northouse 1997) and is also an attribute of context (Øvretveit 2011).

Each microsystem develops its own culture (Anderson-Wallace & Blanter 2005). Safety culture comprises the microsystem's values, attitudes and competencies associated with safety practices (Nieva & Sorra 2003). A growing body of evidence suggests a positive relationship exists between safety culture and patient outcomes: for example, fewer patient safety incidents (Singer et al. 2009) and lower incident severity (Kline et al. 2008). Consequently, evaluation of safety practices is recommended to incorporate exploration of how the practices are influenced by safety culture (Shekelle et al. 2010). It has been suggested that an assessment of safety culture may be a potential mechanism for fulfilling some JC accreditation standards (Nieva & Sorra 2003). A number

2. The CAS

of studies, findings of which are presented in Chapter 3, have explored the association between healthcare accreditation and safety culture.

The key target of the CAS is the Trust microsystems. However, the microsystems are nested within a larger system, that is, the mesosystem comprising senior clinical and management staff (who participate as CAS review panel members). The microsystems and mesosystem are autonomous units with their own inputs, processes, outputs and feedback loops but the interdependency of their processes creates linked chains of effects (Nelson et al. 2008). A function of the mesosystem is to feed information forward and backward to support microsystems to achieve desired patient outcomes (Nelson et al. 2008). Thus, the finding by El-Jardali et al. (2008)¹⁰ that senior management commitment and support is significantly associated with ensuring accreditation is accompanied by successful implementation of quality improvement practices. Yet, differences in understanding of quality improvement processes between clinical nurses and nurse managers have also been shown to exist (Price et al. 2007).

The mesosystem is in turn nested within an over-arching system, the macrosystem, which for the CAS operates at the hospital level and comprises the most senior management staff (who sanctioned development of the CAS and chair peer review panels) and the Trust Board members. The macrosystem provides backward support but it also holds the mesosystem accountable (Nelson et al. 2008). Thus, the results of the CAS accreditation reviews are reported to the Trust Board. In contrast to the CAS, accreditation schemes, such as that of the JC (Schmaltz et al. 2011), are directed at the macrosystem; that is, data provided by the clinical microsystems is aggregated to hospital level and accreditation is awarded to the hospital.

For the macrosystem, it is financial cost that may determine participation in an accreditation scheme. For example, 80% of randomly selected US rural hospital administrators ($n = 299$) responding to a cross sectional survey (response rate = 92%) listed cost as the reason they did not participate in JC accreditation (Brasure et al. 2000). Existing systematic reviews of healthcare accreditation

¹⁰ Study reported in Section 2.6.2 paragraph 3

research concluded this is an under researched area (Greenfield & Braithwaite 2008, Greenfield et al. 2007a).

Finally, in the case of the CAS, the macrosystem is nested within the national systems and processes of the NHS: that is, the supramacro system which holds the mesosystem accountable. It is the supramacro system, and consequently national policy, which most often determines the nature of participation and administration, and the goals and outcomes of accreditation schemes (Montagu 2003). Overall, each systems level operates within a different set of contextual influences which act to determine healthcare professional and organisational behaviour towards the CAS. Figure 2 illustrates the organisational levels across which the CAS operates.

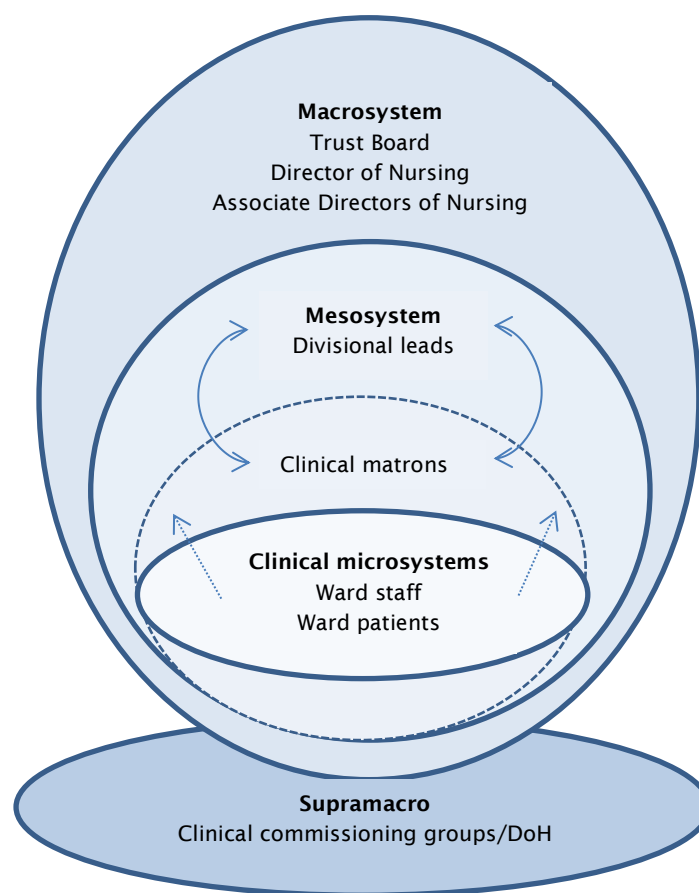


Figure 2: The CAS nested systems

2. The CAS

2.6.3 The nature of participation and administration

Participation in the CAS is mandatory for all of the Trust hospital wards. The nature of participation in other accreditation schemes varies. For example, accreditation by the French Accreditation College is a legislated requirement for French hospitals; the process is suggested to act as a mechanism supporting central governmental control, accountability and transparency (Daucourt & Michel 2003). In contrast, in the US and Australia participation in accreditation schemes is voluntary with public disclosure of outcomes being crucial in informing healthcare provider purchasing decisions and supporting consumer choice. Yet, participation in many voluntary schemes, such as those of the JC and the Japanese Council for Quality Health Care, is linked to hospital reimbursement requirements: consequently, it is questionable whether the nature of participation is truly voluntary.

A key variable in achieving behaviour change associated with quality improvement activities is that of individual motivation which results from many factors including a combination of intrinsic and extrinsic rewards. Intrinsic reward represents how an individual feels about their work and perceives its value; this includes the concept of choice which has potential to impact upon commitment (Manion 2005). Hence, Montagu (2003) suggests that voluntary participation is a principal accreditation scheme attribute and that mandated participation is less effective than voluntary participation.

The CAS is administered by the hospital Trust in which it was developed. Successful accreditation schemes are underpinned by the notion of trust, both on the part of the healthcare service consumers (ACHS no date) and healthcare provider organisations (Pomey et al. 2005). Government ownership and administration of accreditation schemes introduces the potential for loss of objectivity and linkage of quality assessment to national health legislation. Furthermore, evidence suggests this weakens the relationship of trust between healthcare provider organisations and accrediting bodies: delivery of accreditation reports to healthcare authorities may result in perceptions of a punitive system, opportunities for instigation of continuous quality improvement processes are undermined and the system has potential to more closely resemble licensure (Pomey et al. 2005).

Licensure sets the minimum legal requirements for a healthcare organisation or practitioner to operate (Rooney & van Ostenberg 1999): this resembles the role of the CQC in regulating and monitoring the activities of the NHS.

However, consumers are increasingly demanding levels of accountability and transparency that go beyond the minimum standards of licensure (Pawilson et al. 2005). Therefore, consumers need to be able to trust that accreditation standards go beyond national regulatory standards and are objectively reported. Consequently, administration by an independent body is also seen as an ideal attribute of an accreditation scheme (Montagu 2003).

2.6.4 **Dysfunctional consequences**

Implementation of innovative healthcare interventions has been shown to have potential to provoke negative unintended consequences on the part of healthcare organisations, staff and consumers. For example, findings from longitudinal application of a range of survey instruments ($n = 100$ healthcare professionals, $n = 1$ hospital, response rate $n = 55$) suggested that preparation for the ACHS accreditation survey had a negative impact upon workforce wellbeing through increased staff stress and anxiety (Elkins et al. 2010). Additionally, implementation of key activities associated with accreditation, such as the introduction of quality indicators (Lester et al. 2011), public disclosure of performance information (Fung et al. 2008) and use of rating systems (Mannion et al. 2005), have been demonstrated to provoke a range of dysfunctional consequences (Table 3). Such dysfunctional behaviours have potential to impede quality improvement efforts (Lilford et al. 2004).

2. The CAS

Table 3: Dysfunctional consequences	
Tunnel Vision	Concentration on the clinical areas being measured
Sub-optimisation	Pursuit of local objectives to the detriment of long-term criteria
Myopia	Concentration on short-term targets and issues
Measure fixation	Pursuit of strategies to enhance the measure rather than the wider objectives
Misrepresentation	Deliberate manipulation of data
Misinterpretation	Drawing misleading inferences
Gaming	Alteration of behaviour to gain strategic advantage
Ossification	Lack of application of new and innovative approaches to reduce risk of appearing to perform poorly
Erosion of public trust and reduced staff morale	Experienced by services with low ratings
Ghettoisation	Low performing services experience greater difficulties with staff recruitment and retention than high performing services
From (Freeman 2002, Lester et al. 2011, Mannion et al. 2005, Smith 1995)	

2.7 The CAS logic model

Exploration of the CAS components in relation to relevant empirical, theoretical and conceptual literature has highlighted the inputs required for participation in the CAS together with the anticipated outputs and outcomes. The interconnections of these theoretically predicted events are illustrated in a logic model (Figure 3). It demonstrates:

- the components of the CAS (outputs/activities)
- who participates in those components (inputs/resources)
- which groups and individuals may be affected by each component (outputs/participants)
- the potential outcomes the participants/targets may experience

The logic model demonstrates that the CAS seeks to assure and improve quality of care at the ward level. This represents an innovative departure from the norm of healthcare accreditation schemes operating at the hospital level. Yet, this approach accords with the suggestion by Mohr et al. (2004) that the ward, being the level at which significant changes in patient care can be made, is an important level at which to target quality improvement interventions. Moreover, a review of significant failings in NHS quality of care stated the ability to quickly and readily identify the performance level of each individual hospital ward would be a successful outcome of these failings (Nuffield Trust 2012).

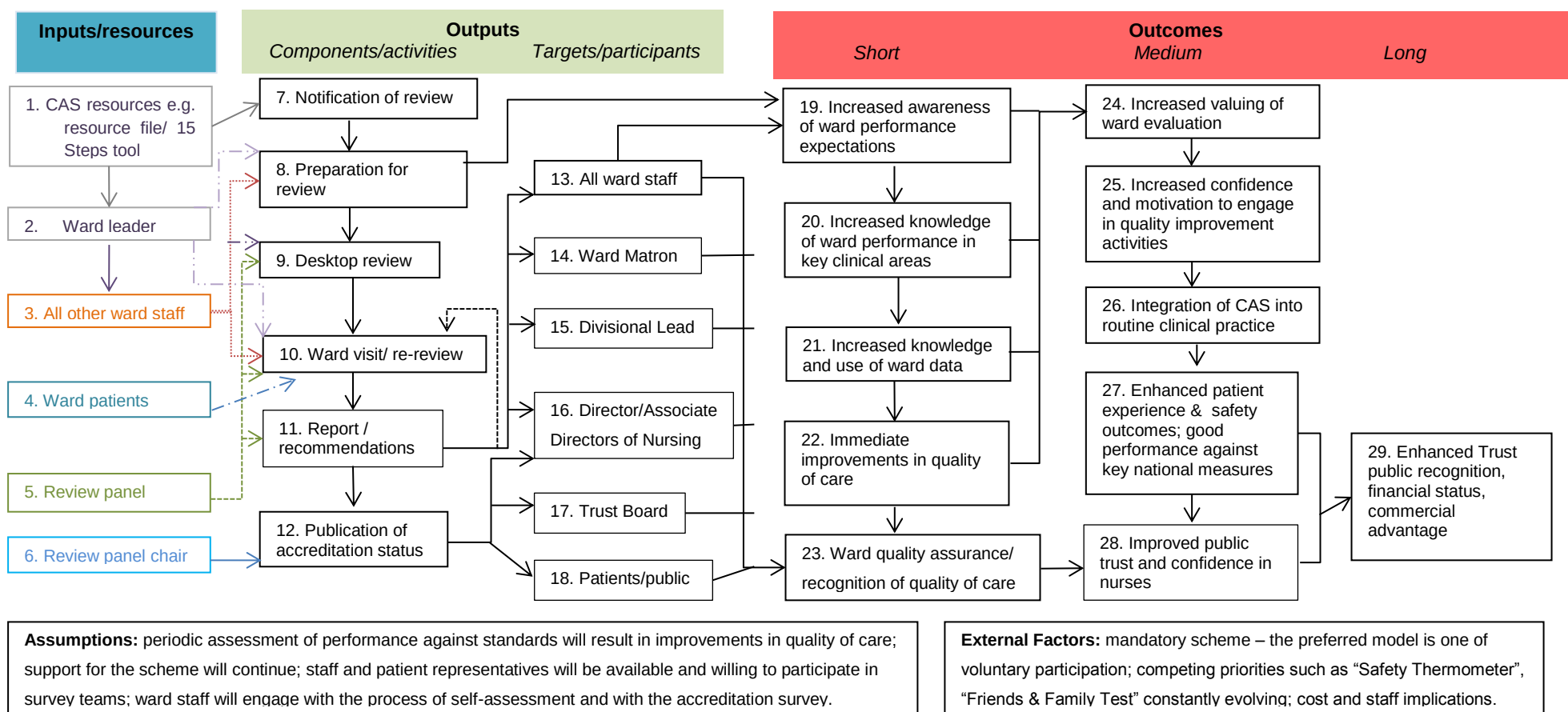


Figure 3: The CAS logic model

2. The CAS

2.8 Summary

The key points of this chapter are:

- the components of the CAS model accord with those employed by international healthcare accreditation organisations
- the framework for the CAS domains/standards accords with components of other healthcare accreditation schemes
- the CAS standards include standardised performance indicators; there is continuing debate surrounding many facets of performance indicators
- the CAS accreditation process triangulates the processes of ward self-assessment and peer review comprising staff interviews and a ward visit commonly applied in other accreditation schemes; there are both benefits and disadvantages associated with these processes
- the CAS accreditation process is cyclical and ongoing; the time limited award of accreditation status concurs with other healthcare accreditation schemes
- the CAS seeks to improve ward quality of care through participation in the accreditation survey, the formulation of review recommendations and the publication of results; there is mixed evidence demonstrating the outcomes of these mechanisms
- the CAS operates across a number of systems levels for which a wide range of contextual factors have been shown to determine the outcomes of implementation of quality improvement activities
- participation in healthcare accreditation schemes has potential to both positively and negatively impact upon microsystem contextual factors

The following chapter presents a systematic review of quantitative research reporting associations between healthcare accreditation and patient outcomes.

3. Systematic review of effectiveness

3.1 Literature review purpose

A systematic review of quantitative research reporting associations between healthcare accreditation and patient outcomes sought to answer the following questions:

- What patient outcomes have been reported in studies reporting hospital accreditation?
- What is the evidence for better patient outcomes in accredited hospitals compared to non-accredited hospitals?
- What is the evidence for participation in accreditation schemes causing an improvement in patient outcomes?

3.2 Literature review methods

3.2.1 Study inclusion/exclusion criteria

Studies that explored the effects of participation in accreditation schemes in general acute care hospitals were sought. All studies of specialist medical services such as pathology services, with substantially different service activities and patient contact/outcomes from ward based acute physical nursing care, were excluded. Accreditation schemes were required to conform to the common model of periodic external peer review and assessment of performance against pre-determined standards.

Studies that compared accredited hospitals with non-accredited hospitals operating in similar healthcare systems, or described characteristics of accredited hospitals, and investigated quantitative measures of hospital quality of care relating to safety, patient experience and effectiveness including measures of patient outcome, care processes, staff attitudes or organisational culture were sought. Studies not published in English were excluded.

3. Review of effectiveness

3.2.2 Data sources

Systematic development of an objective sensitive and precise search strategy was guided by the approach proposed by Simon et al. (2012) as follows:

- two systematic reviews of healthcare accreditation research (Alkhenizan & Shaw 2011, Greenfield & Braithwaite 2008) were utilised to develop a pool of relevant papers ($n = 15$)
- keywords commonly employed by the pool of papers were used to develop a combination of subject and topic specific free-text and Medical Subject Heading terms
- appropriateness of the topic specific terms was also checked by reference to AHRQ validated safety indicators (AHRQ 2003) and the NHS Quality Improvement Indicators (HSCIC 2013a)
- iterative queries in Medline, refining the combination of terms, led to the development of a search strategy returning the pool of selected papers
- the search strategy was used to search the Cochrane Library, Medline and CINAHL for all English language publications indexed to end of October 2014

For details of the Medline search strategy see Table 4.

3.2.3 Study selection

Figure 4 shows the article selection flow diagram. The initial search strategy identified 3,268 papers ($n = 3,197$ following removal of duplicates). Titles and abstracts were screened to exclude irrelevant studies. Of the 146 papers selected for full screening 39 papers met the inclusion criteria. Citations in all relevant articles were reviewed for other potentially relevant studies. A further paper was identified via the reference list of an included study. A total of 40 papers were selected for inclusion in this literature review.

Table 4: MEDLINE (EBSCOhost) search strategy

Search	String	
All hospitals	#1	Hospital*[ti]
Magnet	#2	Magnet[mh]
Magnet hospitals	#3	#1 AND #2
Accreditation/JC accreditation	#4	Accreditation[mh] OR Joint Commission on Accreditation of Healthcare Organizations[mh]
Hospital accreditation/JC accredited hospitals	#5	#1 AND #4
All hospital accreditation	#6	#3 AND #5
Quality dimensions: safety, patient experience, effectiveness	#7	Intraoperative Complications[mh] OR Postoperative Complications[mh]
	#8	Catheter-related Infections[mh]
	#9	Surgical Wound Infection[mh] OR Cross Infection[mh] OR Infection Control[mh]
	#10	Medical Errors[mh] OR Medication Errors[mh]
	#11	Accidental Falls[mh]
	#12	Pressure Ulcer[mh]
	#13	Patient Safety[mh] OR Safety Management[mh]
	#14	Safety Culture[ti]
	#15	Hospital Mortality[mh]
	#16	Patient Satisfaction[mh]
	#17	Patient Experience[ti]
	#18	Quality of Health Care[mh] OR Quality Indicators, Health Care [mh]
	#19	Standard of Care[mh]
	#20	Patient Readmission[mh]
All quality dimensions	#21	#7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20
Main result	#22	#6 AND #21
Total	#23	#22 Excluding non-English Language papers

3. Review of effectiveness

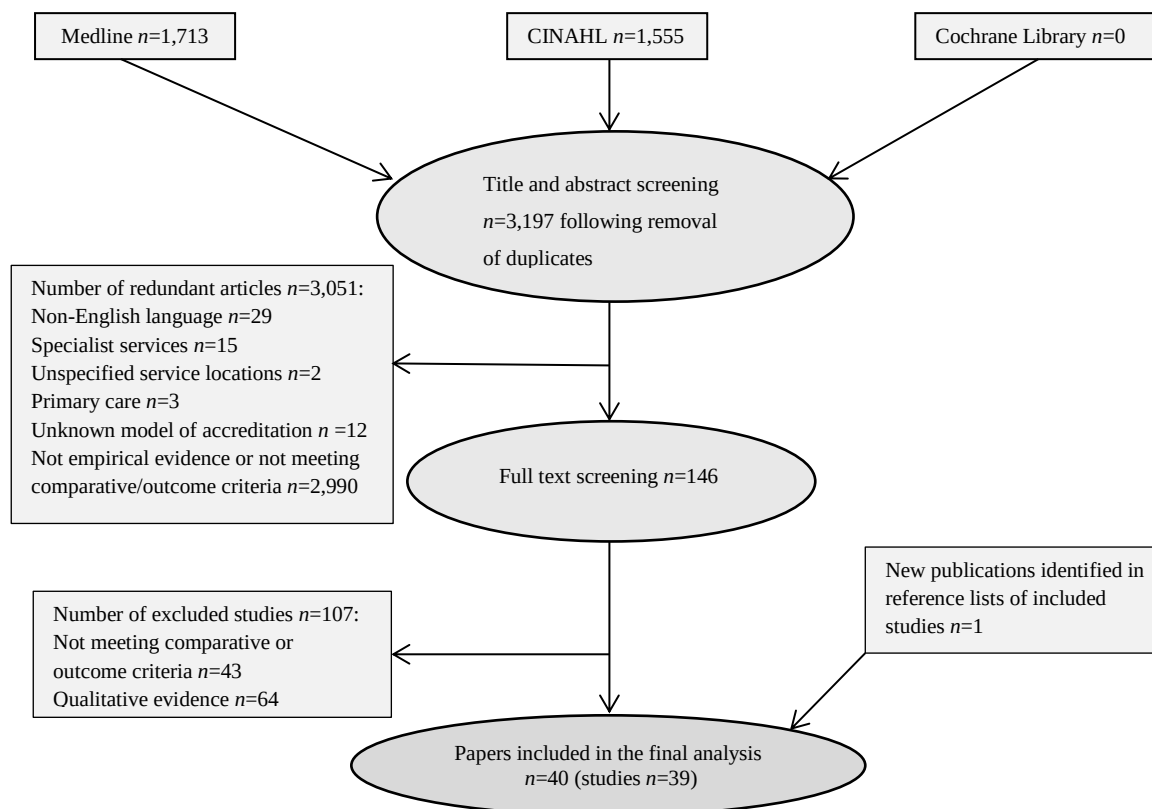


Figure 4: Article selection flow diagram

3.2.4 Data extraction and synthesis

The core data extracted was the research aim, methods, sample, control for confounding/risk adjustment, and measures or patient outcomes of relevance to this review. Studies were grouped into categories relating to the quality dimensions of safety, patient experience and effectiveness.

Following the Cochrane Collaboration for Effective Practice and Organisation of Care Group (EPOC no date) recommendations, risk of bias criteria for each quantitative study design and a quality of evidence grading tool to support rigour, judgement and synthesis in quality appraisal were developed. A list of key hospital characteristics identified as being associated with quality of care (size (Flood et al. 1984), ownership/management (Hartz et al. 1989), teaching/university status (Hartz et al. 1989), financial status (Burstin et al. 1993), urban/rural status (Keeler et al. 1986), proportion of nurses and board certified physicians (Krakauer et al. 1992)) was utilised to support assessment of control for confounding. In instances where studies explored a range of outcomes crossing a number of quality dimensions, risk of bias was assessed

separately for each dimension. Studies were not excluded on the basis of quality.

There are multiple methods available for synthesising research evidence. Choice of approach is determined by the review questions and the nature of the evidence selected (Mays et al. 2005). Due to the heterogeneous methods and research outcomes exhibited by the studies included in this systematic review a narrative approach was adopted with results presented within their outcome categories. Reporting of each outcome category also includes tables detailing the assessed risk of bias for each study and a brief summary of overall findings. Table 5 provides guidance on interpretation of study risk of bias.

Table 5: Study risk of bias				
Overall risk of bias grading	Low	Moderate	Serious	Very serious
Number of elements judged as unclear	0-3	4-6	7-9	10+
Risk of bias	Interpretation of individual studies			
Low	Plausible low risk of bias for a small number of key domains within a study that is unlikely to seriously impact upon results			
Moderate	Plausible bias for a moderate number of key domains within a study that is sufficient to raise a moderate level of doubt about the results			
Serious	Plausible high risk of bias for a significant number of key domains within a study that raises serious concerns surrounding the results			
Very serious	Plausible very high risk of bias for a majority of key domains within a study that seriously weakens confidence in the results			
Based on EPOC (no date)				

3.3 Results

Thirty nine studies, reported in 40 papers, were selected for review. A number of studies ($n = 4/39$) explored multiple quality dimensions. The largest number of studies provided evidence of an association between hospital accreditation and safety ($n = 29$ papers, $n = 28$ studies) with a majority exploring adverse events/complications ($n = 15/28$) and the remainder exploring the broader contextual ($n = 6/28$) and cultural ($n = 2/28$) dimensions of safety practices, or the relationship between accreditation scores and safety indicator performance ($5/28$). Patient experience was explored in the form of

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willingness to recommend the hospital to another ($n = 2/5$), expressed satisfaction ($n = 2/5$) and the relationship between accreditation scores and patient experience ($n = 1/5$). Effectiveness was explored as performance against a range of process measures ($n = 8/9$) and readmission rates ($n = 1/9$).

A single study adopted a randomised controlled trial (RCT) design with the remainder encompassing retrospective secondary data analysis ($n = 24$), cross-sectional surveys ($n = 11$), other cross-sectional studies ($n = 2$) and a before-and-after study ($n = 1$). A mixture of comparative (accredited hospitals versus non-accredited hospitals) or descriptive (accredited hospitals) approaches were adopted. A range of methodological biases were present in the quality dimensions explored by each study such that moderate ($n = 26$) and serious ($n = 8$) concerns of risk of bias were exhibited in a majority of cases.

Fifteen of the selected studies explored the JC accreditation scheme whilst a further 12 explored the Magnet Recognition Program®. The remaining studies investigated a diverse range of accreditation schemes. Table 6 details the key characteristics of these schemes.

Table 6: Key accreditation scheme characteristics					
Scheme	Country	Nature of participation	Ownership	Details	No. of studies
Australian Council of Healthcare Standards	Australia	Voluntary	Non-governmental	Conforms to the common model of healthcare accreditation. Accreditation status awarded for 4 years. Includes voluntary clinical performance indicator programme. Details on standards not in public domain (ACHS no date)	1
Central Board for Accreditation of Healthcare Institutions	Saudi Arabia	Voluntary	Non-governmental	Conforms to the common model of healthcare accreditation. Standards relating to Quality Improvement, Patient/Service User Focus, Organisational Planning and Performance, Safety, Standards Development, Standards Measurement (Alkhenizan & Shaw 2010) Note: some hospitals also opted for international accreditation from the JC International or Accreditation Canada or the Australian Council on Healthcare Standards; it is not clear which scheme the hospital in this study opted to be accredited by	1
Cooperation for Transparency and Quality in Hospitals	Germany	Voluntary	Financially supported by the Federal Ministry of Health	Conforms to common model of healthcare accreditation. Focuses on measures of structure. Public reporting of results. Accreditation status awarded for 3 years (Breckenkamp et al. 2007)	2
Japanese Council for Quality Health Care	Japan	Voluntary but is a prerequisite for some reimbursement mechanisms	Governmental, not-for-profit	Conforms to common model of healthcare accreditation. Emphasises facilities and environmental management including infection control processes. No clinical quality of care indicators. Accreditation status awarded for 5 years (WHO & Japanese Ministry of Health, Labour and Welfare 2012)	2
Joint Commission	US	Voluntary but is a prerequisite for some reimbursement	Non-governmental	Conforms to common model of healthcare accreditation. Public reporting of results. Wide range of standards covering all domains. Accreditation status awarded for 18-36 months (JC 2012a)	15

mechanisms					
Lebanese Ministry of Public Health	Lebanon	Voluntary but is a prerequisite for some reimbursement mechanisms	Governmental	Conforms to common model of healthcare accreditation. Standards focusing on infra-structure and safety. Accreditation status awarded for 3 years (Ammar et al. 2007)	1
Magnet Recognition Program®	US	Voluntary	Non-governmental	Conforms to common model of healthcare accreditation. Public reporting of results. Accreditation status awarded for 4 years (ANCC 2008)	12
Accreditation Association for Ambulatory Health Care	US	Voluntary	Non-governmental	Conforms to common model of healthcare accreditation (Accreditation Association for Ambulatory Health 2013)	1
The Council for Health Service Accreditation	South Africa	Voluntary	Non-governmental, not-for-profit	Conforms to common model of healthcare accreditation. Standards relating to Management, Clinical and clinical support, Domestic, Technical, Professions allied to medicine. Review timescales not available (The Council for Health Service Accreditation of Southern Africa 2013)	1
The Pennsylvania Trauma Systems Foundation	US, Pennsylvania	Voluntary	Non-governmental, not-for-profit	Conforms to common model of healthcare accreditation. Details of standards, review timescales etc not available (Pennsylvania Trauma Systems Foundation no date)	1
Society of Chest Pain Center Accreditation	US	Voluntary	Society of Cardiovascular Patient Care, non-governmental, not-for-profit	Conforms to common model of healthcare accreditation. Standards relate to measures of structure, process and outcomes. Review timescales not available (Society of Cardiovascular Patient Care 2012)	2

3.4 Safety

The largest body of research identified was that exploring the association between accreditation and safety systems/practices, safety culture, adverse events/complications, or the relationship between accreditation scores and safety indicator performance. Table 7 provides details of the assessed risk of bias for each study. For guidance on the interpretation of risk of bias refer to Table 5 (Section 3.2.4). Appendix 4 provides a table of core data extracted for each study and further details of study risk of bias.

3.4.1 Safety systems/practices

The relationship between Japanese hospital infection control programs and accreditation status was explored in two cross-sectional surveys (Sekimoto et al. 2008, Sekimoto et al. 2009). In both studies linear regression models, controlling for key hospital characteristics such as size and staffing levels, suggested accreditation was a significant predictor for improved infection control performance. Comparison of performance score changes following survey administrations in two consecutive years to all teaching hospitals with more than 300 beds (response rate to both surveys = 52%, $n = 335$) also suggested the greatest increase in infection control performance score over time was associated with the process of preparing for, and becoming, newly accredited (hospitals $n = 31$) (Sekimoto et al. 2008). However, the strongest predictor of improved infection control performance was indicated to be hospital bed size as opposed to accreditation or teaching status (Sekimoto et al. 2009). The clinical significance of the small increment identified on the overall infection control performance scores by both studies is not clear.

Two further studies explored the relationship between accreditation status and implementation of generalised safety systems/processes in US hospitals. Both studies compared JC accredited hospitals with non-accredited hospitals utilising findings from cross-sectional surveys. Hosford (2008) utilised stratified random sampling of hospitals in all US states (response rate = 18%, $n = 145$). Findings from logistic regression, without controlling for key hospital characteristics, suggested there was a statistically significant association between JC accreditation and substantially greater improvements in medical

3. Review of effectiveness

error management systems. Longo et al. (2007) sampled hospitals in two US states on two occasions (response rate to both surveys = 65.2%, $n = 107$). Results from linear regression, controlling for a range of hospital characteristics including size and management type but not teaching/university or urban/rural status, suggested JC accreditation was a significant predictor for higher levels of both safety system implementation and improvement in implementation. However, evidence suggests that implementation of safety systems, such as infection control programmes, does not always directly translate into improved patient outcomes (Director of Nursing and Patient Services 2007). Hence, the overall implications of these findings are not clear.

Al Awa et al. (2011) conducted pre- and post-accreditation surveys in a single Saudi Arabian hospital. Nurses' perceptions of the impact of accreditation on a number of factors including compliance with risk management procedures and with nursing actions to reduce risk were assessed (response rate to both surveys = 93.62%, $n = 721$). A statistically significant increase in nurses' perceptions of compliance with all survey items post-accreditation was found. Relative improvement rates for items within the '*risk management*' and '*nursing action*' factors ranged from 11.76% to 100%: for example, the survey items '*communicating to patients about safety*', '*compliance with hand hygiene guidelines*' and '*compliance with fall reduction program*' demonstrated relative improvements of 95.65%, 58.93% and 32.39% respectively.

Finally, an RCT explored many facets of hospital accreditation (Salmon et al. 2003). Sample selection was via stratified sampling by size of all South African acute care hospitals ($n = 53$). Selected hospitals were randomly allocated to an intervention group ($n = 10$) which commenced the accreditation process and a control group ($n = 10$) for whom this process pended. Tests of differences identified non-significant findings in relation to the effect of accreditation upon measures such as hospital sanitation levels and medical record completeness/accessibility. Stratification by factors that were found to affect a hospital's ability to comply with the safety standards such as regional variations in availability of water and budget levels, and an increased

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timeframe for collection of indicator data to support changes in infrastructure may have increased the study's ability to detect significant findings.

Table 7 : Risk of bias – safety studies												
Studies (cross-sectional surveys, observational studies, secondary data analysis)	Representative sample	Free of sampling bias	Adequate sample size	Reliable measures	Valid measures	Free of outcome identification bias	Incomplete outcome data addressed	Confounding addressed in study design	Confounding addressed statistically	Free of selective reporting	Free of other bias	Overall risk of bias
Safety systems												
Al Awa et al. 2011	0	0	+	0	0	0	0	0	0	+	+	S
Hosford et al. 2008	0	0	0	0	0	0	0	+	0	0	0	VS
Longo et al. 2007	0	0	0	0	0	0	0	0	+	+	+	S
Sekimoto et al. 2008	0	+	0	0	0	0	0	0	+	+	+	S
Sekimoto et al. 2009	0	0	0	0	0	0	0	+	+	+	+	S
Safety culture												
El-Jardali et al. 2011, 2010	+	+	0	0	0	0	+	0	+	+	0	M
Hughes et al. 2009	0	0	0	+	0	0	0	0	0	+	+	S
Adverse events/complications												
Aiken et al. 1994	+	+	0	0	0	0	+	+	+	+	+	M
Aiken et al 1999	0	0	0	0	+	0	+	+	+	+	+	M
Barker et al. 2002	0	0	0	+	+	+	+	+	0	+	+	M
Chandra et al. 2009	0	0	0	+	+	+	+	0	+	+	+	M
Chen et al. 2003	0	0	0	+	+	0	+	+	+	+	+	M
Dunton et al. 2007	0	+	0	+	+	0	0	0	+	+	+	M
Evans et al. 2014	0	+	0	+	+	0	+	0	+	+	+	M
Everhart et al. 2014	0	+	+	0	+	0	+	+	+	+	+	L
Goode et al. 2011	0	+	0	+	+	0	0	0	+	+	+	M
He et al. 2012	0	+	+	+	+	0	+	0	+	+	+	L
Hickey et al. 2010	0	0	0	+	+	+	+	0	+	+	+	M
Lake et al. 2010	0	+	+	0	+	0	+	0	+	+	+	M
Lake et al. 2012	0	+	0	0	+	0	+	0	+	+	+	M
McHugh et al. 2013	+	+	+	0	+	+	0	0	+	+	+	L
Pasquale et al. 2001	0	+	0	+	+	0	0	+	0	+	+	M

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Relationship between accreditation scores/standards and safety indicator performance													
Braithwaite et al. 2010	0	+	0	+	0	+	+	+	+	+	0	M	
Griffith et al. 2002	0	+	0	0	+	0	+	+	+	+	+	M	
Joshi 2003	0	+	0	+	+	0	+	0	+	+	+	M	
Miller et al. 2005	0	+	0	0	+	0	0	0	+	+	+	M	
Thornlow & Merwin 2009	0	+	0	0	0	0	+	+	+	+	+	M	
Studies (RCTs)	Adequate sequence generation	Allocation concealment	Blinding	Adequate sample size	Incomplete outcome data addressed	Free of selective reporting	Free of contamination	Similar baseline /outcomes characteristics	Use of reliable measures	Use of valid measures	Free of selective reporting	Free of other bias	Overall risk of bias
Safety systems													
Salmon et al. 2003	0	0	0	0	+	+	0	+	+	0	+	0	VS
Legend: + = evidence of bias 0 = no evidence of bias Risk of bias: L = low, M = moderate, S = serious, VS = Very serious													

3.4.2 Safety culture/climate

A more positive patient safety culture has been found to be associated with fewer adverse events in hospitals (Mardon et al. 2010). Consequently, consideration of whether accredited hospitals are safer than non-accredited hospitals will be enhanced by assessment of safety culture as a key contextual factor (Shekelle et al. 2011). Yet, only two studies (three papers) were identified.

A study by Hughes et al. (2009) compared nurses' perceptions of the safety climate on medical-surgical units with/without Magnet accreditation. Secondary analysis of data from the Outcomes Research in Nursing Administration survey (registered nurses (response rate = 58%, $n = 3,689$) working on medical-surgical units ($n = 286$) in randomly selected JC accredited hospitals ($n = 146$) was conducted. Tests of differences indicated that there was a statistically significant ($p < 0.05$) positive association between Magnet accreditation and safety climate on 2/7 of the scale dimensions: nurses in hospitals with Magnet accreditation were significantly more likely to communicate about errors and participate in corrective activities compared to

nurses in hospitals without Magnet accreditation. However, use of a sample of hospitals that had already attained the JC standard of quality of care, will have limited the potential to detect the full effect of Magnet accreditation.

Contrasting findings were identified in a study exploring nurses' perceptions of safety culture in all accredited Lebanese private hospitals ($n = 126$) (El-Jardali et al. 2011, El-Jardali et al. 2010). Generalised estimating equations, used in the analysis of data from the administration of the Hospital Survey on Patient Safety Culture to a random sample of 50% of hospital staff in the 68 participating hospitals (response rate = 55.56%, $n = 6,807$), found that hospital accreditation status was not a significant predictor of a safety culture: these non-significant findings included the two outcome variables of '*Perception of Patient Safety*' and '*Number of Events Reported*'.

3.4.3 Adverse events/complications

A number of studies have explored the relationship between accreditation and mortality rates. Aiken et al. (1994) investigated the association between the original Magnet hospitals and mortality rates. All Magnet hospitals ($n = 39$) reporting to the 1988 US Health Care Financing Administration Medicare Hospital mortality rate file were sampled. Random order, nearest available pair matching based on the 12 organisational dimensions identified as characterising Magnet properties was used to create a control sample of hospitals ($n = 195$) from all non-Magnet hospitals ($n = 5,053$) reporting to the same file. Magnet hospitals, when controlling for differences in patient characteristics using hospital specific predicted mortality, were found to have a statistically significant lower thirty-day mortality rate (4.6%, $p = 0.026$) than non-Magnet hospitals.

Findings of logistic regression modelling in a further study by Aiken et al. (1999), controlling for the HIV risk category of intravenous drug use and a range of illness severity measures, also indicated AIDS patients admitted to Magnet accredited hospitals (hospitals $n = 3$, patients $n = 162$) had statistically significant lower thirty-day mortality rates (Odds Ratio 0.4, $p < 0.01$) compared to those admitted to non-Magnet hospitals (hospitals $n = 7$, patients $n = 1,043$). However, further regression modelling demonstrated an AIDS speciality

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physician and nurse-to-patient ratios were significant explanatory variables that rendered this association insignificant.

A study by Evans et al. (2014) compared the relationship between Magnet hospital ($n = 10$) and non-Magnet hospital ($n = 17$) trauma centre mortality rates using patient data ($n = 73,830$) from the Pennsylvania Trauma Outcome Study database (2009-2011). There were no statistically significant differences between the Magnet and non-Magnet hospital trauma centre key characteristics. A multivariate logistic regression model, controlling for a wide range of factors correlated with mortality, showed that patients admitted to Magnet hospital trauma centres had statistically significant decreased odds of mortality (Odds Ratio 0.83, 95% CI 0.70 to 0.99, $p = 0.033$) compared to those admitted to non-Magnet hospital trauma centres.

Chen et al. (2003) compared the relationship between hospitals with/without JC accreditation status and thirty-day risk adjusted mortality rates for adults hospitalised with a principal diagnosis of acute myocardial infarction. Logistic regression explored data from the US Cooperative Cardiovascular Project (1994-1996) (accredited hospitals $n = 3,179$ /non-accredited hospitals $n = 1,042$, patients $n = 134,579$). A further study compared risk adjusted mortality rates for patients with non-ST-segment elevation acute myocardial infarction in hospitals with/without US Society of Chest Pain Center (SCPC) accreditation (Chandra et al. 2009). Generalised estimating equations explored secondary data from hospitals ($n = 364$) enrolled in the CRUSADE quality improvement initiative (2005) (accredited hospitals $n = 14$, patients $n = 3,059$ /non-accredited hospitals $n = 323$, patients $n = 30,179$).

Chen et al. (2003) identified a positive association between non-accredited hospitals and higher thirty-day mortality rates (Hazard Ratio 1.08, $p < 0.01$). In contrast, Chandra et al. (2009) failed to find a significant association between accreditation status and patient outcomes. Both studies controlled for a wide range of patient, physician and hospital characteristics, utilised data from hospitals already participating in cardiovascular care quality improvement projects, and exhibited moderate levels of bias; the effect of factors such as hospital participation in different accreditation schemes, and utilisation of

different sample sizes and statistical methods, upon these contrasting findings is not clear.

The mortality and failure-to-rescue rates of hospitals (Magnet hospitals $n = 56$ /non-Magnet hospitals $n = 508$) in four large US states were also studied through analysis of linked data (American Nurses Credentialing Center data, American Hospital Association annual hospital survey, hospital discharge abstract databases 2006-2007) and nursing survey results (random sample of all registered nurses in the four states, $n = 39,039$, response rate = 39%) (McHugh et al. 2013). Treatment in Magnet hospitals, while controlling for nursing features identified as being predictors of Magnet accreditation together with key patient and hospital characteristics, was shown to be significantly associated with lower odds of mortality (Odds Ratio 0.86, 95% CI 0.76 to 0.98, $p = 0.02$) but not with lower odds of failure-to-rescue (Odds Ratio 0.88, 95% CI 0.77 to 1.01, $p = 0.07$).

In contrast, a study of hospitals and affiliates (Magnet hospitals $n = 19$ /non-Magnet hospitals $n = 35$) reporting to the US University Health Systems Consortium database in 2005 indicated there was no association between risk adjusted mortality rates for either congestive heart failure or acute myocardial infarction, or hospital acquired pneumonia, failure to rescue, hospital acquired infection, post-operative metabolic derangement rates and hospital accreditation status (Goode et al. 2011).

A further study compared outcomes in very low birth weight infants in hospitals with/without Magnet accreditation (Lake et al. 2012). Logistic regression models, including random effects and controlling for a wide range of infant, neonatal intensive care unit and hospital characteristics, were utilised to analyse data from all hospitals with in-born infants reporting to the Vermont Oxford Network in 2007 and 2008 (Magnet hospitals $n = 119$, infant cases $n = 17,455$ /non-Magnet hospitals $n = 439$, infant cases $n = 54,780$). Findings indicated statistically significant lower risk adjusted rates of 7-day mortality¹¹ (Odds Ratio 0.83, 95% CI 0.72 to 0.96, $p = 0.01$) in Magnet hospitals. Similar

¹¹ Very low birth weight infants with gestational age of 24 weeks or more at birth

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findings were identified in relation to outcome rates for 28-day mortality, mortality before discharge and nosocomial infection.

In contrast, Hickey et al. (2010) explored risk adjusted mortality rates for congenital heart surgery reported to the US Paediatric Health Information System database (Magnet hospitals $n = 16$ /non-Magnet hospitals $n = 23$, cases $n = 19,736$): generalised estimating equations, incorporating case mix adjustment but not controlling for key hospital characteristics, failed to demonstrate a significant association between Magnet accreditation and mortality rates. Finally, logistic regression modelling of survival rates of trauma patients with a predicted probability of survival of less than 50% (patients $n = 3,562$) in a further study indicated accreditation status for trauma centers in the US state of Pennsylvania ($n = 24$) was not a significant predictor variable (Pasquale et al. 2001).

The association between Magnet accreditation and monthly rates of patient falls per 1,000 bed days has been explored in four retrospective cross-sectional studies. All four studies utilised secondary data from the US NDNQI database and aggregated nursing unit patient falls counts to the hospital level. A study by Lake et al. (2010) compared nursing unit ($n = 5,388$) patient fall counts (2004 data) between Magnet accredited hospitals ($n = 108$) and non-Magnet accredited hospitals ($n = 528$). Generalised estimating equations, in controlling for case mix, patient age and sex, and key hospital characteristics, resulted in a multivariate model explaining 49% of the variance associated with patient falls and an incident rate ratio (Incident Rate Ratio 0.947, $p < 0.001$) indicating 5% fewer patient falls in hospitals with Magnet accreditation.

Findings by Dunton et al. (2007) also indicated a 10.3% lower patient falls rate in Magnet accredited hospitals compared to non-Magnet accredited hospitals (nursing units $n = 1,610$, 2005-2006 data). However, p values and confidence intervals not reported. Consequently, it is not known whether this is a statistically significant finding. In contrast, findings by He et al. (2012) suggested that Magnet accreditation was not associated with patient falls rates (nursing units $n = 8,915$, 2004-2009 data, Incident Rate Ratio 0.96, 95% CI 0.92 to 1.00, $p = 0.07$). Both studies utilised multilevel modelling, controlled

for the same key hospital characteristics and unit types, and identified the same nursing workforce characteristics as being associated with lower fall rates. Finally, Everhart et al. (2014) classified hospitals ($n = 1,529$) into high, medium and low fall rate trajectory groups (July 2006 to December 2010 data). Findings from logistic regression analysis indicated that hospitals with Magnet accreditation were significantly less likely to be in the high fall rate trajectory group relative to hospitals without Magnet accreditation (Odds Ratio – 0.48, 95% CI 0.33 to 0.67, $p < 0.01$).

A single study by Barker et al. (2002) sought to identify the prevalence of medication errors in a stratified random sample of JC accredited hospital, non-accredited hospitals and skilled nursing facilities in two US states ($n = 6$ for each facility type in each state). No significant difference was found when medication error rates were compared between accredited and non-accredited hospitals, and accredited hospitals and skilled nursing facilities. The large number of sites declining to participate ($n = 26$) and significant under achievement of target sample sizes for direct observation of medication administrations at each participating site may have limited ability to detect significant associations.

3.4.4 Relationship between accreditation scores/standards and safety indicator performance

Three studies explored the association between a hospital's final overall accreditation survey evaluation score and their safety indicator performance scores for the year in which they underwent the accreditation survey. Exploration of JC hospital accreditation scores and their associated performance data by Miller et al. (2005) failed to find any associations between accreditation score and a range of safety indicators including mortality rates (data from the JC database/ $n = 2,116$ US hospitals undergoing accreditation surveys 1997 to 1999). Risk adjustment and control for confounding variables were not performed.

Findings from regression analysis in a study by Griffith et al. (2002), utilising risk adjusted patient safety data and controlling for key hospital variables, concluded there was a very weak but statistically significant negative association between overall evaluation scores and mortality rates ($R = -0.085$, $p =$

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0.021) (survey data from the JC database/ $n = 1,596$ hospitals undergoing an accreditation survey 1996-1998 and performance data from the Medicare Solucient LLC database/ $n = 742$ matched patient cases). A further study (survey data from the JC database/ $n = 965$ hospitals undergoing an accreditation survey May 1996 to April 1997 and performance data from the 1998 American Hospital Association Annual Hospital Guide), also utilising risk adjustment and control for key hospital variables, failed to find a statistically significant association between higher overall evaluation scores and reduced mortality rates (Odds Ratio 1.381, $p = 0.09$, no confidence intervals given) (Joshi 2003).

Finally, Thornlow and Merwin (2009) applied factor analysis to 12 of the JC survey accreditation standards to create four safety dimensions that represented hospital utilisation of safety practices. Data analysis explored a stratified probability sample of $n = 115$ hospitals reporting to both the JC and the Nationwide Inpatient Sample databases and undergoing JC accreditation surveys in 2002. Regression models, controlling for key hospital characteristics, indicated that the JC accreditation standard constituting the '*Care procedures*' was significantly associated with reduced rates of pressure ulcers ($p < 0.01$) whilst the '*Assessing patients*' dimension was significantly associated with reduced rates hospital acquired infections ($p < 0.05$).

Included here is also a study by Braithwaite et al. (2010) which sought to determine the association between EQUiP overall accreditation performance and clinical indicator performance. Routinely reported EQUiP indicator data for a random sample of participating hospitals (stratified by size, sector, location and jurisdiction) was collected for the 2001 to 2006 accreditation cycle. An index, the proportion of clinical indicators for each hospital which were higher than the national average for those indicators, was used to rank the hospital's quality of care. No evidence was found of an association between overall hospital accreditation performance and clinical indicator performance (Spearman rank order correlation (ρ) = 0.45, $p = 0.08$). The study authors do not indicate the specific clinical indicators selected for use in the analysis; whilst a high proportion of the EQUiP indicators measure safety dimensions it

is not clear the extent to which the study findings may also pertain to the patient experience and effectiveness dimensions.

3.4.5 Safety findings summary

Table 8 provides a brief summary of overall findings.

Table 8: Summary of safety findings		
Numbers/types of studies	Quality of evidence (bias)	Comments
Safety systems		
5x Cross-sectional surveys	5x serious	2 studies indicate that hospital infection control performance is positively associated with accreditation status
1x RCT	1x very serious	2 studies indicate that the process of preparing for and becoming accredited is associated with improvements in hospital infection control performance and compliance with risk management procedures associated with infection control
		A positive association between hospital safety system implementation/safety system performance was found in 5/6 studies
Safety culture		
2x Cross-sectional surveys (2x studies/3x papers)	1x moderate 1x serious	1 study (2x papers) found that hospital accreditation status was not a significant predictor of a safety culture; a further study found that nurses in accredited hospitals were more likely to communicate about errors and participate in corrective activities
Adverse events		
13x Secondary data analysis	3x low 12x moderate	6/9 studies found accreditation status was positively associated with lower mortality rates (2x low risk of bias)
2x Cross-sectional observational studies		3/4 studies concluded accreditation status was positively associated with decreased hospital falls rates (3x low risk of bias)
		1/2 studies found accreditation status was positively associated with increased rates of hospital acquired infections; no associations were found in relation to rates of pressure ulcers
		A single study failed to find an association between accreditation status and medication error rates
Relationship between accreditation scores/standards and safety indicator performance		
5x Secondary data analysis	5x moderate	1/3 showed a very weak but significant positive association between lower mortality rates and a higher overall accreditation evaluation score
		A single study concluded accreditation standards specific to patient safety processes were associated with decreased rates of pressure ulcers and hospital acquired infections

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3.5 Patient experience

A small body of research has explored the impact of accreditation upon patient experience of hospital care. Table 9 provides details of the assessed risk of bias for each study. For guidance on the interpretation of risk of bias refer to Table 5 (Section 3.2.4). Appendix 5 provides a table of core data extracted for each study and further details of study risk of bias.

3.5.1 Recommendation rate

The relationship between accreditation status and “*willingness to recommend a given hospital to others*” as a measure of satisfaction in discharged patients has been explored in two studies utilising 2007 data from the standardised Picker Inpatient Experience survey administered to German hospital patients four weeks post-discharge (Sack et al. 2010, Sack et al. 2011). The earlier study explored data collected from cardiology units (accredited units $n = 15$, patients $n = 1,835$ /non-accredited units $n = 10$, patients $n = 1,202$). The later study explored data collected from hospitals (accredited hospitals $n = 43$, patients $n = 21,221$ /non-accredited hospitals $n = 30$, patients $n = 15,556$). Tests of differences in the earlier study indicated the sample of accredited and non-accredited units did not differ significantly in relation to a range of unit and patient characteristics. The later study utilised the same characteristics in regression modelling which included generalised estimating equations. Findings from both studies concluded there was no significant association between accreditation status and recommendation rates.

3.5.2 Expressed satisfaction

A positive relationship between patient satisfaction and accreditation status was also not evidenced in a further study (previously introduced in section 3.4.1) that administered a non-standardised patient satisfaction questionnaire on two occasions to patients (baseline administration $n = 954$ and follow-up administration $n = 969$) in the twenty participating hospitals (Salmon et al. 2003). Details of this aspect of the study are limited and a high level of overall bias is exhibited. Finally, findings from regression modelling in a study by

Aiken et al. (1999) (previously introduced in section 3.4.3) identified Magnet accreditation was a significant predictor variable for AIDs patient satisfaction with care (hospitals with Magnet accreditation $n = 3$, patients $n = 162$ /hospitals or dedicated AIDs units without Magnet accreditation $n = 37$, patients $n = 1,043$). However, nurse control over the practice environment was found to be a significant explanatory variable that mediated this association. The serious level of bias exhibited by this study also raises concerns regarding plausibility of results.

Table 9 : Risk of bias – patient experience studies												
Studies (cross-sectional surveys, observational studies, secondary data analysis)	Representative sample	Free of sampling bias	Adequate sample size	Reliable measures	Valid measures	Free of outcome identification bias	Incomplete outcome data addressed	Confounding addressed in study design	Confounding addressed statistically	Free of selective reporting	Free of other bias	Overall risk of bias
Recommendation rate												
Sack et al. 2010	0	+	0	+	0	+	0	0	0	+	+	M
Sack et al. 2011	0	+	+	+	0	+	0	0	+	+	+	M
Expressed satisfaction												
Aiken et al. 1999	0	+	0	0	0	0	0	+	+	+	+	M
Salmon et al. 2003	0	0	0	0	0	0	0	0	0	0	+	VS
Relationship between accreditation scores/standards and patient satisfaction survey scores												
Heuer 2004	0	0	0	0	0	+	0	0	0	+	+	S
Legend: + = evidence of bias 0 = no evidence of bias Risk of bias: L = low, M = moderate, S = serious, VS = Very serious												

3.5.3 Relationship between accreditation scores/standards and patient satisfaction survey scores

Finally, JC accreditation survey scores (1998) and patient satisfaction scores from a survey independently administered by a private organisation (1998) were explored using correlation analysis ($n = 41$ not-for-profit acute care hospitals with more than 200 beds in two US States) (Heuer 2004). The principal finding that there was no relationship between JC overall survey scores and patient satisfaction survey scores concurs with the findings of others such as Miller et al. (2005) showing no relationship between JC accreditation scores and safety outcomes.

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3.5.4 Patient experience findings summary

Table 10 provides a brief summary of overall findings.

Table 10: Summary of patient experience findings		
Numbers/types of studies	Quality of evidence (bias)	Comments
Recommendation rate		
2x Cross-sectional surveys	2x moderate	No association was found with recommendation rate
Expressed satisfaction		
1x Cross-sectional observational study	1x moderate	1 study found a positive association between accreditation status and patient satisfaction
1x Cross-sectional survey	1x very serious	
Relationship between accreditation scores/standards and patient satisfaction survey scores		
1x Secondary data analysis	1x serious	No relationship was found between accreditation scores and patient satisfaction

3.6 Effectiveness

The impact of accreditation upon clinical effectiveness has been evaluated in a number of studies exploring a range of patient outcomes. Table 11 provides details of the assessed risk of bias for each study. For guidance on the interpretation of risk of bias refer to Table 5 (Section 3.2.4). Appendix 6 provides a table of core data extracted for each study and further details of study risk of bias.

3.6.1 Readmission rates

A study by Menachemi et al. (2008) sought to identify whether there was an association between surgical centre accreditation status and unexpected hospitalisations following the five most common ambulatory surgical procedures. Florida Agency for Health Care Administration 2004 risk-adjusted hospital discharge data (JC accredited centres $n = 95$, Accreditation Association for Ambulatory Health Care centres $n = 106$, state regulatory agency facilities $n = 163$, patients $n = 720,472$) was utilised in logistic regression analysis that

controlled for facility volume and key patient characteristics. Findings suggested that patients ($n = 315,070$) treated at JC accredited facilities were less likely to be hospitalised after colonoscopy (within 7 days Odds Ratio 0.89, 95% CI 0.80 to 0.99, $p < 0.05$ and within 30 days Odds Ratio 0.91, 95% CI 0.85 to 0.10, $p < 0.01$).

Table 11: Risk of bias - effectiveness studies												
Studies (secondary data analysis)	Representative sample	Free of sampling bias	Adequate sample size	Reliable measures	Valid measures	Free of outcome identification bias	Incomplete outcome data addressed	Confounding addressed in study design	Confounding addressed statistically	Free of selective reporting	Free of other bias	Overall risk of bias
Readmission rates												
Menachemi et al. 2008	0	+	+	+	+	+	0	0	+	+	+	L
Quality of care measures												
Chandra et al. 2009	0	+	0	+	+	+	+	0	+	+	+	M
Chen et al. 2003	0	0	0	+	+	0	+	+	+	+	+	M
Juul et al. 2005	0	0	0	0	0	0	+	0	0	+	0	S
Landon et al. 2006	0	+	+	+	+	+	0	0	+	+	+	L
Lutifiyya et al. 2009	0	+	0	+	0	0	0	0	0	+	+	S
Ross et al. 2008	0	+	+	+	+	0	0	0	+	+	0	M
Schmaltz et al. 2011	0	+	+	0	+	0	0	+	+	+	+	M
Williams et al. 2005	0	0	+	+	+	0	+	+	0	+	+	M
Legend:												
+ = evidence of bias 0 = no evidence of bias												
Risk of bias: L = low, M = moderate, S = serious, VS = Very serious												

3.6.2 Quality of care measures

A study by Juul et al. (2005) compared the availability and quality of clinical guidelines on perioperative diabetes care in hospital units ($n = 51$ units in $n = 9$ hospitals) before and after participation in a diabetes care RCT; 27 of the units also underwent JCI accreditation. Tests of differences found that among the units without a guideline before the trial, significantly more accredited units compared to non-accredited units had a guideline at the end of the trial (90% compared to 29%, $p = 0.008$). The quality of the guidelines improved

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significantly in all units but the improvement was significantly higher in accredited units ($p < 0.01$).

Four cross-sectional studies explored the relationship between receipt of standardised quality of care measures for acute myocardial infarction and accreditation status. Lutfiyya et al. (2009) utilised 2006 data from the US Centers for Medicare and Medicaid Services Hospital Compare database to compare JC accredited US critical access rural hospitals ($n = 205$) with non-accredited critical access rural hospitals ($n = 525$); analysis encompassed data from 218,290 patients. Ross et al. (2008) extracted data from the same database January 2005-December 2005 (Society of Chest Pain Centers (SCPC) accredited hospitals $n = 178$, patients $n = 55,418$ compared to non-SCPC accredited hospitals $n = 4,019$, patients $n = 339,832$). Chen et al. (2003) explored data from the US Cooperative Cardiovascular Project 1994-1996 (JC accredited hospitals $n = 3,179$ compared to non-accredited hospitals $n = 1,042$, total patients $n = 134,579$). Chandra et al. (2009) utilised data from hospitals enrolled in the US CRUSADE quality improvement in 2005 (SCPC accredited hospitals $n = 14$, patients $n = 3,059$ compared to hospitals without SCPC accreditation $n = 323$, patients $n = 30,179$).

These studies explore a number of common process measures but study findings are heterogeneous. Tests of differences by Lutfiyya et al. (2009) suggested that hospital accreditation was significantly associated with higher performance on 1/4 measures. In contrast, Chen et al. (2003) found this to be the case in all five of the measures examined. However, setting statistical significance at a value of $p = 0.01$ may have limited the ability to detect significant findings in the former study. Logistic regression analysis by Ross et al. (2008), controlling for key hospital characteristics, indicated there was significantly greater compliance with 7/8 measures in SCPC accredited hospitals. In contrast, logistic regression analysis with generalised estimating equations, and control for an extensive range of hospital/physician characteristics and clinical variables, suggested this to be the case in only 2/5 measures in the final study (Chandra et al. 2009).

Lutfiyya et al. (2009) also suggested that hospital accreditation was significantly associated with higher performance on 2/4 heart failure and 1/6 pneumonia quality of care measures. Additionally, findings from a further secondary data analysis of the CMS Hospital Compare and JC databases (January 2004-June 2004) suggested that JC accredited hospitals (72.1% of total sample of 4,856 hospitals) consistently outperformed non-accredited hospitals on acute myocardial infarction (Odds Ratio 1.32, 95% CI 1.26 to 1.37), heart failure (Odds Ratio 1.43, 95% CI 1.39 to 1.47) and pneumonia (Odds Ratio 1.18, 95% CI 1.26 to 1.20) composite performance measures¹²; control for key hospital characteristics also included availability of advanced technologies and nurse staffing levels (Landon et al. 2006).

Temporal trends in hospital performance on quality of care measures for acute myocardial infarction, heart failure and pneumonia have also been explored. Descriptive analysis of US JC accredited hospital performance data (JC database 3rd quarter 2002 to 2nd quarter 2004) found there was trend of a consistent significant improvement ($p \leq 0.01$) in hospital performance on 15/18 measures for acute myocardial infarction ($n = 1,404$ hospitals), heart failure ($n = 1,864$ hospitals) and pneumonia ($n = 1,702$ hospitals) (Williams et al. 2005). Schmaltz et al. (2011) utilised data from the US CMS Hospital Compare and JC databases (2004-2008) to compare hospital performance (hospitals not accredited in the study period $n = 762$ /hospitals accredited throughout the entire study period $n = 2,917$) on the same measures. Findings from logistic regression analysis, controlling for hospital characteristics and baseline performance, indicated that accredited hospitals were significantly more likely to have high performance in 2008 on 13/16 of the performance measures ($p < 0.001$ for 11/13 measures). Furthermore, accreditation was significantly associated with larger gains in performance improvement over time for the same 13/16 measures.

Whilst all these studies indicate an association between accreditation and improved performance, the extent of improvement evidenced varies.

¹² Note: p values not given

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3.6.3 Effectiveness findings summary

Table 12 provides a brief summary of overall findings.

Table 12: Summary of effectiveness findings		
Numbers/types of studies	Quality of evidence (bias)	Comments
Readmission rates		
1x Secondary data analysis	1 x low	Accreditation status was found to be positively associated with lower readmission rates following ambulatory surgery
Quality of care measures		
7x Secondary data analysis	1 x low	A positive association was found in all studies with improved performance on AMI, heart failure and pneumonia process measures and accreditation status; the extent of improved performance varied between studies
1 x before and after study	5x moderate	
	2x serious	
		A positive association was found between the availability and quality of clinical guidelines and hospital accreditation

3.7 Chapter summary

This systematic literature review identified 40 papers/39 studies exploring the effect of healthcare accreditation upon hospital quality of care. Of these studies a positive association between accreditation status and improved:

- safety was found in 15/28 studies
- patient experience was found in 1/5 studies
- effectiveness was found in 9/9 studies

Overall, a small body of evidence exists indicating there is potential for quality of care to be higher in accredited hospitals than non-accredited hospital and for accreditation to cause an improvement in quality of care. However, there is a paucity of high quality evidence due to the following factors:

- a majority of studies adopt cross-sectional and retrospective designs which do not preclude the presence of other parallel initiatives influencing results and therefore prevent attribution of cause
- detail concerning the purpose and approaches of the accreditation schemes studied is frequently lacking thus preventing:

- identification of other unmeasured factors that may be potentially contributing to the observed effects
 - appropriate interpretation of results
- scant consideration is given to the underlying causal levers, such as employee's knowledge, leadership activities or performance incentives, which act to influence the generation of desired intervention outcomes

A key finding of this systematic literature review was that studies exploring effects at the mesosystem, or hospital level, are common but no studies were identified exploring effects at the microsystem, or ward, level.

Consequently, this study seeks to explore the impact of the CAS on hospital wards by:

- making a preliminary assessment of the effect on patient outcomes
- exploring the contextual factors and processes thorough which change is accomplished
- evaluating its capacity for successful integration into NHS acute care hospital wards

The potential impact of such a scheme upon service users can be summed up by considering the statement that “... *accreditation is basically an issue of trust. People who use health services want to have confidence that those services are safe and will provide consistent high quality care*” (ACHS no date).

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3.8 Research questions

The research questions for this study are as follows:

- What is the impact of implementation of a ward based accreditation scheme on safety and patient experience?
- How do key participants receive and view such a scheme?
- What are the critical determinants that influence effective implementation and potential integration of an accreditation scheme into ward based clinical practice?

The methodology and methods associated with this study are discussed in the following chapter.

4. Methods

4.1 Study aim and objectives

This study aims to explore the impact of the CAS on hospital wards by making a preliminary assessment of the effect on patient outcomes and exploring the contextual factors and processes through which change is accomplished.

The study objectives are to:

1. Identify changes in safety and patient experience associated with implementation of the CAS
2. Identify contextual changes associated with implementation of the CAS
3. Explore processes by which any effect is achieved
4. Explore how the CAS is embedded into routine clinical practice
5. Gain key participant perspectives on the feasibility and utility of the CAS
6. Inform the development and design of a more extensive study if warranted

4.2 Study design

The range of performance domains and standards included in the CAS indicates the potential for a number of patient outcomes. Consequently, the CAS is a complex healthcare intervention (Craig et al. 2008). The frameworks proposed by the British Medical Research Council (MRC) (Craig et al. 2008, MRC 2000) for evaluating complex healthcare interventions provided guidance in identifying an appropriate study design. RCTs are the most advantageous design in minimising study bias and providing the most accurate estimates of intervention effects (MRC 2000). This corresponds to Phase III of the framework. However, successful modelling and planning of an RCT requires baseline information such as knowledge of sample populations/sizes, effective data collection and recruitment methods, potential implementation processes, trial outcomes, and measures to ensure validity and reliability (MRC 2000). The CAS was an intervention that had yet to be evaluated and such baseline information was unavailable. Therefore, the design for this study merged Phases I and II of the framework. Findings from Phase I, the development of an understanding of the CAS and its possible effects, are presented in Chapters 2

4. Methods

and 3. Phase II, the exploratory trial stage, is concerned with gathering evidence of intervention effects and information to inform a further trial if warranted.

A controlled before-and-after study design in which matched pairs of control and intervention wards were studied over a 12 month period was used to reduce threats to internal validity by controlling for potential ambiguity about causal influence (Bryman 2008). The study population comprised all of the Trust hospital wards. A sampling frame of adult general medical and surgical wards was utilised. Wards were mapped onto a template of key ward characteristics such as mode of admission and safety indicator performance for the previous six months. Insufficient matched pairs with identical values of these key variables were identified. Consequently, the pragmatic approach of nearest pair matching was employed to identify three matched pairs (Rubin 2006).

A stepped wedge approach (Brown & Lilford 2006), involving sequential roll out of the CAS on the participating wards, was adopted to accommodate logistical constraints associated with availability of staff to participate in the review panels. Matched pairs of wards joined the study at fortnightly intervals. There was no cross-over of the control wards into the intervention group although these wards were eligible to participate in the CAS later as part of the wider Trust roll out. Assignment as intervention or control ward within each pair and the order in which the intervention wards commenced participation in the CAS was randomised. The randomisation sequence was generated by a blinded independent researcher at the University of Southampton. For the purposes of allocation pairs of wards were identified only by a code number with the key supplied after allocations were made. This avoided potential familiarity with the hospital wards influencing the allocation sequence.

The ward sample size for this study was constrained by the Trust's capacity to undertake the CAS review panels and by the research resources. An aim of this study was to determine parameters needed to estimate the sample size required for a further trial if warranted. Thus, no formal calculation of sample

size for comparing intervention and control groups was undertaken prior to this study.

4.3 Study methodology

Traditionally evaluation research has sought to simply identify whether or not an intervention works. For example, the theoretical underpinnings of accreditation schemes indicate that an effective scheme is one in which a positive impact upon the value of the quantitative measures/accreditation standards is demonstrated. Hence, accreditation scheme evaluation research most often adopts a quantitative research approach. Yet, sole use of a quantitative research approach does not enable the study of the dynamic contextual and process factors that underpin the development of mechanisms determining accreditation scheme outcomes. The study of these processes is essential to the formulation of causal explanations. Omission of their evaluation is highlighted as a major factor in restricting appropriate interpretation of results from studies of complex healthcare interventions (Glenton et al. 2011, Möhler et al. 2012).

Therefore, the methodology for this study was informed by a realist evaluation approach. This approach shifts the study focus to one which seeks to provide a broader exploration of not just what works, but also for whom this works, and in what circumstances it works; neither qualitative nor quantitative research methods are favoured (Pawson et al. 2005). A realist perspective regards intervention participants as key sources for eliciting data on how the CAS works (Pawson 2006). This study is underpinned by recognition that each participant in the CAS creates their own subjective interpretations of the scheme and that the first-hand knowledge of those experiencing the CAS is required to elicit data on how the CAS works. This stance is compatible with qualitative research methods in which the multiple and diverse contextual and subjective experiences of participants are explored from the emic, or insider's, perspective (Holloway & Wheeler 2010). Analysis of these experiences with detailed portrayals, abstract interpretation, description and reflection by the researcher provides the etic perspective, or the outsider's view (Holloway & Wheeler 2010).

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Consequently, this controlled before-and-after study utilised the following parallel mixed methods:

1. A quantitative strand to explore the effectiveness of the CAS in relation to safety and patient experience
2. A concurrent quantitative strand to explore the:
 - a. context (culture and environment) through which change is accomplished
 - b. impact of the CAS on contextual factors
3. A concurrent qualitative process evaluation to explore:
 - a. staff perspectives on the process of implementation
 - b. the feasibility of embedding the CAS into routine clinical practice

Equal weighting was given to each quantitative/qualitative strand with strands independently analysed in parallel tracks (Teddlie & Tashakkori 2009). Inferences from each strand were integrated together in the final discussion of study findings. Figure 5 provides a schematic of the mixed methods study design.

Debate regarding the validity of mixing research paradigms is ongoing (Ritchie & Lewis 2003). However, this study adopted the pragmatic approach recommended by Dures et al. (2010) in considering that an enhanced understanding of the complexities of the CAS would be gained from multiple methods. The combined findings would provide a formative assessment contributing towards the continuing development of the CAS and a summative assessment that more fully evaluates scheme effectiveness.

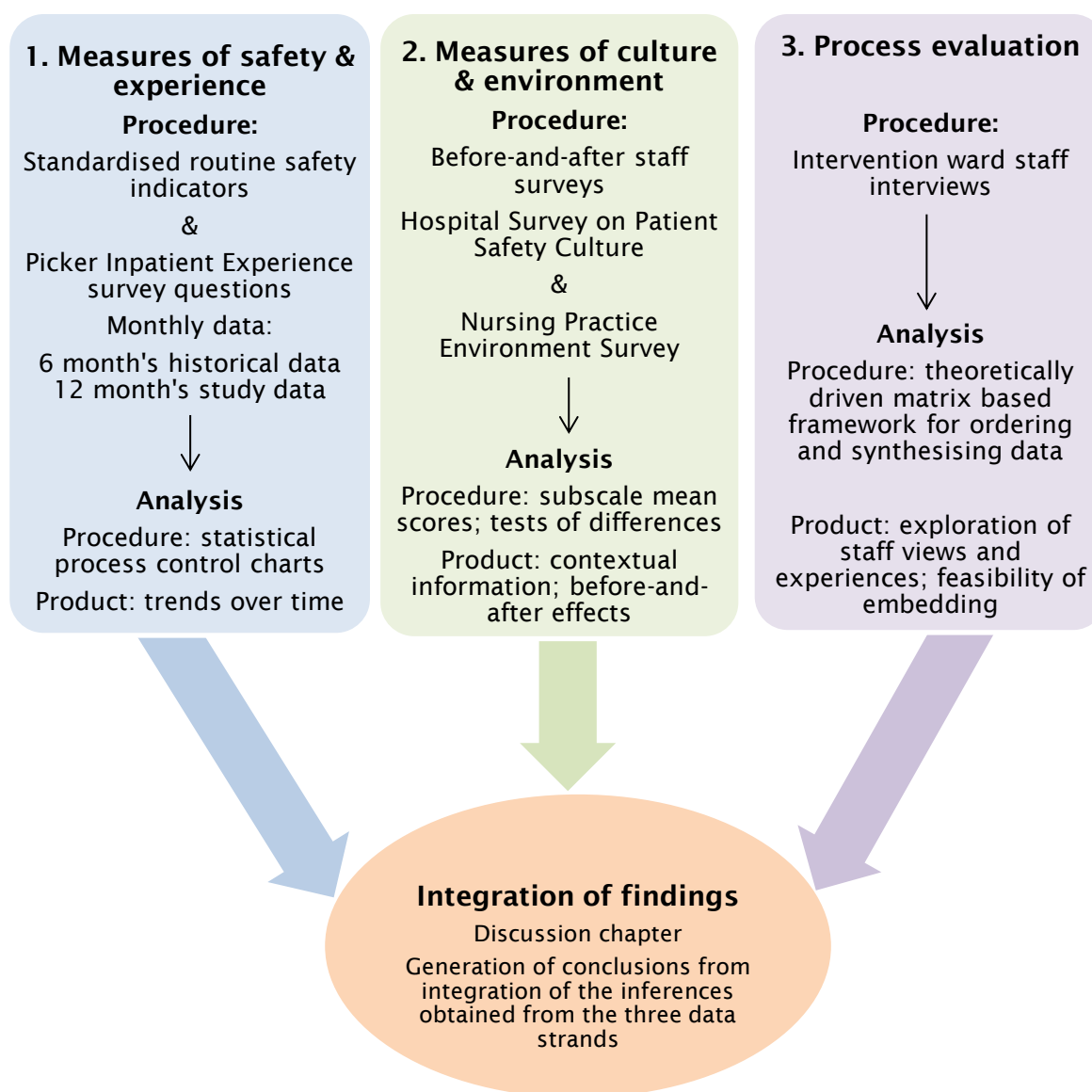


Figure 5: Study design schematic

4.4 Outcome measures

The wide ranging outcome measures adopted by this study are illustrated in Figure 6. They seek to:

1. Identify changes in safety and patient experience associated with implementation of the CAS (measures of safety and experience)
2. Identify contextual changes associated with implementation of the CAS (measures of culture and environment)

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3. Explore the processes by which any effect is achieved, explore how the CAS is embedded into routine clinical practice and gain key participants' perspectives on the feasibility and utility of the CAS (process evaluation)



Figure 6: Schematic of study measures

4.5 Measures of safety and experience

Intervention effects for the CAS cross a number of performance domains. In such instances multiple outcomes may be required to assess effectiveness (Craig et al. 2008). Therefore, a range of data exploring a number of outcomes was collected.

4.5.1 Routine clinical safety indicators

Safety has been identified as a key quality measurement dimension (Section 1.2). Hence, a wide range of nationally mandated standardised clinical safety indicator data were routinely collected by this Trust on a monthly basis and reported for each ward as part of the CQD. These indicators link to the planning and preventative nature of nursing care (HSCIC 2009) and accord with the DoH nurse sensitive quality indicators (DoH no date). They have been identified as having potential to incentivise improvements in quality of care (Griffiths et al. 2008). Therefore, the following secondary data, included as core accreditation standards in the CAS, were collected as key measures of intervention effectiveness for each participating ward for the study duration.

- Rates of falls (all grades) per 1,000 occupied bed days
- Rates of grade 1-4 pressure ulcers per 1,000 occupied bed days
- Rates of MRSA Bacteraemia/*C. difficile* per 1,000 occupied bed days

These are all important safety events. For example, NHS data (2005-2006) suggests an average rate of 4.8 falls per 1,000 acute NHS hospital bed days and that 1,022 of those falls resulted in severe harm (Healey & Scobie 2007). Hospital acquired infection and pressure ulcer rates are included as clinical quality indicators in the NHS Outcomes Framework (HSCIC 2013a), and falls and pressure ulcers in the NHS Safety Thermometer (HSCIC 2013b). NHS Trust performance for these safety events is linked to financial incentives and sanctions (NHS Commissioning Board 2013).

A number of factors have potential to affect the quality of secondary data. One of these factors is the degree of completeness of registration of cases in the data sources being utilised (Sørensen et al. 1996). This is closely linked to the sensitivity and specificity of the concepts being explored. That is, the

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proportion of positive or negative incidents correctly identified; this is likely to be high in low rate events (Sørensen et al. 1996). Publicly available data indicates the safety indicators selected as outcome measures for this study were potentially low rate events (HSCIC 2013a). Consequently, completeness of registration of cases in the study data sources was likely to be high.

A further factor is the degree of correctly classified cases in the data sources (Sørensen et al. 1996). Rigour in classification of pressure ulcers was achieved by review of ward staff grading of severity by a specialist tissue viability nurse and application of a nationally developed standard definition (HSCIC 2013a). Ward staff graded severity of falls utilising a nationally developed risk matrix (National Patient Safety Agency 2008) and Root Cause Analyses of falls resulting in severe harm were reviewed by a Trust panel of experts. Hospital acquired infections were also subject to nationally developed standard definitions (HSCIC 2013a). Hence, the validity and accuracy of cases in the study data sources was also likely to be high. Furthermore, the use of secondary data reduced the potential for the attention caused by the research activities to increase bias in the grading/reporting of the events being studied (Sørensen et al. 1996).

4.5.2 Routine patient experience survey data

Patient experience has also been identified as a key quality measurement dimension (Section 1.2). Patient experience of hospital care is an improvement area in the NHS Outcomes Framework (DoH 2014). Hence, nationally mandated patient feedback was already collected on a monthly basis by this Trust. Data were collected using the Picker Inpatient Experience Survey and reported for each ward as part of the CQD. This survey has been subjected to detailed cognitive testing (Jenkinson et al. 2002), is successfully used in national NHS patient surveys (NHS Surveys no date), and is commonly used in healthcare accreditation (Auras & Geraedts 2010). Therefore, secondary data from the Picker Inpatient Experience Survey, included as core accreditation standards in the CAS, were collected as key measures of intervention effectiveness for each participating ward for the study duration.

The Picker Inpatient Experience Survey comprises a range of questions. The choice of questions for outcome measures in this study (Table 13) was primarily based on those that been identified as being nurse sensitive outcome indicators (DoH no date) and evidenced as representing patients' priorities (Coulter et al. 2009).

Table 13: Picker Inpatient Experience Survey Questions for analysis ¹³		
Picker question	NHS Nurse sensitive indicator ¹	King's Fund Patients' priority ²
1. <i>Do you have confidence and trust in the nurses treating you?</i>	Yes	No. 1
2. <i>How clean are the wards and bathrooms that you use in the hospital?</i>	Yes	No. 4
3. <i>Do you think hospital staff did everything they could to control your pain?</i>	Yes	No. 7
4. <i>Did staff talk in front of you as if you weren't there?</i>	Yes	No
5. <i>Overall, did you feel you were treated with respect and dignity while you were in hospital?</i>	No	No. 6
6. <i>Overall, how would you rate the care you have received</i>	N/A	N/A
1. NHS Commissioned Care Nurse Sensitive Outcome Indicators (DoH no date)		
2. King's Fund Point of Care programme " <i>Measures of patients' experience in hospital: purpose, methods and uses</i> " (Coulter et al. 2009)		

Questions 1-5 are 'experience' questions which ask patients to give factual answers about their period of care. These have been shown to be the Picker Inpatient Experience survey questions most strongly correlated with Question 6 which is a single measure indicative of 'satisfaction' (Sizmur & Redding 2009). Treatment with dignity (Question 5) has been highlighted as a key principle of nursing care (RCN 2013) and a key feature of quality of care (DoH 2013).

The Trust had established a level of rigor in the data collection process through survey administration by trained hospital volunteers as opposed to health professionals. This was intended to put patients at ease and

¹³ The questions "*If or when you have important questions to ask hospital staff, did you get answers that you could understand?*" and "*Would you recommend this hospital to family and friends?*" were also selected for inclusion but were omitted from the final analysis due to their removal from the Trust Picker Inpatient Experience Survey in study month 4

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consequently have a positive effect on the suggestion that patients may be more frank in evaluating their experience of a hospital admission post discharge (Fitzpatrick 1991).

4.5.3 Samples

Measures of safety and experience sought to explore trends over time. The Trust Business Information Team supplied:

- safety indicator data in the form of monthly rates per ward
 - both numbers of falls and numbers of pressure ulcers were broken down into grades of severity
- patient experience data, produced by the Picker Institute utilising data collected by the Trust volunteers, in the form of individual patient responses
- the number of occupied bed days per month per ward

Monthly data for the three safety indicators and six patient experience survey questions were collected from each study ward for the study duration¹⁴.

Historical data were obtained for the six months prior to the study commencement to provide baseline information¹⁵. Monthly safety indicator data for the three months following study end were also supplied to ensure capture of delayed entries into the Trust business information systems.

The sample size for the safety indicator data for each study ward was monthly rate data collected for a 12 month period and historical data from six months prior to the study. This yielded 18 data points per ward per measure in total.

The sample size for the patient experience data set was constrained by the number of surveys completed by ward patients on each of the study wards. The Trust sought to obtain 20 survey responses per ward per month.

¹⁴ Study months 0 to 11

¹⁵ Study months -6 to -1

4.5.4 Analysis

Analysis of the safety indicator data and patient experience data sought to explore the plausibility of the hypothesis that any changes in the monthly rates were associated with participation in the CAS. Classical statistical tests can determine whether these performance indicators demonstrate a significant difference before and after participation in the CAS. However, interpretation of findings is complicated due to the inherent variability in the data arising from variation in factors such as patient demographics or ward case mix.

Furthermore, such statistical tests may not effectively answer the question as to whether any improvement associated with participation in the CAS is sustained. Viewing longitudinal data presented in chronological order provides an alternative method by which more robust conclusions may be drawn regarding the effects of quality improvement programmes (Perla et al. 2011). Consequently, statistical process control (SPC) charts, providing a graphical representation of small sets of longitudinal data, are a useful alternative approach to evaluation of before-and-after effects (Simon & Griffiths 2014).

Initially developed as a key approach to improving quality in industrial manufacturing, SPC charts are being increasingly applied to the evaluation and interpretation of healthcare quality improvement and monitoring processes (Thor et al. 2007). The basic premise of SPC theory is that the natural variation of process data can be computed from statistical models selected according to the data distribution: for example, a poisson distribution model for data counting rates of events or a binomial distribution model for dichotomous data (Benneyan 1998). Process data is subject to two types of variation, that is, “*common cause variation*” and “*special cause variation*” (Benneyan 1998).

All processes exhibit variability due to the effects of naturally occurring variation such as monthly variations in ward patient acuity; this is common cause variation. Processes subject to common cause variation will continue to produce data that falls within its underlying statistical distribution model provided the process parameters remain unchanged (Benneyan 2001). In this instance, the process being measured is stable, predictable and in a state of statistical control. If the process parameters are subject to the effects of atypical factors the process data will deviate from the underlying statistical

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distribution model. This is unnatural or special cause variation and the process is considered to be out of control.

Factors giving rise to special cause variation may be transient and arise from random external events, such as short term staffing shortages on a ward, in which case they may be evidenced by, for example, a single data point deviating from the statistical distribution model. However, they may also be non-random intentional events, such as implementation of a process change that seeks to improve process quality, for example implementation of the CAS (Benneyan et al. 2003). In this eventuality, they may result in deviations from the statistical distribution model in the form of trends, cycles and shifts in the process data which eventually become integrated into the common cause system (Benneyan 2001). SPC charts provide a statistical tool that support identification of these two types of variation within process data. Hence, Shewhart SPC charts were selected as a tool to evaluate the effect of participation in the CAS on the study measures of safety and patient experience.

The format of the Shewhart SPC chart comprises a statistically defined centre line, and upper and lower control limits as illustrated in Figure 7.

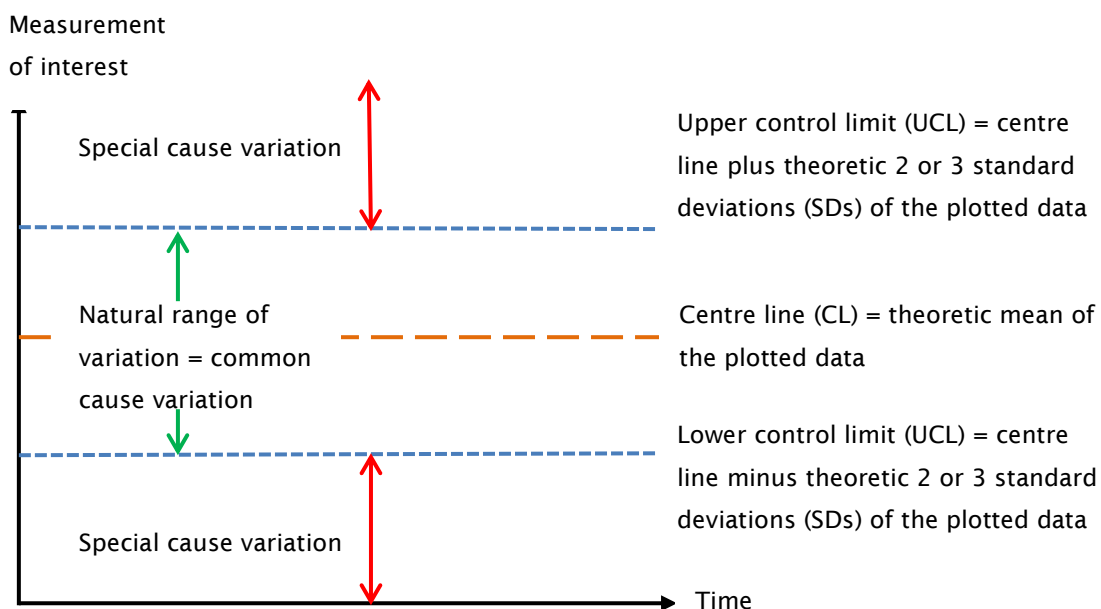


Figure 7: Shewhart SPC chart

If all process values fall within the upper and lower control limits the variation is considered to be common cause; values falling outside of the control limits represent special cause variation and are indications that the process is producing different results or inconsistent processes are producing the outcomes (Benneyan 2001).

4.5.4.1 Data management

SPC charts were produced using QI Macros SPC software for Microsoft Excel 2010.

The safety indicator data were converted into rates per 1,000 occupied bed days per wards. Table 14 summarises the outcome variables, their definitions and the events explored in the data analysis.

Table 14: Safety outcome variables			
Outcome variables	Definitions	Grading	Events analysed
Falls	(Falls per month per ward/bed days) x 1,000	No injury Low injury Moderate injury Severe harm Catastrophic/death	All grades of falls Falls with injury Falls with no injury
Pressure ulcers	(Pressure ulcers per month per ward/bed days) x 1,000	Grade 1 Grade 2 Grade 3 Grade 4	Grade 1 Grades 2-4 combined
MRSA	(MRSA cases per month per ward/bed days) x 1,000	N/A	All cases
<i>C. difficile</i>	(<i>C. diff.</i> cases per month per ward/bed days) x 1,000	N/A	All cases

Picker Inpatient Experience Survey data was provided in the form of monthly Excel spreadsheets of individual level patient data; relevant question response data for each study ward was extracted from these Trust wide files. The CAS aims to generate improvements in quality of care hence, for each question, the response category indicating the highest possible rating was selected for

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analysis. All other responses were aggregated to provide a dichotomous count. Patients declining to give a response, or those answering “*I was not in any pain*” or “*I can’t say*” in response to the question “*Do you think hospital staff did everything they could to control your pain?*”, did not contribute to the data for this analysis and were omitted from the question samples. Table 15 gives the Picker Inpatient Experience Survey questions, the response categories and the definitions utilised in the analysis.

Table 15: Picker Inpatient Experience survey questions		
Patient experience question	Response categories	Definitions for analysis
<i>Do you have confidence and trust in the nurses treating you?</i>	<i>Yes, Sometimes, No, Declined</i>	Number of “Yes” responses versus all other responses excluding declined
<i>Did you feel you were treated with respect and dignity while you were in hospital?</i>	<i>Yes, Sometimes, No, Declined</i>	Number of “Yes” responses versus all other responses excluding declined
<i>Overall, how would you rate the care you have received?</i>	<i>Excellent, Very good, Good, Fair, Poor, Declined</i>	Number of “Excellent” responses versus all other responses excluding declined Number of “Excellent” and “Very good” responses combined versus all other responses excluding declined
<i>Do you think hospital staff did everything they could to control your pain?</i>	<i>Yes definitely, Yes sometimes, No, I can’t say, I was not in any pain</i>	Number of “Yes, definitely” responses versus all other responses excluding “ <i>I can’t say</i> ” or “ <i>I was not in any pain</i> ”
<i>Did staff talk in front of you as if you weren’t there?</i>	<i>Yes often, Yes sometimes, No, Don’t know/declined</i>	Number of “No” responses versus all other responses excluding “ <i>Don’t know/declined</i> ”
<i>How clean are the wards and bathrooms that you use in the hospital?</i>	<i>Clean, Fairly clean, Not very clean, Not at all, Declined</i>	Number of “Clean” responses versus all other responses excluding declined

Chart sensitivity is linked to subgroup sample sizes. Therefore, in addition to the individual analysis of each ward’s data, the 3 intervention ward samples and the 3 control wards samples were aggregated to form combined intervention and control ward groups. This produced larger subgroup samples with greater power to detect process changes (Benneyan 2001).

4.5.4.2 Chart type

A range of Shewhart chart types are available and selection of the most appropriate is determined according to the probability distribution of the data (Benneyan 2001).

Safety outcome variables were explored using u charts, these being appropriate for data with a poisson distribution in which there can be more than one event per patient and there is no exact upper boundary (Benneyan 2001). The u chart plots the event rate adjusted to the average per a common sampling denominator size, in this case the average number of monthly events per 1,000 bed days.

Picker Inpatient Experience survey question responses were explored as dichotomous cases in which the patient either selected, or failed to select, the response category identified for analysis. Data were therefore explored utilising p charts, these being appropriate for binomial probability distributions in which the sample size can change from sample to sample, that is, from month to month (Benneyan 2001). The p chart plots the percentage of patients giving the predetermined response category.

4.5.4.3 The centre line and control limits

The centre line, or mean, for each of the control charts was created using historical data from the six months prior to a study ward's participation in the CAS. This served two purposes. First, a process whose performance is inconsistent and unpredictable indicates there is no consistent process producing the outcomes (Benneyan 2001). Such a lack of consistency prior to participation in the CAS has potential to negatively impact upon the outcomes of the CAS. Consequently, best practice in exploring the impact of a process change entails first creating charts using baseline data (Phase 1) in order to understand past process performance and its degree of consistency and predictability (Perla et al. 2011). Second, data following participation in the CAS was prevented from influencing calculation of the centre line through the projection of the Phase 1 centre line across the prospective study data (Phase 2). This improved the accuracy of detection of signals of non-random variation

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that may be potentially attributable to participation in the CAS (Perla et al. 2011).

The commonly selected and recommended control limit of 3 SDs above/below the centre was selected as the upper control limit and lower control limit respectively; selection of 3 SDs, as opposed to 2 SDs, reduces the risk of Type I errors (Benneyan 2001, Woodall 2000). Points outside of the control limits provide evidence of special cause variation.

4.5.4.4 Identification of non-random signals

Sensitivity of the $\bar{x}$ and p charts to detect or verify process changes was increased through the use of supplementary tests to detect special cause variation or non-random patterns within the control limits. These “within limit” tests add power to detect rate decreases for those $\bar{x}$ charts with lower control limits of zero and for those p charts with small sample sizes (Benneyan 2001). The additional tests for identifying special cause variation cited as being common are outlined in Table 16.

Table 16 : Within limit tests for special cause variation

1. Two out of three successive points more than 2 SD from the mean on the same side of the centre line
2. Four out of five successive points more than 1 SD from the mean on the same side of the centre line
3. Eight successive points on the same side of the centre line (shift)
4. Six successive points increasing or decreasing (trend/run)
5. Obvious cyclic behaviour

Based on Benneyan et al. (2003 p461)

The following points from Perla et al. (2011 p47-48) were also utilised to ensure clarity in interpretation -

- A. For a shift: values that fall on the centre line do not add or break a shift and are not included in the count
- For a trend: if the value of two or more consecutive points are the same, only the first point is counted and the repeating values are ignored; like values do not make or break a trend
- B.

These additional tests result in a minor increase in the risk of Type I errors and reduce the specificity of the charts (Benneyan 2001). Consequently, the choice of supplementary tests to apply to chart analysis was limited to those of numbers 3 and 4 in Table 15; these are similar to those advocated by Perla et al. (2011) for use in the interpretation of run charts. Figure 8 provides an example of an SPC chart illustrating these types of special cause variation.

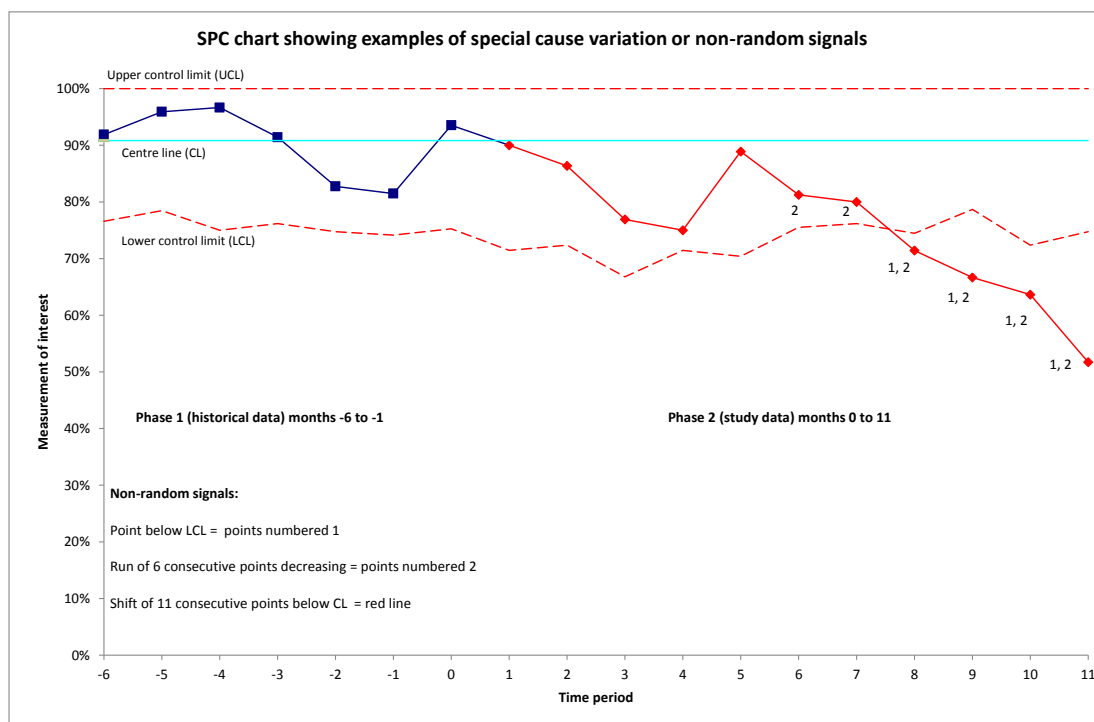


Figure 8: SPC chart illustrating special cause variation

4.5.4.5 Interpretation of non-random signals

The highest quality of care in relation to safety was a rate of zero events. Therefore non-random signals occurring in the u charts for the safety indicator data were interpreted as follows:

1. Measurement points occurring above the upper control limit indicated unusually high rates of safety events
2. Measurement points below the lower control limit were acceptable given their indication of unusually low rates of safety events
3. A shift below the centre line or downward trend indicated a sustained decrease in rates and improving quality of care

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4. A shift above the centre line or upward trend indicated a sustained increase in rates and decreasing quality of care

The target for best quality of care in relation to patient experience was 100% of respondents giving the response category selected for analysis. Therefore non-random signals occurring in the p charts for the Picker Inpatient Experience Survey data were interpreted as follows:

1. Measurement points occurring below the lower control limit indicated unusually low ratings of patient experience
2. Measurement points above the upper control limit were acceptable given their indication of unusually high ratings of patient experience
3. A shift above the centre line or upward trend indicated a sustained improvement in ratings of patient experience
4. A shift below the centre line or downward trend indicated a sustained decrease in ratings of patient experience

4.5.4.6 Approach to causal inference

The approach to chart interpretation and causal inference, as shown in Figure 9, was as follows:

1. Tables were produced summarising the key information from each chart
2. Each intervention ward chart was reviewed and evidence of non-random signals was sought using the criteria introduced above (section 4.5.4.4)
3. Charts displaying non-random signals were selected for further interpretation
4. Alternative explanations for the source of non-random signals were sought: relevant ward fieldwork notes were consulted in order to identify potential contributory contextual factors; Phase 1 chart sections were explored in order to identify whether past process instability may have potentially impacted upon Phase 2 outcomes
5. In instances where no contextual or Phase 1 explanations were identified, the matching chart for the control ward and the tabulated summarised information were explored for intervention/control ward similarities and differences

6. In instances where no similar non-random signals were observed on the control ward the presence of non-random signals were then attributed as being a potential effect of participation in the CAS

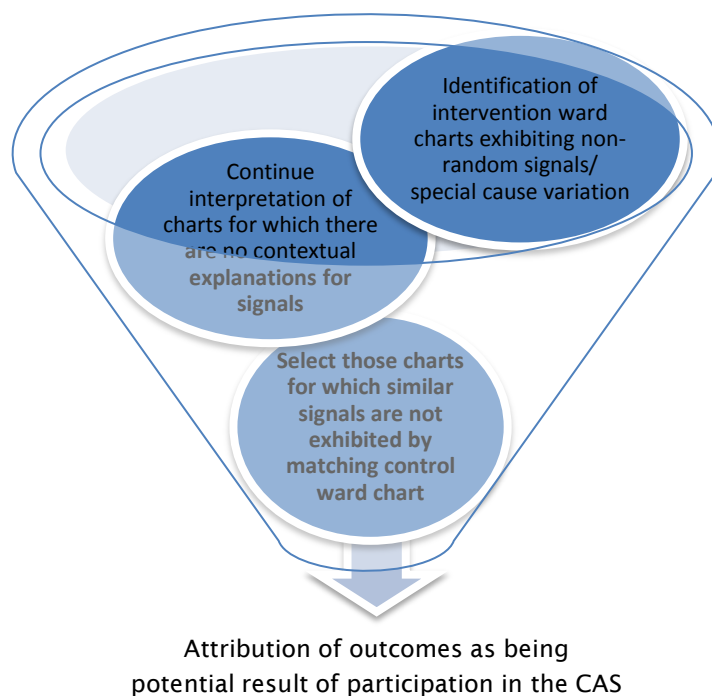


Figure 9: Framework for chart interpretation

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4.6 Measures of culture and environment

The safety culture and nursing practice environment have been identified as being potential contextual influences upon implementation of the CAS (Section 2.6.2). Where there is a pre-existing body of knowledge, such as that about the dimensions of safety culture (Halligan & Zecevic 2011) and an effective nurse practice environment (Lake 2007), a quantitative survey approach is an appropriate data collection method (Bowling 1997); hence, adoption of this approach in exploring contextual influences upon implementation of the CAS.

Choice of potential survey instruments was based on the following criteria:

- readily accessible in the public domain
- standardised, preferably for use in the UK, with evidence of reliability and validity available
- developed for use in hospital settings
- exploring ward staff perspectives on what occurs in the daily life of the ward
- conceptual breadth of instrument domains closely reflected those specific contextual factors that were identified as having potential to influence, or be influenced by, the CAS
- survey format and length ensured ease of use

4.6.1 Hospital Survey on Patient Safety Culture (HSoPSC)

Whilst use of hospital safety culture survey instruments in patient safety research is documented (Hellings et al. 2007, Mardon et al. 2010, Sexton et al. 2011), the AHRQ recently concluded there is insufficient evidence to be able to clearly recommend a particular survey instrument (Shekelle et al. 2010). Few standardised instruments are readily available to survey hospital safety culture. Those that are most commonly available and most frequently cited, the Safety Attitudes and Safety Climate Surveys (Sexton et al. 2006) and the HSoPSC (Sorra & Nieva 2004), are of US origin. All these instruments meet the selection criteria identified above. However, the conceptual breadth of the HSoPSC most closely reflects the range of dimensions identified as being

commonly associated with a patient safety culture (Box 2). Consequently, the HSoPSC was selected for use in this study.

Box 2: Commonly cited safety culture dimensions (Halligan & Zecevic 2011)

- Leadership commitment to safety
- Open communication founded on trust
- Organisational learning
- A non-punitive approach to adverse event reporting and analysis
- Teamwork
- Shared belief in the importance of safety

The HSoPSC was developed by the AHRQ to provide a reliable safety culture survey by which to assess patient safety culture from the perspectives of hospital staff (Sorra & Nieva 2004). Evidence from the literature supports the psychometric rigor of the instrument (Sorra & Nieva 2004), the measurement of unit level group culture (Smits et al. 2009), and its ability to differentiate between hospitals with differing levels of patient safety (Sorra & Dyer 2010). Subsequent psychometric analysis of the HSoPSC, through demonstration of Cronbach's alpha for a number of UK study samples, has further established the reliability of this instrument when used with UK populations (Table 17).

Cronbach's alpha produces an estimate of the reliability, or internal consistency, of items within a scale and hence provides an indication of the extent to which scale items are measuring the same concept (Bowling 1997). There is no clear agreement over the minimum acceptable standards for scale reliability (Bowling 1997). However, Cronbach (1951 cited Bowling 1997) regarded a value of Cronbach alpha greater than or equal to 0.50 as indicative of adequate scale internal consistency .

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Table 17: Cronbach alpha for HSoPSC subscales

Studies	Sorra & Nieva (2004)	Sarac et al. (2011)	Waterson et al. (2010)
Sample sizes (<i>n</i> =)	1,437	1,969	1,461
Location	US	Scotland	England

Subscales	Cronbach α scores		
Ward level safety culture dimensions (<i>n</i> = subscale items)			
<i>Teamwork within units</i> (4)	0.83	0.80	0.73
<i>Supervisor expectations and actions promoting patient safety</i> (4)	0.75	0.79	0.68
<i>Organisational learning - continuous improvement</i> (3)	0.76	0.64	0.66
<i>Feedback and communication about error</i> (3)	0.78	0.78	0.80
<i>Communication openness</i> (3)	0.72	0.73	0.67
<i>Staffing</i> (4)	0.63	0.60	0.58
<i>Non-punitive response to error</i> (3)	0.79	0.77	0.65
Hospital level safety culture dimensions (<i>n</i> = subscale items)			
<i>Hospital management support for patient safety</i> (3)	0.83	0.79	0.69
<i>Teamwork across hospital units</i> (4)	0.80	0.70	0.70
<i>Hospital handoffs and transitions</i> (4)	0.80	0.74	0.77
Outcome measures (<i>n</i> = subscale items)			
<i>Frequency of event reporting</i> (3)	0.84	0.84	0.83
<i>Overall perceptions of safety</i> (4)	0.74	0.71	0.67

The HSoPSC is a self-administered survey comprising a total of 42 items. Seven subscales measure ward level, and three subscales measure hospital level, dimensions of safety culture. Each subscale comprises between three and four items which are answered using 5-point Likert scales of agreement (“*Strongly disagree*” to “*Strongly agree*”) or frequency (“*Never*” to “*Always*”). Items are worded in positive and negative directions. Two further single item outcome dimensions explore the “*Frequency of events reported*” using a 1 to 5 numeric response category and the “*Patient safety grade*” using grades A through E as response categories. A composite mean of these 12 subscale scores provides an overall measure of the safety culture. Table 18 provides definitions of each of the subscales. A general open question in which

respondents are invited to provide any further comments finalises the questionnaire.

Table 18: HSoPSC subscales		
Unit level dimensions	Definition: the extent to which	No. of items
<i>Supervisor/manager expectations and actions promoting patient safety</i>	Supervisors/managers consider staff suggestions regarding patient safety, praise staff for following patient safety procedures, do not overlook safety problems	4
<i>Organisational learning – continuous improvement</i>	Mistakes lead to positive changes and improvements which are evaluated	3
<i>Teamwork within hospital units</i>	People support and respect one another, work together as a team when things are busy	4
<i>Communication openness</i>	Staff feel free to ask questions and to challenge those in authority if they see things that may negatively impact upon patient care	3
<i>Feedback and communication about error</i>	Event reports and errors are discussed and feedback is given, including about changes subsequently arising	3
<i>Non punitive response to error</i>	Staff feel that their mistakes are not held against them and are not recorded in their personnel details	3
<i>Staffing</i>	There are enough permanent staff to handle the workload and work appropriate hours to provide best quality patient care	4
Hospital wide dimensions		
<i>Hospital management support for patient safety</i>	Hospital management actively promote and prioritise patient safety	3
<i>Teamwork across hospital units</i>	Hospital units cooperate and coordinate with one another to provide the best care for patients	4
<i>Hospital handoffs and transitions</i>	Important patient information is transferred between units and during shift changes	4
Outcome dimensions		
<i>Overall perceptions of safety</i>	Procedures and systems are good at preventing errors, there are no safety problems on the unit	4
<i>Frequency of events reported</i>	Mistakes that could harm the patient, mistakes that have no potential to harm the patient, mistakes that are corrected before they harm the patient are all reported	3
Single item outcome dimensions		
<i>Patient safety grade</i>	Overall safety grade for the unit: excellent, very good, acceptable, poor, failing	1
<i>Number of events reported</i>	The number of event reports filled out and submitted in the past year	1

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4.6.2 Practice Environment Scale of the Nursing Work Index (PES-NWI)

Understanding of the attributes of a high quality nursing practice environment is underpinned by work exploring the early Magnet Recognition Program® (Buchan 1999). Attributes such as quality of nursing leadership, interdisciplinary relationships, professional development and autonomy were identified and termed the “Forces of Magnetism” (Kramer & Schamlenberg 1988). Nonetheless, the specific characteristics of the nursing practice environment that facilitate or hinder effective outcomes from healthcare accreditation schemes are not articulated in the accreditation literature. However, a number of survey instruments are available to explore a diverse range of factors associated with the nursing practice environment: for example, satisfaction with the work environment (Whitley & Putzier 1994) and organisational features of acute wards (Adams & Bond 1997). Recent critical reviews of a range of such instruments concluded the domains measured by the PES-NWI had the greatest conceptual coverage that was particular to nursing (Bonneterre et al. 2008, Lake 2007). Consequently, the PES-NWI was selected for use in this study.

The PES-NWI aims to provide a valid and reliable instrument by which the characteristics of the nursing practice environment that facilitate or constrain professional nursing practice and contribute toward patient outcomes may be evaluated from the perspective of registered nurses (Lake 2007). The PES-NWI, use of which is growing internationally, is the most widely reported instrument assessing the nursing practice environment (Warshawsky & Havens 2011). The JC assess the hospital staffing effectiveness accreditation indicator via the PES-NWI (Warshawsky & Havens 2011). Extensive evidence from the literature supports the psychometric rigor of the instrument, as demonstrated through the production of Cronbach’s alpha, in a range of countries and clinical settings (Table 19). Furthermore, the PES-NWI has been successfully used in UK populations in previous studies (Sermeus et al. 2011).

This self-administered survey comprises a total of 31 items. Three subscales measure ward level, and two subscales measure hospital level, dimensions of the nursing practice environment. Each subscale comprises between three and

ten items. Respondents are asked to rate each statement on the extent to which the items are present in their current work environment using a 4-point Likert scale of agreement (“*Strongly disagree*” to “*Strongly agree*”). Values above 2.5 indicate agreement, a value of 2.5 corresponds to a neutral midpoint, and values below 2.5 indicate disagreement that the subscale items are present in the current work environment (Lake 2002). All items are worded in a positive direction. The 12 subscale dimensions can be combined to create a composite mean providing an overall measure of the nursing practice environment (Lake & Friese 2006). Table 20 provides definitions of each of the dimensions.

Table 19: Cronbach alpha for PES-NWI subscales

Studies	Lake (2002)	Parker et al. (2010)	(McCusker et al. 2004)
Sample sizes (<i>n</i> =)	11,636	1,192	246
Location	US	Australia	Canada
Subscales (<i>n</i> = subscale items)		Cronbach α scores	
<i>Nurse participation in hospital affairs</i> (9)	0.83	0.89	0.71
<i>Nursing foundations for quality of care</i> (10)	0.80	0.81	0.71
<i>Nurse manager ability, leadership and support</i> (5)	0.84	0.71	0.77
<i>Staffing and resource adequacy</i> (4)	0.80	0.77	0.83
<i>Collegial nurse-physician relations</i> (3)	0.71	0.85	0.84

Table 20: PES-NWI subscales

Subscales	Definition	No. of items
Hospital wide dimensions		
<i>Nurse participation in hospital affairs</i>	Exploring nurses’ perceptions of involvement in policy decisions, the visibility of senior nursing staff, opportunities for career progression	9
<i>Nurse foundations for quality of care</i>	Assessing opportunities for continuing professional development, nursing standards utilising a nursing model of care	10
Unit/ward specific dimensions		
<i>Nurse manager ability, leadership and support for nurses</i>	Asking whether a supportive practice environment is provided by senior nurse managers who demonstrate effective leadership skills	5
<i>Staffing and resource adequacy</i>	Exploring staff perceptions of nurse/patient ratios, time to provide patient care	4
<i>Collegial nurse-physician relations</i>	Seeking nurses’ views on relationships with doctors	3

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4.6.3 HSoPSC and PES-NWI analysis preparation

Guidance on the HSoPSC suggests that surveys be excluded from data analysis in instances where respondents fail to answer more than half of the survey items or where less than one entire section of the survey has been completed (Sorra & Nieva 2004). In such instances case wise deletion was utilised. No such guidance is given in relation to the PES-NWI and a similar approach was adopted. Illegible, mismarked and double marked responses were recorded as missing values (Sorra & Nieva 2004). Scale items were reverse scored following each survey instrument's guidance.

Following guidance on the PES-NWI, subscale mean scores for each respondent were computed as the sum of the subscale item values divided by the number of subscale items with non-missing values; this adjustment of denominator permitted inclusion of responses from those who did not answer all items. Ward level subscale mean scores were calculated as the sum of each respondent's mean scores divided by the number of respondents for each subscale. Overall composite mean scores were calculated as the sum of the mean of the ward level subscale scores divided by the number of subscale scores; this approach gave equal weight to the subscales. No such guidance is given in relation to the HSoPC and a similar approach was adopted.

4.6.4 Sample

The HSoPSC is designed to be administered to all types of staff including non-clinical staff. The PES-NWI is designed to be administered to nursing staff only. Therefore, the sampling frame was all staff working on the randomly selected study wards.

The measures of culture and environment sought to explore before-and-after effects, or change over time. Greater precision in exploring changes in attitudes and behaviours is achieved by linking data from multiple surveys through the use of personal identifiers (Bowling 1997). Consequently, trends in associations between individual characteristics and the variables of interest can be identified and explored (Bowling 1997). Hence, a prospective longitudinal survey design was adopted with the same survey being

administered at two points in time (baseline administration at study commencement in month 0 and a follow-up administration in month 9).

The sample size was constrained by the number of staff working on each ward. Longitudinal surveys, with use of linked data, are subject to high attrition rates (Bowling 1997). Therefore, sampling of all study ward staff meeting the inclusion criteria occurred for both survey administrations.

4.6.4.1 Inclusion/exclusion criteria

Survey inclusion and exclusion criteria were the same for both the baseline and follow-up survey administrations. For participants to be included the study ward had to be their primary workplace. Participants were excluded if they were either Bank or Agency staff given the likelihood of their regularly working across a range of wards had potential to bias responses. Students, for whom the ward would not be their primary workplace, were also excluded.

4.6.4.2 Recruitment

Response rate is a key determinant of representativeness of a sample and hence of the degree of response bias (Groves et al. 2009). A systematic review of strategies to improve nurse participation in surveys concluded that postal strategies are more successful than web-based or telephone strategies (VanGeest & Johnson 2011). Discussions with Trust ward leaders identified that many ward staff did not have computer access at work. Therefore, a postal strategy was adopted to reduce coverage error and maximise response rates. Evidence also suggests the 'opt out' method of recruitment, in which participants are presented with all the appropriate information enabling them to choose whether or not to complete and return the survey, is associated with a higher response rate than the 'opt in' method (Hunt et al. 2013). Furthermore, covering letters that include a hand written signature are suggested to increase the odds of achieving a higher response rate (Edwards et al. 2009).

Consequently, survey recruitment for the baseline and follow-up administrations adopted an 'opt out' approach in which all study ward staff were provided with a survey pack comprising:

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- hand signed covering letter detailing the research study and an invitation to complete the survey within two weeks of receipt (baseline survey appendix 7, follow-up survey appendix 8)
- summary poster with the aim of engaging staff in the study (baseline survey appendices 9/10, follow-up survey appendices 11/12)
- the survey (ward clerks/housekeepers appendix 13; all other staff appendix 14)
- addressed return envelope

A further recent systematic review of methods to increase response to postal questionnaires found that the odds of response were substantially higher with follow-up contact that also provided a second copy of the questionnaire (Edwards et al. 2009). Hence, a further mailing, with the content as above but including a reminder letter (baseline survey appendix 15 and follow-up survey appendix 16), was distributed to all staff two weeks after the baseline administration. Additionally, at both survey administrations Trust managers contacted the study ward clinical matrons with a request they support ward leaders in encouraging staff to participate in the survey. Prior to the follow-up survey administration a workshop was offered to ward leaders aimed at supporting them to explore and problem solve challenges in securing staff participation in the surveys: the attendance rate was low.

4.6.4.3 Survey administration

The same process was followed for the baseline and follow-up survey administrations. Ward leaders were provided with survey packs to distribute to all ward staff. Mailings were addressed to either ward clerks/housekeepers or clinical staff. Following survey administration guidance, the former were requested to complete the HSoPSC and the latter to complete both the HSoPSC and the PES-NWI. For ease of completion the survey instruments were combined and the items age, gender, staff grade, role, years of working in the hospital and on the study ward, were added to support data analysis and screening for inappropriately completed surveys. Survey participants were also requested to complete a code that maintained anonymity but enabled data linkage between the baseline and follow-up administrations. The summary

poster was also displayed in ward staff rooms. The same process was followed for the initial and reminder administrations.

4.6.5 **Analysis**

4.6.5.1 **Data preparation**

Initial data entry utilised the Microsoft Excel 2010 spread sheet program which supported verification of accuracy of data entry through use of the double data entry function. The generated file was imported into SPSS Version 19.0 statistical package.

Preparation for survey analysis followed the plan in Section 4.6.3. Checks of minimum and maximum value and the number of valid and missing cases for each subscale item were performed. Three types of subscale mean scores were calculated for a number of subscales to explore the effect of missing values: all cases included with adjustment of the denominator in accordance with the number of missing items, exclusion of cases with a number of missing items and exclusion of cases for which all items are scored the same (for an example see Appendix 17).

4.6.5.2 **Reliability of measures**

The reliability of a subscale is a property of the survey score from a specific sample (Tavakol & Dennick 2011). Therefore, the internal consistency of the survey subscales was evaluated for this study sample using Cronbach alpha (as discussed in Section 4.6.1 para. 3).

4.6.5.3 **Descriptive statistics**

Descriptive statistics including counts and percentages were used to describe survey response rates and respondent characteristics. Respondent level subscale mean scores, ward level subscale mean scores and overall composite scores were calculated following the processes detailed in Section 4.6.3. Measures of central tendency were used to describe ward level subscale mean scores and composite mean scores.

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4.6.5.4 Bivariate measures of association

Bivariate measures of association were examined using the Kendall's tau correlation coefficient. This rank-order non-parametric test is appropriate for use in measuring the association between the short ordinal scale data (staff demographic or workforce characteristics) obtained from the survey respondents and the HSoPSC and PES-NWI subscale mean scores, composite mean scores and outcome variables (Walker & Almond 2010). Kendall's tau analyses the difference between the probability of concordance and the probability of discordance for two independent pairs of observations drawn from the distribution. The test statistic (tau) can be interpreted as a standard coefficient of correlation (r) (Walker & Almond 2010). Interpretation of results was guided by the benchmarks shown in Table 21.

Table 21 : Effect size benchmarks for correlation coefficient ' r '	
Correlation (r)	Effect size
Less than 0.10	Little or no association
0.10 to 0.29	Weak association
0.30 to 0.49	Moderate association
0.50 to 0.79	Strong association
Greater than 0.80	Very strong association
Based on Walker and Almond Walker & Almond (2010)	

4.6.5.5 Tests of differences

Normal distribution of the baseline survey subscale mean scores and composite scores was assessed using the Kolmogorov-Smirnov test. The findings suggested that a small number of survey dimensions were not normally distributed (Appendix 18). Visual inspection of histograms with normal distribution curves confirmed these findings. Both independent t tests and Mann-Whitney U tests were run for those dimensions not exhibiting a normal distribution. Comparison of results confirmed the independent t test

remained a sufficiently robust test to use for analysis of the survey results (findings are presented in Appendix 19).

Therefore, the following two-tailed statistical tests were utilised:

- Independent *t* tests to assess differences in HSoPSC and PES-NWI subscale mean scores and composite scores
- Mann-Whitney U tests to assess differences in the median values of the two HSoPSC single item outcome ordinal variables

The following analyses were performed:

- Before-and-after differences within-wards comparing each ward's baseline data and follow-up data
- Between-ward differences comparing baseline intervention and control ward data, and follow-up intervention and control ward data

A study's power to detect effects is related to sample size (Ellis 2010).

Therefore, the 3 intervention ward samples and the 3 control wards samples were aggregated to form combined intervention and control ward groups to which the above analyses were also applied.

Each of the within-ward and between-ward family of tests comprised 15 statistical tests of the HSoPSC data and five statistical tests of the PES-NWI data. The Type I error rate for most studies is commonly set at $\alpha = 0.05$ (Gordis & Khamis 2004). However, simultaneous testing of multiple outcome variables inflates the Type I error rate such that the overall error rate across each family of tests is $1 - (1 - \alpha)^n$ (n represents the number of tests) (Gordis & Khamis 2004). Consequently, the overall Type I error rate at $\alpha = 0.05$ for each family of tests for the HSoPSC is 0.54 and for the PES-NWI is 0.23; that is, there is a 54% and 23% probability respectively of declaring significance for one or more test results even if all the respective null hypotheses are true.

A range of views are presented in the literature regarding when and how it is appropriate to adjust for multiple testing so that the study wide error rate remains at 0.05. A commonly cited test procedure is the Bonferroni correction which adjusts the value for declaring statistical significance at α/n . Yet, in exploring the universal null hypothesis this is a conservative test with low power (Bender & Lange 2001). A modification of the Bonferroni correction that

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is less conservative and with more statistical power is the stepwise Holm procedure (Aickin & Gensler 1996). Yet, this too increases the risk of Type II errors (Moran 2003). Therefore, the approach adopted in this study was that suggested by Perneger (1998) of reporting unadjusted p values and 95% confidence intervals (CIs) with discussion of results giving consideration to the range of possible interpretations.

4.6.5.6 Effect sizes

A statistically significant test result indicates the probability of getting the observed result if the null hypothesis, that participation in the CAS will not have an effect upon ward staffs' perception of the HSoPSC or PES-NWI subscale being measured, is true. The p value is a confounded index that reflects both the sample size and the effect size (Turner & Bernard 2006). Hence, passing judgement on the hypothesis by giving only consideration to the p value is unreliable. Consequently, effect sizes, providing a standardised measure of the degree of change in subscale mean scores (Ellis 2010), were calculated for each measure of group difference.

Effect sizes for the measures of group differences explored by independent t tests were calculated using the Hedges' g index: this is the preferred index for small sample sizes (Turner & Bernard 2006). The formula used for estimating Hedges' g (Hedges 1981 cited Ellis 2010) was as follows:

$$\text{Hedges' } g = \frac{M_1 - M_2}{SD_{\text{pooled}}^*} \quad \text{where } M_1 \text{ and } M_2 = \text{mean scores for the two groups}$$

Calculation of SD_{pooled}^* enabled adjustment for the dissimilar sample sizes in matched pair A by pooling the weighted standard deviation for the two groups (Ellis 2010). The formula used for calculating SD_{pooled}^* (Hedges 1981 cited Ellis 2010) was as follows:

$$SD_{\text{pooled}}^* = \sqrt{((n_A - 1)SD_A^2 + (n_B - 1)SD_B^2) / (n_A + n_B - 2)}$$

where n_A and n_B are the intervention and control group sample sizes, and SD_A and SD_B the standard deviation for the intervention and control group mean scores.

Effect sizes for the measures of group differences explored by Mann-Whitney U tests were calculated using the z score and the following formula (Ellis 2010):

$$r = \frac{z}{\sqrt{n}} \quad \text{where } n = \text{total number of cases}$$

Interpretation of effect sizes was guided by the criteria shown in Table 22.

Table 22: Cohen's effect size benchmarks			
	Effect size		
Test	Small	Medium	Large
Comparison of independent means (Hedges' g)	0.20	0.50	0.80
Correlation (r)	0.10	0.30	0.50
Based on Cohen 1988 cited Ellis (2010)			

4.6.5.7 Open question comments

Comments made in response to a general open ended question of the type included at the end of the HSoPSC and PES-NWI may contribute to the survey data in a number of ways. For example, through corroborating closed question responses or through offering insights into factors not raised in the closed survey questions (O'Cathain & Thomas 2004). O'Cathain and Thomas (2004) suggest that in the former case formal analysis may not be worthwhile whilst in the latter case good practice is to develop a formal qualitative or quantitative analysis plan. Therefore, a process of reading through the open question comments was utilised to determine the type of contribution being made to the survey data and inform the consequent analysis plan.

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4.7 Process evaluation

4.7.1 Theoretical approach

The qualitative data for this study was explored within the conceptual framework of the Normalisation Process Theory (NPT). NPT characterises implementation of a complex intervention as a social process the outcome of which is dependent upon the collective action of intervention participants (May & Finch 2009). This theoretical approach provided a structured conceptual framework within which to explore how the CAS was embedded into routine practice and to identify the factors that promoted or inhibited successful implementation. NPT identifies the four core domains of *coherence*, *cognitive participation*, *collective action* and *reflexive monitoring*.

4.7.1.1 *Coherence*

NPT claims that for an innovation to become embedded into routine clinical practice it must make sense to the actors involved, they must individually understand its purpose and utility for their work, and its differences from other practices (May & Finch 2009). Additionally, a communal specification of its meaning, uses and utility is developed as those actors involved in its processes share their experiences and learning about the intervention. NPT proposes that this communal specification of the advantages or disadvantages of the intervention over other processes is the means by which coherence is developed. The degree of coherence attached to an intervention affects the potential for embedding into routine practice.

4.7.1.2 *Cognitive participation*

Having made sense of the intervention, embedding of the intervention is dependent upon the engagement of a range of actors with the material practices required by the intervention (May & Finch 2009). First there is a requirement for initiation of the new practice by key actors. These key actors also serve as leaders in enrolling other key actors required to perform the tasks and processes associated with the intervention. Enrolment in these chains of interactions may either be on a voluntary or mandatory basis. These

actors may be located across the micro, meso and macro systems. This process of enrolment is underpinned by a process of collective validation and reassurance such that participation in the process is seen to be a legitimate activity. This is followed by the activation of team contributions to the tasks required by the intervention. NPT proposes that factors which promote or inhibit the participating actors from interacting and organising themselves into this shared purpose will be influential in determining how, or whether, the intervention is embedded into practice.

4.7.1.3 *Collective action*

Collective purposive action by the enrolled actors is then required to bring the new intervention into practice (May & Finch 2009). This action comprises a number of elements. First, skill set workability: this comprises the work actors undertake in shaping skills required to perform the material practices required by the intervention and the associated division of labour. Second, interactional workability, comprising the material practices that actors do to operationalise the intervention. Third, relational integration, that is, the work required in integrating the intervention within the context and across the wider organisation; this includes how actors understand and relate to the actions of those around them, and assessments of factors such as perceptions of accountability and trust and confidence in the actions of others. Fourth, contextual integration: this focuses on how the intervention is incorporated into the social context.

4.7.1.4 *Reflexive monitoring*

Finally, embedding of an innovation into routine practice requires a process of ongoing appraisal and adjustment of the intervention (May & Finch 2009). Appraisal consists of two elements. Individual appraisal comprises the informal judgements an actor makes of the value of the intervention based upon their experiential knowledge of the processes and outcomes. Communal appraisal comprises the formalised institutional judgements made about the utility and effectiveness of the intervention. These appraisals underpin commitment to continuing engagement with the intervention. Both individual and communal appraisal may lead to actions that attempt to modify or subvert the tasks and processes associated with the intervention.

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4.7.2 Methods

Qualitative data collection sought to explore the process of implementation of the CAS and the feasibility of embedding the CAS into routine clinical practice. Study methods in qualitative research typically involve interactive approaches such as focus groups or interviews in which the interaction between researcher and participants enables spontaneous exploration of emergent topics/themes (Ritchie & Lewis 2003).

Interviews consist of individual one-to-one discussions that support collection of detailed individual accounts and meanings (Holstein & Gubrium 2009). In contrast, a key concept of focus groups is the generation of a collective construction of meaning relating to the discussion topic; this arises as a result of verbal interaction amongst a small number of people in a group discussion (Creswell 2007). Hence, both interviews and focus groups are social situations in which data is generated through the interaction between the researcher and the interviewee (Mason 2002). Use of either method presupposes that interviewees will be able to verbalise, interact, conceptualise and remember in order to formulate answers (Lambert & Loisel 2008). Both methods most commonly utilise a semi-structured topic guide to present key topics and questions (Holloway & Wheeler 2010). Thus, focus groups or interviews were equally valid methods for this study.

It is suggested focus groups, through the process of discussion and social interaction which enables probing and challenging of reasons, opinions and views, generate more realistic and fuller participant accounts (Patton 1990). However, evidence also suggests that using natural groups in which power dynamics exist, such as occurs in clinical microsystems with different staff grades and roles, may inhibit effective discourse (Wilkinson 2009). Therefore, a semi-structured interview method was adopted.

Interviews were conducted on two occasions. The initial interviews occurred approximately two months after each intervention ward had participated in a CAS review. This enabled exploration of staff experiences of, and views on, the CAS following the initial phase of activity associated with preparation for,

and participation in, the accreditation review. The second round of interviews occurred approximately six months after the initial interviews: these sought evidence of sustained engagement with the CAS following receipt of the review feedback, and preparation of a quality improvement plan and ward re-review if applicable.

4.7.3 **Maintaining trustworthiness**

The following approaches supported the quality, or trustworthiness, of the qualitative data strand. Peer review and peer debriefing provided an external check on the research process (Creswell 2007). Audio-recording of interviews reduced recall bias (Bowling 1997). These activities sought to ensure the feasibility of the account developed and thus the credibility of the findings (Bryman 2008). An audit trail was developed and included methodological reporting to support study replication, provision of raw data, information about the development of the interview topic guide and piloting, provision of a full account of the theories and ideas that informed the research, fieldwork notes and production of a thesis integrating the above. This sought to support transparency of the research process thus enabling others to judge the dependability of this study through exploration of the consistency, accuracy and repeatability of the results (Flick 2007) .

Field notes and observations in the form of a reflexive diary were made as the study progressed. This process enabled critical analysis of the status position taken by the researcher in the field and of their own role in the research process (Koch 2006). Such reflexivity supported confirmation of findings. Finally, the provision of thick description and detailed accounts sought to provide sufficient information to enable others to make reasoned judgements regarding the transferability of findings to similar settings and populations (Mason 2002) .

4.7.4 **Fieldwork**

A range of supporting fieldwork activities were undertaken to support the qualitative strand. These included regular meetings with the CAS administrator and study ward leaders, and attendances at the monthly Trust Working Group Meetings, study ward meetings and the Trust Nursing Forums. Meeting

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minutes and supporting Trust documents were collected. Fieldwork notes of observations, in the form of a diary of events as they occurred chronologically, were made. The purpose of these was to more fully capture contextual and process information associated with implementation of the CAS (Mulhall 2003). Notes were reviewed to identify contextual and process information that supported interpretation of the formal qualitative and quantitative data analysis.

4.7.5 Sample

The process evaluation sought to explore key participants' experiences of the process of implementation and the feasibility of embedding the CAS into routine clinical practice. The logic model previously introduced in Figure 3 highlighted that all ward staff can be considered as resources inputting into the CAS process. Hence, the sample frame was all staff on the three intervention wards.

A small sample size is adequate to support a research question which has a narrow focus and is based in local practice (Baker & Edwards no date). Consequently, a quota sample and stratified approach of one Band 7, one Band 5-6, one Band 1-4 from each intervention ward, was adopted to ensure a variety of participants with variability in experiences and views were obtained. Screening questions in relation to staff grade, working practices, work experience and demographics were developed to ensure maximum representativeness amongst selected participants. The logic model also highlighted that clinical matrons were potential targets of the outputs from the CAS. Fieldwork activities as the study progressed also highlighted their role in supporting implementation of the CAS upon their wards. Therefore, the sample frame for the second phase of interviews was revised to include the clinical matrons for the three intervention wards.

A maximum of three interview participants from each intervention ward were sought for each round of interviews, creating a maximum of 18 ward staff interviews. Additionally, interviews with five clinical matrons were sought. Thus, in total, 23 participants were sought for interview.

4.7.5.1 Inclusion/exclusion criteria

In order to ensure the sample provided maximum opportunity for selection of information rich cases, inclusion criteria were developed enabling deliberate selection of participants who reflected features of relevance to this study. To be included in this study participants had to have:

- the intervention ward as their primary workplace
- worked on the intervention ward for the three months prior to study commencement: this ensured participants had some experience of the ward's routine clinical practices prior to implementation of the CAS
- an active knowledge of, and an interest in discussing, the CAS

Participants were excluded if they:

- were Bank or Agency staff given the likelihood of their regularly working across a range of wards had potential to bias responses
- were students for whom the intervention ward would not be their primary workplace
- did not speak English (due to study limitations it was not possible to arrange for a translator)
- were unable to participate in an interview lasting a minimum of 30 minutes

4.7.5.2 Recruitment

For the first round interviews, intervention ward leaders were provided with a recruitment pack to distribute to all ward staff. The mailing comprised a:

- letter inviting expressions of interest (Appendix 20)
- summary poster with the aim of engaging staff (Appendix 21)
- a Participant Information Sheet (Appendix 22)

Ward leaders were also requested to display the summary poster in ward staff rooms and communication folders. Contact by interested parties was requested to be made within two weeks of receipt of the letter of invitation.

Second round interviews took place in month 11 and aimed to enable staff to complete their narrative of the implementation and embedding of the CAS on

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their ward. Hence, a longitudinal approach in which those who participated in the first round interviews were invited to participate in a further interview was adopted. Only two out of the five first round interview participants agreed to be re-interviewed. Therefore, the recruitment process for the first round interviews was repeated. Additionally, individually addressed recruitment packs comprising a letter inviting participation (Appendix 23) and a participant information sheet (Appendix 24) were distributed using both e-mail and post to the clinical matrons.

4.7.6 Data collection

4.7.6.1 First round interview topic guide

The aim of qualitative data collection was to explore staff experiences of the process of implementation of the CAS and the feasibility of embedding the CAS into routine clinical practice using the conceptual framework of NPT. The core domains of NPT provided a set of topics and issues indicating that both descriptive evidence of people's experiences and views, and evaluative elements such as attitudes, were being sought. There was a requirement to cover these topics and issues broadly and consistently with all participants (Ritchie & Lewis 2003). Hence a topic guide, suggested to be critical to the formulation of an effective semi-structured research interview (Gillham 2005), was developed as follows.

Content mapping questions, or broad categories from which a set of questions each with a shift in focus, were developed for each of the NPT core domains (Ritchie & Lewis 2003). For example, the broad question of *"What specific activities did you have to do in relation to the CAS?"* sought to explore the NPT domains of cognitive participation and collective action whilst the question *"Can you tell me about the work that is now being done on the ward in relation to the CAS?"* sought to explore the NPT domain of reflexive monitoring.

For each question a series of probes and prompts, or content mining questions, supporting elicitation of more complete answers were identified (Berg 2007). NPT considers implementation of a complex intervention to be dependent upon the collective action of the individuals working in the

intervention setting (May 2013). Therefore, the content mining questions sought to explore both the interview participant's personal experiences and actions, and their observations of their colleagues' experiences and actions. For example, the content mining questions for "*What specific activities did you have to do in relation to the CAS?*" included "*What did your colleagues have to do when the ward started the CAS?*" and "*What impact did this have upon their normal daily work on the ward?*". Sequencing and presentation followed the suggestions by Patton (1990) of an initial descriptive easy to answer question followed by questions eliciting interpretations, opinions and feelings, and a final summing up question. Question wording aimed to be clear, singular, open ended and neutral (Patton 1990).

4.7.6.2 Piloting

The first round interview topic guide was piloted with two members of staff, of differing staff bands/roles, from two of the CAS pilot wards. The interviews were audio-taped, transcribed verbatim and their content assessed to determine whether questions elicited the types of responses anticipated (Gillham 2005). Additionally, verbal feedback on the interview process, content and interviewer approach was sought. A requirement for minor adjustments to the topic guide to reflect the experience and seniority of interview participants was indicated. Gillham (2005) suggests an interview duration above one hour will result in fatigue and a drop in data quality; the pilot interviews lasted approximately 30 minutes. The interview topic guide developed for the first round of interviews may be found in Appendix 25.

4.7.6.3 Second round interview topic guides

Brief interim summaries were developed for each intervention ward utilising fieldwork observations, preliminary analysis of the baseline survey data, patient experience and safety indicator data, and first round interview data (Appendix 26). These provided a preliminary synthesis of what was known thus far about the CAS on the study wards, facilitated exploration of the quality of the data collected thus far, and indicated emerging questions and areas meriting further exploration (Miles & Huberman 1984). These supported development of the following second round interview topic guides:

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1. Topic guide that aimed to support staff being re-interviewed to complete their narrative of the implementation and embedding of the CAS on their ward (appendix 27)
2. Topic guide for participants who were not interviewed in the first round combining the initial first round interview guide and that developed for use with participants who were being re-interviewed; it was anticipated these interviews would be of a longer duration (Appendix 28)
3. Topic guide for clinical matrons reflecting their different role in the CAS processes as a result of their seniority (Appendix 29)

4.7.6.4 Interview procedure

Interview participants were invited to indicate a convenient date/time and location (Trust premises or their own home) for interview. Participants were made aware they were free to change or cancel the interview appointment at any time and provided with a contact telephone number. All participants were interviewed on the Trust premises. All participants completed the interviews. No amendments were indicated as necessary to either the procedure or interview topic guides as the interviews progressed. The conduct of all interviews followed the preparation, orientation, substantive and closure phases recommended by Gillham (2005).

The first round interview durations were between 10 and 45 minutes; the interview duration for those participants who were re-interviewed was similar to that of the first round interviews. Second round interviews in which the combined first and second round interview topic guide was utilised lasted between 40 minutes and 1 hour 15 minutes.

A total of 11 interviews were conducted: five ward staff were recruited to the first round interviews, two participants were re-interviewed, an additional three ward staff and one clinical matron were recruited to the second round interviews. Insufficient potential participants were forthcoming to warrant use of the screening questions for matching participants against the quota sample. Therefore, there was no requirement to send a thank you letter (Appendix 30) to those who were not selected.

4.7.7 Analysis

Qualitative data for each intervention ward were analysed using a theoretically driven (NPT) matrix based framework for ordering and synthesising the data. This deductive approach supports the systematic within-ward and between-ward analysis and interpretation of qualitative data (Ritchie & Lewis 2003). The stages of data analysis were as follows:

4.7.7.1 Developing the matrix based framework

The structure of the over-arching matrix was provided by the four NPT domains and their associated sub-concepts (Section 4.7.1). Interrogatory questions to ask of the data in relation to each sub-concept were identified via a range of activities (for a schematic example see Figure 10). The over-arching matrix and interrogatory questions may be found in Table 23.

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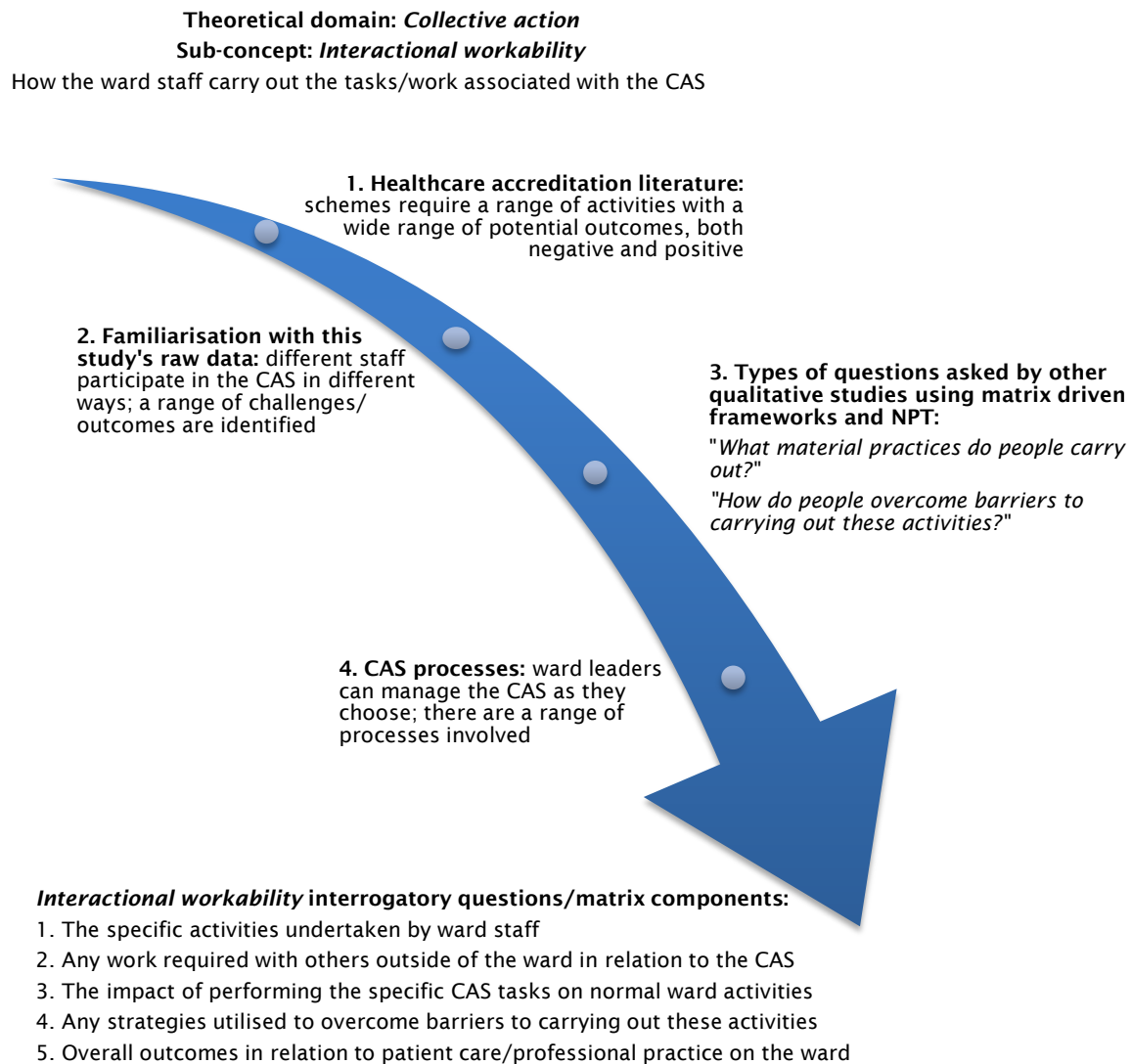


Figure 10: Schematic of matrix development for NPT sub-concept "*Interactional Workability*"

Table 23: Interrogatory questions for NPT driven matrix based framework		
Topic	Sub topic	Descriptions
Coherence (sense-making / attribution of meaning)	<i>Differentiation</i>	What are considered to be the differences between this scheme and current ways of working/other Trust/ward initiatives Staff's understanding of the different processes and tasks associated with the CAS
	<i>Communal specification</i> (shared understanding)	The team understanding of the scheme aims, objectives and expected benefits The things that happen in order for the team to gain an understanding of the CAS
	<i>Individual specification</i> (individual understanding)	The individual participant's understanding of their own tasks and responsibilities within the CAS What the individual participant does to learn about/understand the CAS and their specific responsibilities and tasks Other initiatives/drivers/issues of care/policies and procedures the individual relates to in understanding/making sense of the CAS
	<i>Internalisation</i>	Activities individuals do to be able to attribute worth to the CAS e.g. relating personal experiences of clinical practice on the ward and how this relates to their own work or other initiatives/drivers/issues of care etc.
Cognitive participation (legitimising the scheme and enrolling into the scheme)	<i>Initiation</i> (organising contributions)	Activities that key staff members do to drive the CAS forwards including organising their individual contributions to tasks
	<i>Enrolment</i> (organising participation in the CAS)	How individuals required to work on the CAS are informed about the scheme The processes/activities/communication strategies used to engage staff with the scheme and motivate staff to participate in the scheme Any sources of help/assistance external to the ward used in the process Team engagement with the CAS Individual staff member's engagement with the CAS Any consensual or coercive means that initiate and regulate conduct in relation to the CAS
	<i>Legitimation</i> (making participation in the CAS the right thing to do)	Any other individuals consulted to seek reassurance about the appropriateness of the scheme Other initiatives/drivers/issues of care/policies and practices staff relate the CAS to in order to reassure about the scheme Activities undertaken to encourage team members to feel that they can make a valid contribution Whether staff feel the CAS is the right thing to be doing
	<i>Activation</i> (organising a team contribution to tasks)	Ensuring ward staff continue to support the CAS Development of a collective understanding of activities needed to ensure sustained work towards the CAS Broadening the team contribution to CAS associated tasks
Collective action (mobilising skills and	<i>Skill set workability</i> (the link between the CAS and the staff	Any requirement for ward staff to learn new skills or do things differently The availability of staff on the ward with the right skills Any specific skills required from others outside of the ward

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resources)	skill set)	Any reallocation/ redistribution of normal work activities on the ward Any strategies utilised to overcome barriers
	<i>Interactional workability</i> (actual material practices performed)	The specific activities undertaken by ward staff Any work required with others outside of the ward The impact of performing the specific CAS tasks on normal ward activities Any strategies utilised to overcome barriers to carrying out these activities Overall outcomes in relation to patient care/professional practice on the ward
	<i>Relational integration</i> (accountability, trust and confidence)	Who was responsible for carrying out the activities (roles/responsibilities) Any impact of the CAS on the way ward staff work with one another or relate to one another or external staff Perceptions as to who is accountable for the work associated with the CAS Perceptions of the sources of authoritative knowledge and practice in relation to the CAS (confidence) Assessment of the actions of those working on the CAS (confidence in their work and expertise, assessment of their credibility) and assessment of the scheme processes and outcomes (trust in them/their credibility) Any strategies utilised to overcome barriers
	<i>Contextual integration</i> (support and resources for the CAS)	Any external resources/support that are allocated to the ward Any additional ward resource requirements/diversion of resources in order to be able to participate in the CAS The processes/individuals in the organisation making it happen or wanting it to happen (exercising authority) Any contextual factors that hinder integration Any strategies utilised to overcome barriers
	<i>Systemisation</i> (using knowledge about tasks)	Whether/how participants collect/receive information in relation to the CAS Whether this is used to determine how effective/useful the scheme is for them
Reflexive monitoring (appraising information and reconfiguring actions)	<i>Communal appraisal</i> (shared evaluation of contribution and tasks)	Team appraisal of the validity and usefulness of the CAS processes/tasks (and their effectiveness) Team appraisal of the worth of the scheme - usefulness, goals The shared commitments and values of the ward team towards continuing engagement with the CAS or to alter tasks/activities
	<i>Individual appraisal</i> (individual evaluation of contribution and tasks)	Individual participant's appraisal of the validity and usefulness of the CAS processes/tasks (and their effect on the individual's routine tasks) Individual participant's appraisal of the worth of the scheme Individual participant's motivation to continue engagement with the CAS or to alter specific tasks/activities
	<i>Reconfiguration</i> (changing tasks)	The work patterns ward staff engage in in order to continue the CAS Any changes staff make to the process itself

4.7.7.2 Mapping the data

Conceptually ordered display matrices were developed for each NPT domain. The columns comprised a sub-concept's interrogatory questions. The rows represented interview respondents and were ordered by ward and within each ward by staff grade. Interview transcripts were systematically explored for evidence relating to each interrogatory question; relevant chunks of data were extracted and entered into the corresponding matrix column and row. Table 24 provides an example of a section of the matrix developed for the NPT coherence domain.

Table 24: Conceptually ordered matrix for NPT coherence domain	
Ward/ participant	Interrogatory question: the team understanding of the scheme aims, objectives and expected benefits
Ward AI, participant 2, ward leader (phase II)	<i>"... probably because there is always so much going on the ward at one time, it's very difficult to communicate with all staff personally, em, so we, you know, yes we have displays on the ward, we had it in our newsletter, I talked to plenty of people and quite probably missed some, and some people walk round with their eyes closed a bit as well don't they? So if when someone came on the ward and asked that member of staff "What do you know about the CAS?" they'd probably say "I don't know anything" or just know a little bit about it." (line 207)</i>
Ward AI, participant 3, housekeeper (phase I)	<i>"... I ... might sort of say oh, about the visit, some, that ... actually I've had a few people say: "Oh what visit's that?" And that is really, like, ... even though it's all up in the office and we've had, like, newsletters about it, and it's up on, on the board in the office and stuff, which I found, like, a couple of people said: "Oh what visit?" And I've been preparing it for the last couple of months, it's sort of like, Ooh, what do you mean what visit?" (line 194)</i>
Ward BI, participant 1, ward leader (phase I)	<i>"I am constantly saying to staff and trying to achieve the same things and trying to drum the same things into them all the time. So they know this is an on-going process; they know this wasn't a one-off review that we've got to continue to maintain the standards." (345)</i> <i>"I'm not sure they [team] still realise it's an on-going process. If I'm really truthful I think they think it was just that window that we were working towards and once we'd achieved it that's it." (line 413)</i>
Ward/ participant	Interrogatory question: the things that happen in order for the team to gain an understanding of the CAS
Ward AI, participant 2, ward leader	<i>"... we were given a kind of resource folder of certain things, you know, recommendations, to do, so we worked through that. I got some of the team involved, got them some information out." (line 43)</i>

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4.7.7.3 Creating categories and concepts

Each section of raw data was then summarised to extract the key elements. Table 25 provides an example of the matrix developed for the NPT coherence domain organised under the interrogatory question *“What is the team understanding of the scheme aims, objectives and expected benefits?”*

Table 25: Creating categories and concepts		
Interrogatory question: the team understanding of the scheme aims, objectives and expected benefits		
Summarised raw data	Elements	Categories
Ward AI, participant 2, ward leader (phase II) Ward always busy. Used a range of written communication strategies with staff, spoke to some staff personally, difficult to communicate with all staff personally; some people probably didn't observe displays; staff know a little or nothing about the CAS (line 207)	Busy all time Used range of communication strategies Didn't manage to talk to everyone Some people don't pay attention Some know a little Some don't know about anything	Staff availability Staff receptivity Limited understanding No knowledge
Ward AI, participant 3, housekeeper (phase I) Mentioning visit to people but they would ask “what visit?”. Had information display up and in newsletter. Been preparing for months (line 194)	Mentioning visit to people People not aware Information been supplied	No knowledge
Ward BI, participant 1, ward leader (phase I) Reminding staff need to maintain standards. Reminding on-going process, not one-off review. Team think it's finished.	Constantly reminding staff maintaining standards Staff view one-off-process Process been completed	One-off-process Limited understanding Having different perspectives

Categories were then grouped under higher order concepts as shown in Table 26.

Table 26: Creating categories and higher order concepts		
Interrogatory question: the team understanding of the scheme aims, objectives and expected benefits		
Interrogatory question	Categories	Concepts
Team understanding	No knowledge Limited understanding One-off-process Having different perspectives	Degrees of scheme understanding
	Staff availability Staff receptivity	Barriers to team understanding

This was an iterative process with both categories and higher order concepts inductively emerging and evolving as the key elements across all cases were continuously re-examined and refined. For a table of all emergent categories and concepts for each NPT domain see Appendix 31.

4.7.7.4 Ward display matrices

Clustered matrices were then developed for each ward and each NPT domain. This supported systematic comparison/contrast of responses between interview participants from a single ward (Miles & Huberman 1984). Table 27 shows a section of the matrix developed for the NPT coherence domain and ward AI. A meta-matrix for each NPT domain was also developed to support systematic comparison/contrast of responses between wards (Miles & Huberman 1984). Table 28 shows a section of the meta-matrix developed for the NPT coherence domain.

Appendix 32 provides the ward clustered matrices and meta-matrices for each NPT domain.

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Table 27: Ward display matrix
AI NPT coherence (sense making/attribution of meaning) domain

Interrogatory question	Concept	Participant categories		
		Participant 2, ward leader	Participant 3, house keeper	Participant 8, matron
Scheme differences	Distinguishing features	Simplified measure		Simplified measure
Process and task understanding	Levels of participation	Key actor	Effective actor	Effective actor
	Degrees of process understanding	Extensive understanding	Task specific understanding	Extensive understanding
Team understanding	Degrees of scheme understanding	No Knowledge	No knowledge Having different perspectives	
	Barriers to team understanding	Staff availability Staff receptivity		
Team learning activities	Learning facilitators	Senior staff facilitation		
	Tapping into existing processes	Ward newsletter	Ward newsletter	
	Educational strategies	Resource sharing Facilitating discussions Information display	Information display	
	Modelling activities			
Individual understanding	Supporting microsystem performance			In-depth ward appraisal Improve quality of care Supporting staff experience
	Facilitating mesosystem performance	Trust quality assurance		Trust quality assurance
Individual learning activities	Individual learning activities	Utilising scheme resources Consulting experienced others		Consulting experienced others
Sense making activities	Drawing on self		Drawing on experiential learning	
	Relating to internal activities		Relating to Trust activities	

Table 28: All wards display matrix					
NPT coherence (sense making/attribution of meaning) domain					
Interrogatory question	Concept	Ward categories			
		Ward AI	Ward BI	Ward CI	Ward BC
Scheme differences	Distinguishing features	Simplified measure	Context specific Lacking distinction		Team recognition
					Key actor
Process and task understanding	Levels of participation	Key actor Effective actor	Key actor Effective actors By-stander	Key actor Effective actor	
	Degrees of process understanding	Extensive understanding Task specific understanding	Extensive understanding Limited understanding	Extensive understanding	Extensive understanding
Team understanding	Degrees of scheme understanding	No Knowledge Having different perspectives		Limited understanding Having different perspectives	
	Barriers to team understanding		One-off process		
Team learning activities	Learning facilitators	Senior staff facilitation	Senior staff facilitation	Senior staff facilitation	
	Tapping into existing processes	Ward newsletter	Ward meetings	Morning "Top-Tips"	
	Educational strategies	Facilitating discussions Information display Resource sharing	Facilitating discussions	Facilitating discussions Information display Resource sharing	
			Disseminating data Introducing QI tool	Introducing QI tool	
	Modelling activities		Putting into context Seeing in action		
Individual understanding	Supporting microsystem performance	Improve quality of care In-depth ward appraisal Supporting staff experience	Improve quality of care Supporting staff experience	Improve quality of care	
				Measuring ward performance Educating staff	

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4.8 Data integration and interpretation

Data integration is a key aspect of mixed methods research (Creswell et al. 2004). O' Cathain (2010) describes this process as enabling a "conversation" between the qualitative and quantitative components of a study. This conversation yields greater insights than those available from independent qualitative and quantitative studies. Data integration for this study occurred in two ways.

Preliminary analysis of data from months 0-8 was used to support the development of interim ward summaries (for fuller details see section 4.7.6.3 and Appendix 26). Qualitative and quantitative data were then interrogated to identify new questions and areas meriting further exploration which could be incorporated into second round interviews. Box 3 provides an example of this.

Box 3: Example of integration of preliminary data analysis (ward AI)

Quantitative data analysis (measures of effectiveness)

1. Safety data: falls and pressure ulcers showing points above upper control limit; patient experience data: 5/7 question responses showing shift below centre line which represented deteriorating patient experience
2. Question arising: the effect of the CAS upon staff use of CQD data?
3. Interview topic guide question: *"What effect has the CAS had on how you review and use your CQD data?"*

Qualitative data analysis (process evaluation, first round interviews)

1. Limited evidence of motivation to continue with work associated with the CAS
2. Gap in data: exploration of reflexive monitoring
3. Interview topic guide question: *"I have the impression that most of the effort that wards put into the CAS focused around preparing for the assessment, what do you think needs to happen in order to sustain the momentum that preparing for the CAS built up?"*

When the analysis was further advanced, integration was achieved by pulling together the quantitative and qualitative data for each case, that is, each intervention ward. A matrix was used to summarise and display the data together allowing comparison and examination (O'Cathain 2010). From this work a meta-matrix summarising the quantitative and qualitative evidence of effects or change for each ward was developed: this followed the format suggested by Miles and Huberman (1984) in which the columns represented each ward and the rows displayed the quantitative and qualitative findings. The effects/change matrix may be found in Appendix 33.

This was used to systematically compare findings from different components of the study within and between wards. Alongside this work, the HSoPSC and PES-NWI survey subscale findings were re-examined to identify relevant contextual information that supported or challenged the interpretation of the qualitative findings. For example, the finding in the qualitative data that ward leaders perceived 'overburdened staff' was confirmed in the HSoPSC "*Staffing*" and PES-NWI "*Staffing and resource adequacy*" subscale data. This process of identification of convergences and contradictions between the qualitative and quantitative findings strengthened the inference making process (Teddlie & Tàshakkori 2009). This led to an enhanced level of clarity, or according to O'Cathain (2007) a state of "crystallisation" whereby the insights offered by the different data sources were brought together. The results of this analytical integration are presented in the discussion chapter.

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4.9 Study timescales

Figure 11 provides a schematic of the study data collection timings.

Figure 11: Schematic of the study data collection timings												
Study month	0	1	2	3	4	5	6	7	8	9	10	11
Ward AI: intervention	Baseline administration of staff surveys				Round 1 Interviews Week 1-2					Follow-up administration of staff surveys	Round 2 Interviews Week 3-4	
Ward AC: control												
Ward BI: intervention					Round 1 Interviews Week 3-4							Round 2 Interviews Week 1-2
Ward BC: control												
Ward CI: intervention						Round 1 Interviews Week 1-2						Round 2 Interviews Week 3-4
Ward CC: control												
Clinical indicator data (safety) from CQDs for all study wards, study months 0 to 11 (+ 6 months historical data)												
Patient survey data for all study wards, study months 0 to 11 (+ 6 months historical data)												

4.10 Ethical considerations

Ethical standards were maintained in accordance with the requirements of the Research Governance Framework for Health and Social Care (DoH 2005) by management of the following factors:

4.10.1 Participant consent for interview

The process of giving prospective subjects the opportunity to make informed autonomous decisions regarding participation in research is a key ethical requirement. It consists of adequate disclosure of information, and ensuring comprehension and on-going voluntariness (Grady 2007). Additionally there is the stipulation that researchers actively seek informed consent (National Research Ethics Service (NRES) 2011). Therefore, the following processes were employed to ensure on-going informed consent was obtained:

1. A Participant Information Sheet (Appendix 22) identifying the purpose of the research and what is expected of participants was developed following the NRES guidance (NRES 2011). This was provided to potential research subjects as part of the recruitment process (Section 4.7.5.2).
2. Telephone contact was made with potential participants to provide an opportunity for participants to raise questions, seek further clarification and to ensure participants had adequately comprehended the Participant Information Sheet.
3. Written consent was obtained prior to commencement of the interview. The consent form (Appendix 34) was developed following the NRES (2011) guidance. Ongoing consent was ensured through informing participants they were free to withdraw from the study at any time without needing to give a reason.

4.10.2 Interview participant well-being

This was supported through the following mechanisms:

1. Participant inconvenience was minimised through inviting them to indicate a preferred date, time and venue for interview.
2. Participants were made aware they were free to cancel the interview appointment, or withdraw from the study, at any time.
3. Interviews may provoke distressing psychological and emotional responses (Holloway & Wheeler 2010). Should a participant have become distressed during the interview, the interview would have been halted, and the interviewee would have been encouraged to contact their ward leader, clinical matron or occupational health department as appropriate. This eventuality did not occur.

4.10.3 Participant consent for surveys

The 'opt out' method of recruitment, in presenting participants with all the appropriate information, ensured that a fully informed decision to participate was made (Hunt et al. 2013).

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4.10.4 Confidentiality and anonymity

The following processes were employed in order to ensure the ethical and legal duties in relation to confidentiality (DoH 2005) were attained.

1. Minimal personal data enabling contact with participants was collected, stored in a secure fashion, and was only available to the researcher/research supervisors.
2. Consent forms were stored in a secure location at the Faculty of Health Sciences.
3. Computer data files for analysis (transcribed interview scripts) were stored on a password protected computer and allocated the ward notation (see below) and the participant's staff role to ensure anonymity.
4. Anonymised hard copies of the data transcripts were stored separately to the contact details. The only link between the identifying information and the data transcripts was the ward notation and participant's role which were kept with the personal data.
5. The thesis withheld information, such as specific Trust details and interview participant workforce characteristics, to minimise potential for identification of the Trust/study wards/participants.
6. Participants were made aware that any interview comments could be excluded from the analysis if they so requested.
7. Upon completion of the study, data was removed from the computers. Computer data, digital recordings and relevant paperwork were handed to the University of Southampton. The procedures for the handling, processing, storage and destruction of data accord with the Data Protection Act 1998 requirements.

4.10.5 Ethical approval

Ethical approval for this study was obtained from the Faculty of Health Sciences, University of Southampton, Ethics Committee (Ethics Number 2904).

4.10.6 Research governance

Research governance approval was obtained from the Trust in which this study was carried out (NHS Research and Development approval reference RHM MISC0008). The Trust also acted as the research sponsor.

4.11 Ward notation

The notation used throughout this thesis, in order to preserve ward anonymity, is as shown in Table 29.

Table 29: Matched pairs notation		
Matched pairs	A, B and C	
Wards	I = intervention ward	C = Control ward
Matched pair A	AI = Intervention ward	AC = Control ward
Matched pair B	BI = Intervention ward	BC = Control ward
Matched pair C	CI = Intervention ward	CC = Control ward

4.12 Chapter summary

The key features of this study, as summarised in Figure 12, are:

- this is a controlled before-and-after study using parallel mixed methods
- matched pairs of control and intervention wards were studied over a 12 month period
- standardised routine safety indicators and Picker Inpatient Experience survey data were used to explore the effectiveness of the CAS
 - data were analysed as trends over time using SPC charts
- the HSoPSC and PES-NWI survey instruments were used to explore the effect of the CAS on ward culture and environment
 - data were analysed using tests of before-and-after differences between matched intervention/control wards
- a process evaluation, employing semi-structured interviews, explored staff experiences and views of the CAS
 - data were analysed within an NPT driven matrix
- findings from each data strand were displayed in an effects/change matrix; this was used to support the inference making process

4. Methods

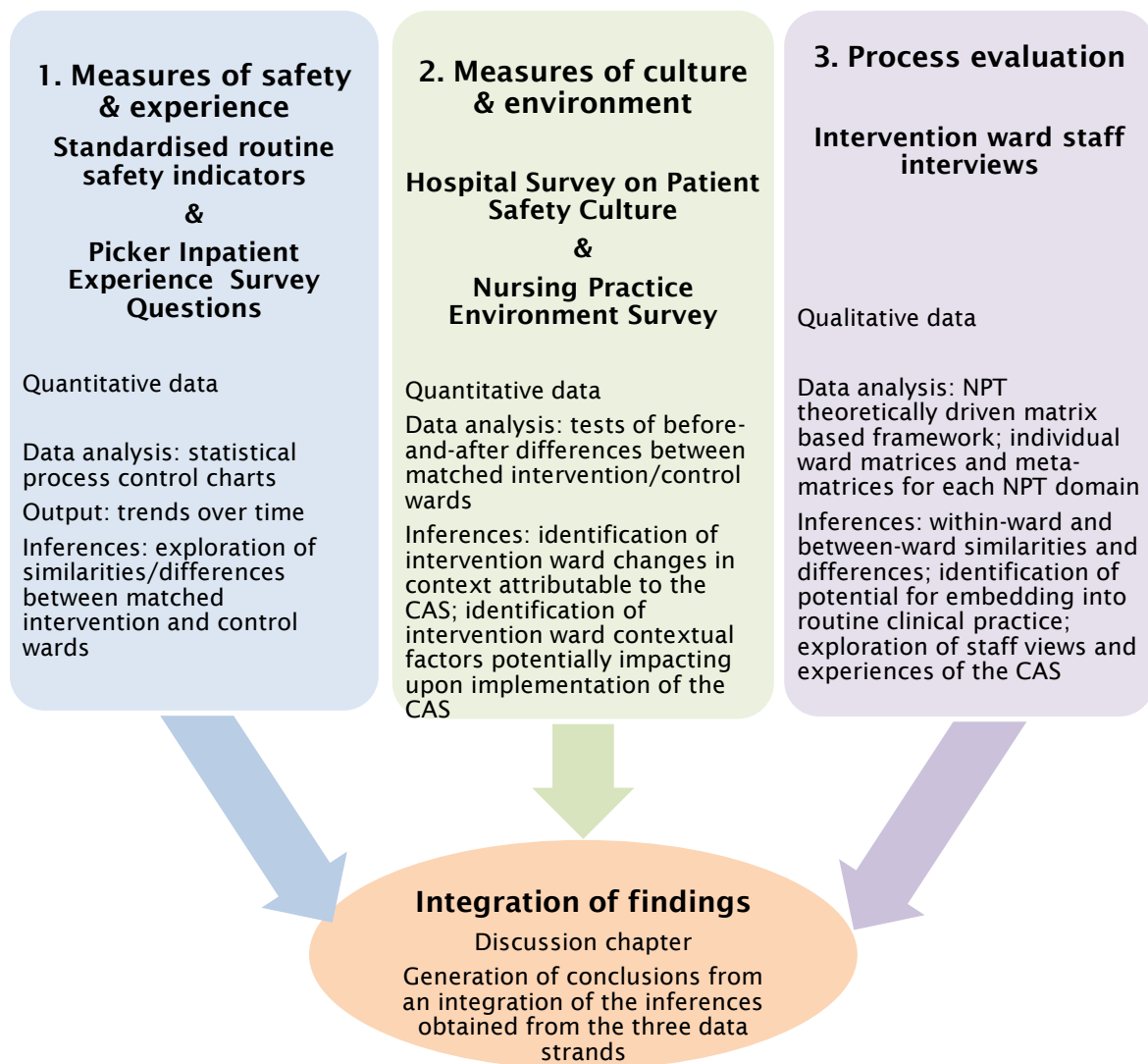


Figure 12: Schematic of data collected, analysis methods and outputs

The following chapter provides an introduction to the key contextual features of each of the matched pairs of wards.

5. Introduction to the matched pairs

This study explored outcomes from three matched pairs of adult general medical and surgical wards. Provided below is a brief summary of the key characteristics of each of the study wards. Each matched pair's intervention and control ward are presented alongside one another in order to enable background contextual information to be compared and contrasted.

5.1 Matched pair A

Matched pair A consisted of two cardiothoracic wards. Table 30 provides a summary of each ward's key characteristics.

Table 30: Matched Pair A - Cardiothoracic		
	Intervention ward (AI)	Control ward (AC)
Speciality	Cardiovascular and thoracic	Vascular surgery
Other admission criteria	Outliers of any type	Mainly other cardiothoracic cases but also outliers of any type
General mode of admission	Elective and all other modes	Elective and all other modes
Number of beds	28	22
Approximate patient age range	Adult	Adult
Prevalent age group	50s-80s	70s-80s
Mixed or single sex	Mixed with single sex bays	Mixed with single sex bays
General level of patient acuity¹⁶	1a: 35% 1b: 65%	<i>Information not supplied</i>
Average length of stay	Variable from 24 hours to months	Variables from 24 hours to months

The intervention ward was described by their ward leader as a busy environment with a supportive team who were generally aware of the ward problem areas. The ward leader had held the position for a number of years and was participating in the Trust Leadership training. There were minimal

¹⁶ 1a = patients requiring regular observations, requiring low level nursing input but with the potential to deteriorate

1b = patients with complex nursing needs

5. The matched pairs

staffing vacancies but a high rate of long term sick leave at the start of the study. The control ward was described by their ward leader as having experienced a challenging year due to a high staff vacancy rate, a relatively junior workforce and a high rate of long term leave. The ward leader had held the position for a number of years.

5.2 Matched pair B

Matched pair B consisted of two surgical wards. Table 31 provides a summary of each ward's key characteristics.

Table 31: Matched Pair B – Surgery		
	Intervention ward (BI)	Control ward (BC)
Speciality	ENT and Maxillo-facial surgery	Hepatobiliary & pancreatic surgery/intestinal failure
Other admission criteria	General surgical outliers	General surgical outliers
General mode of admission	Elective and all other modes	Elective and all other modes
Number of beds	28	29
Approximate patient age range	Adult	Adult
Prevalent age group	None	40s-60s
Mixed or single sex	Mixed but with single sex bays	Mixed but with single sex bays
General level of patient acuity¹⁷	1a: 25-30% 1b 50%	<i>Information not supplied</i>
Average length of stay	Variable from 24 hours to 14 days	Variable from days to months

The intervention ward was described by their ward leader as having a cohesive team with a strong work ethic and a united vision. The ward had minimal staffing vacancies or staff on long term leave at the start of the study.

Significant changes in ward leadership occurred throughout the study duration: the ward leader at the start of the study, having held the position for 14 years, took retirement at the end of study month two; a further change in ward

¹⁷ 1a = patients requiring regular observations, requiring low level nursing input but with the potential to deteriorate

1b = patients with complex nursing needs

leadership occurred in study month five. The control ward was described by their ward leader as having experienced a number of difficult years due to a high staff vacancy rate but morale was improving. At the start of the study the ward leader had held the position for six months and was participating in the Trust Leadership training.

5.3 Matched pair C

Matched pair C consisted of two wards specialising in gastroenterology. Table 32 provides a summary of each ward's key characteristics.

Table 32: Matched Pair C - Gastroenterology		
	Intervention ward (CI)	Control ward (CC)
Speciality	Gastro-medical/hepatology	Gastroenterology/hepatology
Other admission criteria	General medical, elderly care outliers	General medical, elderly care outliers
General mode of admission	Mainly emergency admissions	Acute Medical Unit, small number of electives
Number of beds	28	30
Approximate patient age range	Adult	Adult
Prevalent age group	60 to 80 years old	None
Mixed or single sex	Male	Female
General level of patient acuity¹⁸	1a: 20% 1b: 45% 1c: 35%	1a: 50% 1b: 50%
Average length of stay	24 hours to months	24 hours to days

The intervention ward was described by their ward leader as being a busy environment with a supportive team. The ward had a high staff vacancy rate, high levels of long term leave and a relatively junior workforce at the start of the study. At the start of the study the ward leader had held the position for six months. The control ward was described by their ward leader as

¹⁸ 1a = patients requiring regular observations, requiring low level nursing input but with the potential to deteriorate

1b = patients with complex nursing needs

1c = independent patients

5. The matched pairs

experiencing decreasing morale due to a high staff vacancy rate and high rates of long term leave. From study month seven onwards there was an influx of newly qualified international nurses. As a consequence, the ward received intensive clinical, managerial and educational support, between study months seven and ten. The ward was also participating in a “No Delays Project” aimed at improving the patient discharge process. At the start of the study the ward leader had held the position for six months.

5.4 Accreditation processes

The accreditation processes for each ward are detailed below in Table 33.

Table 33: Ward accreditation processes	
Ward AI	
Review panel timing	6 weeks after enrolment
Review panel composition	Deputy director of nursing, clinical matron
Review outcome	Accredited with recommendations Areas of excellent practice: good understanding on the part of the ward leader of the issues that needed to be addressed on the ward, excellent patient and student feedback, evidence of good team working Progress required in the following areas: improvements in nurse in charge ward rounds, staff communication, multi-disciplinary working and discharge planning, and reviews of unplanned admissions to the intensive treatment unit and documentation
Re-review timing	Due to a number of unanticipated ward challenges (fieldwork notes Trust Working Group Meeting 18/03/13) the unannounced re-review was delayed and occurred in the sixth month following the initial review
Re-review outcome	Successful re-review; no further action required
Ward BI	
Review panel timing	6 weeks after enrolment
Review panel composition	Deputy Director of Nursing, clinical matron, patient representative
Review outcome	Full accreditation without recommendations Senior and junior ward sister leadership, the overall ward staff team work, the organisation and management of the ward environment, positive patient feedback, the understanding on the part of the senior staff of the key challenges facing the ward and the manner in which the senior staff had used the CAS processes to further learn about and understand their ward were all highlighted as areas of excellent practice

5. The matched pairs

Ward BC ¹⁹	
Review panel timing	6 weeks after enrolment
Review panel composition	Divisional Head of Nursing, clinical matron, specialist nurse
Review outcome	Full accreditation without recommendations Difficulties experienced by the review panel resulted in a short delay in the ward receiving their accreditation decision The following areas of excellent practice were highlighted: ward cleanliness and organisation, clear leadership, openness in relation to complaints and a willingness to learn, positive patient feedback, identifiable improvements in relation to some CQD data and clear action plans in place to improve other areas
Ward CI	
Review panel timing	Concerns regarding this ward's potential to have an unsatisfactory review outcome were raised (fieldwork notes Trust Working Group meeting 19/11/12 and 19/12/12) following receipt of a red Matron's Review in the first month of the study. Consequently, accreditation process timescales were extended with the desktop review and ward review visit taking place twelve weeks after enrolment (study month 3)
Review panel composition	Associate Director of Nursing, two clinical matrons, patient representative
Review outcome	Accredited with recommendations
Re-review timing	Six months following the date of the review panel (study month 9) Progress required in the following areas: improving the nurses' role in ensuring a Do Not Resuscitate statement is discussed with family, improving the feel of aspects of the ward environment, improving the after care of family/relatives post patient transfer to the intensive treatment unit, improving the timeliness of notifying the next of kin of a change in the patient's condition
Re-review outcome	Successful re-review; no further action required

Figure 13 timetables each ward's participation in the CAS processes and the study data collection activities.

¹⁹ Due to a Trust administrative error control ward BC was enrolled in the CAS shortly before the end of the study. This provided an opportunity for further qualitative data collection; the implications for quantitative findings will be discussed later.

Figure 13: Timings for the CAS processes and data collection												
Study month	0	1	2	3	4	5	6	7	8	9	10	11
Ward AI: intervention	CAS enrolment	Review panel					Ward re-review					
	Baseline survey			1 st round interviews						Follow up survey		2 nd round interviews
Ward AC: control	Baseline survey									Follow up survey		
Ward BI: intervention	CAS enrolment	Review panel										
	Baseline survey			1 st round interviews						Follow up survey		2 nd round interviews
Ward BC: control										CAS enrolment	Review panel	
	Baseline survey									Follow up survey		2 nd round interviews
Ward CI: intervention	CAS enrolment	Review panel							Ward re-review			
	Baseline survey			1 st round interviews						Follow up survey		2 nd round interviews
Ward CC: control	Baseline survey									Follow up survey		

6. Findings: Measures of safety and experience

This chapter presents the findings of the SPC chart analysis for the quantitative measures of safety and patient experience.

Findings are presented in four sections: findings for the effects of participation in the CAS on rates of falls, followed by rates of pressure ulcers, rates of hospital acquired infections and finally the Picker Inpatient Experience survey responses. Within these sections the findings for each intervention ward are presented. Each section completes with presentation of the findings of the pooled analysis of the aggregated data for the three intervention wards.

Presentation of findings for each intervention ward and the aggregated intervention wards commences with descriptive statistics and summarised SPC chart findings for each of the intervention wards/the aggregated intervention wards and their matching control ward/the aggregated control wards. This introduces the data used to interpret the SPC charts and to attribute potential causal inference (for a more detailed explanation refer to Chapter 4 Section 4.5.4). Findings and SPC chart interpretation for each of the intervention wards/aggregated intervention wards are then introduced.

6. Measures of safety & experience

6.1 Rates of falls: matched pair A

6.1.1 Descriptive statistics

Monthly falls rates²⁰ for intervention ward AI in the six months prior to participation in the CAS²¹ ranged between 1.20 and 5.05 for all grades of falls, 1.16 and 3.87 falls resulting in injury, and nil and 1.20 falls resulting in no injury. Rates post participation in the CAS²² ranged between 1.12 and 7.70 for all grades of falls, nil and 2.52 for falls resulting in injury, and nil and 1.27 falls resulting in no injury. There were no months pre- or post-participation recording nil rates of patient falls.

Monthly falls rates for control ward AC in the six months prior to implementation of the CAS on intervention ward AI ranged between nil and 9.66 for all grades of falls, nil and 8.05 falls resulting in injury, and nil and 1.52 falls resulting in no injury. Rates for the months post implementation of the CAS on intervention ward AI ranged between 1.25 and 13.2 for all grades of falls, nil and 4.20 falls resulting in injury, and nil and 9.34 falls resulting in no injury. Between months -6 to -1 there were two consecutive months in which nil falls were recorded; falls were recorded as occurring in each of the months 0 to 11.

Table 34 provides the summarised key information from the $\bar{u}$ charts plotting rates of all grades of falls, falls with injury and falls with no injury for matched pair A.

Appendix 35 provides the complete set of descriptive statistics and SPC charts.

²⁰ All rates are quoted as rates per 1,000 bed days per month

²¹ Study months -6 to -1

²² Study months 0 to 11

Table 34: Matched pair A rates of falls

All grades of falls (per 1,000 bed days)		
	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.20 to 5.05	0.00 to 9.66
Monthly rates months 0 to 11	1.12 to 7.70	1.25 to 13.2
SPC chart summary		
Stabilised centre line value	2.21	4.35
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	3 out of 12	7 out of 12
Points outside UCL post process change (months 0 to 11)	1 points above UCL	1 point above UCL
Shifts or trends post process change (months 0 to 11)	None	None
Falls with injury (per 1,000 bed days)		
	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.16 to 3.87	0.00 to 8.05
Monthly rates months 0 to 11	0.00 to 2.52	0.00 to 4.20
SPC chart summary		
Stabilised centre line value	1.81	3.80
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	11 out of 12	7 out of 12
Points outside UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	Shift: 8 consecutive points below CL	Shift: 11 consecutive points below CL
Falls with no injury (per 1,000 bed days)		
	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.20	0.00 to 1.52
Monthly rates months 0 to 11	0.00 to 1.27	0.00 to 9.43
SPC chart summary		
Stabilised centre line value	0.40	0.54
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points outside UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	1 out of 12
Points outside UCL post process change (months 0 to 11)	5 points above UCL	4 points above UCL
Shifts or trends post process change (months 0 to 11)	None	None

6. Measures of safety & experience

6.1.2 Intervention ward AI

No special cause variation was identified in the six months prior to participation in the CAS. Consequently, the processes for managing and preventing the occurrence of falls on ward AI were indicated as being stable for this time period.

A number of occurrences of special cause variation were identified following participation in the CAS. A single measurement point above the upper control limit was identified in charting the rate of all grades of falls (Figure 14). Fieldwork notes identified this coincided with a period of time when ward AI was experiencing severe staff issues with potential to negatively impact upon quality of ward nursing care (Trust Working Group meeting minutes 18/03/13). Consequently, it was not possible to attribute this event to the effects of the CAS.

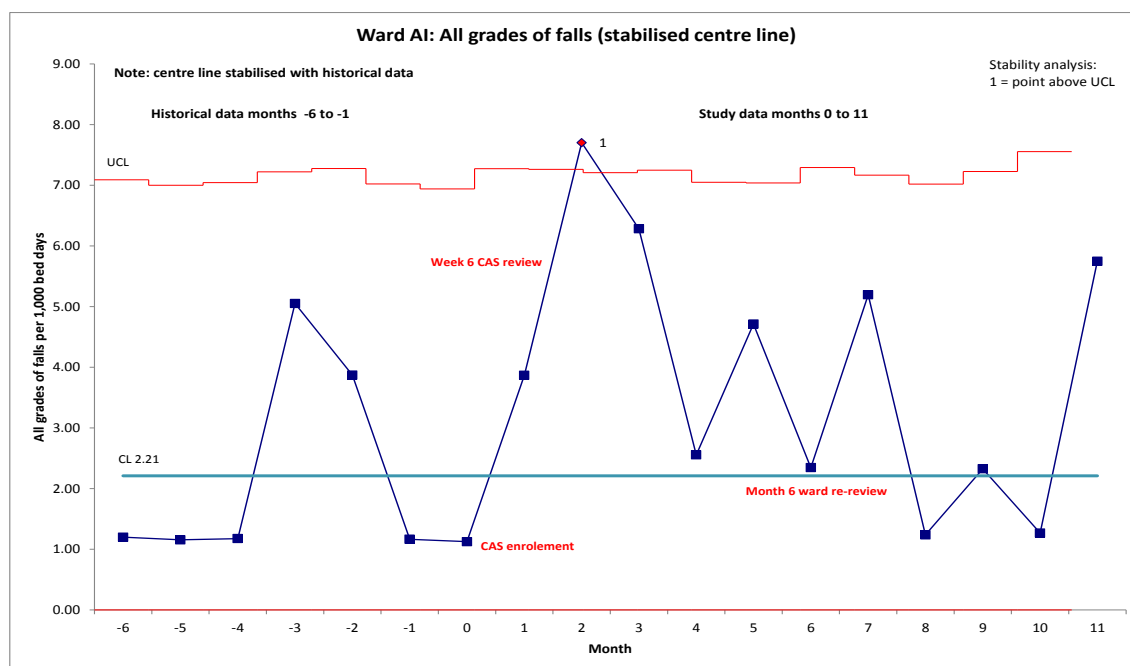


Figure 14: Intervention ward AI SPC chart for all grades of fall

Special cause variation in the form of a shift of 8 consecutive points below the centre line indicated an overall decrease in the number of falls with injury post implementation of the CAS (Figure 15). However, a shift of 11 consecutive points below the centre line was also indicated as occurring on the control ward (Figure 16).

6. Measures of safety & experience

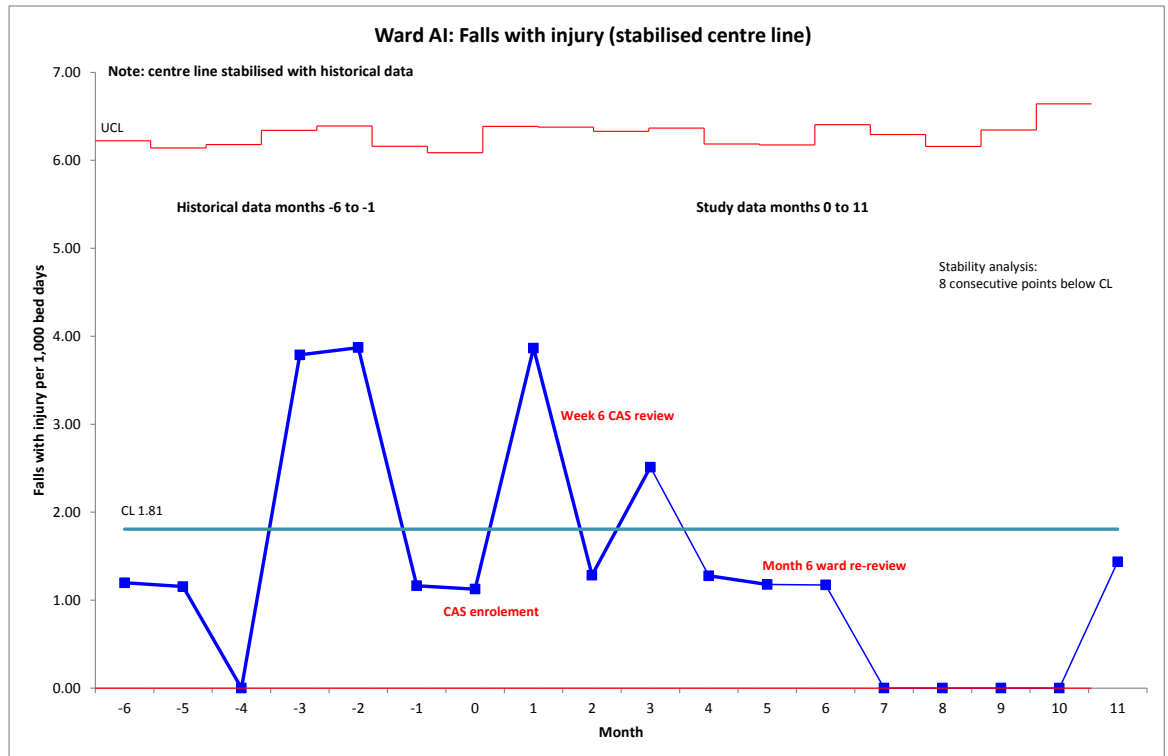


Figure 15: Intervention ward AI SPC chart for all falls with injury

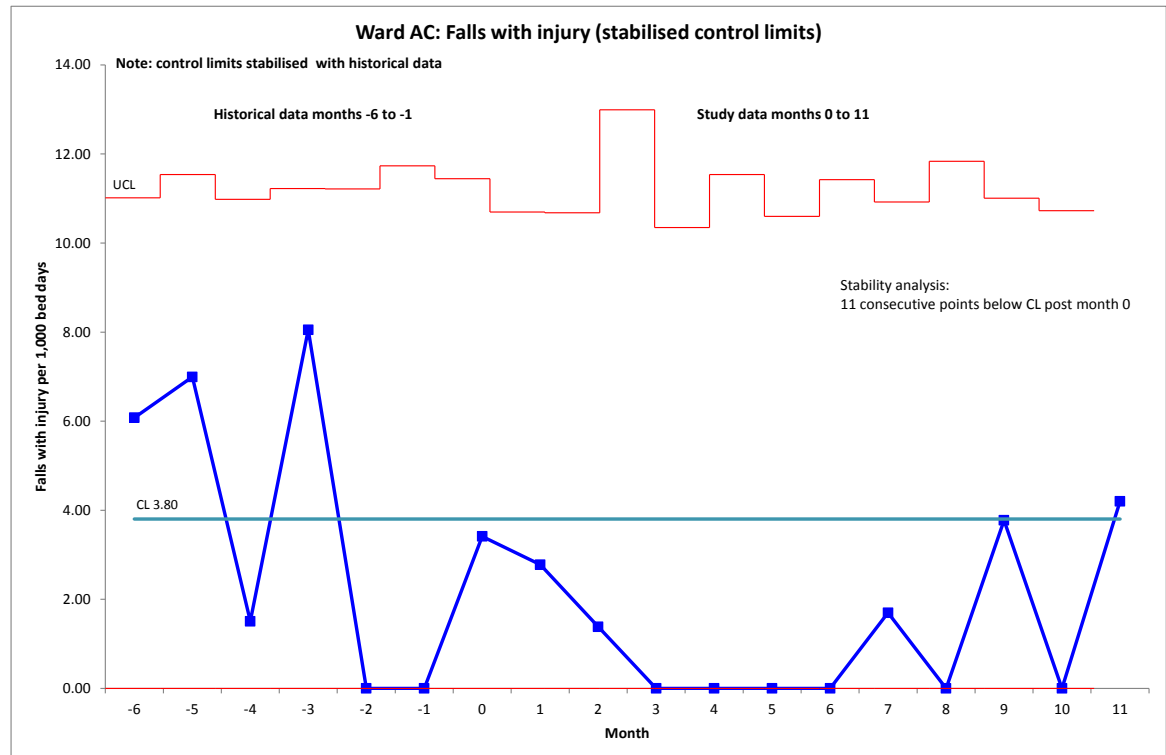


Figure 16: Control ward AC SPC chart for all falls with injury

6. Measures of safety & experience

The occurrence of five measurement points above the upper control limit for the rate of falls with no injury also indicated the processes for managing and preventing falls on ward AI had become unstable following participation in the CAS (Figure 17).

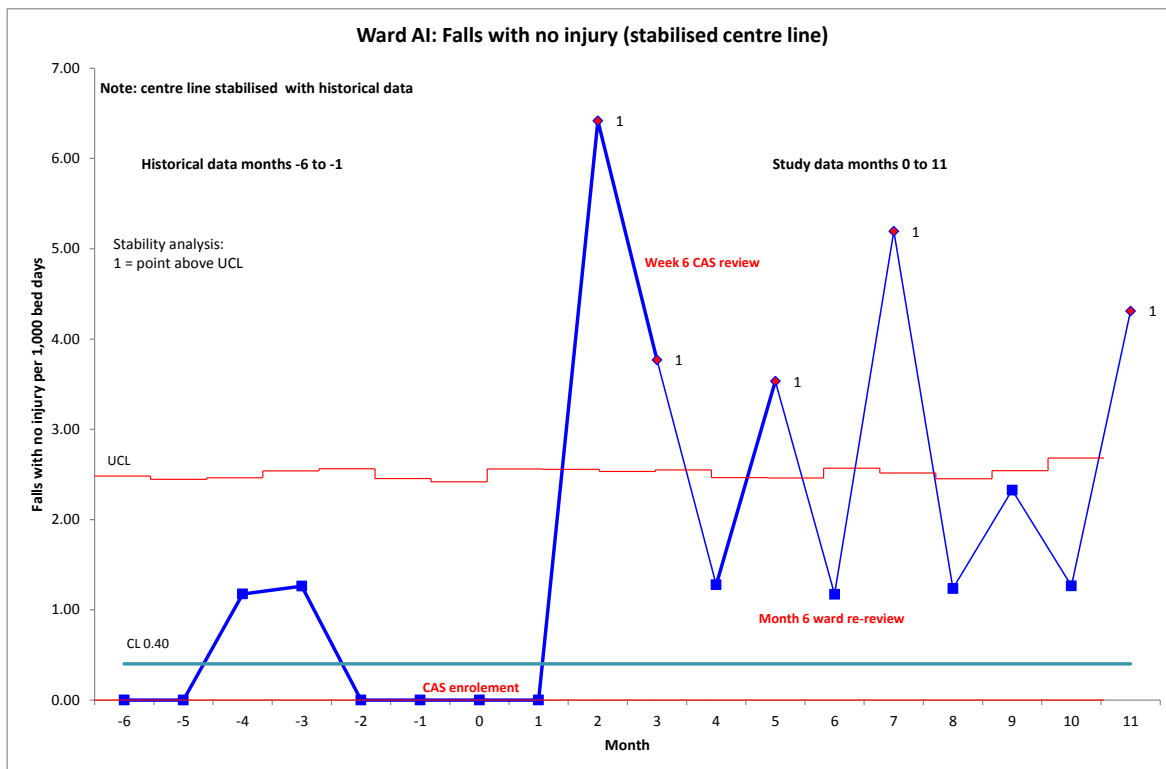


Figure 17: Intervention ward AI SPC chart for rates of falls with no injury

However, two of these measurement points (months 2 and 3) also coincided with the occurrence of the severe staffing issues and this may have contributed towards these incidents of special cause variation. Furthermore, similar intermittent occurrences of special cause variation were also found to occur on the control ward (Figure 18). Hence, it was not possible to attribute these findings to the effects of the CAS.

6. Measures of safety & experience

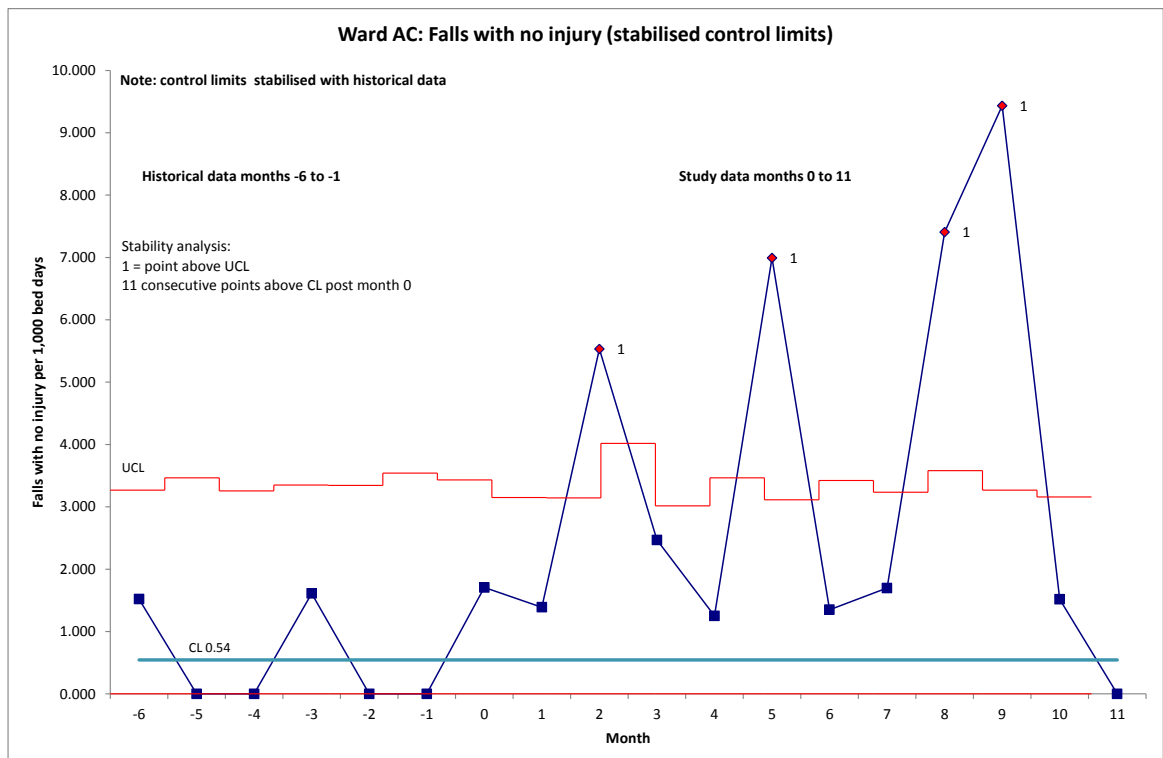


Figure 18: Control ward AC SPC chart for rates of falls with no injury

Overall, no evidence was identified indicating participation in the CAS had an effect on either rates or grades of falls on ward AI.

6. Measures of safety & experience

6.2 Rates of falls: matched pair B

6.2.1 Descriptive statistics

Monthly rates²³ for intervention ward BI in the six months prior to participation in the CAS ranged between 1.41 and 6.35 for all grades of falls, 1.17 and 4.45 falls resulting in injury, and nil and 1.43 falls resulting in no injury. Monthly rates following participation in the CAS ranged between nil and 13.4 for all grades of falls, nil and 4.66 falls resulting in injury, and nil and 9.40 falls resulting in no injury. A single month post implementation of the CAS recorded nil patient falls.

Monthly rates for control ward BC in the six months prior to implementation of the CAS on intervention ward BI ranged between nil and 6.37 for all grades of falls, nil and 6.37 falls resulting in injury, and nil and 1.07 falls resulting in no injury. Monthly rates post implementation of the CAS on intervention ward BI ranged between nil and 6.13 for all grades of falls, nil and 3.81 falls resulting in injury, and nil and 4.91 falls resulting in no injury. Two months between months -6 to -1, and a single month between months 0 to 11, recorded nil rates of falls.

Table 35 provides the summarised key information from the $\bar{u}$ charts plotting rates of all grades of falls, falls with injury and falls with no injury for matched pair B.

Appendix 35 provides a complete set of descriptive statistics and SPC charts.

²³ All rates are quoted as rates per 1,000 bed days per month

Table 35: Matched pair B rates of falls

All grades of falls (per 1,000 bed days)		
	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.41 to 6.35	0.00 to 6.37
Monthly rates months 0 to 11	0.00 to 13.4	0.00 to 6.13
SPC chart summary		
Stabilised centre line value	3.79	2.14
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	4 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	6 out of 12	4 out of 6
Points above UCL post process change (months 0 to 11)	1 point above UCL	None
Shifts or trends post process change (months 0 to 11)	None	None
Falls with injury (per 1,000 bed days)		
	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.17 to 4.45	0.00 to 6.37
Monthly rates months 0 to 11	0.00 to 4.66	0.00 to 3.81
SPC chart summary		
Stabilised centre line value	3.12	2.52
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	10 out of 12	12 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	12 consecutive points below CL
Falls with no injury (per 1,000 bed days)		
	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.43	0.00 to 1.07
Monthly rates months 0 to 11	0.00 to 9.40	0.00 to 4.91
SPC chart summary		
Stabilised centre line value	0.67	0.19
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	5 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	3 out of 12	5 out of 12
Points above UCL post process change (months 0 to 11)	3 points above UCL	5 points above UCL
Shifts or trends post process change (months 0 to 11)	None	None

6. Measures of safety & experience

6.2.2 Intervention ward BI

No evidence of special cause variation was identified as occurring in the six months prior to participation in the CAS. Hence, the processes for managing and preventing the occurrence of falls on ward BI were indicated as being stable for this time period.

The only special cause variation identified following participation in the CAS was that of measurement points occurring above the upper control limit for all grades of falls (Figure 19) and for falls resulting in no injury (Figure 20). No contributory contextual factors were identified but the small number of events (1 and 3 measurement points respectively) and their dispersed pattern meant their occurrence was not attributable to participation in the CAS. Furthermore, five occurrences of special cause variation in the rates of falls with no injury were identified as occurring on control ward BC (Figure 21).

Overall, there was no evidence indicating participation in the CAS had an effect on either rates or grades of falls on ward BI.

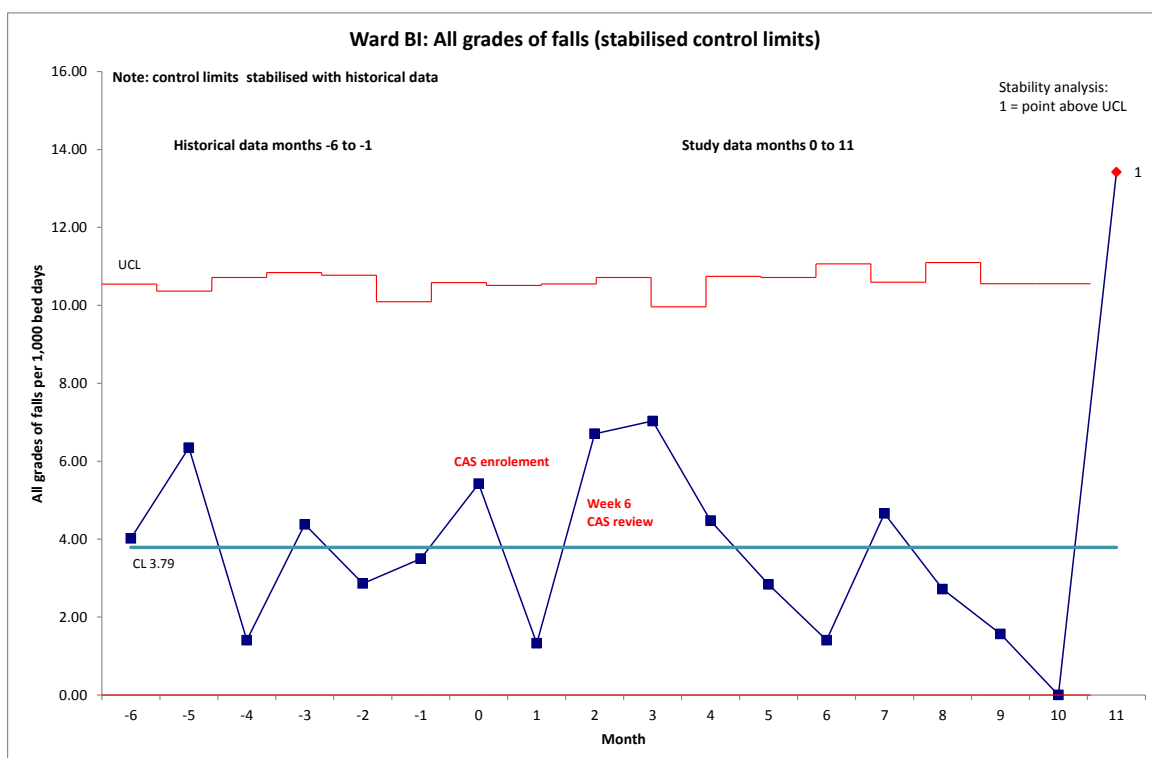


Figure 19: Intervention ward BI SPC chart for all grades of falls

6. Measures of safety & experience

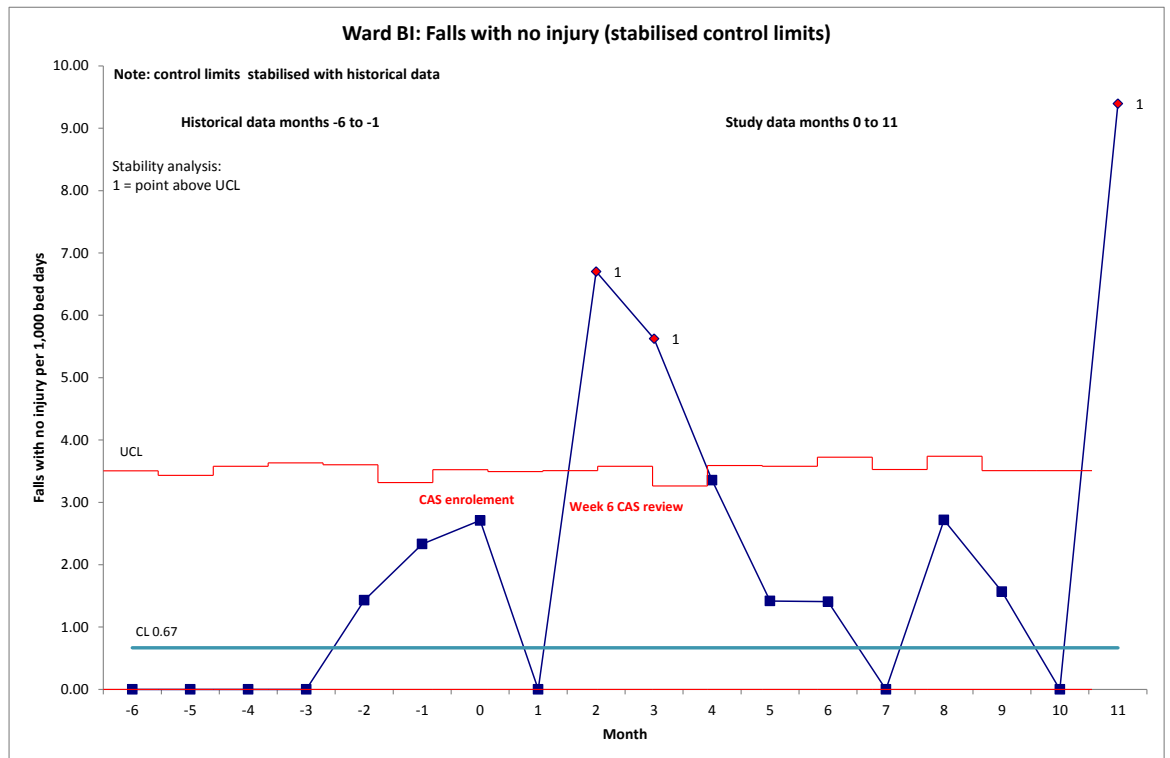


Figure 20: Intervention ward BI SPC chart for falls with no injury

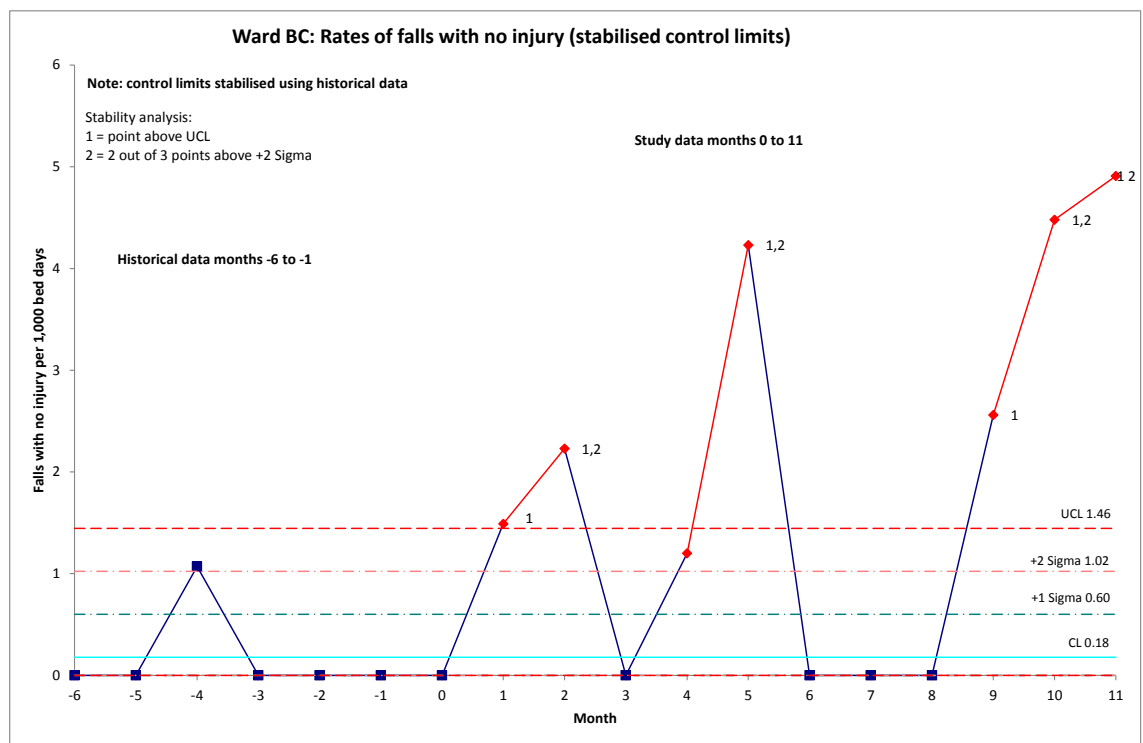


Figure 21: Control ward BC SPC chart for falls with no injury

6. Measures of safety & experience

6.3 Rates of falls: matched pair C

6.3.1 Descriptive statistics

Monthly rates²⁴ for intervention ward CI prior to participation in the CAS ranged between 5.86 and 19.70 for all grades of falls, 1.46 and 14.78 falls resulting in injury, and nil and 4.93 falls resulting in no injury. Monthly rates following participation in the CAS ranged between 1.41 and 32.04 for all grades of falls, nil and 9.35 falls resulting in injury, and nil and 22.70 falls resulting in no injury. There were no months in which nil rates of patient falls were recorded.

Monthly rates for control ward CC for the six months prior to implementation of the CAS on intervention ward CI ranged between 2.68 and 17.50 for all grades of falls, 1.34 and 17.50 falls resulting in injury, and nil and 1.34 falls resulting in no injury. Monthly rates post implementation of the CAS on ward intervention ward CI ranged between 1.91 and 23.63 for all grades of falls, nil and 10.90 falls resulting in injury, and nil and 13.96 falls resulting in no injury. There were no months in which nil rates of patient falls were recorded.

Table 36 provides the summarised key information from the $\bar{u}$ charts plotting rates of all grades of falls, falls with injury and falls with no injury for matched pair C.

Appendix 36 provides a complete set of descriptive statistics and SPC charts.

²⁴ All rates are quoted as rates per 1,000 bed days per month

Table 36: Matched pair C rates of falls

All grades of falls (per 1,000 bed days)	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	5.86 to 19.70	2.68 to 17.50
Monthly rates months 0 to 11	1.42 to 32.04	1.91 to 23.63
SPC chart summary		
Stabilised centre line value	10.70	8.34
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	5 out of 6
Points above LCL prior to process change (months -6 to -1)	None	1 point above UCL
Number of points below stabilised centre line (months 0 to 11)	6 out of 12	5 out of 12
Points above LCL post process change (months 0 to 11)	1 point above UCL	1 point above UCL
Shifts or trends post process change (months 0 to 11)	None	None
Falls with injury (per 1,000 bed days)	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.46 to 14.78	2.34 to 17.50
Monthly rates months 0 to 11	0.00 to 9.35	0.00 to 10.90
SPC chart summary		
Stabilised centre line value	8.22	7.02
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points above LCL prior to process change (months -6 to -1)	None	1 point above UCL
Number of points below stabilised centre line (months 0 to 11)	11 out of 12	10 out of 12
Points above LCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	Shift: 9 consecutive points below CL
Falls with no injury (per 1,000 bed days)	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 4.93	0.00 to 1.34
Monthly rates months 0 to 11	0.00 to 22.70	1.00 to 13.96
SPC chart summary		
Stabilised centre line value	2.47	1.32
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points above LCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	1 out of 12	1 out of 12
Points above LCL post process change (months 0 to 11)	6 points above UCL	5 points above UCL
Shifts or trends post process change (months 0 to 11)	Shift: 11 consecutive points above CL	Shift: 11 consecutive points above CL

6. Measures of safety & experience

6.3.2 Intervention ward CI

No incidence of special cause variation was identified as occurring in the six months prior to participation in the CAS; the systems for managing and preventing the occurrence of falls on ward CI were indicated as being stable for this time period.

Following participation in the CAS, special cause variation, in the form of 1 point above the upper control limit, was identified as occurring in the case of all grades of falls (Figure 22). However, the same effect was evidenced on the control ward CC (Figure 23). A shift of 11 consecutive points above the centre line suggested an overall increase in the rate of falls with no injury but the same shift was evidenced as occurring on the control ward CC (Figures 24 and 25). Furthermore, both wards exhibited a similar incidence of points above the upper control limit (intervention ward 6 points, control ward 5 points). Hence, the cause of these occurrences of special cause was not attributed to participation in the CAS.

Overall, there was no evidence indicating participation in the CAS had an effect on either rates or grades of falls on ward CI.

6. Measures of safety & experience

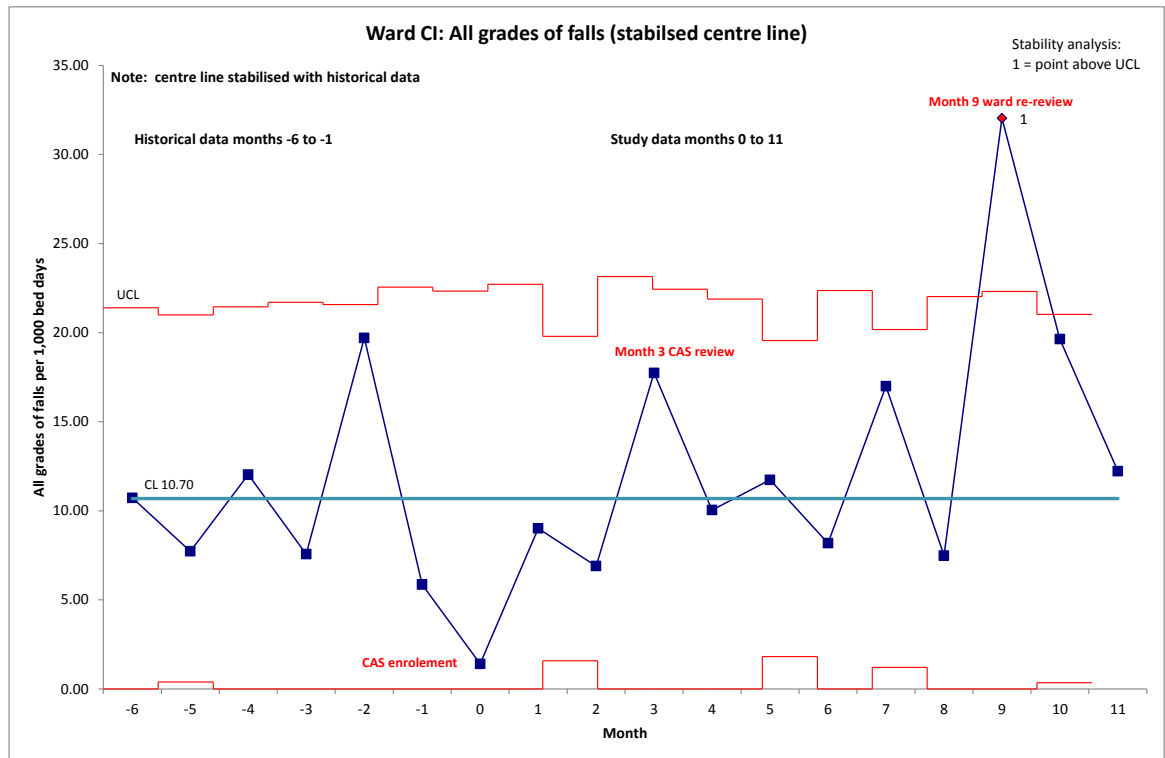


Figure 22: Intervention ward CI SPC chart for all grades of falls

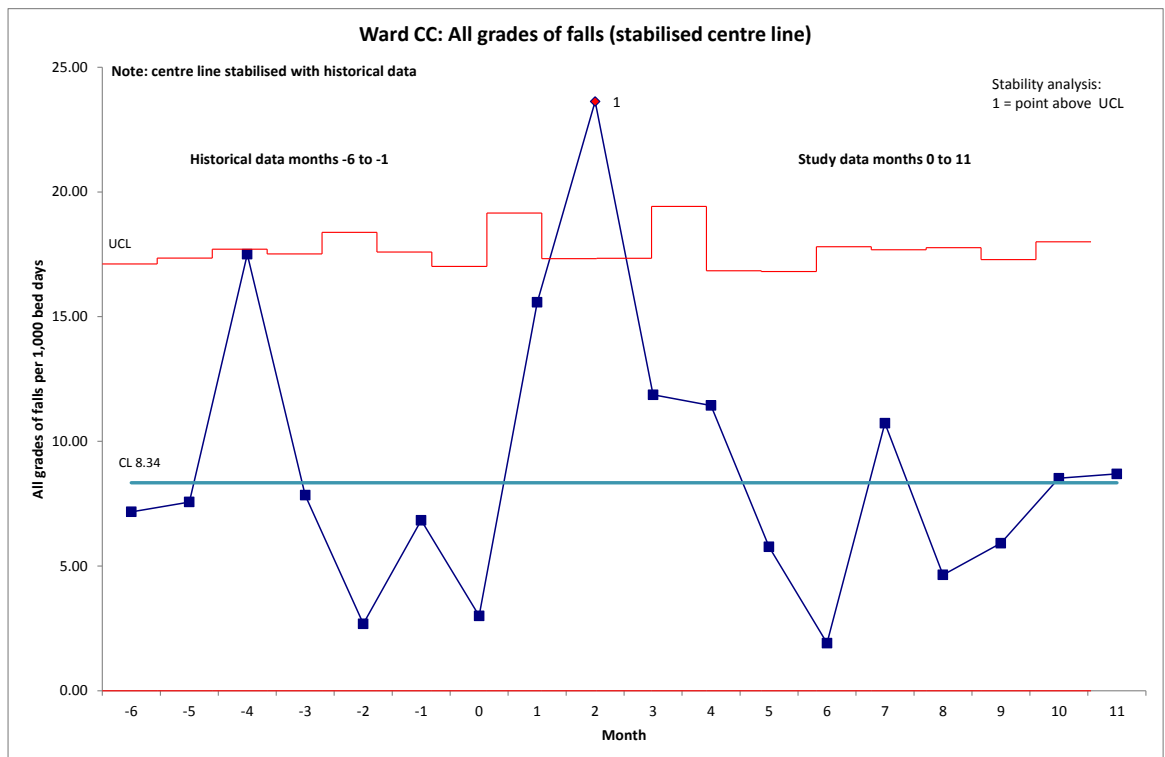


Figure 23: Control ward CC SPC chart for all grades of falls

6. Measures of safety & experience

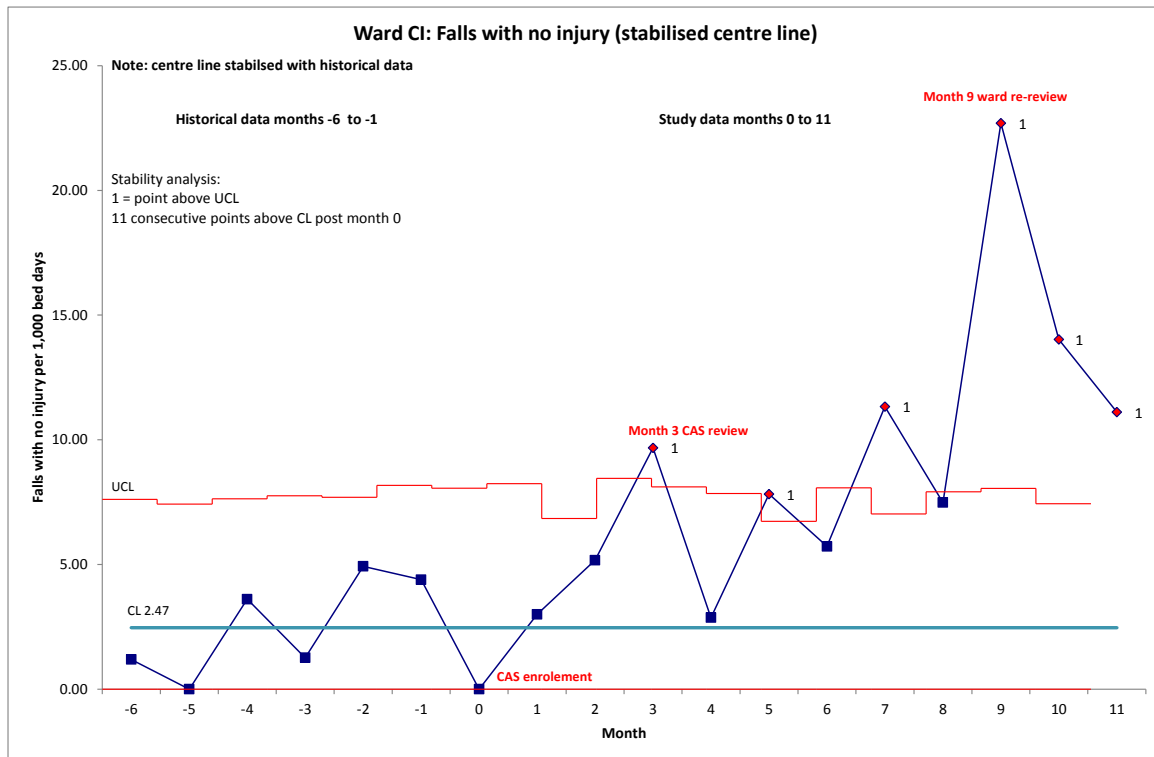


Figure 24: Intervention ward CI SPC chart for falls with no injury

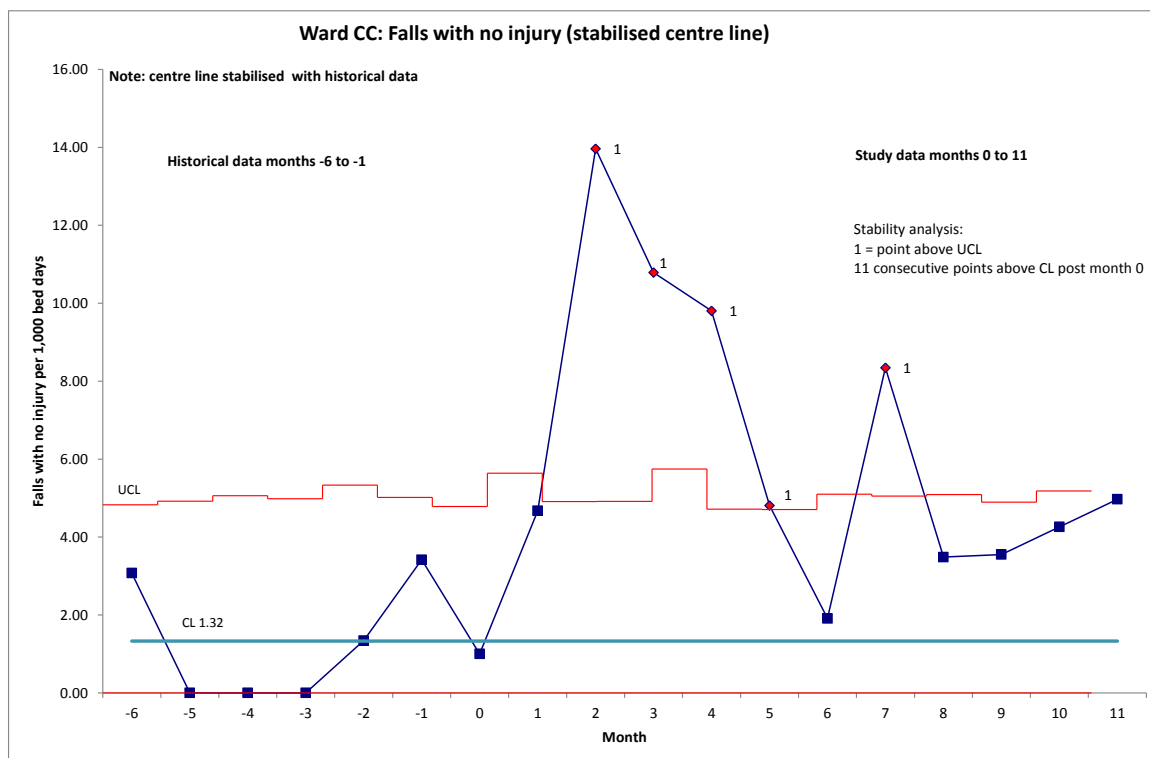


Figure 25: Control ward CC SPC chart for falls with no injury

6.4 Rates of falls: pooled analysis

6.4.1 Descriptive statistics

Aggregated monthly rates²⁵ across the three intervention wards prior to participation in the CAS ranged between 3.33 and 9.19 for all grades of falls, 1.25 and 7.00 falls resulting in injury, and nil and 2.19 falls resulting in no injury. Aggregated monthly rates following participation in the CAS ranged between 2.57 and 12.02 for all grades of falls, 1.12 and 3.76 falls resulting in injury, and 0.86 and 8.90 falls resulting in no injury.

Aggregated monthly rates across the three control wards in the six months prior to implementation of the CAS on the intervention wards ranged between 2.67 and 7.74 for all grades of falls, 2.23 and 7.31 falls resulting in injury, and nil and 0.41 falls resulting in no injury. Aggregated monthly rates post implementation of the CAS on the intervention wards ranged between 1.43 and 11.36 for all grades of falls, 0.36 and 4.92 falls resulting in injury, and 0.84 and 7.45 falls resulting in no injury.

Falls were recorded as occurring in all months across both the intervention wards and the control wards.

Table 37 provides the summarised key information from the $\bar{u}$ charts plotting rates of all grades of falls, falls with injury and falls with no injury for the aggregated intervention ward and aggregated control ward data sets.

Appendix 35 provides the complete set of descriptive statistics and SPC charts.

²⁵ All rates are quoted as rates per 1,000 bed days per month

6. Measures of safety & experience

Table 37: Aggregated intervention/control ward groups rates of falls		
All grades of falls (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	3.33 to 9.19	2.67 to 7.74
Monthly rates months 0 to 11	2.57 to 12.02	1.43 to 11.36
SPC chart summary		
Stabilised centre line value	5.59	4.89
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	5 out of 12	4 out of 12
Points above UCL post process change (months 0 to 11)	2 points above UCL	1 point above UCL
Shifts or trends post process change (months 0 to 11)	None	None
Falls with injury (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.25 to 7.00	2.23 to 7.31
Monthly rates months 0 to 11	1.12 to 3.76	0.36 to 4.92
SPC chart summary		
Stabilised centre line value	4.40	4.32
Number of points below stabilised centre line (months -6 to -1)	2 out of 6	3 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	12 out of 12	10 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	Shift: 12 consecutive points below CL	Shift; 9 consecutive points below CL
Falls with no injury (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 2.19	0.00 to 0.41
Monthly rates months 0 to 11	0.86 to 8.90	0.84 to 7.45
SPC chart summary		
Stabilised centre line value	1.19	0.57
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	5 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	2 out of 12	0 out of 12
Points above UCL post process change (months 0 to 11)	8 points above UCL	9 points above UCL
Shifts or trends post process change (months 0 to 11)	Shift; 10 consecutive points above CL	Shift: 12 consecutive points above CL

6.4.2 The aggregated intervention wards

No special cause variation was identified in the six months prior to participation in the CAS. Therefore, the systems for managing and preventing the occurrence of falls across the three intervention wards were indicated as being stable for this time period.

Following participation in the CAS, the occurrence of two measurement points above the upper control limit indicated a period of instability in the processes for managing and preventing the occurrence of all grades of falls (Figure 26). An overall increase in the rate of falls with no injury was also indicated by a shift of 10 consecutive points above the centre line (Figure 28). However, for each of these findings there was a similar finding across the control wards (Figures 27 and 29). Therefore, it was not possible to attribute these effects to participation in the CAS.

Overall, there was no evidence indicating participation in the CAS had an effect on either rates or grades of falls across the aggregated data set for the three intervention wards.

6. Measures of safety & experience

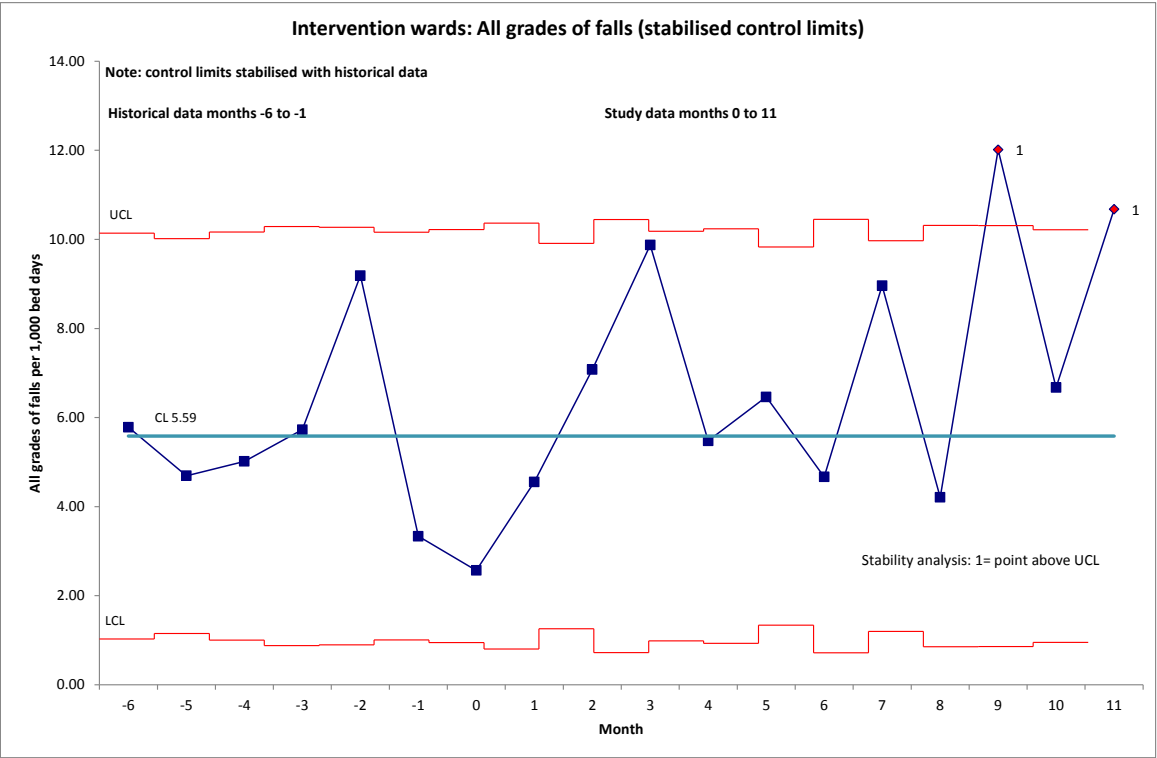


Figure 26: Intervention wards SPC chart for all grades of falls

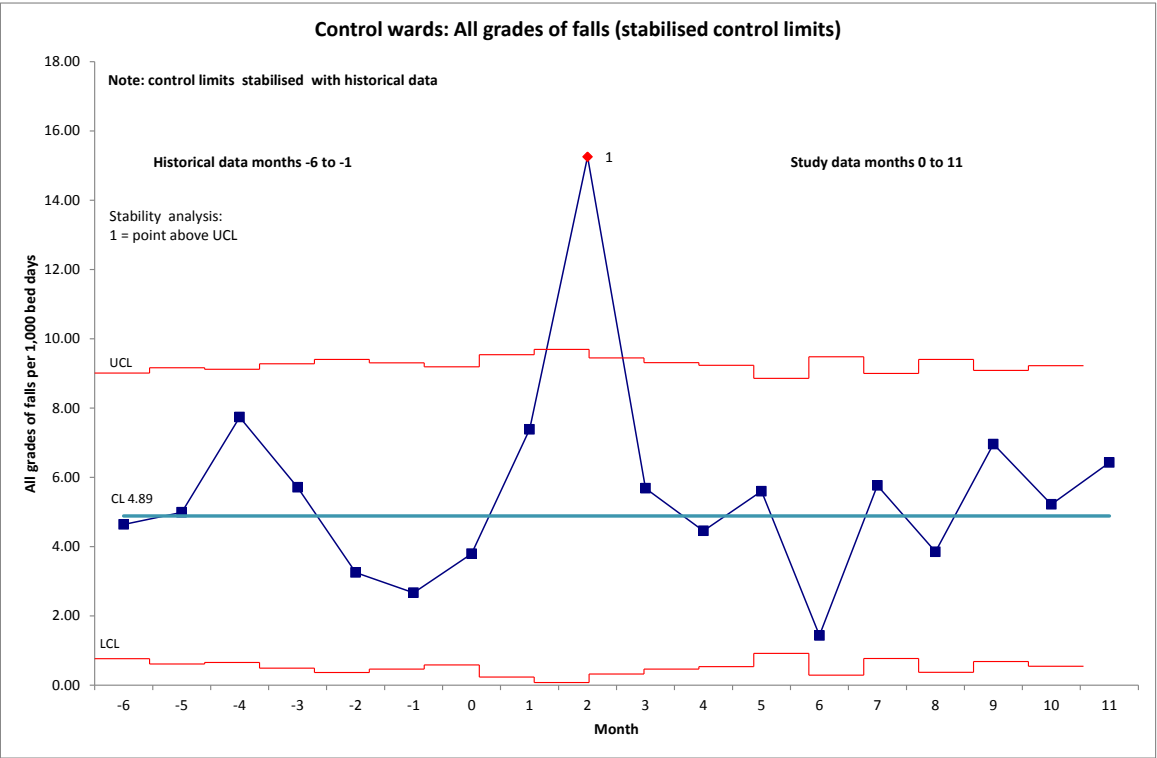


Figure 27: Control wards SPC chart for all grades of falls

6. Measures of safety & experience

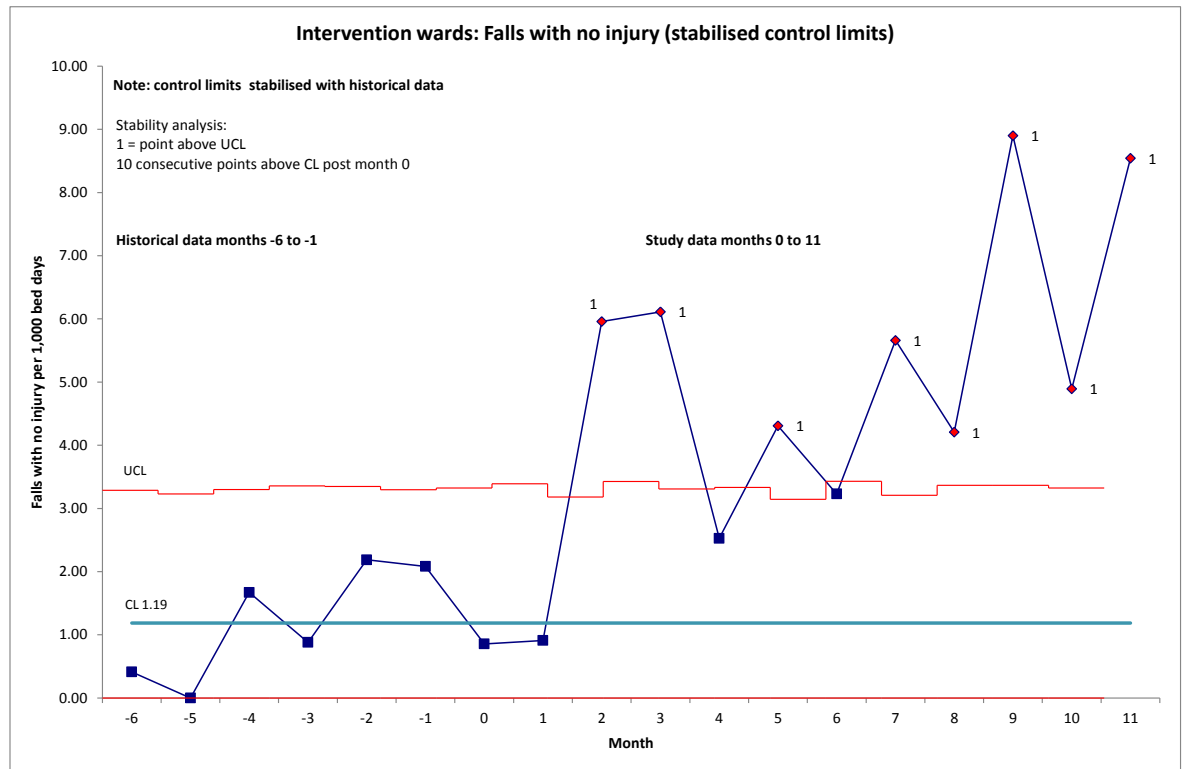


Figure 28: Intervention wards SPC chart for falls with no injury

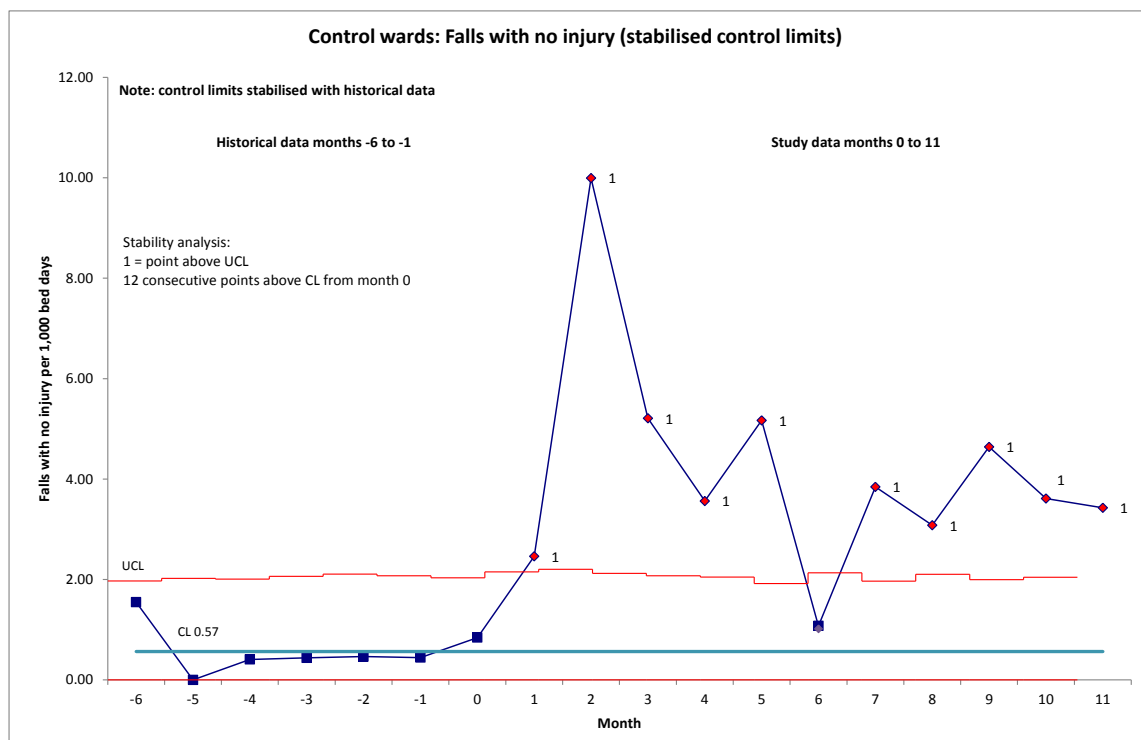


Figure 29: Control wards SPC chart for falls with no injury

6. Measures of safety & experience

6.5 Matched pair A: rates of pressure ulcers

6.5.1 Descriptive statistics

Intervention ward AI exhibited low rates²⁶ of pressure ulcers with a single historical occurrence of a pressure ulcer (grade 2) in the six months prior to implementation of the CAS and occurrences only in months 1 to 3 (grades 1-4) following participation in the CAS.

Monthly rates for control ward AC in the six months prior to implementation of the CAS on intervention ward AI ranged between nil and 5.25 for all grades of pressure ulcer and grades 2-4, and nil and 1.84 for grade 1 pressure ulcers; three out of the six months recorded nil occurrences. Rates post implementation of the CAS on intervention ward AI ranged between nil and 5.23 for all grades of pressure ulcers, nil and 1.89 for grades 2-4, and nil and 3.50 for grade 1 pressure ulcers; three consecutive months recorded nil occurrences.

Table 38 provides the summarised key information from the *C* charts plotting rates of all grades of pressure ulcers and grade 2-4 pressure ulcers for matched pair A. Charts for rates of grade 1 pressure ulcers were not produced due their occurrence in study month 3 only.

Appendix 36 provides the complete set of descriptive statistics and SPC charts.

²⁶ Rates are quoted as rates per 1,000 bed days per month

Table 38: Matched pair A rates of pressure ulcers

All grades of pressure ulcers (per 1,000 bed days)	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.16	0.00 to 5.25
Monthly rates months 0 to 11	0.00 to 2.57	0.00 to 5.24
SPC chart summary		
Stabilised centre line value	0.20	1.36
Number of points below stabilised centre line (months -6 to -1)	5 out of 6	3 out of 6
Points outside UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	9 out of 12	3 out of 12
Points outside UCL post process change (months 0 to 11)	2 points above UCL	None
Shifts or trends post process change (months 0 to 11)	Shift: 8 consecutive points below CL	None
Grade 2-4 pressure ulcers (per 1,000 bed days)	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.16	0.00 to 5.25
Monthly rates months 0 to 11	0.00 to 2.57	0.00 to 1.89
SPC chart summary		
Stabilised centre line value	0.20	1.09
Number of points below stabilised centre line (months -6 to -1)	5 out of 6	4 out of 6
Points outside UCL, shifts or trends prior to process change (months -6 to -1)	None	1 point above UCL
Number of points below stabilised centre line (months 0 to 11)	9 out of 12	3 out of 12
Points outside UCL post process change (months 0 to 11)	1 point above UCL	None
Shifts or trends post process change (months 0 to 11)	Shift: 8 consecutive points below CL	Shift: 8 consecutive points above CL
Grade 1 pressure ulcers (per 1,000 bed days)	Intervention ward AI	Control ward AC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	Zero occurrences	0.00 to 1.84
Monthly rates months 0 to 11	0.00 to 1.26 (single occurrence in month 3)	0.00 to 3.50

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6.5.2 Intervention ward AI

In exploring all grades of pressure ulcers the incidents occurring in months 2 and 3 are highlighted as special cause variation (Figure 30). Fieldwork notes identified these coincided with a period of severe staffing issues with potential to negatively impact upon ward quality of nursing care (Trust Working Group meeting minutes 18/03/13). Following these two events pressure ulcer rates for ward AI resumed the pattern exhibited in the historical data. Consequently, no evidence was identified indicating participation in the CAS had an effect on either rates or grades of pressure ulcers on ward AI.

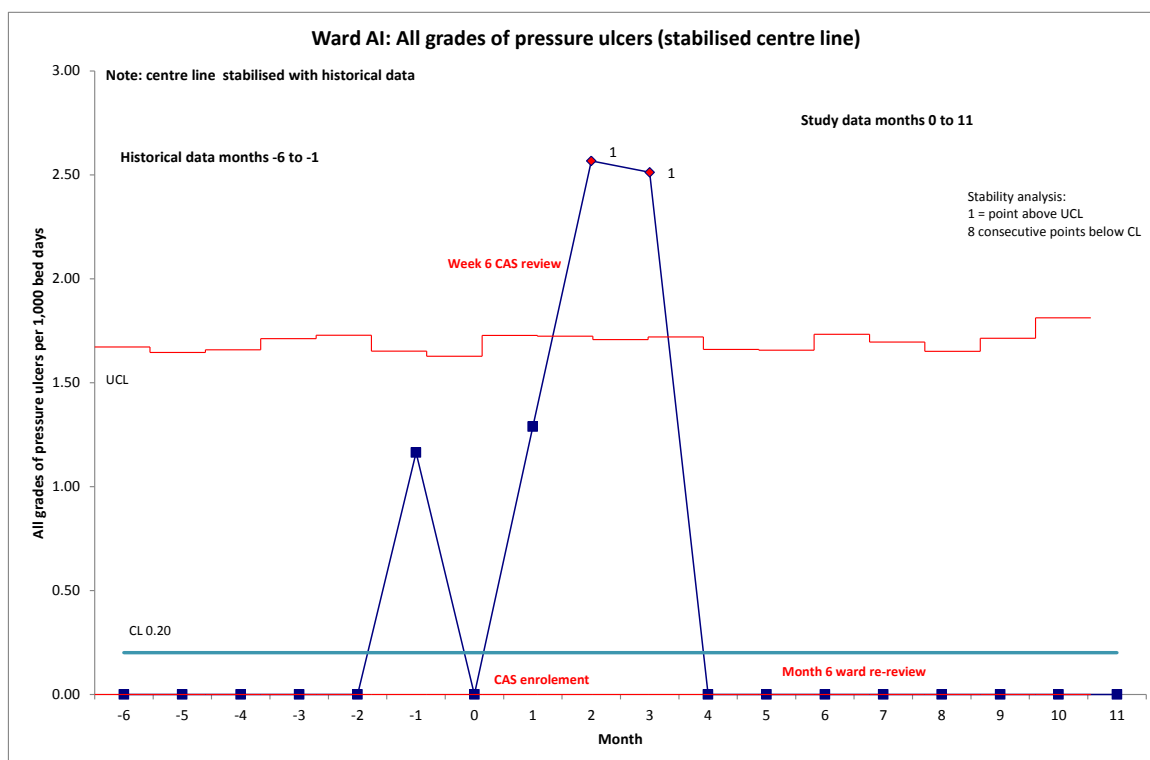


Figure 30: Intervention ward AI SPC chart for all grades of pressure ulcers

6.6 Rates of pressure ulcers: matched pair B

6.6.1 Descriptive statistics

Monthly rates²⁷ for intervention ward BI in the six months prior to participation in the CAS ranged from nil to 4.02 for all grades, nil to 4.04 for grades 2-4, and nil to 1.41 for grade 1; a single month recorded nil occurrences.

Following participation in the CAS monthly rates ranged between nil to 3.13 for all grades, nil to 2.81 for grades 2-4, and nil to 1.33 for grade 1; six out of the 12 months recorded nil occurrences.

Monthly rates for control ward BC in the six months prior to implementation of the CAS on intervention ward BI ranged from nil to 1.27 for all grades, nil to 1.21 for grades 2-4, and nil to 1.27 for grade 1; three out of the six months recorded nil occurrences. Rates in the months post implementation of the CAS on ward BI ranged between nil to 4.48 for all grades, nil to 1.49 for grades 2-4, and nil to 4.91 for grade 1; five out of the 12 months recorded nil occurrences.

The summarised key information from the *C* charts plotting rates of all grades of pressure ulcers and grade 2-4 pressure ulcers for matched pair B is provided in Table 39.

A complete set of descriptive statistics and SPC charts is provided in Appendix 36.

²⁷ Rates are quoted as rates per 1,000 bed days per month

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Table 39: Matched pair B rates of pressure ulcers		
All grades of pressure ulcers (per 1,000 bed days)	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 4.02	0.00 to 1.27
Monthly rates months 0 to 11	0.00 to 3.13	0.00 to 4.48
SPC chart summary		
Stabilised centre line value	1.56	0.58
Number of points below stabilised centre line (months -6 to -1)	5 out of 6	3 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	8 out of 12	5 out of 12
Points above UCL post process change (months 0 to 11)	None	1 point above UCL
Shifts or trends post process change	None	None
Grade 2-4 pressure ulcers (per 1,000 bed days)	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 4.04	0.00 to 1.21
Monthly rates months 0 to 11	0.00 to 2.81	0.00 to 1.49
SPC chart summary		
Stabilised centre line value	1.11	0.19
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	5 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	8 out of 12	6 out of 12
Points above UCL post process change (months 0 to 11)	None	1 point above UCL
Shifts or trends post process change	None	None
Grade 1 pressure ulcers (per 1,000 bed days)	Intervention ward BI	Control ward BC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.41	0.00 to 1.27
Monthly rates months 0 to 11	0.00 to 1.33	0.00 to 4.91
SPC chart summary		
Stabilised centre line value	0.45	0.39
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points above UCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	8 out of 12	9 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change	None	None

6.6.2 Intervention ward BI

No special cause variation was identified for either the six month time period prior to participation in the CAS or following participation in the CAS.

Therefore, the processes for managing and preventing the occurrence of pressure ulcers were indicated as being stable pre- and post-implementation of the CAS. Consequently, there was no evidence to indicate participation in the CAS had an effect upon these processes on ward BI.

An example is provided in Figure 31.

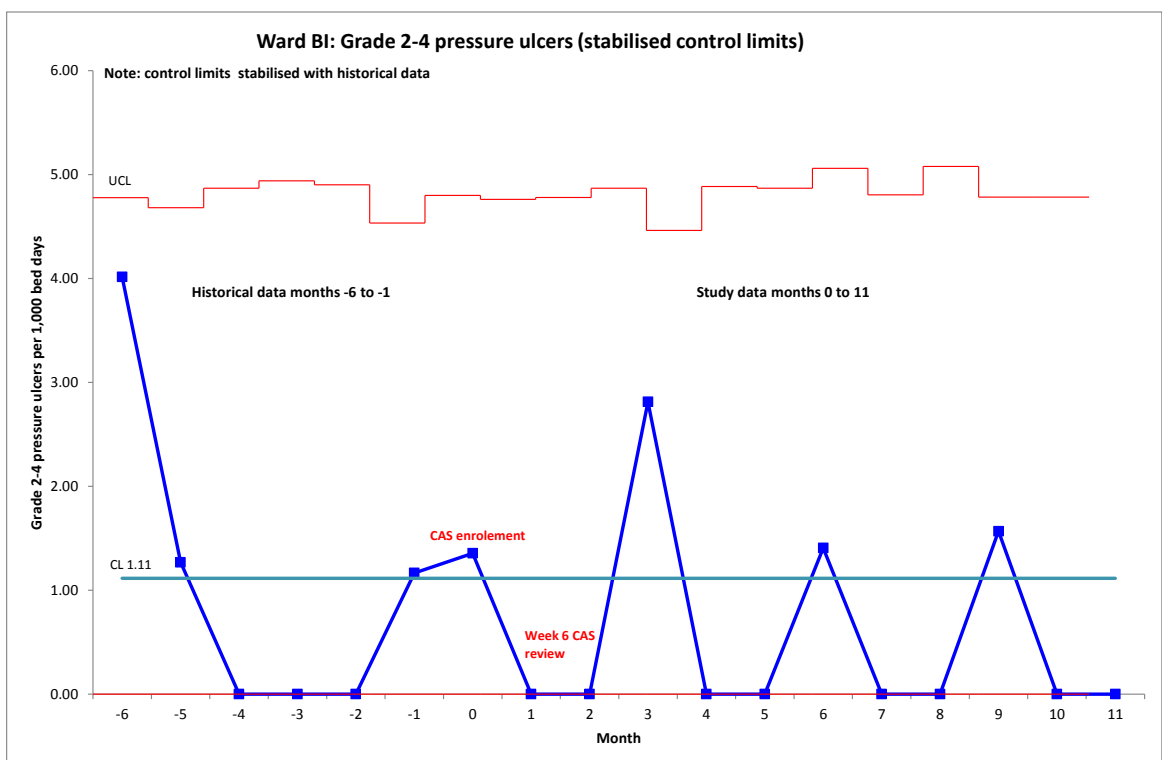


Figure 31: Intervention ward BI SPC chart for grade 2-4 pressure ulcers

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6.7 Rates of pressure ulcers: matched pair C

6.7.1 Descriptive statistics

Intervention ward CI monthly rates ²⁸of pressure ulcers in the six months prior to participation in the CAS ranged from 1.46 to 6.16 for all grades, nil to 3.78 for grades 2-4, and nil to 2.46 for grade 1. Monthly rates following participation in the CAS ranged between nil to 7.81 for all grades, nil to 3.90 for grades 2-4, and nil to 4.84 for grade 1; two out of the 12 months recorded nil occurrences.

Control ward CC monthly rates of pressure ulcers in the six months prior to implementation of the CAS on intervention ward CI ranged from nil to 4.10 for all grades, nil to 1.17 for grades 2-4, and nil to 3.07 for grade 1; a single month recorded nil occurrences. Rates post implementation of the CAS on intervention ward CI ranged between nil to 5.37 for all grades, nil to 3.26 for grades 2-4, and nil to 3.22 for grade 1; months 7 to 11 recorded nil occurrences.

The summarised key information from the *C* charts plotting rates of all grades of pressure ulcers and grade 2-4 pressure ulcers for matched pair C is provided in Table 40.

A complete set of descriptive statistics and SPC charts is provided in Appendix 36.

²⁸ Rates are quoted as rates per 1,000 bed days per month

Table 40: Matched pair C rates of pressure ulcers

All grades of pressure ulcers (per 1,000 bed days)		
	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.46 to 6.16	0.00 to 4.10
Monthly rates months 0 to 11	0.00 to 7.81	0.00 to 5.37
SPC chart summary		
Stabilised centre line value	3.50	2.66
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	7 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change	None	Trend: 7 consecutive points falling or at 0
Grade 2-4 pressure ulcers (per 1,000 bed days)		
	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 3.78	0.00 to 1.17
Monthly rates months 0 to 11	0.00 to 3.90	0.00 to 3.26
SPC chart summary		
Stabilised centre line value	1.85	0.76
Number of points below stabilised centre line (months -6 to -1)	4 out of 6	2 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	9 out of 12	7 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change	None	Trend: 7 points falling or at 0
Grade 1 pressure ulcers (per 1,000 bed days)		
	Intervention ward CI	Control ward CC
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 2.46	1.00 to 3.07
Monthly rates months 0 to 11	0.00 to 4.84	0.00 to 3.22
SPC chart summary		
Stabilised centre line value	1.65	1.90
Number of points below stabilised centre line (months -6 to -1)	2 out of 6	2 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	10 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shifts or trends post process change	None	Shift: 10 consecutive points below CL; Trend: 7 consecutive points falling or at 0

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6.7.2 Intervention ward CI

No special cause variation was identified either pre- or post-participation in the CAS. Therefore, the processes for managing and preventing the occurrence of pressure ulcers were indicated as being stable throughout this time period. Therefore, there was no evidence to indicate participation in the CAS had an effect upon these processes on ward CI.

An example is provided in Figure 32.

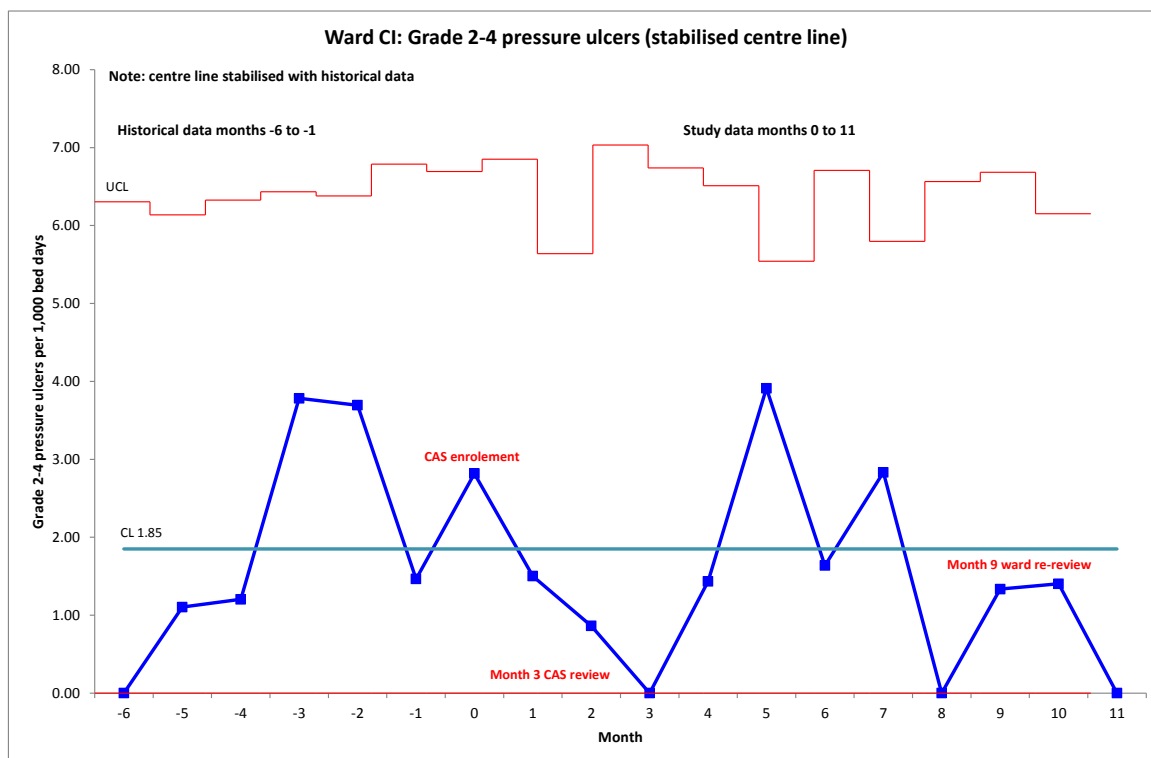


Figure 32: Intervention ward CI SPC chart for grade 2-4 pressure ulcers

6.8 Rates of pressure ulcers: pooled analysis

6.8.1 Descriptive statistics

Aggregated monthly rates²⁹ of pressure ulcers in the six months prior to participation in the CAS for the combined intervention wards ranged from 1.25 to 2.07 for all grades, nil to 1.32 for grades 2-4, and nil to 1.25 for grade 1. Following participation in the CAS aggregated monthly rates ranged between nil to 3.29 for all grades, nil to 1.41 for grades 2-4, and nil to 1.88 for grade 1; nil occurrences were recorded across the wards for two out of the 12 months.

Aggregated monthly rates of pressure ulcers in the six months prior to implementation of the CAS on the intervention wards for the control wards ranged from 0.44 to 2.08 for all grades, 0.39 to 1.67 for grades 2-4, and nil to 1.56 for grade 1. Aggregated rates post implementation of the CAS on the intervention wards ranged between 0.40 to 3.16 for all grades, 0.40 to 1.79 for grades 2-4, and nil to 1.97 for grade 1. There were no months in which nil occurrences were recorded.

The summarised key information from the *C* charts plotting rates of all grades of pressure ulcers and grade 2-4 pressure ulcers for the aggregated intervention wards and aggregated control wards is provided in Table 41.

A complete set of descriptive statistics and SPC charts is provided in Appendix 36.

²⁹ Rates are quoted as rates per 1,000 bed days per month

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Table 41: Aggregated intervention/control ward groups rates of pressure ulcers

All grades of pressure ulcers (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	1.25 to 2.07	0.44 to 2.08
Monthly rates months 0 to 11	0.00 to 3.29	0.40 to 3.16
SPC chart summary		
Stabilised centre line value	1.75	1.56
Number of points below stabilised centre line (months -6 to -1)	3 out of 6	2 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	7 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shift or trend post process change	None	None
Grade 2-4 pressure ulcers (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.32	0.39 to 1.67
Monthly rates months 0 to 11	0.00 to 1.41	0.40 to 1.79
SPC chart summary		
Stabilised centre line value	1.05	0.64
Number of points below stabilised centre line (months -6 to -1)	2 out of 6	5 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	5 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shift or trend post process change	None	None
Grade 1 pressure ulcers (per 1,000 bed days)	Intervention wards	Control wards
Descriptive statistics	Range	Range
Monthly rates months -6 to -1	0.00 to 1.25	0.00 to 1.56
Monthly rates months 0 to 11	0.00 to 1.88	0.00 to 1.97
SPC chart summary		
Stabilised centre line value	0.70	0.92
Number of points below stabilised centre line (months -6 to -1)	2 out of 6	3 out of 6
Points above UCL prior to process change (months -6 to -1)	None	None
Number of points below stabilised centre line (months 0 to 11)	7 out of 12	7 out of 12
Points above UCL post process change (months 0 to 11)	None	None
Shift or trend post process change	None	None

6.8.2 The aggregated intervention wards

No special cause variation was identified either pre- or post-participation in the CAS. Therefore, the processes for managing and preventing the occurrence of pressure ulcers across the intervention wards were indicated as being stable throughout this time period. As a result, there was no evidence to indicate participation in the CAS had an effect upon these processes for the combined data set for the intervention wards.

An example is provided in Figure 33.

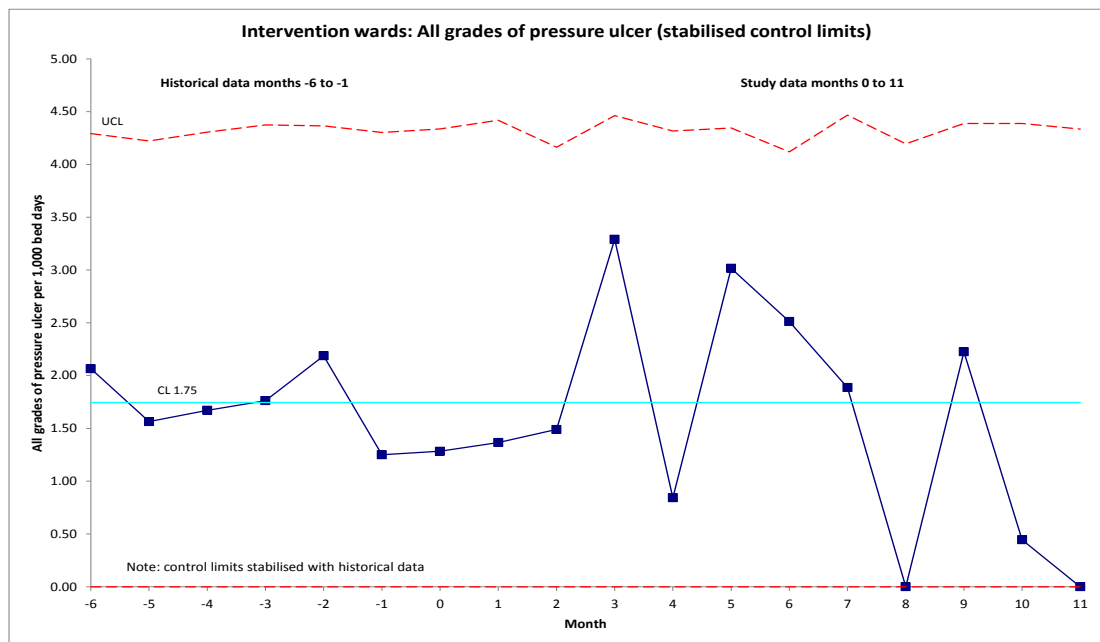


Figure 33: Intervention wards SPC chart for all grades of pressure ulcers

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6.9 Rates of hospital acquired infections

Due to the low rates of hospital acquired infections experienced by all the matched pairs no formal statistical analysis was undertaken. However, the data suggests the systems for preventing the occurrence of hospital acquired infections on these wards were stable prior to participation in the CAS and were unaffected by participation in the CAS. Table 42 provides details of the hospital acquired infection rates for each of the matched pairs.

Table 42: Hospital acquired infection rates

	MRSA		<i>C. Diff.</i>	
	Historical rates (months -6 to -1)	Study rates (month 0 to 11)	Historical rates (months -6 to -1)	Study rates (month 0 to 11)
Ward AI	0	0	1	0
Ward AC	0	0	1	0
Ward BI	0	0	0	1
Ward BC	0	1	0	1
Ward CI	0	0	2	0
Ward CC	0	0	0	1

6.10 Picker Inpatient Experience survey questions: matched pair A

6.10.1 Descriptive statistics

Monthly sample sizes for the selected Picker Inpatient Experience survey questions in the six months prior to participation in the CAS ranged between 4 to 28 respondents on ward AI and 7 to 21 respondents on ward AC; following participation in the CAS the range was between 6 and 39 respondents on intervention ward AI and 2 to 22 respondents on control ward AC.

The monthly proportion of respondents answering “Yes” to “*Do you have trust and confidence in the nurses treating you?*” in the four months prior to participation in the CAS ranged between 96.3% to 100% on ward AI and 87.5% to 100% on ward AC; following participation in the CAS the range was between 62.5% to 92.9% on ward AI and 70.6% to 100% on ward AC. The stabilised centre line value for ward AI was 98.8% and 96.5% for ward AC.

The monthly proportion of respondents answering “Yes” to “*Overall, did you feel you were treated with respect and dignity while you were in hospital?*” in the six months prior to participation in the CAS ranged between 92.6% to 100% on ward AI and 71.4% to 100% on ward AC; following participation in the CAS the range was between 80.0% and 100% on ward AI and 75.0% to 100% on ward AC. The stabilised centre line value for ward AI was 96.9% and 91.0% for ward AC.

The monthly proportion of respondents answering “Excellent” to “*Overall, how would you rate the care you have received?*” in the six months prior to participation in the CAS ranged between 44.2% to 59.3% on ward AI and 50.0% to 66.7% on ward AC; following participation in the CAS the range was between 35.7% to 75.0% on ward AI and 25.0% to 66.7% on ward AC. The stabilised centre line value for ward AI was 68.5% and 60.3% for ward AC. The monthly proportion of respondents answering either “Excellent” or “Very good” to this question in the six months prior to participation in the CAS ranged between 81.8% to 100% on ward AI and 71.5% to 100% on ward AC; following participation in the CAS the range was between 68.8% to 100% on ward AI and

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75.0 % to 100% on ward AC. The stabilised centre line value for ward AI was 94.9% and 93.6% for ward AC.

The monthly proportion of respondents answering “*Yes, definitely*” to “*Do you think the hospital staff did everything they could to help control your pain?*” in the six months prior to participation in the CAS ranged between 75.0% to 100% on ward AI and 71.4% to 100% on ward AC; following participation in the CAS the range was between 66.7% and 87.2% on ward AI and 50.0% to 100% on ward AC. The stabilised centre line value for ward AI was 94.3% and 91.9% for ward AC.

The monthly proportion of respondents answering “*No*” to “*Did staff talk in front of you as if you weren’t there?*” in the six months prior to participation in the CAS ranged between nil to 92.6% on ward AI and 67.7% to 100% on ward AC; following participation in the CAS the range was between 54.6% and 100% on ward AI and 75.0% to 100% on ward AC. The stabilised centre line value for ward AI was 80.2% and 89.9% for ward AC.

The monthly proportion of respondents answering “*Clean*” to “*How clean are the wards and bathrooms that you use in the hospital?*” in the six months prior to participation in the CAS ranged between 63.6% to 100% on ward AI and 50.0% to 90.0% on ward AC; following participation in the CAS the range was between 16.7% and 75.0% on ward AI and 38.9% to 100% on ward AC. The stabilised centre line value for ward AI was 75.5% and 80.5% for ward AC.

Table 43 provides the key information from the *C* charts plotting the response categories selected for analysis for each of the patient experience survey questions.

Appendix 37 provides the complete set of descriptive statistics and SPC charts.

Table 43: Matched pair A Picker Inpatient Experience Survey questions³⁰

<i>"Do you have trust and confidence in the nurses treating you?"</i>		
Respondents answering "Yes"	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -4 to -1	96.3% to 100%	87.5% to 100%
Sample size range (<i>n</i> =) months -4 to -1	5 to 27	7 to 18
Response range (%) months 0 to 11	62.5% to 92.9%	70.6% to 100%
Sample size range (<i>n</i> =) months 0 to 11	7 to 39	4 to 22
SPC chart summary		
Stabilised centre line value	98.8%	96.5%
Number of points above stabilised centre line (months -4 to -1)	3 out of 4	2 out of 4
Points outside LCL, shifts or trends prior to process change (months -4 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	0 out of 12	3 out of 12
Points outside LCL post process change (months 0 to 11)	10 points below LCL	1 point below LCL
Shifts or trends post process change (months 0 to 11)	Shift: 12 consecutive points below CL	None
<i>"Overall, did you feel you were treated with respect and dignity while you were in hospital?"</i>		
Respondents answering "Yes"	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	92.6% to 100%	71.4% to 100%
Sample size range (<i>n</i> =) months -6 to -1	5 to 27	7 to 21
Response range (%) months 0 to 11	80.0% to 100%	75.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	7 to 39	4 to 21
SPC chart summary		
Stabilised centre line value	96.9%	91.0%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	2 out of 12	7 out of 12
Points outside LCL post process change (months 0 to 11)	3 points below LCL	None
Shifts or trends post process change (months 0 to 11)	10 consecutive points below CL	None
<i>"Overall, how would you rate the care you have received?"</i>		
Respondents answering "Excellent"	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	44.2% to 59.3%	50.0% to 66.7%
Sample size range (<i>n</i> =) months -6 to -1	5 to 27	7 to 21
Response range (%) months 0 to 11	35.7% to 75.0%	25.0% to 66.7%
Sample size range (<i>n</i> =) months 0 to 11	7 to 39	4 to 20
SPC chart summary		

³⁰ Question analysis omitted any respondent declining to answer a question or replying "I was not in any pain"/"I can't say" in response to the management of pain question

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Stabilised centre line value	68.5%	60.3%
Number of points above stabilised centre line (months -6 to -1)	2 out of 4	2 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	4 out of 12	1 out of 12
Points outside LCL post process change (months 0 to 11)	2 points below LCL	None
Shifts or trends post process change (months 0 to 11)	None	Shift: 10 consecutive points below LCL
<i>“Overall, how would you rate the care you have received?”</i>		
Respondents answering “Excellent” & “Very good”	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	81.8% to 100%	71.5% to 100%
Sample size range (<i>n</i> =) months -6 to -1	5 to 27	7 to 21
Response range (%) months 0 to 11	68.8% to 100%	75.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	7 to 39	4 to 20
SPC chart summary		
Stabilised centre line value	94.9%	93.6%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	1 out of 12	7 out of 12
Points outside LCL post process change (months 0 to 11)	1 out of 12	1 point below LCL
Shifts or trends post process change (months 0 to 11)	Shift: 11 consecutive points below CL	None
<i>“Do you think the hospital staff did everything they could to help control your pain?”</i>		
Respondents answering “Yes, definitely”	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	75.0% to 100%	71.4% to 100%
Sample size range (<i>n</i> =) months -6 to -1	4 to 26	7 to 21
Response range (%) months 0 to 11	66.7% to 87.2%	50.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	6 to 39	4 to 20
SPC chart summary		
Stabilised centre line value	94.3%	91.9%
Number of points above stabilised centre line (months -6 to -1)	2 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	1 out of 12	4 out of 12
Points outside LCL post process change (months 0 to 11)	None	2 points below LCL
Shifts or trends post process change (months 0 to 11)	Shift: 11 consecutive points below CL	None

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<i>"Did staff talk in front of you as if you weren't there?"</i>		
Respondents answering "No"	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	0% to 92.6%	66.7% to 100%
Sample size range ($n =$) months -6 to -1	1 to 27	8 to 21
Response range (%) months 0 to 11	54.6% to 100%	75.0% to 100%
Sample size range ($n =$) months 0 to 11	7 to 39	2 to 17
SPC chart summary		
Stabilised centre line value	80.2%	89.9%
Number of points above stabilised centre line (months -6 to -1)	2 out of 6	5 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	6 out of 12	4 out of 12
Points outside LCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	None
<i>"How clean are the wards and bathrooms that you use in the hospital?"</i>		
Respondents answering "Clean"	Intervention ward AI	Control ward AC
Descriptive statistics	Minimum - maximum	Minimum - maximum
Response range (%) months -6 to -1	63.6% to 100%	50.0% to 90.0%
Sample size range ($n =$) months -6 to -1	5 to 28	8 to 21
Response range (%) months 0 to 11	16.7% to 75.0%	38.9% to 100%
Sample size range ($n =$) months 0 to 11	6 to 36	4 to 18
SPC chart summary		
Stabilised centre line value	75.5%	80.5%
Number of points above stabilised centre line (months -6 to -1)	2 out of 6	4 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	0 out of 12	2 out of 12
Points outside LCL post process change (months 0 to 11)	1 point below LCL	2 points below LCL
Shifts or trends post process change (months 0 to 11)	Shift: 12 consecutive points below CL	None

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6.10.2 Intervention ward AI

No special cause variation was identified for any question in the 6 months prior to participation in the CAS. Hence, the processes determining patient experience in relation to the selected questions on ward AI were indicated as being stable for this time period.

“Did staff talk in front of you as if you weren’t there?” was the only question exhibiting no special cause variation following participation in the CAS.

Special cause variation in the form of points below the lower control limit was exhibited by the questions *“How clean are the wards and bathrooms that you use in the hospital?”* (1 point, Figure 34), *“Overall, how would you rate the care you have received?”* (2 points, respondents answering *“Excellent”*, Figure 35; 1 point, respondents answering *“Excellent”* and *“Very good”*, Figure 36) and *“Overall, did you feel you were treated with respect and dignity while you were in hospital?”* (3 points, Figure 39).

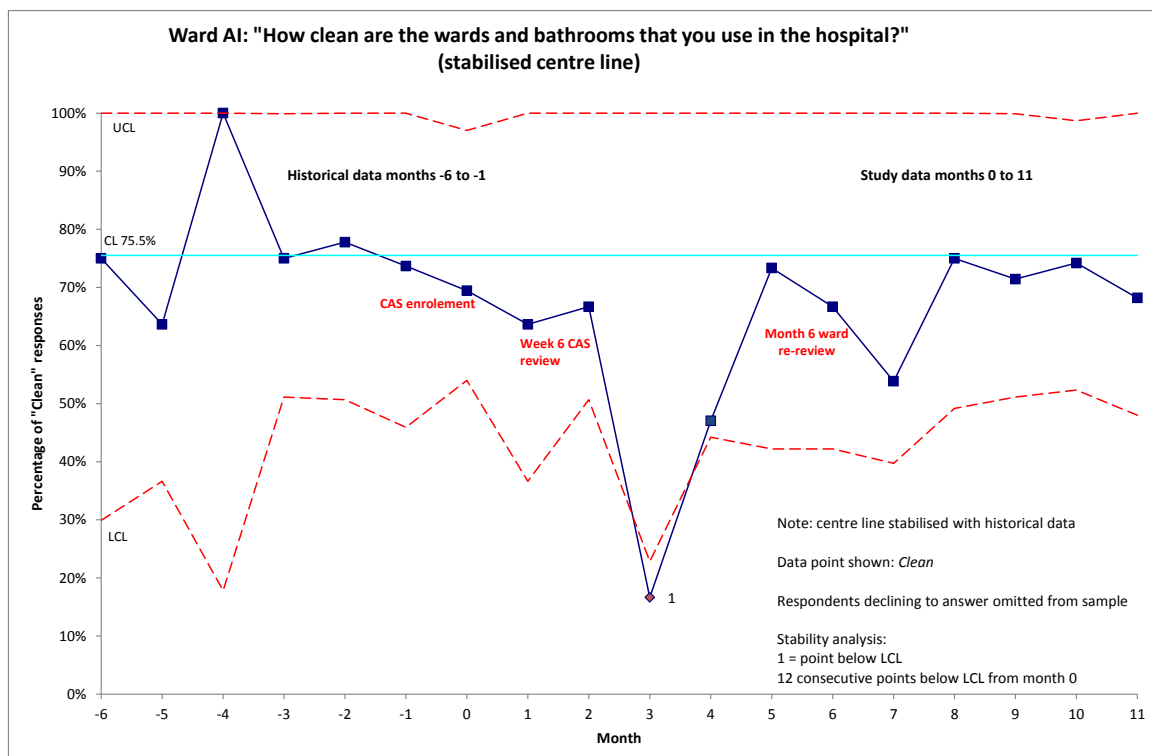


Figure 34: Intervention ward AI SPC chart *“How clean are the wards and bathrooms that you use in the hospital?”*

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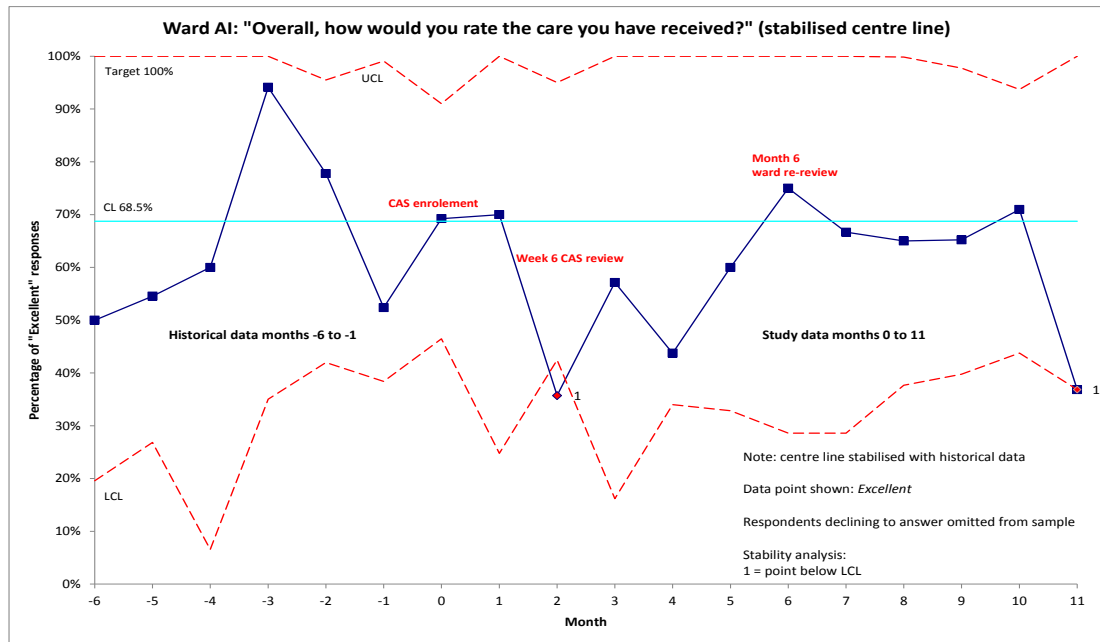


Figure 35: Intervention ward AI SPC chart “Overall, how would you rate the care you have received?” (respondents answering “Excellent”)

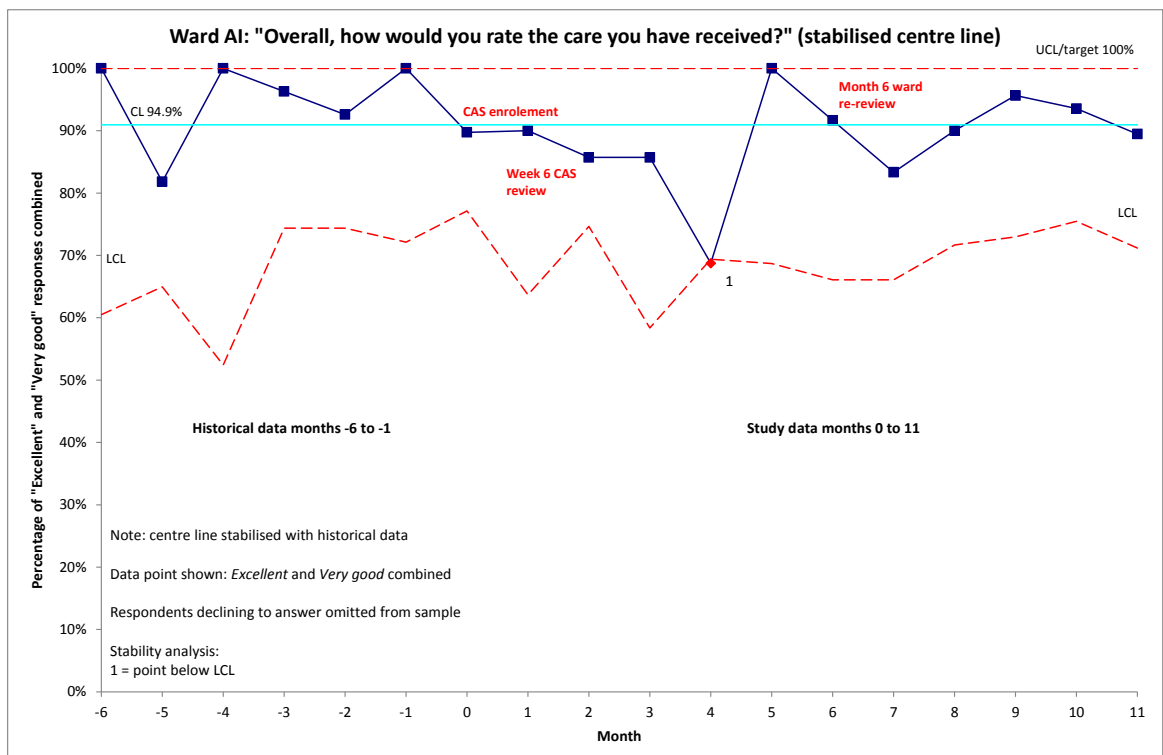


Figure 36: Intervention ward AI SPC chart “Overall, how would you rate the care you have received?” (respondents answering “Excellent” and “Very good”)

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For all of these questions, the occurrence of a number of these measurement points below the lower control limit coincided with severe staffing issues with potential to impact upon ward quality of nursing care (Trust Working Group meeting minutes 18/03/13); these events were therefore not attributable to the CAS. Occurrence of the remaining measurement points below the lower control limit, given their small number and dispersed pattern, was not indicative of a change in process producing differing outcomes. Therefore, the cause of these events was not attributed to the CAS.

In contrast, *“Do you have trust and confidence in the nurses treating you?”* evidenced a shift of 12 consecutive points below the centre line and 10 points below the lower control limit. The lack of a corresponding finding on the control ward was indicative of participation in the CAS resulting in less favourable outcomes for this question (Figures 37 and 38). Similar downward shifts were exhibited by the questions *“Overall, did you feel you were treated with respect and dignity while you were in hospital?”* (10 points, Figures 39 and 40), *“Do you think the hospital staff did everything they could to help control your pain?”* (11 points, Figures 41 and 42) and *“How clean are the wards and bathrooms that you use in the hospital?”* (12 points, Figure 34). This represents an overall decrease in patient experience in relation to these questions.

Fieldwork notes did not identify any evidence of sustained contextual factors with potential to produce any these results. Furthermore, similar control ward shifts were not evidenced for any of these questions. Consequently, all of these events were potentially attributable to the effects of participation in the CAS.

6. Measures of safety & experience

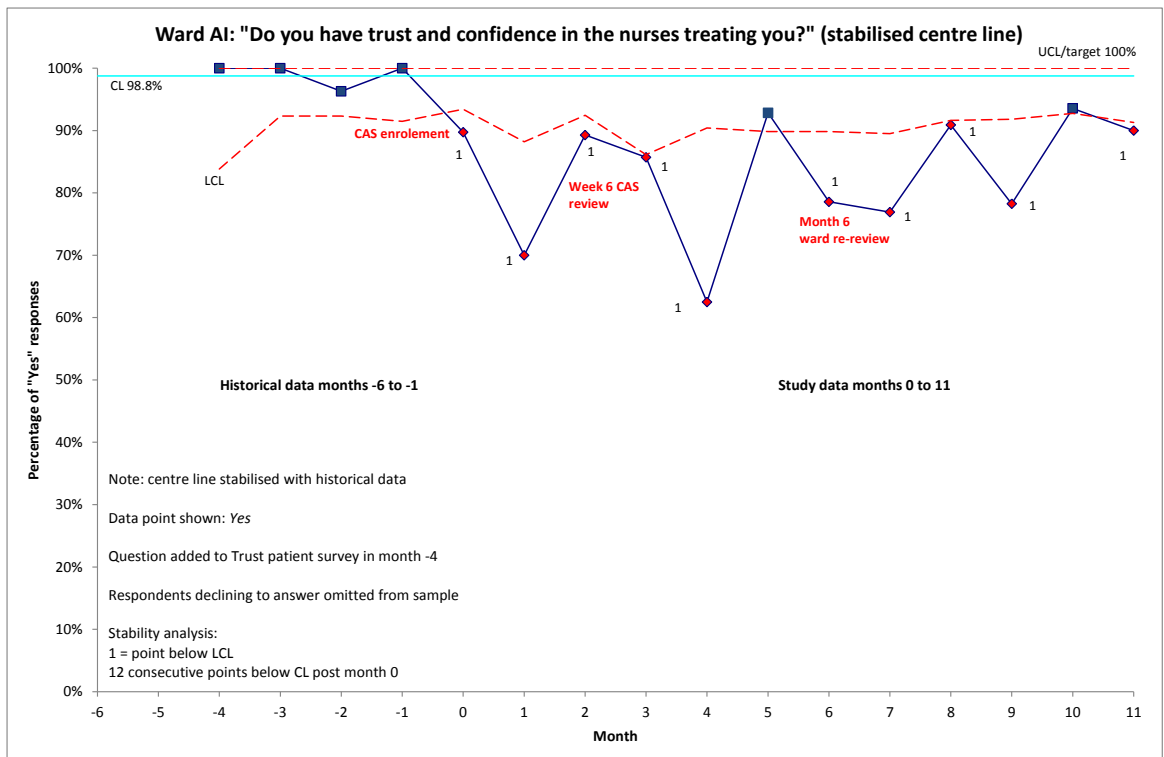


Figure 37: Intervention ward AI SPC chart "Do you have trust and confidence in the nurses treating you?"

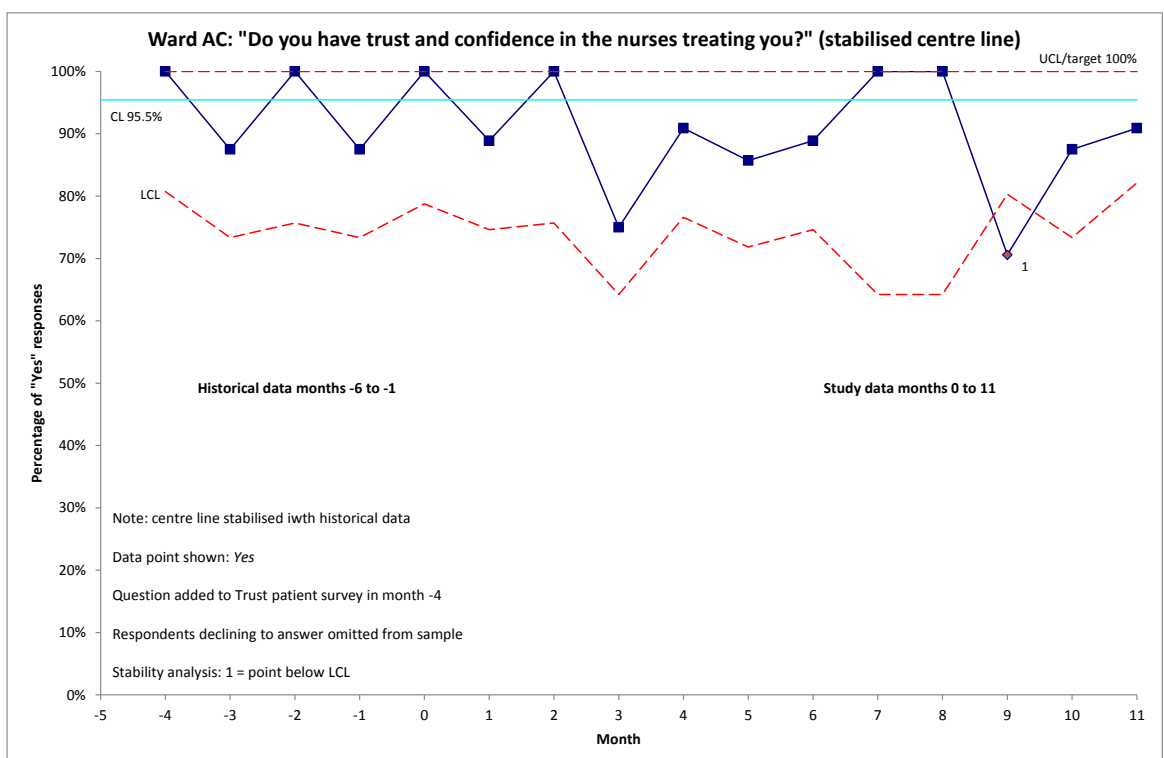


Figure 38: Control ward AC SPC chart "Do you have trust and confidence in the nurses treating you?"

6. Measures of safety & experience

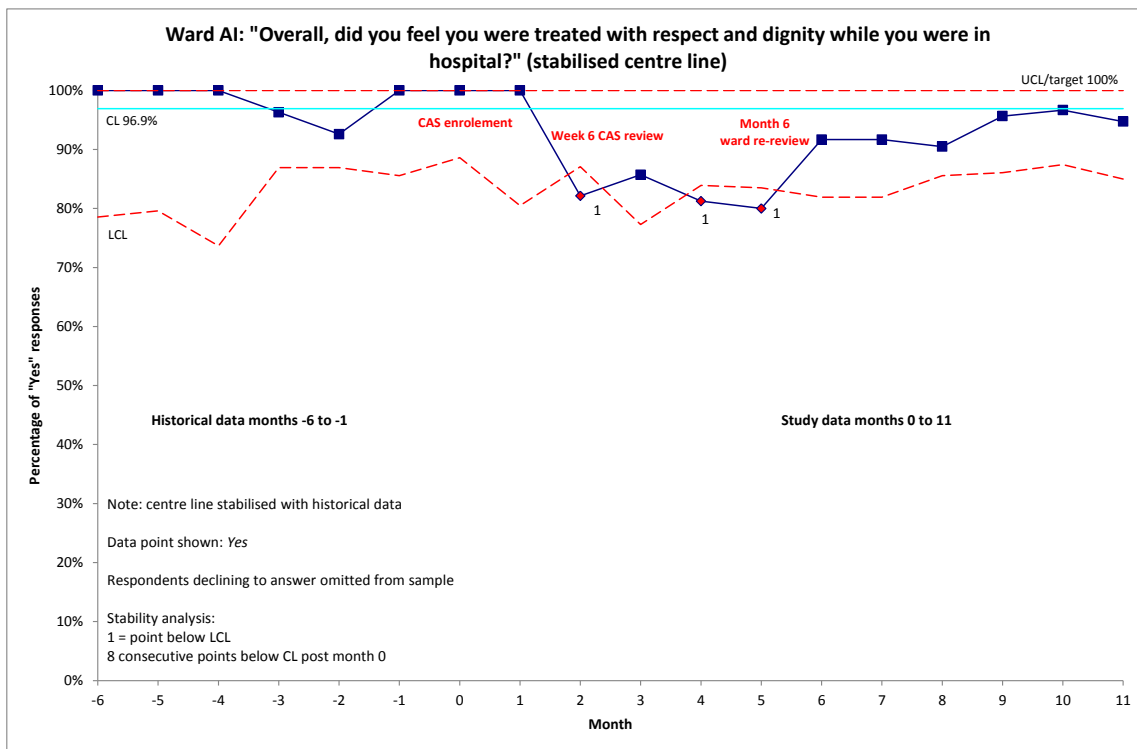


Figure 39: Intervention ward AI SPC chart "Overall, did you feel you were treated with respect and dignity while you were in hospital?"

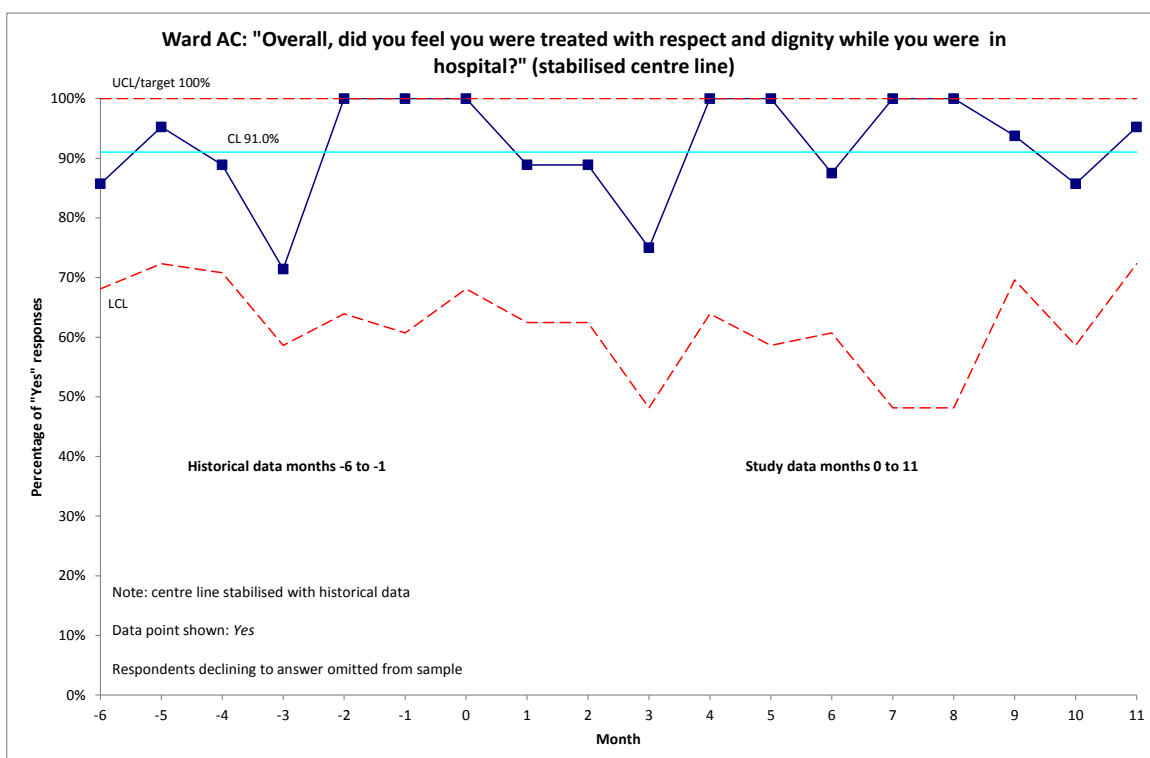


Figure 40: Control ward SPC chart "Overall, did you feel you were treated with respect and dignity while you were in hospital?"

6. Measures of safety & experience

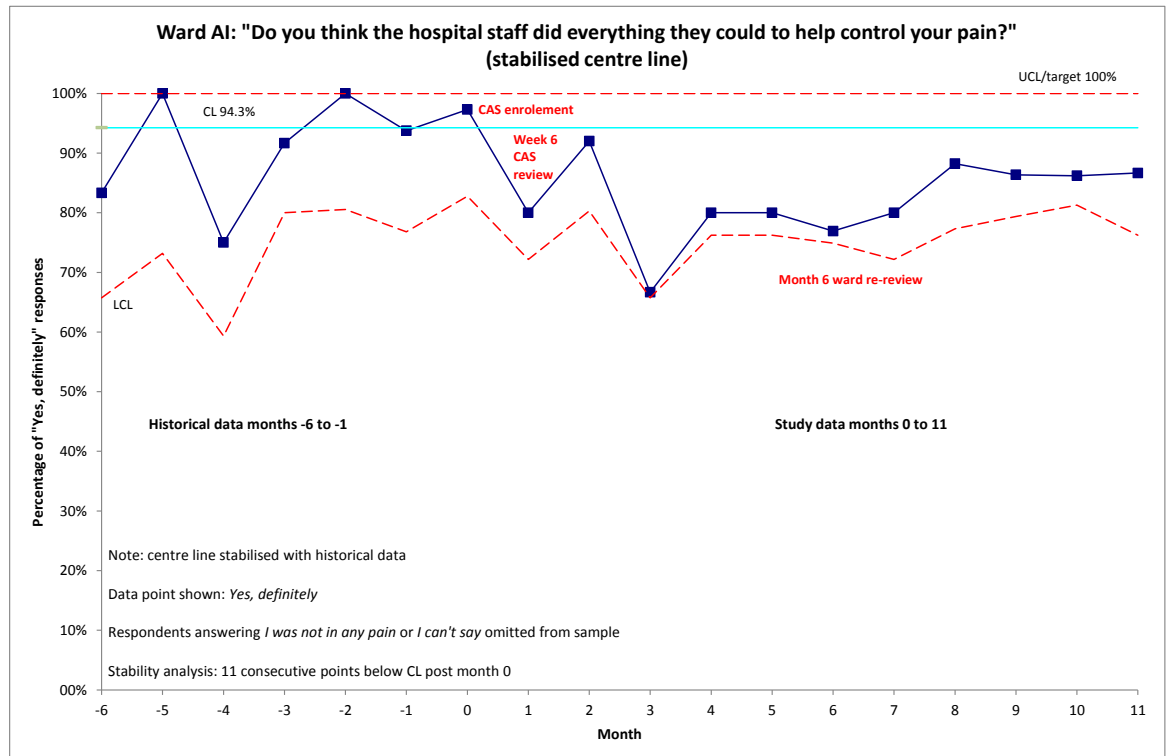


Figure 41: Intervention ward AI SPC chart "Do you think hospital staff did everything they could to help control your pain?"

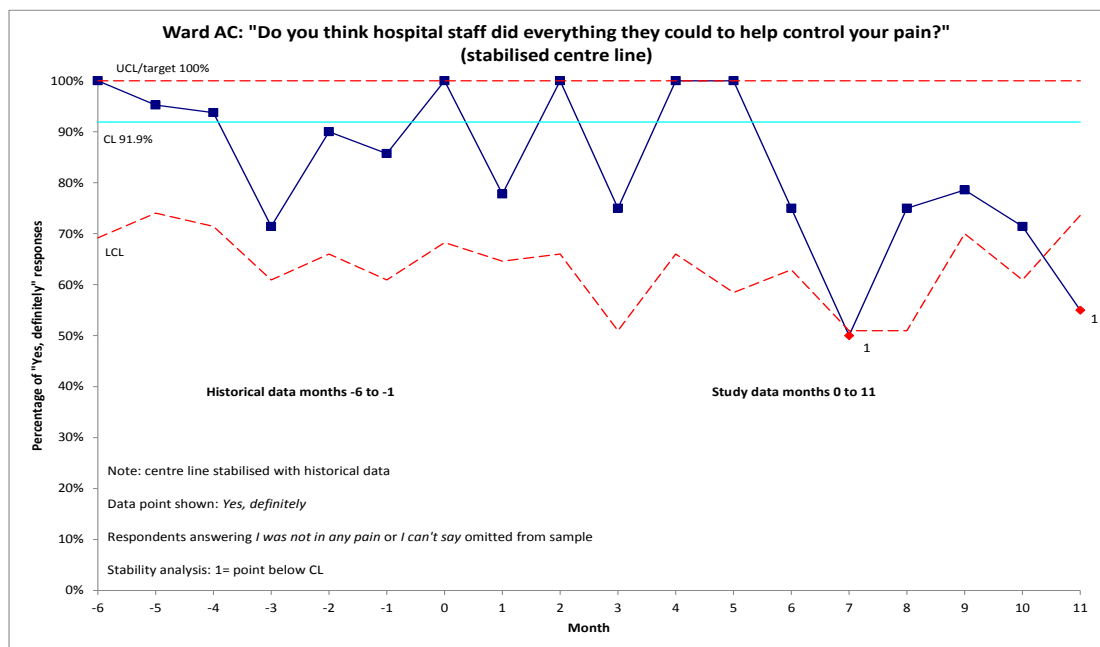


Figure 42: Control ward AC SPC chart "Do you think hospital staff did everything they could to help control your pain?"

6. Measures of safety & experience

6.11 Picker Inpatient Experience Survey questions: matched pair B

6.11.1 Descriptive statistics

Monthly sample sizes for the selected Picker Inpatient Experience Survey questions in the six months prior to participation in the CAS ranged between 1 to 29 respondents on intervention ward BI and 4 to 15 respondents on control ward BC; following participation in the CAS the range was between 8 and 35 respondents on ward BI and 2 to 26 respondents on ward BC.

The monthly proportion of respondents answering “Yes” to “*Do you have trust and confidence in the nurses treating you?*” in the four months prior to participation in the CAS ranged between 66.7% to 100% on ward BI and 55.6% to 100% on ward BC; following participation in the CAS the range was between 63.6% to 100% on ward BI and 55.6% to 100% on ward BC. The stabilised centre line value for ward BI was 85.7% and 86.4% for ward BC.

The monthly proportion of respondents answering “Yes” to “*Overall, did you feel you were treated with respect and dignity while you were in hospital?*” in the six months prior to participation in the CAS ranged between 33.3% to 100% on ward BI and 83.3% to 100% on ward BC; following participation in the CAS the range was between 72.7% and 100% on ward BI and 25.0% to 100% on ward BC. The stabilised centre line value for ward BI was 88.8% and 93.7% for ward BC.

The monthly proportion of respondents answering “Excellent” to “*Overall, how would you rate the care you have received?*” in the six months prior to participation in the CAS ranged between nil to 71.4% on ward BI and 25.0% to 50.0% on ward BC; following participation in the CAS the range was between 27.3% to 66.7% on ward BI and 11.1% to 80.0% on ward BC. The stabilised centre line value for ward BI was 31.6% and 36.7% for ward BC. The monthly proportion of respondents answering either “Excellent” or “Very good” to this question in the six months prior to participation in the CAS ranged between nil to 100% on ward BI and 25.0% to 75.0% on ward BC; following participation in the CAS the range was between 64.3% to 100% on ward BI and 25.0% to 100%

on ward BC. The stabilised centre line value for ward BI was 75.9% and 85.0% for ward BC.

The monthly proportion of respondents answering *“Yes, definitely”* to *“Do you think the hospital staff did everything they could to help control your pain?”* in the six months prior to participation in the CAS ranged between 50.0% to 100% on ward BI and 80.0% to 100% on ward BC; following participation in the CAS the range was between 33.3% and 90.0% on ward BI and 40.0% to 100% on ward BC. The stabilised centre line value for ward BI was 88.5% and 90.3% for ward BC.

The monthly proportion of respondents answering *“No”* to *“Did staff talk in front of you as if you weren’t there?”* in the six months prior to participation in the CAS ranged between 50.0% to 100% on ward BI and 72.7% to 100% on ward BC; following participation in the CAS the range was between 66.6% and 100% on ward BI and 21.4% to 100% on ward BC. The stabilised centre line value for ward BI was 83.3% and 82.5% for ward BC.

The monthly proportion of respondents answering *“Clean”* to *“How clean are the wards and bathrooms that you use in the hospital?”* in the six months prior to participation in the CAS ranged between 38.9% to 100% on ward BI and 53.3% to 87.5% on ward BC; prior to participation in the CAS the range was between 10.0% and 88.9% on ward BI and 33.3% to 100% on ward BC. The stabilised centre line value for ward BI was 53.2% and 65.6% for ward BC.

Table 44 provides the key information from the *C* charts plotting the response categories selected for analysis for each of the patient experience survey questions.

Appendix 37 provides a complete set of descriptive statistics and SPC charts.

6. Measures of safety & experience

Table 44: Matched pair B Picker Inpatient Experience Survey questions³¹

<i>“Do you have trust and confidence in the nurses treating you?”</i>		
Respondents answering “Yes”	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -4 to -1	66.7% to 100%	80.0% to 100%
Sample size range (<i>n</i> =) months -4 to -1	6 to 27	4 to 15
Response range (%) months 0 to 11	63.6% to 100%	55.6% to 100%
Sample size range (<i>n</i> =) months 0 to 11	10 to 35	3 to 25
SPC chart summary		
Stabilised centre line value	85.7%	86.4%
Number of points above stabilised centre line (months -4 to -1)	1 out of 4	2 out of 4
Points outside LCL, shifts or trends prior to process change (months -4 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	6 out of 12	3 out of 12
Point outside LCL post process change (months 0 to 11)	None	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>“Overall, did you feel you were treated with respect and dignity while you were in hospital?”</i>		
Respondents answering “Yes”	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	33.3% to 100%	83.3% to 100%
Sample size range (<i>n</i> =) months -6 to -1	1 to 27	4 to 15
Response range (%) months 0 to 11	72.7% to 100%	25.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	9 to 35	3 to 26
SPC chart summary		
Stabilised centre line value	88.8%	93.7%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	1 point below LCL	None
Number of points above stabilised centre line (months 0 to 11)	5 out of 12	5 out of 12
Points outside LCL post process change (months 0 to 11)	None	3 points below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>“Overall, how would you rate the care you have received?”</i>		
Respondents answering “Excellent”	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	0.0% to 71.4%	25.0% to 50.0%
Sample size range (<i>n</i> =) months -6 to -1	1 to 28	4 to 14
Response range (%) months 0 to 11	27.3% to 66.7%	11.1% to 80.0%
Sample size range (<i>n</i> =) months 0 to 11	10 to 34	3 to 26

³¹ Question analysis omitted any respondent declining to answer a question or replying “I was not in any pain” or “I can’t say” in response to the management of pain question

6. Measures of safety & experience

SPC chart summary		
Stabilised centre line value	31.6%	36.7%
Number of points above stabilised centre line (months -6 to -1)	2 out of 4	2 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	10 out of 12	8 out of 12
Points outside LCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	None
<i>"Overall, how would you rate the care you have received?"</i>		
Respondents answering "Excellent" & "Very good"	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	0.0% to 100%	25.0% to 75.0%
Sample size range ($n =$) months -6 to -1	1 to 28	4 to 14
Response range (%) months 0 to 11	64.3% to 100%	25.0% to 100%
Sample size range ($n =$) months 0 to 11	10 to 34	3 to 26
SPC chart summary		
Stabilised centre line value	75.9%	85.0%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	1 point below LCL	None
Number of points above stabilised centre line (months 0 to 11)	8 out of 12	4 out of 12
Points outside LCL post process change (months 0 to 11)	None	2 points below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>"Do you think the hospital staff did everything they could to help control your pain?"</i>		
Respondents answering "Yes, definitely"	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	50.0% to 100%	80.0% to 100%
Sample size range ($n =$) months -6 to -1	1 to 26	4 to 14
Response range (%) months 0 to 11	33.3% to 90.0%	40.0% to 100%
Sample size range ($n =$) months 0 to 11	9 to 29	3 to 25
SPC chart summary		
Stabilised centre line value	88.5%	90.3%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	2 out of 12	2 out of 12
Points outside LCL post process change (months 0 to 11)	1 point below LCL	3 points below LCL
Shifts or trends post process change (months 0 to 11)	None	10 consecutive points below CL

6. Measures of safety & experience

<i>“Did staff talk in front of you as if you weren’t there?”</i>		
Respondents answering “No”	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	50.0% to 100%	72.7% to 100%
Sample size range (<i>n</i> =) months -6 to -1	1 to 27	4 to 15
Response range (%) months 0 to 11	66.6% to 100%	21.4% to 100%
Sample size range (<i>n</i> =) months 0 to 11	9 to 33	2 to 26
SPC chart summary		
Stabilised centre line value	83.3%	82.5%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	5 out of 12	4 out of 12
Points outside LCL post process change (months 0 to 11)	None	2 points below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>“How clean are the wards and bathrooms that you use in the hospital?”</i>		
Respondents answering “Clean”	Intervention ward BI	Control ward BC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	38.9% to 100%	53.3% to 87.5%
Sample size range (<i>n</i> =) months -6 to -1	1 to 27	4 to 15
Response range (%) months 0 to 11	10.0% to 88.9%	33.3% to 100%
Sample size range (<i>n</i> =) months 0 to 11	8 to 34	2 to 26
SPC chart summary		
Stabilised centre line value	53.2%	65.6%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points outside LCL, shifts or trends prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	9 out of 12	5 out of 12
Points outside LCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	None

6.11.2 Intervention ward BI

Prior to participation in the CAS the questions “Overall, did you feel you were treated with respect and dignity while you were in hospital?” (Figure 43) and “Overall, how would you rate the care you have received?” (respondents answering “Excellent” and “Very good”, Figure 44) were indicated a being unstable with each having a single measurement point below the lower control limit.

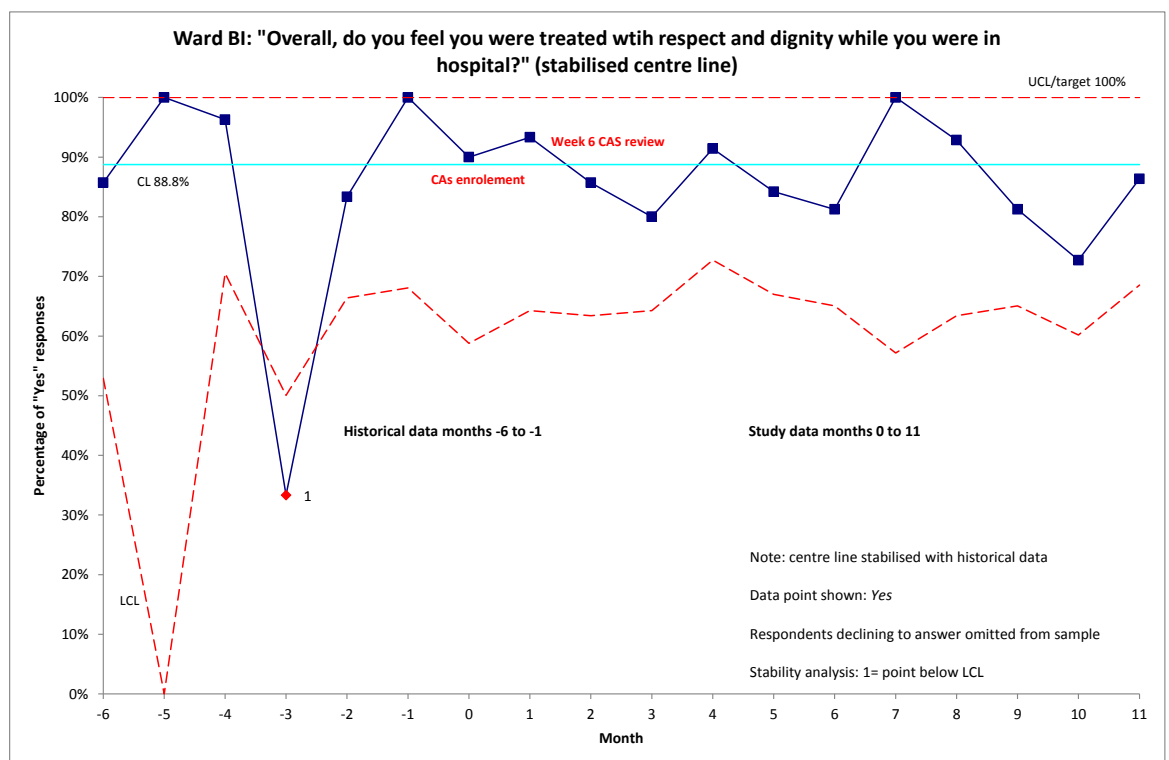


Figure 43: Intervention ward BI SPC chart “Overall, do you feel you were treated with respect and dignity while you were in hospital?”

6. Measures of safety & experience

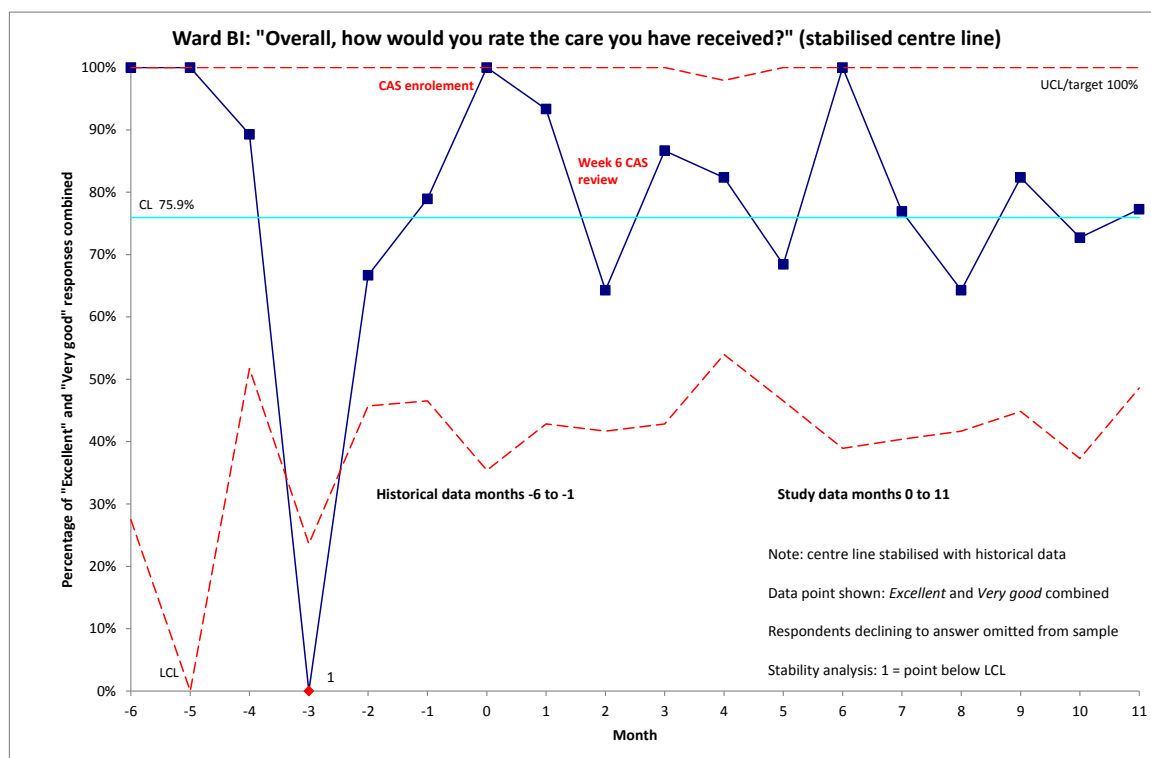


Figure 44: Intervention ward BI SPC chart *"Overall, how would you rate the care you have received?"* (response categories *"Excellent"* and *"Very good"*)

No special cause variation was identified for the remaining questions for this time period and the processes determining patient experience in relation to these questions were indicated as being stable for the six months prior to participation in the CAS.

"Do you think the hospital staff did everything they could to help control your pain?" (Figure 45) was the only question exhibiting special cause variation following participation in the CAS: in this case a single measurement point fell below the lower control limit. Fieldwork notes did not identify any contributory contextual factors but as an isolated point of special cause variation this effect was not attributed to participation in the CAS.

6. Measures of safety & experience

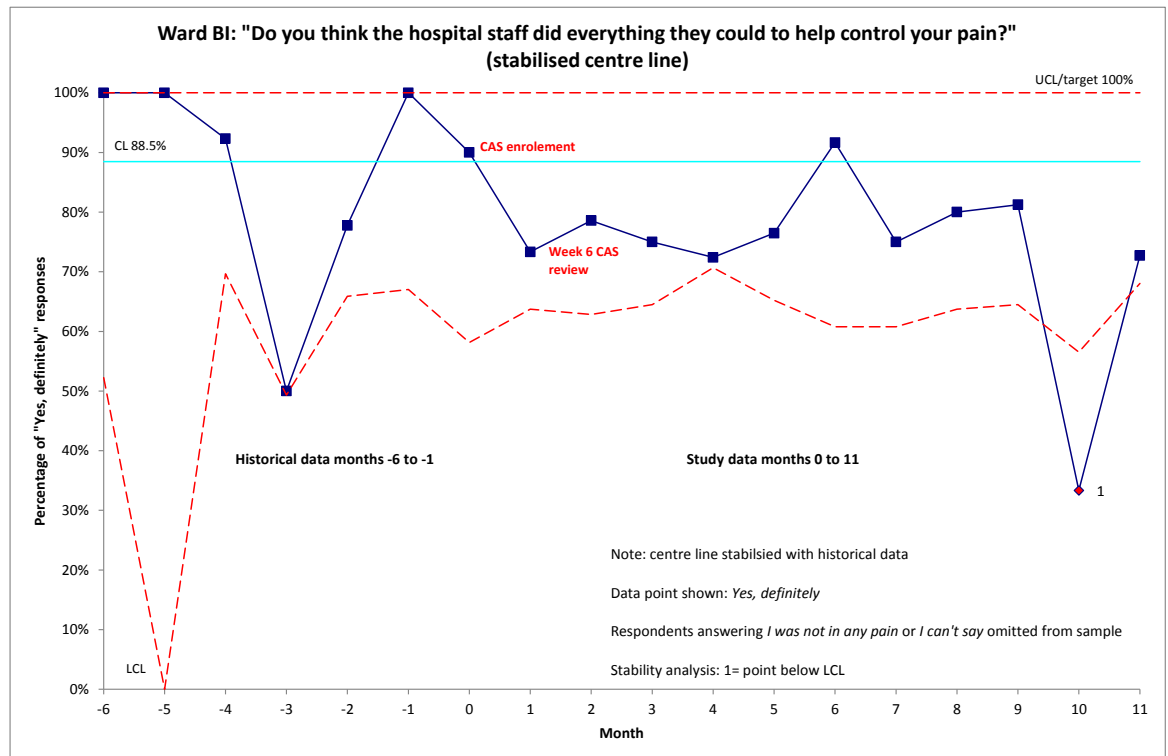


Figure 45: Intervention ward BI SPC chart *"Do you think the hospital staff did everything they could to help control your pain?"*

Overall, there was no evidence indicating participation in the CAS on ward BI had an effect upon patient experience in relation to the questions selected for analysis.

6. Measures of safety & experience

6.12 Picker Inpatient Experience Survey questions: matched pair C

6.12.1 Descriptive statistics

Monthly sample sizes for the selected Picker Inpatient Experience Survey questions in the four months prior to participation in the CAS ranged between 2 to 24 respondents on intervention ward CI and 1 to 32 respondents on control ward CC; following participation in the CAS the range was between 1 and 36 respondents on ward CI and 1 to 15 respondents on ward CC.

The monthly proportion of respondents answering “Yes” to “*Do you have trust and confidence in the nurses treating you?*” in the four months prior to participation in the CAS ranged between 60.0% to 100% on ward CI and 73.3% to 77.8% on ward CC; following participation in the CAS the range was between 44.4% to 100% on ward CI and 50.0% to 100% on ward CC. The stabilised centre line value for ward CI was 90.0% and 75.0% for ward CC.

The monthly proportion of respondents answering “Yes” to “*Overall, did you feel you were treated with respect and dignity while you were in hospital?*” in the six months prior to participation in the CAS ranged between 40.0% to 100% on ward CI and 72.7% to 100% on ward CC; following participation in the CAS the range was between 33.3% and 100% on ward CI and 57.5% to 100% on ward CC. The stabilised centre line value for ward CI was 90.4% and 85.9% for ward CC.

The monthly proportion of respondents answering “Excellent” to “*Overall, how would you rate the care you have received?*” in the six months prior to participation in the CAS ranged between nil to 56.5% on ward CI and 35.7% to 50.0% on ward CC; following participation in the CAS the range was between nil % to 75.0% on ward CI and 12.5% to 100% on ward CC. The stabilised centre line value for ward CI was 47.3% and 39.7% for ward CC. The monthly proportion of respondents answering either “Excellent” or “Very good” to this question in the six months prior to participation in the CAS ranged between 20.0% to 100% on ward CI and 60.0% to 90.9% on ward CC; participation in the CAS the range was between 28.6% to 100% on ward CI and 16.7% to 100% on

ward CC. The stabilised centre line value for ward CI was 78.2% and 82.4% for ward CC.

The monthly proportion of respondents answering *“Yes, definitely”* to *“Do you think the hospital staff did everything they could to help control your pain?”* in the six months prior to participation in the CAS ranged between 50.0% to 100% on ward CI and from 60.0 to 100% on ward CC; following participation in the CAS the range was between 28.6% and 100% on ward CI and nil to 100% on ward CC. The stabilised centre line value for ward CI was 85.1% and 90.1% for ward CC.

The monthly proportion of respondents answering *“No”* to *“Did staff talk in front of you as if you weren’t there?”* in the six months prior to participation in the CAS ranged between 66.7% to 100% on ward CI and 40.0% to 70.0% on ward CC; following participation in the CAS the range was between 37.5% and 100% on ward CI and nil to 100% on ward CC. The stabilised centre line value for ward CI was 86.5% and 76.0% for ward CC.

The monthly proportion of respondents answering *“Clean”* to *“How clean are the wards and bathrooms that you use in the hospital?”* in the six months prior to participation in the CAS ranged between 40.0% to 100% on ward CI and 60.0% to 76.9% on ward CC; following participation in the CAS the range was between nil and 100% on ward CI and 33.3% to 85.7% on ward CC. The stabilised centre line value for ward CI was 69.6% and 71.8% for ward CC.

Table 45 provides the key information from the *C* charts plotting the response categories selected from analysis for each of the patient experience survey questions.

Appendix 37 provides a complete set of descriptive statistics and SPC charts.

6. Measures of safety & experience

Table 45: Matched pair C Picker Inpatient Experience Survey questions³²

<i>“Do you have trust and confidence in the nurses treating you?”</i>		
Respondents answering “Yes”	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -4 to -1	60.0% to 100%	73.3% to 77.8%
Sample size range (<i>n</i> =) months -4 to -1	5 to 24	13 to 20
Response range (%) months 0 to 11	44.4% to 100%	50.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	1 to 32	2 to 14
SPC chart summary		
Stabilised centre line value	90.0%	75.0%
Number of points above stabilised centre line (months -4 to -1)	3 out of 4	3 out of 4
Points below LCL prior to process change (months -4 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	6 out of 12	7 out of 12
Points below LCL post process change (months 0 to 11)	1 point below LCL	None
Shifts or trends post process change (months 0 to 11)	None	None
<i>“Overall, did you feel you were treated with respect and dignity while you were in hospital?”</i>		
Respondents answering “Yes”	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	40.0% to 100%	72.7% to 100%
Sample size range (<i>n</i> =) months -6 to -1	2 to 23	5 to 21
Response range (%) months 0 to 11	33.3% to 100%	57.5% to 100%
Sample size range (<i>n</i> =) months 0 to 11	2 to 22	1 to 14
SPC chart summary		
Stabilised centre line value	90.4%	85.9%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points below LCL prior to process change (months -6 to -1)	1 point below LCL	None
Number of points above stabilised centre line (months 0 to 11)	5 out of 12	4 out of 12
Points below LCL post process change (months 0 to 11)	2 points below LCL	None
Shifts or trends post process change (months 0 to 11)	None	None
<i>“Overall, how would you rate the care you have received?”</i>		
Respondents answering “Excellent”	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	0.00% to 56.5%	35.7% to 50.0%
Sample size range (<i>n</i> =) months -6 to -1	2 to 23	5 to 20
Response range (%) months 0 to 11	0.0% to 75.0%	12.5% to 100%
Sample size range (<i>n</i> =) months 0 to 11	1 to 22	1 to 14

³² Question analysis omitted any respondent declining to answer a question or replying “I was not in any pain”/“I can’t say” in response to the management of pain question

6. Measures of safety & experience

SPC chart summary		
Stabilised centre line value	47.3%	39.7%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	1 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	6 out of 12	7 out of 12
Points below LCL post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	None
<i>"Overall, how would you rate the care you have received?"</i>		
Respondents answering "Excellent" & "Very good"	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	20.0% to 100%	60.0% to 90.9%
Sample size range (n =) months -6 to -1	2 to 23	5 to 20
Response range (%) months 0 to 11	28.6% to 100%	16.7% to 100%
Sample size range (n =) months 0 to 11	1 to 22	1 to 14
SPC chart summary		
Stabilised centre line value	78.2%	82.4%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points below LCL prior to process change (months -6 to -1)	1 point below LCL	None
Number of points above stabilised centre line (months 0 to 11)	8 out of 12	9 out of 12
Points below LCL post process change (months 0 to 11)	1 point below LCL	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>"Do you think the hospital staff did everything they could to help control your pain?"</i>		
Respondents answering "Yes, definitely"	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	50.0% to 100%	60.0% to 100%
Sample size range (n =) months -6 to -1	2 to 21	20 to 4
Response range (%) months 0 to 11	28.6% to 100%	0.0% to 100%
Sample size range (n =) months 0 to 11	1 to 24	1 to 14
SPC chart summary		
Stabilised centre line value	85.1%	90.1%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	5 out of 12	4 out of 12
Points below LCL post process change (months 0 to 11)	1 point below LCL	None
Shifts or trends post process change (months 0 to 11)	None	None

6. Measures of safety & experience

<i>“Did staff talk in front of you as if you weren’t there?”</i>		
Respondents answering “No”	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	66.7% to 100%	40.0% to 70.0%
Sample size range (<i>n</i> =) months -6 to -1	2 to 22	5 to 16
Response range (%) months 0 to 11	37.5% to 100%	0.0% to 100%
Sample size range (<i>n</i> =) months 0 to 11	1 to 31	1 to 14
SPC chart summary		
Stabilised centre line value	86.5%	76.0%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	2 out of 4
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	2 out of 12	5 out of 6
Points below LCL post process change (months 0 to 11)	3 points below LCL	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>“How clean are the wards and bathrooms that you use in the hospital?”</i>		
Respondents answering “Clean”	Intervention ward CI	Control ward CC
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	40.0% to 100%	60.0% to 76.9%
Sample size range (<i>n</i> =) months -6 to -1	2 to 23	5 to 20
Response range (%) months 0 to 11	0.0% to 100%	33.3% to 85.7%
Sample size range (<i>n</i> =) months 0 to 11	1 to 36	2 to 15
SPC chart summary		
Stabilised centre line value	69.6%	71.8%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	3 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	3 out of 12	1 out of 12
Points below LCL post process change (months 0 to 11)	3 points below LCL	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	10 consecutive points below CL

6.12.2 Intervention ward CI

Special cause variation in the six months prior to participation in the CAS, in the form of a single point below the lower control limit, was indicated for the questions “Overall, how would you rate the care you have received?” (respondents answering “Excellent” and “Very good”, Figure 46) and “Overall, did you feel you were treated with respect and dignity while you were in hospital?” (Figure 47).

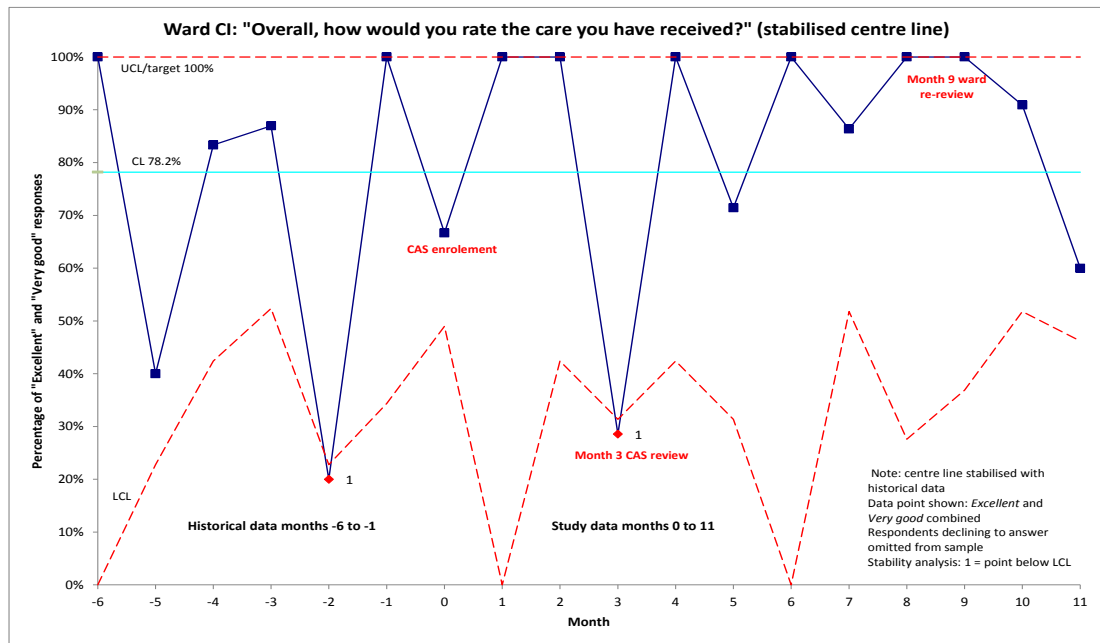


Figure 46: Intervention ward CI SPC chart “Overall, how would you rate the care you have received?” (respondents answering “Excellent” and “Very good”)

6. Measures of safety & experience

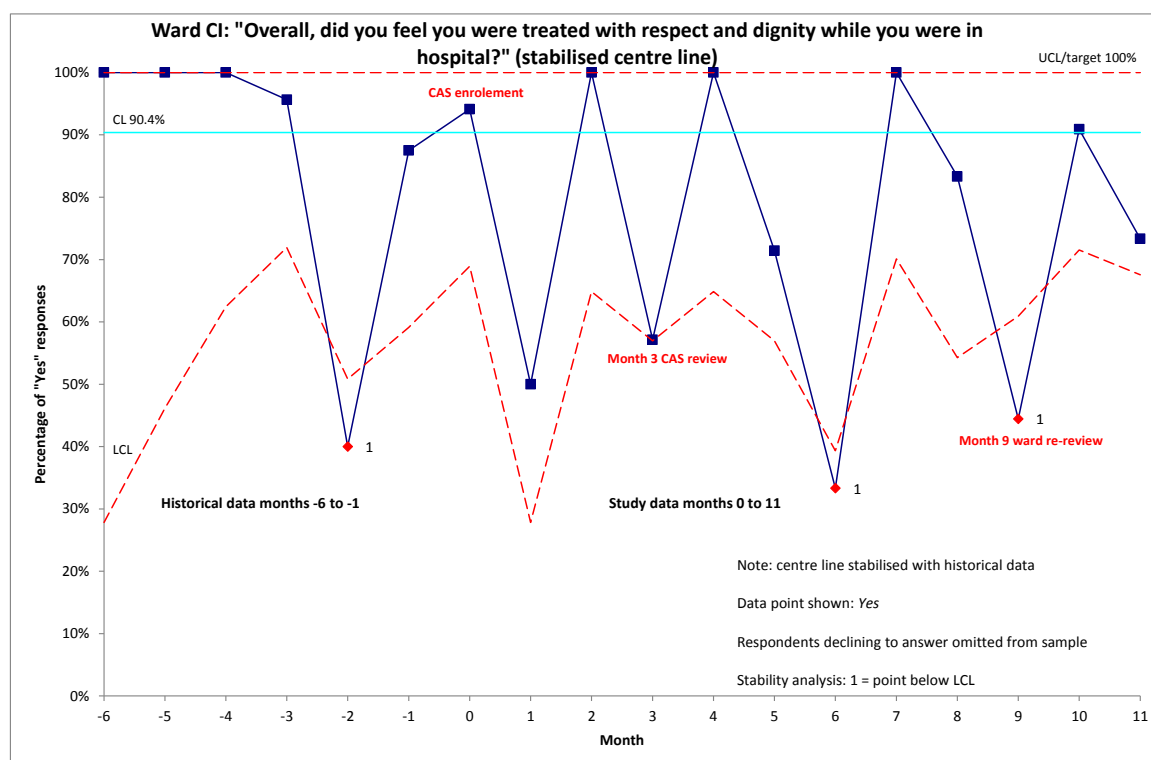


Figure 47: Intervention ward CI SPC chart "Overall, did you feel you were treated with respect and dignity while you were in hospital?"

No special cause variation was identified for the remaining questions for this time period and the processes determining patient experience in relation to these questions were indicated as being stable.

Points below the lower control limit were the only type of special cause variation identified in analysis of the patient experience questions for ward CI following participation in the CAS. This special cause variation occurred between one to three occasions for all the patient experience questions except "Overall, how would you rate the care you have received?" (respondents answering "Excellent") for which there were no occurrences. Figure 48 provides an example of a chart with a single occurrence of special cause variation occurring on ward CI post participation in the CAS.

6. Measures of safety & experience

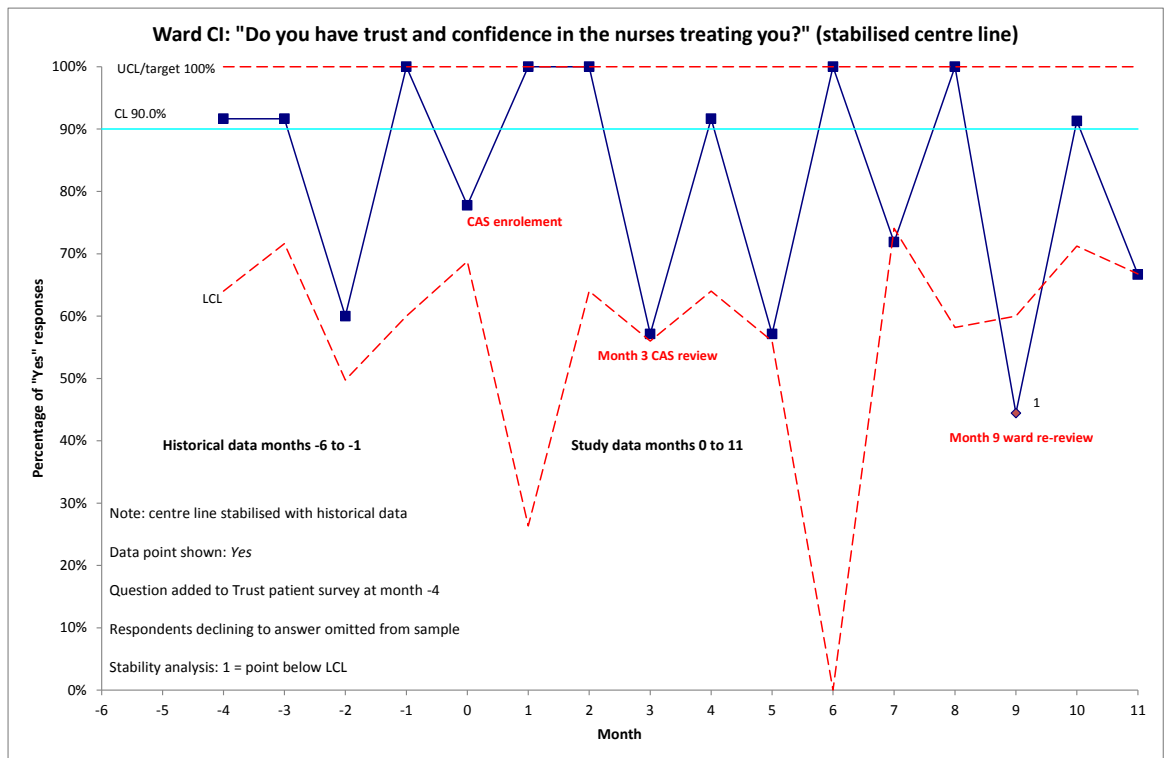


Figure 48: Intervention ward CI SPC *"Do you have trust and confidence in the nurses treating you?"*

Lack of prior statistical control for the question *"Overall, did you feel you were treated with respect and dignity while you were in hospital?"* (Figure 47) may have contributed towards this question's two measurement points below the lower control limit following participation in the CAS. No contextual factors with potential to contribute towards the special cause variation were identified for the remaining questions but their small number and dispersed pattern did not indicate they arose as a result of a process change. Consequently, these points of special cause variation were not attributable to the CAS.

Overall, there was no evidence indicating participation in the CAS had an effect on patient experience in relation to questions selected for analysis on ward CI.

6. Measures of safety & experience

6.13 Picker Inpatient Experience Survey questions: pooled analysis

6.13.1 Descriptive statistics

Monthly sample sizes for the selected Picker Inpatient Experience survey questions in the four months prior to participation in the CAS ranged between 10 to 57 respondents for the aggregated intervention wards and 27 to 49 respondents for the aggregated control wards; following participation in the CAS the range was between 107 and 27 respondents for the aggregated intervention wards and 12 to 56 respondents for the aggregated control wards.

The monthly proportion of respondents answering “Yes” to “*Do you have trust and confidence in the nurses treating you?*” in the four months prior to participation in the CAS ranged between 84.0% to 100% for the intervention wards and 81.1% to 91.9% for the control wards; following participation in the CAS the range was between 74.1% to 100% for the intervention wards and 88.9% to 65.7% for the control wards. The stabilised centre line value for the intervention wards was 90.2% and 85.6% for the control wards.

The monthly proportion of respondents answering “Yes” to “*Overall, did you feel you were treated with respect and dignity while you were in hospital?*” in the six months prior to participation in the CAS ranged between 84.0% to 98.0% for the intervention wards and 85.8% to 94.1 % for the control wards; following participation in the CAS the range was between 75.9% and 98.0% for the intervention wards and 75.0% to 97.1% for the control wards. The stabilised centre line value for the intervention wards was 92.6% and 90.0% for the control wards.

The monthly proportion of respondents answering “Excellent” to “*Overall, how would you rate the care you have received?*” in the six months prior to participation in the CAS ranged between 32.0% to 58.8% for the intervention wards and 40.0% to 55.9% for the control wards; following participation in the CAS the range was 33.9% to 68.0% for the intervention wards and 30.0% to 64.3% for the control wards. The stabilised centre line value for the intervention wards was 44.7% and 46.3% for the control wards. The monthly proportion of respondents answering either “Excellent” or “Very good” to this

question in the six months prior to participation in the CAS ranged between 66.7% to 100% for the intervention wards and 81.8% to 86.2% for the control wards; following participation in the CAS the range was 75.0% to 100% for the intervention wards and 52.6 % to 93.9% for the control wards. The stabilised centre line value for the intervention wards was 85.1% and 86.1% for the control wards.

The monthly proportion of respondents answering *“Yes, definitely”* to *“Do you think the hospital staff did everything they could to help control your pain?”* in the six months prior to participation in the CAS ranged between 82.4% to 92.5% for the intervention wards and 81.5% to 85.3% for the control wards; following participation in the CAS the range was between 62.1% and 85.1% for the intervention wards and 51.7% to 82.9% for the control wards. The stabilised centre line value for the intervention wards was 90.5% and 90.8% for the control wards.

The monthly proportion of respondents answering *“No”* to *“Did staff talk in front of you as if you weren’t there?”* in the six months prior to participation in the CAS ranged between 71.4% to 90.0% for the intervention wards and 77.5% to 85.3% for the control wards; following participation in the CAS the range was between 57.1% and 90.6% for the intervention wards and 58.4% to 90.5% for the control wards. The stabilised centre line value for the intervention wards was 81.3% and 81.6% for the control wards.

The monthly proportion of respondents answering *“Clean”* to *“How clean are the wards and bathrooms that you use in the hospital?”* in the six months prior to participation in the CAS ranged between 60.0% to 70.6% for the intervention wards and 80.0% to 81.6% for the control wards; following participation in the CAS the range was between 19.0% and 78.2% for the intervention wards and 47.2% to 95.2% for the control wards. The stabilised centre line value for the intervention wards was 66.5% and 70.8% for the control wards.

Table 46 provides the key information from the C charts plotting the response categories selected from analysis for each of the patient experience survey questions.

Appendix 37 provides a complete set of descriptive statistics and SPC charts.

6. Measures of safety & experience

Table 46: Aggregated intervention/control wards Picker Inpatient Experience Survey questions³³

“Do you have trust and confidence in the nurses treating you?”

Respondents answering “Yes”	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -4 to -1	84.0% to 100%	81.1% to 91.9%
Sample size range (n =) months -4 to -1	44 to 57	37 to 41
Response range (%) months 0 to 11	74.1% to 100%	65.7% to 88.9%
Sample size range (n =) months 0 to 11	27 to 69	14 to 56
SPC chart summary		
Stabilised centre line value	90.2%	85.6%
Number of points above stabilised centre line (months -4 to -1)	2 out of 4	1 out of 4
Points below LCL prior to process change (months -4 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	2 out of 12	2 out of 12
Points below LCL post process change (months 0 to 11)	3 points below LCL	2 points below LCL
Shifts or trends post process change (months 0 to 11)	None	Shift: 8 consecutive points below CL

“Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Respondents answering “Yes”	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	84.4% to 98.0%	85.8% to 94.1%
Sample size range (n =) months -6 to -1	16 to 56	30 to 49
Response range (%) months 0 to 11	75.9% to 98.0%	75.0% to 97.1% t
Sample size range (n =) months 0 to 11	27 to 66	12 to 56
SPC chart summary		
Stabilised centre line value	92.6%	90.0%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	2 out of 12	4 out of 12
Points below post process change (months 0 to 11)	2 points below LCL	None
Shifts or trends post process change (months 0 to 11)	None	None

³³ Question analysis omitted any respondent declining to answer a question or replying “I was not in any pain”/“I can’t say” in response to the management of pain question

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“Overall, how would you rate the care you have received?”

Respondents answering <i>“Excellent”</i>	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	32.0% to 58.8%	40.0% to 55.9%
Sample size range ($n =$) months -6 to -1	17 to 50	29 to 48
Response range (%) months 0 to 11	33.9% to 68.0%	30.0% to 64.3%
Sample size range ($n =$) months 0 to 11	27 to 107	13 to 56
SPC chart summary		
Stabilised centre line value	44.7%	46.3%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	2 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	9 out of 12	6 out of 12
Points below post process change (months 0 to 11)	None	None
Shifts or trends post process change (months 0 to 11)	None	None

“Overall, how would you rate the care you have received?”

Respondents answering <i>“Excellent” & “Very good”</i>	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	66.7% to 100%	81.8% to 86.2%
Sample size range ($n =$) months -6 to -1	17 to 50	29 to 48
Response range (%) months 0 to 11	75.0% to 100%	52.6% to 93.9%
Sample size range ($n =$) months 0 to 11	27 to 107	13 to 56
SPC chart summary		
Stabilised centre line value	85.1%	86.1%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	2 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	6 out of 12	5 out of 12
Points below post process change (months 0 to 11)	None	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	None

“Do you think the hospital staff did everything they could to help control your pain?”

Respondents answering <i>“Yes, definitely”</i>	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	82.4% to 92.5%	81.5% to 85.3%
Sample size range ($n =$) months -6 to -1	14 to 51	27 to 49
Response range (%) months 0 to 11	62.1% to 85.1%	51.7% to 82.9%
Sample size range ($n =$) months 0 to 11	26 to 63	13 to 49

6. Measures of safety & experience

SPC chart summary		
Stabilised centre line value	90.5%	90.8%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	4 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	0 out of 12	1 out of 12
Points below post process change (months 0 to 11)	5 points below LCL	5 points below LCL
Shifts or trends post process change (months 0 to 11)	Shift: 11 consecutive points below CL	Shift: 11 consecutive points below CL
<i>"Did staff talk in front of you as if you weren't there?"</i>		
Respondents answering "No"	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	71.4% to 90.0%	77.5% to 85.3%
Sample size range (<i>n</i> =) months -6 to -1	10 to 53	30 to 42
Response range (%) months 0 to 11	57.1% to 90.6%	58.4% to 90.5%
Sample size range (<i>n</i> =) months 0 to 11	28 to 66	12 to 57
SPC chart summary		
Stabilised centre line value	81.3%	81.6%
Number of points above stabilised centre line (months -6 to -1)	3 out of 6	3 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	3 out of 12	3 out of 12
Points below post process change (months 0 to 11)	1 point below LCL	1 point below LCL
Shifts or trends post process change (months 0 to 11)	None	None
<i>"How clean are the wards and bathrooms that you use in the hospital?"</i>		
Respondents answering "Clean"	Intervention wards	Control wards
Descriptive statistics	Minimum to maximum	Minimum to maximum
Response range (%) months -6 to -1	60.0% to 70.6%	80.0% to 81.6%
Sample size range (<i>n</i> =) months -6 to -1	17 to 56	29 to 49
Response range (%) months 0 to 11	19.0% to 78.2%	47.2% to 95.2%
Sample size range (<i>n</i> =) months 0 to 11	21 to 69	14 to 59
SPC chart summary		
Stabilised centre line value	66.5%	70.8%
Number of points above stabilised centre line (months -6 to -1)	4 out of 6	2 out of 6
Points below LCL prior to process change (months -6 to -1)	None	None
Number of points above stabilised centre line (months 0 to 11)	3 out of 12	3 out of 12
Points below post process change (months 0 to 11)	3 points below LCL	2 points below LCL
Shifts or trends post process change (months 0 to 11)	None	None

6.13.2 The aggregated intervention wards

There was no evidence of special cause variation occurring for any of the questions in the six months prior to participation in the CAS. Hence, the systems determining patient experience in relation to the selected questions were indicated as being stable for this period of time.

One question, *“Do you think the hospital staff did everything they could to control your pain?”* indicated special cause variation following participation in the CAS. There was a shift of 11 consecutive points below the centre line and the occurrence of five measurement points below the lower control limit (Figure 49). This represented an overall decline in performance. However, the same effects were exhibited by the control group (Figure 50). Therefore, the intervention group effects were not attributable to participation in the CAS. Yet, this finding also suggests that participation in the CAS did not confer an effect which protected against declining performance in relation to this question.

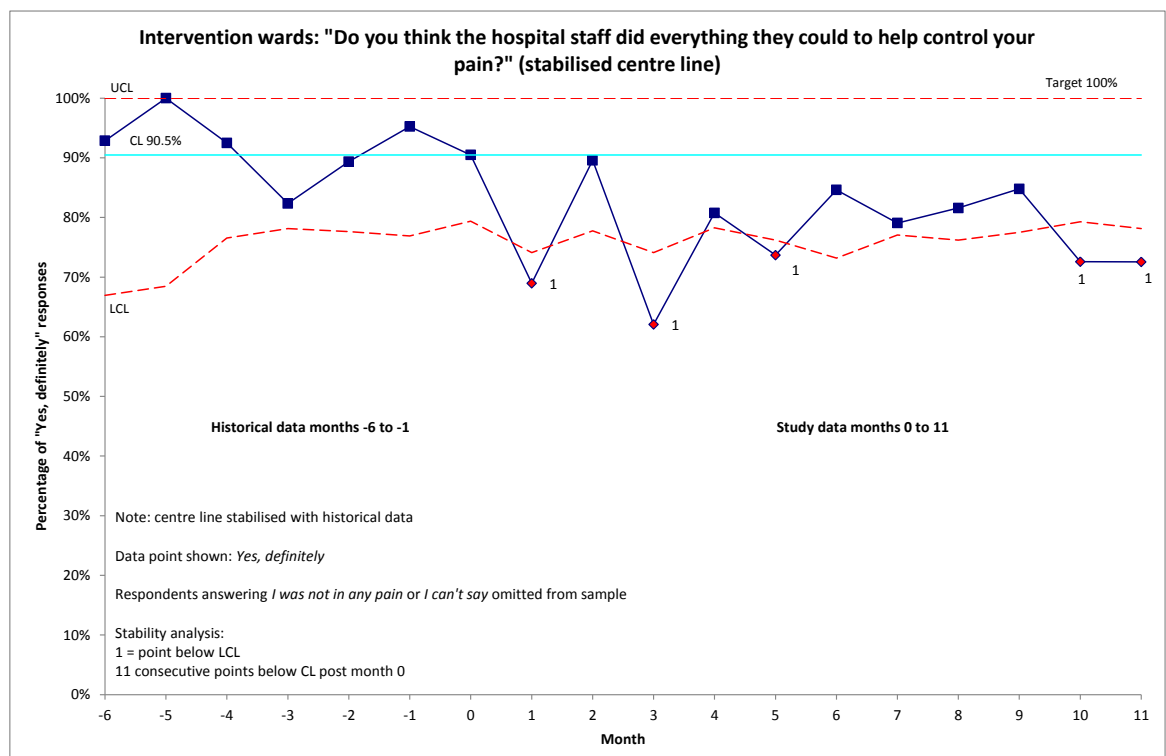


Figure 49: Intervention wards SPC chart *“Do you think the hospital staff did everything they could to control your pain?”*

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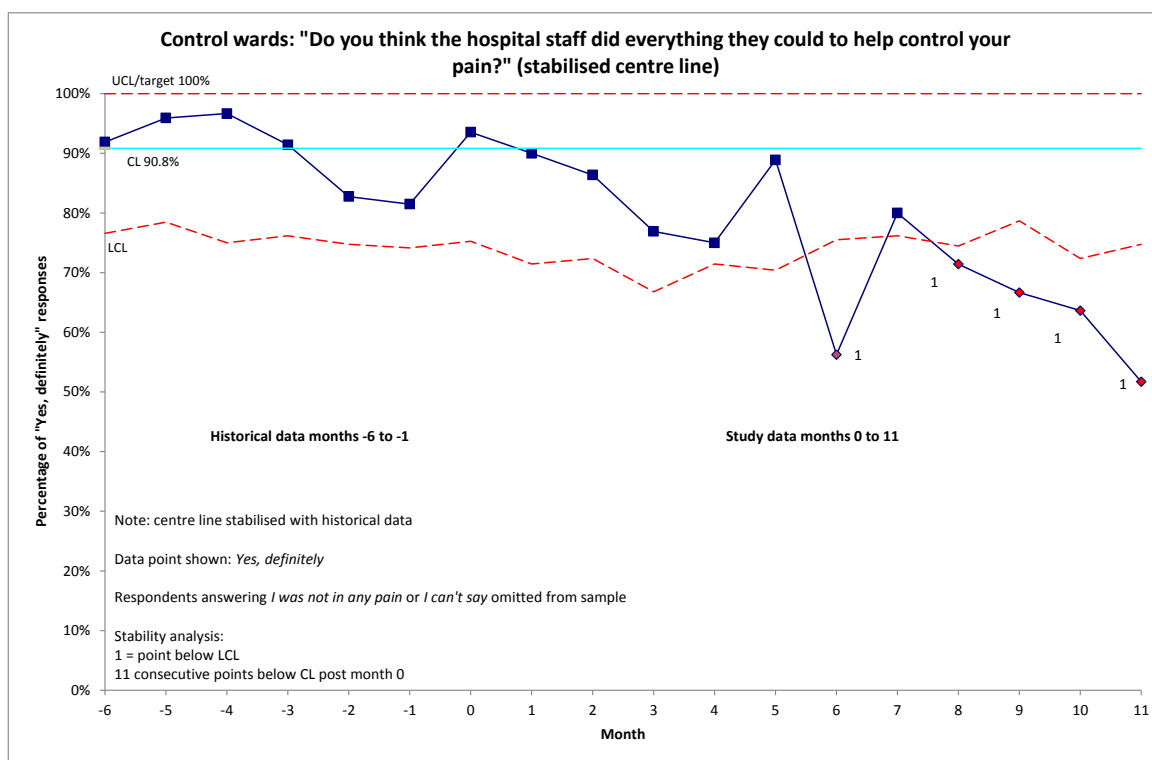


Figure 50: Control wards SPC chart "Do you think the hospital staff did everything they could to control your pain?"

Four further questions, "Do you have trust and confidence in the nurses treating you?" (Figures 51 and 52), "Overall, did you feel you were treated with respect and dignity while you were in hospital?", "Did staff talk in front of you as if you weren't there?" and "How clean are the wards and bathrooms that you use in the hospital?" (Figures 53 and 54), all exhibited between 1 and 3 measurement points below the lower control limit. Once again, similar findings occurred on the control wards. Hence, given their small number and dispersed pattern these points of special cause variation were not attributed to participation in the CAS.

Overall, in exploring the aggregated intervention wards and aggregated control wards data sets there was no evidence that participation in the CAS had an effect upon the systems determining patient experience for the selected questions.

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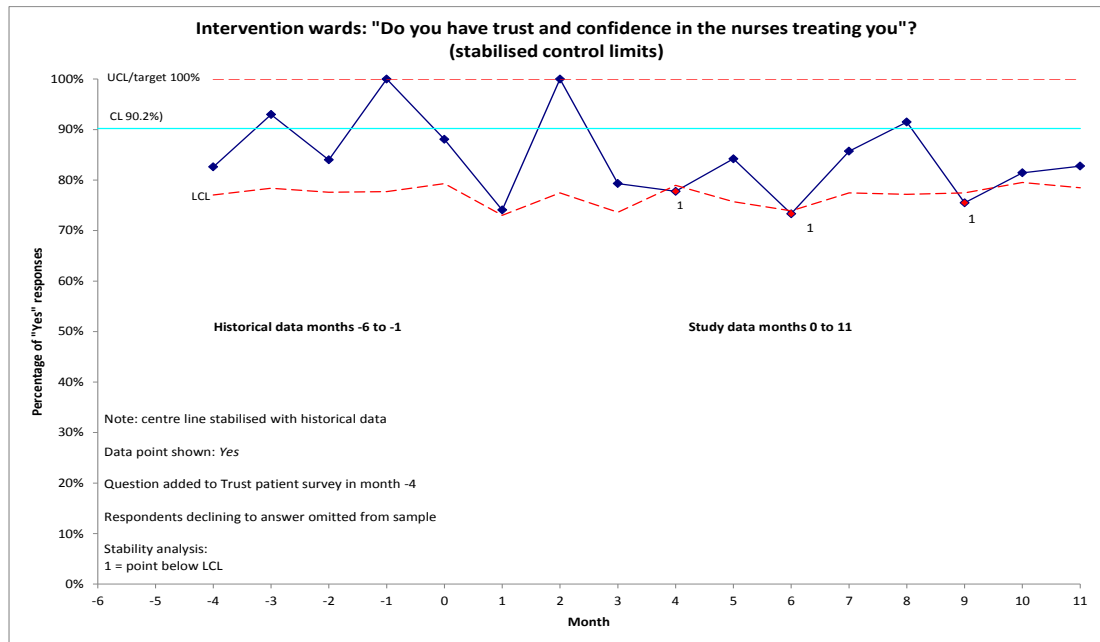


Figure 51: Intervention wards SPC chart "Do you have trust and confidence in the nurses treating you?"

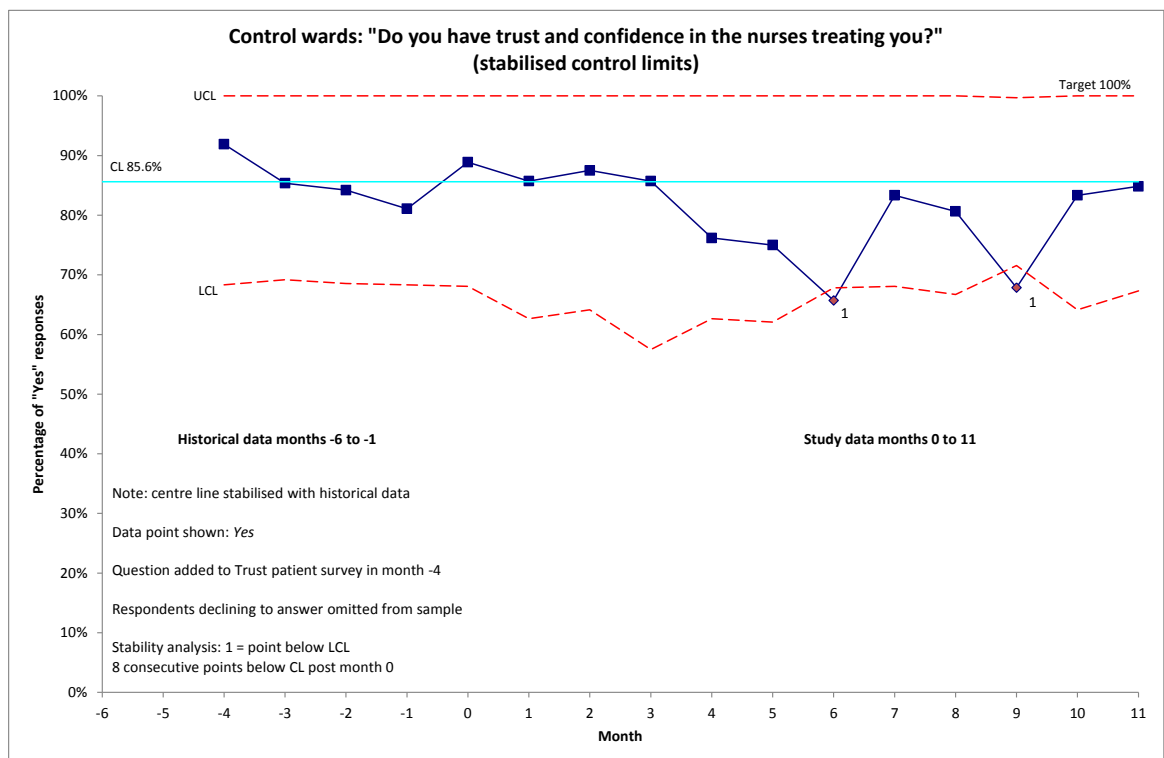


Figure 52: Control wards SPC chart "Do you have trust and confidence in the nurses treating you?"

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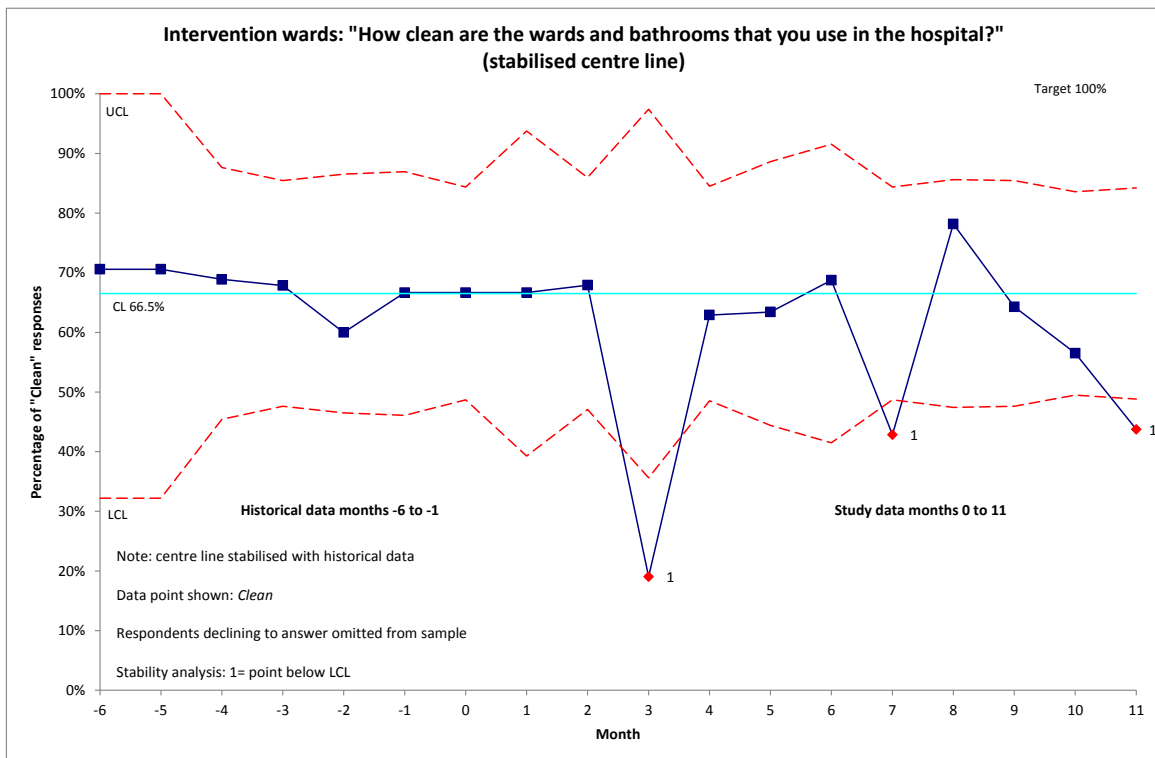


Figure 53: Intervention wards SPC chart "How clean are the wards and bathrooms that you use in hospital?"

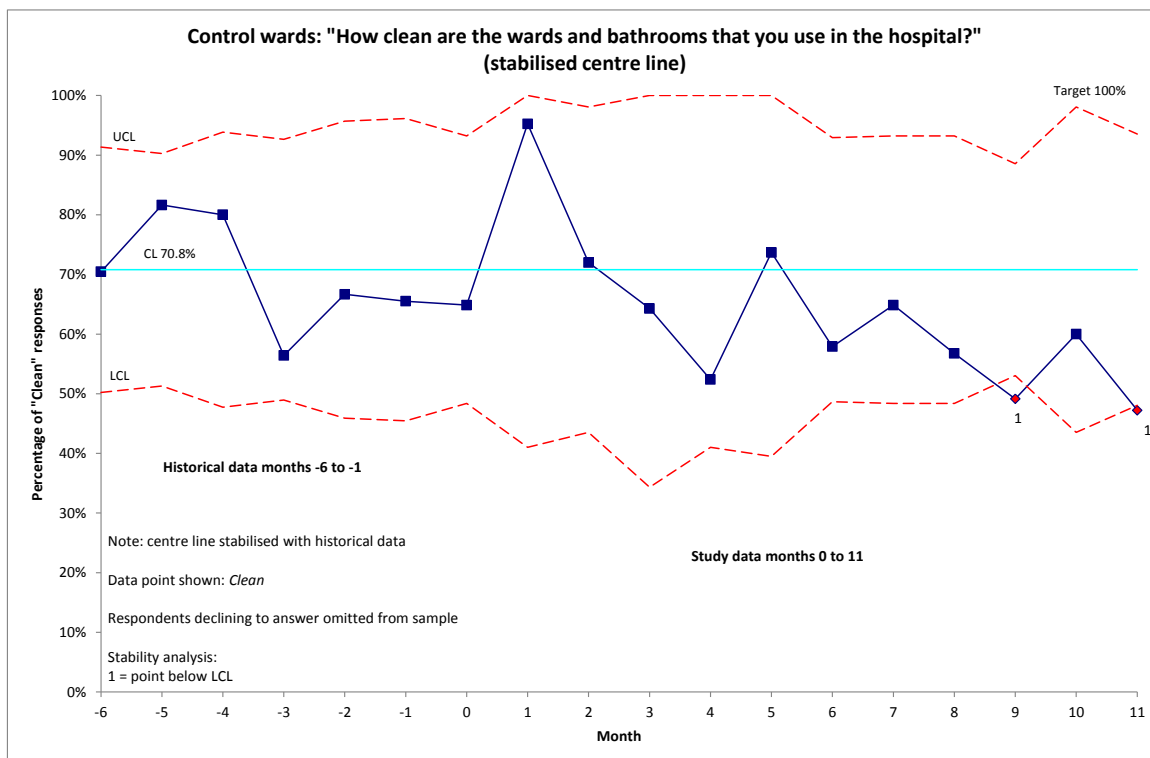


Figure 54: Control wards SPC chart "How clean are the wards and bathrooms that you use in hospital?"

6.14 Chapter summary

The key findings of the measures of safety and experience are as follows:

- there was no evidence indicating that participation in the CAS had an effect on rates or grades of falls on any of the intervention wards or the combined intervention ward group
- there was no evidence indicating that participation in the CAS had an effect on rates or grades of pressure ulcers on any of the intervention wards or the combined intervention ward group
- the systems for preventing the occurrence of hospital acquired infections on all wards were indicated to be stable prior to participation in the CAS and unaffected by participation in the CAS
- findings suggested that participation in the CAS on ward AI was associated with poorer ratings of patient experience in relation to the following questions:
 - *“Do you have trust and confidence in the nurses treating you?”*
 - *“Overall, did you feel you were treated with respect and dignity while you were in hospital?”*
 - *“Do you think the hospital did everything they could to help control your pain?”*
 - *“How clean are the wards and bathrooms that you use in the hospital?”*
- there was no evidence suggesting that participation in the CAS on wards BI, CI, and the combined intervention ward group had an effect upon patient experience in relation to the questions selected for analysis

The following chapter presents the findings of analysis of the measures of culture and environment.

7. Findings: Measures of culture and environment

This chapter presents the findings of the analysis of the quantitative survey measures of culture and environment.

Presentation of findings commences with descriptive statistics detailing survey response rates and respondent characteristics for each matched intervention and control ward, and for the pooled analysis of the aggregated intervention and aggregated control ward data sets. This enables comparisons to be drawn between the intervention and control wards in each matched pair.

Findings are then presented in two sections: findings for the effects of participation in the CAS on the HSoPSC survey data followed by the PES-NWI survey data. Within these sections the findings of tests of differences for each matched pair of intervention and control ward are presented. For each matched pair, baseline and follow-up between-ward and within-ward tests of differences are presented. Each section completes with presentation of the findings of the pooled analysis of the aggregated data for the three intervention wards and three control wards.

7.1 Sample characteristics

7.1.1 Matched pair A

Survey response rates for the intervention ward were 91.7% ($n = 33$) at baseline and 41.7% ($n = 15$) at follow-up. 50.0% ($n = 2$) of senior sisters, 100% ($n = 19$) of staff nurses and 72.8% ($n = 8$) of healthcare assistants responded to the baseline survey administration compared to 20.0% ($n = 1$) senior sister, 57.9% ($n = 11$) of staff nurses and 20.0% ($n = 2$) of healthcare assistants at follow-up. Working practices were full-time for 78.8% ($n = 26$) of respondents at baseline and 86.7% ($n = 13$) of respondents at follow-up. 57.6% ($n = 19$) of the respondents had been employed by the hospital for five years or longer at baseline compared to 66.7% ($n = 10$) at follow-up. 48.5% ($n = 16$) of respondents had worked on the study ward for five years or longer at baseline compared to 60.0% ($n = 9$) at follow-up. Respondents at both survey administrations were predominately female (81.8%, $n = 27$ at baseline and 80.0%, $n = 12$ at follow-up).

Response rates for the control ward were 50.0% ($n = 13$) at baseline and 28.6% ($n = 10$) at follow-up. 25.0% ($n = 1$) of senior sisters, 53.8% ($n = 7$) of staff nurses and 57.1% ($n = 4$) of healthcare assistants responded to the baseline survey administration compared to 25.0% ($n = 1$) of senior sisters, 22.2% ($n = 4$) of staff nurses and 18.2% ($n = 2$) of healthcare assistants at follow-up. Working practices were full-time for 69.2% ($n = 9$) of respondents at baseline compared to 90.0% ($n = 9$) of respondents at follow-up. 38.5% ($n = 5$) of the respondents had been employed by the hospital for five years or longer at baseline compared to 40.0% ($n = 4$) at follow-up. 38.5% ($n = 5$) of respondents had worked on the study for five years or longer at baseline compared to 40.0% ($n = 4$) at follow-up. Respondents at both survey administrations were predominately female (92.3%, $n = 12$ at baseline and 90.0%, $n = 9$ at follow-up).

Table 47 shows the overall survey response rates by staff grade, and respondent working practices and demographics for matched pair A.

7. Measures of culture and environment

Table 47: Matched pair A survey respondent descriptive statistics³⁴

	Intervention ward AI		Control ward AC	
	Baseline	Follow-up	Baseline	Follow-up
Staff role	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)
Senior Sister/Sisters	2 (50.0)	1 (20.0)	1 (25.0)	1 (25.0)
Staff Nurse	19 (100.0)	11 (57.9)	7 (53.8)	4 (22.2)
Health Care Assistants	8 (72.8)	2 (20.0)	4 (57.1)	2 (18.2)
Ward Clerk/House Keeper	2 (100.0)	1 (50.0)	1 (50.00)	2 (100.0)
Unknown data	2			1
Total	33 (91.7)	15 (41.7)	13 (50.0)	10 (28.6)

Respondent Characteristics	Intervention ward AI <i>n</i> = (%)		Control ward AC <i>n</i> = (%)	
	Baseline	Follow-up	Baseline	Follow-up
Working practices				
Working hours				
Full-time	26 (78.8)	13 (86.7)	9 (69.2)	9 (90.0)
Part-time	7 (21.2)	2 (13.3)	4 (30.8)	0
Missing data				1 (10.0)
Length of time employed by hospital				
2 years or less	4 (12.1)	3 (20.0)	4 (30.8)	3 (30.0)
3-4 years	9 (27.3)	2 (13.3)	4 (30.8)	2 (20.0)
5+ years	19 (57.6)	10 (66.7)	5 (38.5)	4 (40.0)
Missing data				1 (10.0)
Length of time working on ward				
2 years or less	8 (24.2)	4 (26.7)	3 (23.1)	3 (30.0)
3-4 years	8 (24.2)	2 (13.3)	5 (38.5)	2 (20.0)
5+ years	16 (48.5)	9 (60.0)	5 (38.5)	4 (40.0)
Missing data	1 (3.0)			1 (10.0)
Workforce characteristics				
Sex				
Female	27 (81.8)	12 (80.0)	12 (92.3)	9 (90.0)
Male	6 (18.2)	3 (20.0)	1 (7.7)	1 (10.0)
Age				
19 years old or less	0	0	0	0
20-29 years old	10 (30.3)	3 (20.0)	5 (38.5)	5 (50.0)
30-39 years old	9 (27.3)	5 (33.3)	5 (38.5)	3 (30.0)
40-49 years old	10 (30.3)	4 (26.7)	2 (15.4)	2 (20.0)
50-59 years old	3 (9.1)	3 (20.0)	1 (7.7)	0
60+ years	1 (3.0)	0	0	0

³⁴ For the PES-NWIS sample exclude housekeepers/ward clerks

7.1.2 Matched pair B

Survey response rates for the intervention ward were 50.0% ($n = 15$) at baseline and 26.7% ($n = 8$) at follow-up. 100% ($n = 4$) of senior sisters, 38.9% ($n = 7$) of staff nurses and 33.3% ($n = 2$) of healthcare assistants responded to the baseline survey administration compared to 50.0% ($n = 2$) senior sisters, 25.0% ($n = 4$) staff nurses and nil healthcare assistants at follow-up. Respondent working practices were predominantly full-time (80.0%, $n = 12$ at baseline and 62.5%, $n = 5$ at follow-up). 66.7% ($n = 10$) of the respondents had been employed by the hospital for five years or longer at baseline compared to 50.0% ($n = 4$) at follow-up. 53.3% ($n = 8$) of the respondents had worked on the study ward for five years or longer at baseline compared to 37.5% ($n = 3$) at follow-up. Respondents at both survey administrations were predominantly female (93.3%, $n = 14$ at baseline and 87.5%, $n = 7$ at follow-up).

Survey response rates for the control ward were 48.0% ($n = 12$) at baseline and 32.2% ($n = 10$) at follow-up. No senior sisters, 58.3% ($n = 7$) of staff nurses and 28.6% ($n = 2$) of healthcare assistants responded to the baseline survey administration compared to 100% ($n = 4$) of senior sisters, 25.0% ($n = 4$) of staff nurses and nil healthcare assistants at follow-up. Respondent working practices were predominantly full-time (91.7%, $n = 11$ at baseline and 90.0%, $n = 9$ at follow-up). 58.3% ($n = 7$) of the respondents had been employed by the hospital for five years or longer at baseline compared to 40.0% ($n = 4$) at follow-up. 41.7% ($n = 5$) of the respondents had worked on the study ward for two years or less at baseline compared to 70.0% ($n = 7$) at follow-up. Respondents at both survey administrations were predominantly female (83.3%, $n = 10$ at baseline and 100%, $n = 10$ at follow-up).

Table 48 shows the survey response rates by staff grade, and respondent working practices and demographics for matched pair B.

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Table 48: Matched pair B survey respondent descriptive statistics³⁵

	Intervention ward BI		Control ward BC	
	Baseline	Follow-up	Baseline	Follow-up
	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)	Response rate <i>n</i> = (%)
Staff role				
Senior Sister/Sisters	4 (100.0)	2 (50.0)	0	4 (100.0)
Staff Nurse	7 (38.9)	4 (25.0)	7 (58.3)	4 (25.0)
Health Care Assistants	2 (33.3)	0	2 (28.6)	0
Ward Clerk/House Keeper	1 (50.0)	2 (100.0)	2 (100.0)	2 (100.0)
Unknown data	1		1	
Total	15 (50.0)	8 (26.7)	12 (48.0)	10 (32.2)
Respondent Characteristics	Intervention ward BI <i>n</i> = (%)		Control ward BC <i>n</i> = (%)	
	Baseline	Follow-up	Baseline	Follow-up
Working practices				
Working hours				
Full-time	12 (80.0)	5 (62.5)	11 (91.7)	9 (90.0)
Part-time	3 (20.0)	2 (25.0)	1 (8.3)	1 (10.0)
Missing data		1 (12.5)		
Length of time employed by hospital				
2 years or less	3 (20.0)	2 (25.0)	3 (25.0)	2 (20.0)
3-4 years	2 (13.3)	1 (12.5)	2 (16.7)	4 (40.0)
5+ years	10 (66.7)	4 (50.0)	7 (58.3)	4 (40.0)
Missing data		1 (12.5)		
Length of time working on ward				
2 years or less	5 (33.3)	3 (37.5)	5 (41.7)	7 (70.0)
3-4 years	2 (13.3)	1 (12.5)	1 (8.3)	0
5+ years	8 (53.3)	3 (37.5)	6 (50.0)	3 (30.0)
Missing data		1 (12.5)		
Workforce characteristics				
Sex				
Female	14 (93.3)	7 (87.5)	10 (83.3)	10 (100.0)
Male	1 (6.7)	0	2 (16.7)	0
Missing data		1 (12.5)		
Age				
19 years old or less	0	0	0	0
20-29 years old	4 (26.7)	4 (50.0)	6 (50.0)	4 (40.0)
30-39 years old	6 (40.0)	1 (12.5)	1 (8.3)	3 (30.0)
40-49 years old	3 (20.0)	0	1 (8.3)	0
50-59 years old	2 (13.3)	1 (12.5)	2 (16.7)	1 (10.0)
60+ years	0	1 (12.5)	2 (16.7)	2 (20.0)
Missing data		1 (12.5)		

³⁵ For the PES-NWI sample exclude housekeepers/ward clerks

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7.1.3 Matched pair C

Survey response rates for the intervention ward were $n = 1$ at baseline and 34.3% ($n = 11$) at follow-up. The staff role of the baseline respondent is unknown. The follow-up sample included respondents from all staff roles.

Survey response rates for the control ward were 17.2% ($n = 5$) at baseline and 5.88% ($n = 2$) at follow-up. 20.0% ($n = 1/5$) of baseline respondents were staff nurses compared to 100% ($n = 2$) of respondents at follow-up.

Table 49 shows the survey response rate by staff grade, and respondent working practices and demographics.

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Table 49: Matched pair C survey respondent descriptive statistics³⁶

	Intervention ward CI		Control ward CC	
	Baseline Response rate <i>n</i> = (%)	Follow-up Response rate <i>n</i> = (%)	Baseline Response rate <i>n</i> = (%)	Follow-up Response rate <i>n</i> = (%)
Staff role				
Senior Sister/Sisters		1 (25.0)	2 (50.0)	
Staff Nurse		4 (23.5)	1 (8.3)	2 (10.53)
Health Care Assistants		3 (27.3)	1 (9.1)	
Ward Clerk/House Keeper		1 (100.0)	1 (50.0)	
Unknown data	1	2		
Total	1	11 (34.4)	5 (17.2)	2 (5.88)
	Intervention ward CI <i>n</i> = (%)		Control ward CC <i>n</i> = (%)	
	Baseline	Follow-up	Baseline	Follow-up
Respondent Characteristics				
Working practices				
Working hours				
Full-time	1 (100.0)	8 (72.2)	5 (100.0)	2 (100.00)
Part-time	0	2 (18.2)	0	0
Missing data		1 (9.1)		
Length of time employed by hospital				
2 years or less	0	4 (36.4)	4 (80.0)	1 (50.0)
3-4 years	0	5 (45.4)	1 (20.0)	0
5+ years	1 (100.0)	1 (9.1)	0	1 (50.0)
Missing data		1 (9.1)		
Length of time working on ward				
2 years or less	1 (100.0)	6 (54.5)	4 (80.0)	2 (100.00)
3-4 years	0	3 (27.3)	1 (20.0)	0
5+ years	0	1 (9.1)	0	0
Missing data		1 (9.1)		
Workforce characteristics				
Sex				
Female	1 (100.0)	9 (81.8)	5 (100.0)	2 (100.0)
Male	0	2 (18.2)	1 (20.0)	0
Age				
19 years old or less	0	0	0	0
20-29 years old	0	3 (27.3)	3 (60.0)	1 (50.0)
30-39 years old	1 (100.0)	3 (27.3)	1 (20.0)	0
40-49 years old	0	2 (18.2)	0	0
50-59 years old	0	0	1 (20.0)	1 (50.0)
60+ years	0	1 (9.1)	0	0
Missing data		2 (18.2)		

³⁶ For the PES-NWI sample exclude housekeepers/ward clerks

7.1.4 Pooled analysis: intervention wards versus control wards

Survey response rates for the aggregated intervention ward group were 74.2% ($n = 49$) at baseline and 34.3% ($n = 34$) at follow-up. 80.0% ($n = 6$) of senior sisters, 70.3% ($n = 26$) of staff nurses, 58.8% ($n = 10$) of healthcare assistants and 75.0% ($n = 3$) of ward clerks/housekeepers responded to the baseline survey administration compared to 33.3% ($n = 4$) of senior sisters, 36.5% ($n = 19$) of staff nurses, 16.7% ($n = 5$) of healthcare assistants and 80.0% ($n = 4$) of ward clerks/housekeepers at follow-up. Working practices were full-time for 79.6% ($n = 39$) respondents at baseline and 76.5% ($n = 26$) respondents at follow-up. 62.5% ($n = 30$) of the baseline sample and 56.8% ($n = 25$) of the follow-up sample had been employed by the hospital for five years or more. 49.0% ($n = 24$) of the baseline sample and 41.9% ($n = 14$) of the follow-up sample had worked on the study ward for five years or longer. Respondents at both survey administrations were predominantly female (85.7%, $n = 42$ at baseline and 82.4%, $n = 28$ at follow-up).

Survey response rates for the aggregated control ward group were 37.5% ($n = 30$) at baseline and 22.4% ($n = 22$) at follow-up. 25.0% ($n = 3$) of senior sisters, 40.5% ($n = 15$) of staff nurses, 28.0% ($n = 7$) of healthcare assistants and 66.7% ($n = 4$) of ward clerks/housekeepers responded to the baseline survey administration compared to 50.0% ($n = 5$) of senior sisters, 18.9% ($n = 10$) of staff nurses, 6.5% ($n = 2$) of healthcare assistants and 80.0% ($n = 4$) of ward clerks/housekeepers at follow-up. Working practices were full-time for 83.3% ($n = 25$) respondents at baseline and 87.0% ($n = 20$) respondents at follow-up. 40.0% ($n = 12$) of the baseline sample and 31.8% ($n = 7$) of the follow-up sample had been employed by the hospital for five years or more. 40.0% ($n = 12$) of the baseline sample and 54.6% ($n = 12$) of the follow-up sample had worked on the study ward for two years or less. Respondents at both survey administrations were predominantly female (87.1%, $n = 27$ at baseline and 95.5%, $n = 21$ at follow-up).

Table 50 gives the survey response rates by staff grade, and respondent working practices and demographics for the intervention and control ward groups.

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Table 50: Pooled analysis survey respondent descriptive statistics³⁷

	Intervention wards		Control wards	
	Baseline Response rate <i>n</i> = (%)	Follow-up Response rate <i>n</i> = (%)	Baseline Response rate <i>n</i> = (%)	Follow-up Response rate <i>n</i> = (%)
Staff role				
Senior Sister/Sisters	6 (80.0)	4 (33.3)	3 (25.0)	5 (50.0)
Staff Nurse	26 (70.3)	19 (36.5)	15 (40.5)	10 (18.9)
Health Care Assistants	10 (58.8)	5 (16.7)	7 (28.0)	2 (6.5)
Ward Clerk/House Keeper	3 (75.0)	4 (80.0)	4 (66.7)	4 (80.0)
Unknown data	4	2	1	1
Total	49 (74.2)	34 (34.3)	30 (37.5)	22 (22.4)

Respondent Characteristics	Intervention wards <i>n</i> = (%)		Control wards <i>n</i> = (%)	
	Baseline	Follow-up	Baseline	Follow-up
Working practices				
Working hours				
Full-time	39 (79.6)	26 (76.5)	25 (83.3)	20 (87.0)
Part-time	10 (20.4)	6 (17.7)	5 (16.7)	2 (8.7)
Missing data		2 (5.9)		1 (4.3)
Length of time employed by hospital				
2 years or less	7 (14.6)	9 (20.5)	11 (36.7)	12 (54.6)
3-4 years	11 (22.9)	8 (18.2)	7 (23.3)	2 (9.1)
5+ years	30 (62.5)	25 (56.8)	12 (40.0)	7 (31.8)
Missing data		2 (4.6)		1 (4.6)
Length of time working on ward				
2 years or less	14 (28.6)	10 (29.4)	12 (40.0)	12 (54.6)
3-4 years	10 (20.4)	8 (23.5)	7 (23.3)	2 (9.1)
5+ years	24 (49.0)	14 (41.9)	11 (36.7)	7 (31.8)
Missing data	1 (2.0)	2 (5.9)		1 (4.6)
Workforce characteristics				
Sex				
Female	42 (85.7)	28 (82.4)	27 (87.1)	21 (95.5)
Male	7 (14.3)	5 (14.7)	4 (12.9)	1 (4.6)
Missing data		1 (2.9)		
Age				
19 years old or less	0	0	0	0
20-29 years old	14 (28.6)	10 (29.4)	9 (37.5)	10 (45.5)
30-39 years old	16 (32.7)	9 (26.5)	7 (29.2)	6 (27.2)
40-49 years old	13 (26.5)	6 (17.7)	4 (16.7)	2 (9.1)
50-59 years old	5 (10.2)	4 (11.8)	4 (16.7)	2 (9.1)
60+ years	1 (2.0)	2 (5.9)	0	2 (9.1)
Missing data		3 (8.8)		

³⁷ For the PES-NWI sample exclude housekeepers/ward clerks

7.2 Perceptions of the safety culture (HSoPSC)

7.2.1 Preliminary analysis

7.2.1.1 Scale internal consistency

Cronbach alpha scores were calculated at the individual level, utilising all baseline survey data, for each of the HSoPSC subscale items (Table 51). Cronbach alpha greater than or equal to 0.50 was adopted as being indicative of adequate scale internal consistency (Chapter 4, Section 4.6.1, Paragraph 3). Eleven out of the twelve subscales showed adequate internal consistency (range 0.53 to 0.78): these values accord with those of previous studies (Chapter 4, Table 17). “*Supervisor expectations and actions promoting safety*” ($\alpha = 0.42$) demonstrated poor internal consistency. This subscale has been shown to have adequate internal consistency in other studies (Sarac et al. 2011, Sorra & Nieva 2004, Waterson et al. 2010). Therefore, sampling error may have contributed to the poor internal consistency demonstrated by this subscale for this study.

Table 51: Cronbach alpha for HSoPSC survey data

Ward level safety culture dimensions (<i>n</i> = subscale items)	Cronbach α
<i>Teamwork within units</i> (4)	0.66
<i>Supervisor expectations and actions promoting patient safety</i> (4)	0.42
<i>Organisational learning - continuous improvement</i> (3)	0.68
<i>Feedback and communication about error</i> (3)	0.76
<i>Communication openness</i> (3)	0.53
<i>Staffing</i> (4)	0.63
<i>Non-punitive response to error</i> (3)	0.78
Hospital level safety culture dimensions (<i>n</i> = subscale items)	
<i>Hospital management support for patient safety</i> (3)	0.76
<i>Teamwork across hospital units</i> (4)	0.67
<i>Hospital handoffs and transitions</i> (4)	0.78
Outcome measures (<i>n</i> = subscale items)	
<i>Frequency of event reporting</i> (3)	0.70
<i>Overall perceptions of safety</i> (4)	0.71

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7.2.1.2 Missing values analysis

29.1% ($n = 23/79$) of respondents failed to answer all survey items at the baseline administration. Item missing counts ranged between 1.27% ($n = 1/43$) to 37.8% ($n = 17/43$) items per survey. 60.87% ($n = 14$) of those respondents failing to answer all baseline survey items omitted a single item; 30.4% ($n = 7$) omitted between two and ten items; and 8.7% ($n = 2$) omitted between ten and 17 items.

19.6% (11/56) of respondents failed to answer all survey items at the follow-up administration. Item missing counts ranged between 1.27% ($n = 1/43$) to 34.9% ($n = 15/43$) items per survey. 36.4% ($n = 4/11$) of those respondents failing to answer all follow-up survey items omitted a single item; 45.5% ($n = 5$) omitted between two and ten items; 18.2% ($n = 2$) omitted 15 items.

At both survey administrations all respondents answered more than half of the survey items. Hence, all HSoPSC surveys met the criteria for inclusion in data analysis (Chapter 4, Section 4.6.3).

7.2.1.3 Measures of association

Measures of association between each HSoPSC subscale and respondent demographics/workforce characteristics were explored using Kendall's tau b correlation coefficient and the aggregated baseline and follow-up data (Table 52). Correlation coefficients ranged from -0.20 to 0.21 (weak negative association through little or no association to weak positive association). 13/78 of the correlations were statistically significant at either $p < 0.05$ or $p < 0.01$ (unadjusted values).

7.2.1.4 Longitudinal data analysis

Response rates for respondents answering both survey administrations and completing the code to enable data linkage were:

- Ward AI $n = 5$; ward AC $n = 4$
- Ward BI $n = 1$; ward BC $n = 3$

Sample sizes were insufficient to enable analysis as paired observations.

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Table 52: Kendall's tau b correlations for HSoPSC survey data

HSoPSC subscales	Respondent demographics/workforce characteristics					
	Band	Sex	Age	Working hours	Years in hospital	Years on ward
<i>Teamwork across units</i>	0.03	0.07	0.00	0.17*	0.18	-0.03
<i>Supervisor expectations and actions promoting safety</i>	0.16*	0.10	-0.01	-0.03	-0.09	-0.13
<i>Organisational learning</i>	-0.01	-0.07	-0.04	0.01	-0.01	-0.04
<i>Hospital management support for patient safety</i>	-0.02	0.01	-0.05	0.11	-0.16*	-0.20**
<i>Feedback and communication about error</i>	0.05	-0.03	-0.09	0.14	-0.13	0.21**
<i>Communication openness</i>	0.17*	-0.01	-0.04	0.12	-0.13	-0.14*
<i>Teamwork across units</i>	-0.03	-0.00	-0.05	0.06	-0.15*	-0.13
<i>Staffing</i>	0.02	0.01	-0.14*	-0.02	0.14	-0.13
<i>Hospital handoffs and transitions</i>	-0.09	0.04	0.02	0.13	-0.09	-0.01
<i>Non-punitive response to error</i>	0.19**	0.13	-0.11	0.05	0.01	-0.04
<i>Overall perceptions of safety</i>	0.03	0.11	-0.13	0.10	-0.13	-0.19**
<i>Frequency of event reporting</i>	0.07	0.01	0.01	0.17*	-0.06	-0.13
<i>Safety culture composite score</i>	0.05	0.03	-0.08	0.10	-0.12	-0.16*

*Statistically significant at $p < 0.05$ (unadjusted value)

**Statistically significant at $p < 0.01$ (unadjusted value)

7.2.1.5 Open question comments

A small number of respondents ($n = 32$) provided brief responses to the open question. Overall, these corroborated the closed question responses.

Consequently, formal analysis was not undertaken.

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7.2.2 Matched pair A

7.2.2.1 Baseline between-ward tests of differences³⁸

Baseline between-ward results subscale tests of differences results are presented in Table 53; the single item outcome dimensions are presented in Table 57.

Intervention ward and control ward respondents indicated similar perceptions of their ward safety culture prior to implementation of the CAS. There were no significant differences between the intervention and control ward subscale mean scores. Differences between intervention and control ward subscale mean scores ranged from 0.04 to 0.28. Intervention ward mean scores were higher than those for the control ward for five subscales and lower for seven subscales.

The safety culture composite mean score was lower on the intervention ward (mean 3.51) than the control ward (mean 3.6) but this was not statistically significant ($p = 0.61$).

Median values for the “*Patient safety grade*” were “*Very good*” and for the “*Number of event reports*” were “1-2” for both the intervention and control ward.

No overall pattern in the non-significant results was observed.

Respondents agreed with eleven out of the twelve subscales (mean scores above 3.00). Both the intervention and control ward mean score for “*Staffing*” was less than 3.00: this indicated disagreement with this subscale.

³⁸ **Interpretation of subscale mean scores:** the items in each HSoPSC subscale are scored on a five-part Likert scale. Values of 3 correspond to a neutral midpoint, values above 3 indicate stronger agreement with, or more frequent occurrence of, the item, and values below 3 indicate disagreement with, or less frequent occurrence of, the item. Consequently, mean scores above 3 represent perceptions of a more favourable safety culture (Sorra & Nieva 2004).

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Table 53: HSoPSC baseline between-ward independent *t* tests matched pair A

HSoPSC dimensions & subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
Safety culture dimensions							
Teamwork within units							
Intervention ward (AI)	4.03 (0.59)	4.00	0.67	44	0.51	0.14	-0.27 to 0.55
Control ward (AC)	3.89 (0.60)	4.00					
Supervisor expectations and actions promoting safety							
Intervention ward (AI)	3.73 (0.60)	3.75	-1.51	44	0.14	-0.27	-0.63 to 0.09
Control ward (AC)	4.00 (0.40)	4.00					
Organisational learning							
Intervention ward (AI)	3.86 (0.42)	4.00	0.16	14.37	0.88	0.04	-0.48 to 0.56
Control ward (AC)	3.82 (0.84)	4.00					
Hospital management support for patient safety							
Intervention ward (AI)	3.43 (0.73)	3.67	0.34	15.77	0.74	0.13	-0.67 to 0.92
Control ward (AC)	3.31 (1.26)	3.67					
Feedback and communication about error							
Intervention ward (AI)	3.56 (0.90)	3.67	-0.75	44	0.46	-0.21	-0.79 to 0.36
Control ward (AC)	3.77 (0.76)	3.67					
Communication openness							
Intervention ward (AI)	3.65 (0.75)	3.67	-0.29	44	0.77	-0.07	-0.57 to 0.43
Control ward (AC)	3.72 (0.76)	3.67					
Teamwork across units							
Intervention ward (AI)	3.45 (0.66)	3.50	-0.45	44	0.65	-0.11	-0.60 to 0.38
Control ward (AC)	3.56 (0.95)	3.25					
Staffing							
Intervention ward (AI)	2.85 (0.84)	3.00	0.39	44	0.70	0.10	-0.42 to 0.63
Control ward (AC)	2.74 (0.65)	3.00					
Hospital handoffs and transitions							
Intervention ward (AI)	3.11 (0.79)	3.25	0.24	44	0.82	0.07	-0.51 to 0.65
Control ward (AC)	3.04 (1.09)	3.00					
Non-punitive response to error							
Intervention ward (AI)	3.31 (0.66)	3.33	-0.64	44	0.52	-0.16	-0.67 to 0.34
Control ward (AC)	3.47 (0.99)	3.33					
Safety culture outcome dimensions							
Overall perceptions of safety							
Intervention ward (AI)	3.40 (0.82)	3.50	-1.10	44	0.28	-0.28	-0.79 to 0.23
Control ward (AC)	3.68 (0.67)	3.50					
Frequency of event reporting							
Intervention ward (AI)	3.84 (0.66)	3.83	-0.48	43	0.63	-0.13	-0.67 to 0.41
Control ward (AC)	3.97 (1.13)	4.30					
Safety culture composite score							
Intervention ward (AI)	3.51 (0.48)	3.60	-0.51	44	0.61	-0.08	-0.42 to 0.25
Control ward (AC)	3.60 (0.57)	3.62					

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7.2.2.2 Within-ward tests of differences: intervention ward AI

Baseline and follow-up subscale tests of differences results for the intervention ward are presented in Table 54; the single item outcome dimensions are presented in Table 57.

Table 54 shows the mean for all subscale scores increased following participation in the CAS: the range of increases was 0.02 to 0.58. An overall pattern of increasing subscale mean scores and increasing respondent agreement with subscale items is shown.

Four of these increases, indicating increasing agreement with the subscale items, were also statistically significant: “*Supervisor expectations and actions promoting safety*” (difference 0.56, 95% CI 0.17 to 0.94, $p = 0.006$, Hedge’s $g = 0.94$), “*Organisational learning*” (difference 0.34, 95% CI 0.61 to 0.70, $p = 0.015$, Hedge’s $g = 0.81$), “*Frequency of event reporting*” (difference 0.56, 95% CI 0.16 to 0.96, $p = 0.007$, Hedge’s $g = 0.92$) and “*Feedback and communication about error*” (difference 0.58, 95% CI 0.05 to 1.11, $p = 0.034$, Hedge’s $g = 0.71$).

Weak positive correlations were shown between “*Supervisor expectations and actions promoting safety*” and respondent band (grade), between “*Frequency of event reporting*” and respondent work hours, and between “*Feedback and communication about error*” and the number of years a respondent had worked on the ward (Section 7.2.1.3). Differences between the baseline and follow-up sample characteristics for these variables were examined to explore whether they could explain the above findings. More respondents in the follow-up sample were senior sisters and staff nurses (80.0%) compared to the baseline sample (63.3%). More respondents in the follow-up sample worked full time hours (86.7%) compared to the baseline sample (78.8%). More respondents in the follow-up sample had worked on the ward for five years or more (60.0%) compared to the baseline sample (48.5% respectively). These findings provide a partial explanation of the above results but the weak associations and the overall pattern of results make them unlikely to fully account for these results.

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The overall safety culture composite mean score increased following participation in the CAS (difference 0.27, 95% CI -0.01 to 0.55) but the change was not statistically significant ($p = 0.05$).

The "*Patient safety grade*" showed a significant increase ($p = 0.02$, effect size $r = 0.34$) following participation in the CAS: the baseline median of "*Very good*" increased to a follow-up median of "*Excellent*". The "*Number of event reports*" baseline median of "1-2" was unchanged at follow-up.

Respondents continued to indicate disagreement with the "*Staffing*" subscale (mean 2.90) following participation in the CAS. The remaining subscale mean scores were above 3.00 and indicated continuing agreement with these subscales.

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Table 54: HSoPSC within-ward independent *t* tests intervention ward AI

HSoPSC dimensions & subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
Safety culture dimensions							
Teamwork within units							
Baseline	4.03 (0.59)	4.00	1.36	46	0.18	0.24	-0.11 to 0.59
Follow-up	4.27 (0.50)	4.00					
Supervisor expectations and actions promoting safety							
Baseline	3.73 (0.60)	3.75	2.89	46	0.006*	0.56	0.17 to 0.94
Follow-up	4.28 (0.66)	4.50					
Organisational learning							
Baseline	3.86 (0.42)	4.00	2.5	46	0.015*	0.34	0.61 to 0.70
Follow-up	4.20 (0.47)	4.00					
Hospital management support for patient safety							
Baseline	3.43 (0.78)	3.67	0.80	46	0.43	0.19	-0.28 to 0.66
Follow-up	3.62 (0.68)	3.33					
Feedback and communication about error							
Baseline	3.56 (0.90)	3.67	2.18	46	0.034*	0.58	0.05 to 1.11
Follow-up	4.13 (0.71)	4.33					
Communication openness							
Baseline	3.65 (0.75)	3.67	1.08	46	0.29	0.24	-0.21 to 0.70
Follow-up	3.89 (0.65)	4.00					
Teamwork across units							
Baseline	3.45 (0.66)	3.50	1.42	46	0.16	0.29	-0.12 to 0.69
Follow-up	3.73 (0.62)	4.00					
Staffing							
Baseline	2.85 (0.84)	3.00	0.22	46	0.83	0.25	-0.44 to 0.55
Follow-up	2.90 (0.67)	2.75					
Hospital handoffs and transitions							
Baseline	3.11 (0.79)	3.25	0.44	46	0.66	0.11	-0.37 to 0.58
Follow-up	3.21 (0.70)	3.50					
Non-punitive response to error							
Baseline	3.31 (0.66)	3.33	0.08	46	0.94	0.02	-0.45 to 0.49
Follow-up	3.33 (0.93)	3.64					
Safety culture outcome dimensions							
Overall perceptions of safety							
Baseline	3.40 (0.82)	3.50	1.40	46	0.17	0.33	-0.15 to 0.80
Follow-up	3.73 (0.60)	3.75					
Frequency of event reporting							
Baseline	3.84 (0.66)	3.83	2.81	46	0.007*	0.56	0.16 to 0.96
Follow-up	4.40 (0.57)	4.33					
Safety culture composite score							
Baseline	3.51 (0.48)	3.60	1.97	46	0.05	0.27	-0.01 to 0.55
Follow-up	3.79 (0.35)	3.80					

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.2.3 Within-ward tests of differences: control ward AC

Control ward baseline and follow-up subscale tests of differences results are presented in Table 55; the single item outcome dimensions are presented in Table 57.

There were no statistically significant differences between the control ward baseline and follow-up subscale mean scores. Three subscale mean scores increased. The range of these increases was from 0.06 to 0.23. Nine subscale mean scores decreased. The range of these decreases was from 0.05 to 0.55. An overall pattern of a majority of decreased subscale mean scores and decreased respondent agreement with the subscales was shown.

The overall safety culture composite score decreased (difference -0.13, 95% CI -0.60 to 0.33) but the change was not statistically significant.

The baseline and follow-up medians remained unchanged for the “*Patient safety grade*” (“*Very good*”) and for the “*Number of event reports*” (“*1-2*”).

Respondents continued to indicate disagreement with the “*Staffing*” subscale (mean 2.98). Additionally, disagreement with the “*Hospital handoffs and transitions*” (mean 2.83) and “*Non-punitive response to error*” (mean 2.93) subscales was exhibited. Respondents continued to show agreement with the remaining nine subscales (mean scores above 3.00).

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Table 55: HSoPSC within-ward independent *t* tests control ward AC

HSoPSC dimensions & subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
Safety culture dimensions							
Teamwork within units							
Baseline	3.89 (0.71)	4.00	0.23	21	0.82	0.06	-0.47 to 0.59
Follow-up	3.95 (0.44)	3.88					
Supervisor expectations and actions promoting safety							
Baseline	4.00 (0.40)	4.00	-1.48	21	0.15	-0.48	-1.14 to 0.19
Follow-up	3.53 (1.07)	3.50					
Organisational learning							
Baseline	3.82 (0.84)	4.00	-0.19	21	0.85	-0.29	-0.65 to 0.54
Follow-up	3.77 (0.35)	4.00					
Hospital management support for patient safety							
Baseline	3.31 (1.26)	3.67	0.41	21	0.69	0.19	-0.79 to 1.17
Follow-up	3.50 (0.91)	3.67					
Feedback and communication about error							
Baseline	3.77 (0.76)	3.67	-0.83	21	0.41	-0.34	-1.00 to 0.43
Follow-up	3.48 (0.88)	3.33					
Communication openness							
Baseline	3.72 (0.76)	3.67	-0.19	21	0.85	-0.05	-0.60 to 0.50
Follow-up	3.67 (0.42)	3.67					
Teamwork across units							
Baseline	3.56 (0.95)	3.25	1.04	17.50	0.31	0.31	-0.93 to 0.31
Follow-up	3.25 (0.42)	3.25					
Staffing							
Baseline	2.74 (0.65)	3.00	0.86	21	0.40	0.23	-0.33 to 0.79
Follow-up	2.98 (0.62)	3.00					
Hospital handoffs and transitions							
Baseline	3.04 (1.09)	3.00	-0.51	20	0.62	-0.21	-1.05 to 0.64
Follow-up	2.83 (0.61)	3.00					
Non-punitive response to error							
Baseline	3.47 (0.99)	3.33	-1.40	20	0.18	-0.55	-1.37 to 0.27
Follow-up	2.93 (0.76)	3.00					
Safety culture outcome dimensions							
Overall perceptions of safety							
Baseline	3.68 (0.67)	3.50	-0.50	21	0.62	-0.13	-0.66 to 0.40
Follow-up	3.56 (0.52)	3.63					
Frequency of event reporting							
Baseline	3.97 (1.13)	4.30	-0.22	21	0.83	-0.09	-0.96 to 0.78
Follow-up	3.88 (0.76)	3.83					
Safety culture composite score							
Baseline	3.60 (0.57)	3.62	-0.59	21	0.56	-0.13	-0.60 to 0.33
Follow-up	3.46 (0.49)	3.60					

7.2.2.4 Follow-up between-ward tests of differences

Results of the follow-up between-ward subscale tests of differences are presented in Table 56; the single item outcome dimensions are presented in Table 57.

At follow-up the intervention ward mean scores were higher than those for the control ward for 11 subscales and lower for one subscale. Differences between intervention and control ward subscale mean scores ranged from 0.08 to 0.76. Of these, four differences were statistically significant: *“Supervisor expectations and actions promoting safety”* (difference 0.76, 95% CI 0.04 to 1.47, $p = 0.038$, Hedge’s $g = 0.98$), *“Organisational learning”* (difference 0.43, 95% CI 0.07 to 0.79, $p = 0.021$, Hedge’s $g = 0.99$), *“Feedback and communication about error”* (difference 0.65, 95% CI 0.01 to 1.31, $p = 0.049$, Hedge’s $g = 0.90$) and *“Teamwork across units”* (difference 0.48, 95% CI 0.02 to 0.95, $p = 0.043$, Hedge’s $g = 0.94$).

The overall safety culture composite score was higher on the intervention ward compared to the control ward (difference 0.32, 95% CI -0.02 to 0.67) but this difference was not statistically significant ($p = 0.07$).

The intervention ward *“Patient safety grade”* was *“Excellent”* compared to *“Very good”* for the control ward but this difference was not statistically significant ($p = 0.25$). The *“Number of event reports”* was *“1-2”* for both wards.

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Table 56: HSoPSC follow-up between-ward independent *t* tests matched pair A

HSoPSC dimensions & subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Intervention ward (AI)	4.27 (0.50)	4.00					
Control ward (AC)	3.95 (0.44)	3.88	1.64	23	0.12	0.32	-0.08 to 0.72
<i>Supervisor expectations and actions promoting safety</i>							
Intervention ward (AI)	4.28 (0.66)	4.50					
Control ward (AC)	3.53 (1.07)	3.50	2.20	23	0.038*	0.76	0.04 to 1.47
<i>Organisational learning</i>							
Intervention ward (AI)	4.20 (0.47)	4.00					
Control ward (AC)	3.77 (0.35)	4.00	2.49	23	0.021*	0.43	0.07 to 0.79
<i>Hospital management support for patient safety</i>							
Intervention ward (AI)	3.62 (0.68)	3.33					
Control ward (AC)	3.50 (0.91)	3.67	0.39	23	0.70	0.12	-0.53 to 0.78
<i>Feedback and communication about error</i>							
Intervention ward (AI)	4.13 (0.71)	4.33					
Control ward (AC)	3.48 (0.88)	3.33	2.04	23	0.049*	0.65	0.01 to 1.31
<i>Communication openness</i>							
Intervention ward (AI)	3.89 (0.65)	4.00					
Control ward (AC)	3.67 (0.42)	3.67	0.96	23	0.35	0.22	-0.26 to 0.70
<i>Teamwork across units</i>							
Intervention ward (AI)	3.73 (0.62)	4.00					
Control ward (AC)	3.25 (0.42)	3.25	2.14	23	0.043*	0.48	0.02 to 0.95
<i>Staffing</i>							
Intervention ward (AI)	2.90 (0.67)	2.75					
Control ward (AC)	2.98 (0.62)	3.00	-0.28	23	0.78	-0.08	-0.62 to 0.47
<i>Hospital handoffs and transitions</i>							
Intervention ward (AI)	3.21 (0.70)	3.50					
Control ward (AC)	2.83 (0.61)	3.00	1.34	22	0.20	0.38	-0.21 to 0.96
<i>Non-punitive response to error</i>							
Intervention ward (AI)	3.33 (0.93)	3.64					
Control ward (AC)	2.93 (0.76)	3.00	1.11	22	0.28	0.41	-0.35 to 1.17
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Intervention ward (AI)	3.73 (0.60)	3.75					
Control ward (AC)	3.55 (0.52)	3.63	0.76	23	0.45	0.18	-0.30 to 0.66
<i>Frequency of event reporting</i>							
Intervention ward (AI)	4.40 (0.57)	4.33					
Control ward (AC)	3.88 (0.76)	3.83	1.96	23	0.06	0.52	-0.03 to 1.07
Safety culture composite score							
Intervention ward (AI)	3.79 (0.35)	3.80					
Control ward (AC)	3.46 (0.49)	3.60	1.92	23	0.07	0.32	-0.02 to 0.67

*Statistically significant at $p < 0.05$ (unadjusted value)

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Table 57: HSoPSC matched pair A single item outcome dimensions

Patient safety grade									
	Failing <i>n</i> = (%)	Poor <i>n</i> = (%)	Acceptable <i>n</i> = (%)	Very Good <i>n</i> = (%)	Excellent <i>n</i> = (%)	Mann-Whitney U	Z score	<i>p</i>	
Baseline between-ward results									
Ward AI	0	0	9 (29.0)	17 (54.8) [†]	5 (16.1)	131.00	-1.66	0.10	
Ward AC	0	0	1 (8.3)	7 (58.3) [†]	4 (33.3)				
Within-ward results: ward AI									
Baseline	0	0	9 (29.0)	17 (54.8) [†]	5 (16.1)	140.50	-2.33	0.02*	
Follow-up	0	0	2 (13.3)	5 (33.3)	8 (53.3) [†]				
Within-ward results: ward AC									
Baseline	0	0	1 (8.3)	7 (58.3) [†]	4 (33.3)	47.50	-0.54	0.65	
Follow-up	0	0	1 (11.1)	6 (66.7) [†]	2 (22.2)				
Follow-up between-ward results									
Ward AI	0	0	2 (13.3)	5 (33.3)	8 (53.3) [†]	50.00	-1.15	0.25	
Ward AC	0	0	1 (11.1)	6 (66.7) [†]	2 (22.2)				
Number of event reports									
	0 <i>n</i> = (%)	1-2 <i>n</i> = (%)	3-5 <i>n</i> = (%)	6-10 <i>n</i> = (%)	11-20 <i>n</i> = (%)	21+ <i>n</i> = (%)	Mann-Whitney U	Z score	<i>p</i>
Baseline between-ward results									
Ward AI	8 (25.0)	12 (37.5) [†]	10 (31.2)	0	1 (3.1)	1 (3.1)	176.50	-0.82	0.40
Ward AC	3 (23.2)	4 (30.8) [†]	2 (15.4)	1 (7.7)	3 (23.1)	0			
Within-ward results: ward AI									
Baseline	8 (25.0)	12 (37.5) [†]	10 (31.3)	0	1 (3.1)	1 (3.1)	239.50	-0.01	0.99
Follow-up	3 (20.0)	7 (46.7) [†]	4 (26.7)	0	1 (6.7)	0			
Within-ward results: ward AC									
Baseline	3 (23.1)	4 (30.8) [†]	2 (15.4)	1 (7.7)	3 (23.1)	0	53.50	-0.34	0.74
Follow-up	2 (22.2)	3 (33.3) [†]	3 (33.3)	0	1 (11.1)	0			
Follow-up between-ward results									
Ward AI	3 (20.0)	7 (46.7) [†]	4 (26.7)	0	1 (6.7)	0	62.00	-0.35	0.73
Ward AC	2 (22.2)	3 (33.3) [†]	3 (33.3)	0	1 (11.1)	0			

*Statistically significant at $p < 0.05$ (unadjusted value)

[†]Median value

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7.2.2.5 Summary of findings

There were no significant differences between the intervention and control ward subscale mean scores, the overall safety culture composite score, or the single item outcome dimensions at baseline. Intervention ward mean scores were higher than those for the control ward for five subscales and lower for seven subscales at baseline. The overall safety culture composite score was higher on the control ward than the intervention ward.

The mean for all subscale scores and the safety culture composite score increased on the intervention ward following participation in the CAS. Four of these increases were statistically significant. The *“Patient safety grade”* also showed a statistically significant increase. The median for the *“Number of event reports”* remained unchanged.

In contrast, nine subscale mean scores and the overall safety culture composite score had decreased, three subscale mean scores had increased, and the single item outcome dimensions remained unchanged on the control ward. There were no statistically significant differences.

The intervention ward mean for 11 out of the 12 subscale scores and the overall safety culture composite score were higher than those for the control ward at follow-up. Four of these differences were statistically significant. The intervention ward *“Patient safety grade”* median was higher than that for the control ward at follow-up but this difference was not statistically significant. The median for the *“Number of event reports”* was the same on both wards at follow-up.

The summarised findings for matched pair A are shown below in Table 58.

Table 58: Summarised findings matched pair A

Subscale/dimension	Baseline between- ward	Within- ward AI	Within- ward AC	Follow-up between- ward
<i>"Teamwork across units"</i>	(I)	(+)	(+)	(I)
<i>"Supervisor expectations and actions promoting safety"</i>	(C)	+	(-)	I
<i>"Organisational learning"</i>	(I)	+	(-)	I
<i>"Hospital management support for patient safety"</i>	(I)	(+)	(+)	(I)
<i>"Feedback and communication about error"</i>	(C)	+	(-)	I
<i>"Communication openness"</i>	(C)	(+)	(-)	(I)
<i>"Teamwork across units"</i>	(I)	(+)	(-)	I
<i>"Staffing"</i>	(I)	(+)	(+)	(C)
<i>"Hospital handoffs and transitions"</i>	(I)	(+)	(-)	(I)
<i>"Non-punitive response to error"</i>	(C)	(+)	(-)	(I)
<i>"Overall perceptions of safety"</i>	(C)	(+)	(-)	(I)
<i>"Frequency of event reporting"</i>	(C)	+	(-)	(I)
Safety culture composite score	(C)	(+)	(-)	(I)
Patient safety grade	(I/C)	+	(#)	(I)
Number of event reports	(I/C)	(#)	(#)	(I/C)

Legend:

I = Intervention ward mean score/median higher than control ward mean score/median

C = Control ward mean score/median higher than intervention ward mean score/median

I/C = Intervention and control ward mean score/median are the same

+/- = increase/decrease in mean score/median

= unchanged mean score/median

() non-significant difference; absence of parenthesis = significant difference

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The overall safety culture composite scores showed intervention and control ward respondents had similar perceptions of their ward's safety culture at both baseline and follow-up. Yet, all intervention ward subscale mean scores increased whilst nine out of the twelve control ward subscale mean scores decreased.

A significant difference between intervention and control ward respondents' agreement with the *"Teamwork across units"* subscale items had developed at follow-up. However, the intervention ward increase was not statistically significant and this finding was therefore not clearly attributable to the effects of participation in the CAS. Nonetheless, the intervention ward four subscales of *"Supervisor expectations and actions promoting safety"*, *"Organisational learning"*, *"Feedback and communication about error"* and *"Frequency of event reporting"* did show a significant rise in mean score; there was also a corresponding, but non-significant, decrease in control ward mean scores. Equally, the single item outcome dimension of *"Patient safety grade"* showed a statistically significant increase in the median on the intervention ward whilst the control ward median remained unchanged. Furthermore, the findings for *"Supervisor expectations and actions promoting safety"*, *"Organisational learning"*, *"Feedback and communication about error"* also showed a significant between-ward difference at follow-up.

Overall, findings indicate that participation in the CAS was associated with increasing agreement with the HSoPSC *"Supervisor expectations and actions promoting safety"*, *"Organisational learning"*, *"Feedback and communication about error"* and *"Frequency of event reporting"* subscales and higher ratings of patient safety. The magnitude of change for these subscales is large to moderate. Yet, the strength of the evidence is weak given these findings are the results of multiple testing. However, a pattern for participation in the CAS to be positively associated with increasing agreement with the remaining HSoPSC subscales is also indicated.

7.2.3 Matched pair B

7.2.3.1 Baseline between-ward tests of differences

The results of baseline within-ward subscale tests of difference are presented in Table 59; the single item outcome dimensions are presented in Table 63.

Intervention ward mean scores were higher than those for the control ward for five of the subscales and lower for seven subscales. Differences ranged from 0.01 to 0.78. Two of these differences were statistically significant: *“Staffing”* (intervention ward mean 2.77, control ward mean 2.23, difference 0.54, 95% CI 0.04 to 1.05, Hedge’s *g* 0.85) and *“Non-punitive response to error”* (intervention ward mean 3.67, control ward mean, 2.89, difference 0.78, 95% CI 0.20 to 1.36, $p = 0.011$, Hedge’s *g* 0.98).

The safety culture composite mean score was higher on the intervention ward (mean 3.55) than the control ward (mean 3.52) but this was not statistically significant ($p = 0.81$). No significant differences were found between the intervention and control ward *“Patient safety grade”* and *“Number of event reports”*. No overall pattern for the non-significant results was observed.

Respondents on both the intervention and control ward agreed with ten out of the twelve subscales (mean scores above 3.00). The intervention and control ward mean scores for *“Staffing”*, the intervention ward mean score for *“Hospital handoffs and transitions”*, and the control ward mean score for *“Non-punitive response to error”* were less than 3.00 and showed that respondents disagreed with these subscales.

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Table 59: HSoPSC baseline between-ward independent *t* tests matched pair B

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Intervention ward (BI)	3.93 (0.49)	4.00					
Control ward (BC)	3.98 (0.51)	4.00	-0.24	25	0.81	-0.04	-0.44 to 0.35
<i>Supervisor expectations and actions promoting safety</i>							
Intervention ward (BI)	4.22 (0.51)	4.00					
Control ward (BC)	4.33 (0.48)	4.25	-0.61	25	0.55	-0.12	-0.51 to 0.28
<i>Organisational learning</i>							
Intervention ward (BI)	3.76 (0.51)	4.00					
Control ward (BC)	3.92 (0.47)	4.00	-0.79	25	0.43	-0.15	-0.56 to 0.25
<i>Hospital management support for patient safety</i>							
Intervention ward (BI)	3.40 (0.90)	3.67					
Control ward (BC)	3.40 (0.95)	3.33	0.02	24	0.99	0.01	-0.75 to 0.76
<i>Feedback and communication about error</i>							
Intervention ward (BI)	3.51 (0.88)	4.00					
Control ward (BC)	3.81 (0.58)	3.84	-0.99	25	0.33	-0.29	-0.90 to 0.31
<i>Communication openness</i>							
Intervention ward (BI)	3.87 (0.59)	4.00					
Control ward (BC)	3.67 (0.57)	3.67	0.89	25	0.38	0.20	-0.26 to 0.66
<i>Teamwork across units</i>							
Intervention ward (BI)	3.16 (0.58)	3.25					
Control ward (BC)	3.38 (0.64)	3.25	-0.93	25	0.36	-0.22	-0.70 to 0.26
<i>Staffing</i>							
Intervention ward (BI)	2.77 (0.59)	2.75					
Control ward (BC)	2.23 (0.69)	2.38	2.21	25	0.036*	0.54	0.04 to 1.05
<i>Hospital handoffs and transitions</i>							
Intervention ward (BI)	2.90 (0.65)	2.75					
Control ward (BC)	3.10 (0.77)	3.13	-0.74	25	0.46	-0.20	-0.77 to 0.36
<i>Non-punitive response to error</i>							
Intervention ward (BI)	3.67 (0.77)	3.83					
Control ward (BC)	2.89 (0.64)	3.33	2.76	24	0.011*	0.78	0.20 to 1.36
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Intervention ward (BI)	3.51 (0.82)	3.75					
Control ward (BC)	3.65 (0.83)	3.88	-0.44	25	0.66	-0.14	-0.80 to 0.52
<i>Frequency of event reporting</i>							
Intervention ward (BI)	4.02 (0.84)	4.17					
Control ward (BC)	3.63 (1.02)	3.50	1.02	22	0.32	0.39	-0.40 to 1.18
Safety culture composite score							
Intervention ward (BI)	3.55 (0.44)	3.53					
Control ward (BC)	3.52 (0.39)	3.49	0.24	25	0.81	0.04	-0.30 to 0.37

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.3.2 Within-ward tests of differences: intervention ward BI

Results of within-ward subscale tests of differences for the intervention ward are presented in Table 60; the single item outcome dimensions are presented in Table 63.

The mean for eight subscales increased and for four subscales decreased following participation in the CAS. The range of increases was 0.06 to 0.59 and the range of decreases was 0.05 to 0.37. One of these increases, indicating increasing agreement with the subscale, was statistically significant: *“Overall perceptions of safety”* (difference 0.59, 95% CI 0.12 to 1.06, Hedge’s g 0.95). This subscale was shown to have a weak negative association with the number of years a respondent had worked on the ward (Section 7.2.1.3).

Differences between the baseline and follow-up sample characteristics for this variable were examined to explore whether this could explain the result. The percentage of respondents in the follow-up sample (37.5%, $n = 5$) working on the ward for two years or less was similar to that for the baseline sample (33.3%, $n = 3$). Therefore, this does not appear to provide an explanation for this weak association. However, the effect of the missing data (12.5%, $n = 1$) for this variable is unclear.

The overall safety culture composite score increased (difference 0.13, 95% CI - 0.23 to 0.49) but the change was not statistically significant ($p = 0.46$).

The median value for the *“Patient safety grade”* remained unchanged at *“Very good”*. The median value for the *“Number of event reports”* increased from *“1-2”* to *“3-5”* but this change was not statistically significant ($p = 0.54$).

Respondents continued to show disagreement with the *“Hospital handoffs and transitions”* (mean 2.84) and *“Staffing”* (mean 2.97) subscales following participation in the CAS. Agreement with all other subscales was shown by respondents.

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Table 60: HSoPSC within-ward independent *t* tests intervention ward BI

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Baseline	3.39 (0.49)	4.00					
Follow-up	3.34 (0.42)	4.00	-0.20	21	0.98	-0.05	-0.42 to 0.43
<i>Supervisor expectations and actions promoting safety</i>							
Baseline	4.22 (0.51)	4.00					
Follow-up	3.84 (0.50)	3.88	-1.69	21	0.11	-0.37	-0.83 to 0.09
<i>Organisational learning</i>							
Baseline	3.76 (0.51)	4.00					
Follow-up	3.92 (0.24)	4.00	0.80	20	0.43	0.15	-0.25 to 0.56
<i>Hospital management support for patient safety</i>							
Baseline	3.40 (0.90)	3.67					
Follow-up	3.71 (0.49)	4.00	0.86	20	0.40	0.31	-0.45 to 1.08
<i>Feedback and communication about error</i>							
Baseline	3.51 (0.88)	4.00					
Follow-up	3.62 (0.60)	3.67	0.33	21	0.75	0.11	-0.61 to 0.84
<i>Communication openness</i>							
Baseline	3.87 (0.59)	4.00					
Follow-up	3.79 (0.56)	3.83	-0.30	21	0.77	-0.08	-0.60 to 0.45
<i>Teamwork across units</i>							
Baseline	3.16 (0.58)	3.25					
Follow-up	3.22 (0.57)	3.00	0.25	21	0.81	0.06	-0.46 to 0.59
<i>Staffing</i>							
Baseline	2.77 (0.59)	2.75					
Follow-up	2.97 (0.74)	3.13	0.70	21	0.49	0.20	-0.39 to 0.78
<i>Hospital handoffs and transitions</i>							
Baseline	2.90 (0.65)	2.75					
Follow-up	2.84 (0.46)	2.75	-0.22	21	0.83	-0.06	-0.60 to 0.49
<i>Non-punitive response to error</i>							
Baseline	3.67 (0.77)	3.83					
Follow-up	4.08 (0.57)	4.00	1.33	20	0.20	0.42	-0.24 to 1.07
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Baseline	3.51 (0.82)	3.75					
Follow-up	4.09 (0.19)	4.00	2.65	16.512	0.017*	0.59	0.12 to 1.06
<i>Frequency of event reporting</i>							
Baseline	4.02 (0.84)	4.17					
Follow-up	4.25 (0.61)	4.17	0.66	20	0.51	0.23	-0.48 to 0.94
Safety culture composite score							
Baseline	3.55 (0.44)	3.53					
Follow-up	3.68 (0.29)	3.76	0.75	21	0.46	0.13	-0.23 to 0.49

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.3.3 Within-ward tests of differences: control ward BC

Control ward baseline and follow-up subscale tests of differences results are presented in Table 61; the single item outcome dimensions are presented in Table 63.

At follow-up the control ward mean for 11 subscales had increased and for one subscale had decreased. The range of increases was 0.03 to 0.60 and the decrease was 0.03. One of these increases, indicating more favourable perceptions of the subscale, was statistically significant: *“Non-punitive response to error”* (difference 0.28, 95% CI 0.10 to 1.25, Hedge’s g 0.48). The magnitude of change for this subscale is small.

The overall safety composite score increased (difference 0.20, 95% CI -0.45 to 0.85) but the change was not statistically significant ($p = 0.14$).

Median values for the *“Patient safety grade”* and *“Number of event reports”* increased from baseline but the changes were not significant.

An overall pattern of increasing respondent agreement with subscales and increasing ratings of safety dimensions was shown.

Respondents continued to show disagreement with the *“Staffing”* (mean 2.60) subscale. Agreement with all other subscales was shown by respondents.

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Table 61: HSoPSC within-ward independent *t* tests control ward BC

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Baseline	3.98 (0.51)	4.00					
Follow-up	4.20 (0.48)	4.38	1.04	20	0.31	0.22	-0.22 to 0.66
<i>Supervisor expectations and actions promoting safety</i>							
Baseline	4.33 (0.48)	4.25					
Follow-up	4.30 (0.63)	4.25	-0.14	20	0.89	-0.03	-0.53 to 0.46
<i>Organisational learning</i>							
Baseline	3.92 (0.47)	4.00					
Follow-up	4.10 (0.52)	4.00	0.86	20	0.40	0.18	-0.26 to 0.63
<i>Hospital management support for patient safety</i>							
Baseline	3.39 (0.95)	3.33					
Follow-up	3.80 (0.67)	3.83	1.12	19	0.28	0.41	-0.35 to 1.17
<i>Feedback and communication about error</i>							
Baseline	3.81 (0.58)	3.84					
Follow-up	4.17 (0.59)	4.33	1.44	20	0.16	0.36	-0.16 to 0.88
<i>Communication openness</i>							
Baseline	3.67 (0.57)	3.67					
Follow-up	3.97 (0.64)	4.00	1.17	20	0.26	0.30	-0.24 to 0.84
<i>Teamwork across units</i>							
Baseline	3.38 (0.64)	3.25					
Follow-up	3.43 (0.75)	3.38	0.17	20	0.87	0.05	-0.56 to 0.66
<i>Staffing</i>							
Baseline	2.23 (0.69)	2.38					
Follow-up	2.60 (0.73)	2.63	1.23	20	0.23	0.37	-0.30 to 1.00
<i>Hospital handoffs and transitions</i>							
Baseline	3.10 (0.77)	3.13					
Follow-up	3.38 (0.69)	3.50	0.90	20	0.40	0.27	-0.39 to 0.93
<i>Non-punitive response to error</i>							
Baseline	2.89 (0.64)	3.33					
Follow-up	3.57 (0.65)	3.67	2.46	20	0.02*	0.28	0.10 to 1.25
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Baseline	3.65 (0.83)	3.88					
Follow-up	3.85 (0.58)	3.75	0.66	20	0.52	0.20	-0.45 to 0.85
<i>Frequency of event reporting</i>							
Baseline	3.63 (1.02)	3.50					
Follow-up	4.23 (0.79)	4.17	1.47	18	0.16	0.60	-0.26 to 1.46
Safety culture composite score							
Baseline	3.51 (0.39)	3.49					
Follow-up	3.80 (0.47)	3.75	1.54	20	0.14	0.28	-0.10 to 0.67

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.3.4 Follow-up between-ward tests of differences

Results for follow-up between-ward subscale tests of differences are presented in Table 62; the single item outcome dimensions are presented in Table 63.

There were no statistically significant differences between intervention and control ward subscale mean scores at follow-up. Intervention ward mean scores were higher than those for the control ward for four subscales and lower for eight subscales. Differences ranged from 0.02 to 0.54.

The intervention ward overall safety composite mean score (mean 3.68) was lower than that for the control ward (mean 3.80) but the difference was not statistically significant ($p = 0.56$).

The median value for *“Patient safety grade”* was *“Very good”* for both wards. The median value for *Number of event reports* was *“1-2”* on the intervention ward and *“3-5”* on the control ward but this was not a statistically significant difference ($p = 0.23$).

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Table 62: HSoPSC follow-up between-ward independent *t* tests matched pair B

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Intervention ward (BI)	3.94 (0.42)	4.00					
Control ward (BC)	4.20 (0.48)	4.38	-1.21	16	0.24	-0.26	-0.72 to 0.20
<i>Supervisor expectations and actions promoting safety</i>							
Intervention ward (BI)	3.84 (0.50)	3.88					
Control ward (BC)	4.30 (0.63)	4.25	-1.67	16	0.12	-0.46	-1.04 to 0.12
<i>Organisational learning</i>							
Intervention ward (BI)	3.92 (2.36)	4.00					
Control ward (BC)	4.10 (0.52)	4.00	-0.92	16	0.37	-0.18	-0.01 to 0.24
<i>Hospital management support for patient safety</i>							
Intervention ward (BI)	3.71 (0.49)	4.00					
Control ward (BC)	3.80 (0.67)	3.83	-0.29	15	0.78	-0.09	-0.72 to 0.55
<i>Feedback and communication about error</i>							
Intervention ward (BI)	3.63 (0.60)	3.67					
Control ward (BC)	4.17 (0.59)	4.33	-1.91	16	0.07	-0.54	-1.14 to 0.06
<i>Communication openness</i>							
Intervention ward (BI)	3.79 (0.56)	3.83					
Control ward (BC)	3.97 (0.64)	4.00	-0.61	16	0.55	-0.18	-0.78 to 0.43
<i>Teamwork across units</i>							
Intervention ward (BI)	3.22 (0.57)	3.00					
Control ward (BC)	3.43 (0.75)	3.38	-0.64	16	0.53	-0.21	-0.89 to 0.47
<i>Staffing</i>							
Intervention ward (BI)	2.97 (0.74)	3.13					
Control ward (BC)	2.60 (0.73)	2.63	1.06	16	0.30	0.37	-0.37 to 1.11
<i>Hospital handoffs and transitions</i>							
Intervention ward (BI)	2.84 (0.46)	2.75					
Control ward (BC)	3.37 (0.69)	3.50	-1.86	16	0.08	-0.53	-1.14 to 0.07
<i>Non-punitive response to error</i>							
Intervention ward (BI)	4.08 (0.57)	4.00					
Control ward (BC)	3.56 (0.65)	3.67	1.79	16	0.09	0.52	-0.10 to 1.13
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Intervention ward (BI)	4.09 (0.19)	4.00					
Control ward (BC)	3.85 (0.58)	3.75	1.137	16	0.27	0.24	-0.21 to 0.70
<i>Frequency of event reporting</i>							
Intervention ward (BI)	4.25 (0.61)	4.17					
Control ward (BC)	4.23 (0.79)	4.17	0.05	16	0.96	0.02	-0.70 to 0.74
Safety culture composite score							
Intervention ward (BI)	3.68 (0.29)	3.76					
Control ward (BC)	3.80 (0.47)	3.75	-0.59	16	0.56	-0.11	-0.52 to 0.29

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Table 63: HSoPSC matched pair B single item outcome dimensions

Patient safety grade								
	Failing <i>n</i> = (%)	Poor <i>n</i> = (%)	Acceptable <i>n</i> = (%)	Very Good <i>n</i> = (%)	Excellent <i>n</i> = (%)	Mann-Whitney U	Z score	<i>p</i>
Baseline between-ward results								
Ward BI	0	0	3 (20.0)	9 (60.0) [†]	3 (20.0)	58.50	-1.68	0.09
Ward BC	0	1 (8.3)	5 (41.7)*	5 (41.7)	1 (8.3)			
Within-ward results: ward BI								
Baseline	0	0	3 (20.0)	9 (60.0) [†]	3 (20.0)	54.00	-0.48	0.73
Follow-up	0	0	1 (12.5)	7 (87.5) [†]	0			
Within-ward results: ward BC								
Baseline	0	1 (8.3)	5 (41.7)*	5 (41.7)	1 (8.3)	37.00	-1.72	0.14
Follow-up	0	0	1 (10.0)	8 (80.0) [†]	1 (10.0)			
Follow-up between-ward results								
Ward BI	0	0	1 (12.5)	7 (87.5) [†]	0	35.50	-0.62	0.54
Ward BC	0	0	1 (10.0)	8 (80.0) [†]	1 (10.0)			
Number of event reports								
	0 <i>n</i> = (%)	1-2 <i>n</i> = (%)	3-5 <i>n</i> = (%)	6-10 <i>n</i> = (%)	11-20 <i>n</i> = (%)	21+ <i>n</i> = (%)	Mann-Whitney U	Z score <i>p</i>
Baseline between-ward results								
Ward BI	1 (7.1)	5 (35.7)	5 (35.7) [†]	1 (7.1)	2 (14.9)	0	74.00	-0.53
Ward BC	3 (25.0)	3 (25.0)*	4 (33.3)	0	0	2 (16.7)		
Within-ward results: ward BI								
Baseline	1 (7.1)	5 (35.7)	5 (35.7) [†]	1 (7.1)	2 (14.9)	0	40.50	-0.67
Follow-up	1 (14.3)	4 (57.1) [†]	0	0	2 (28.6)	0		
Within-ward results: ward BC								
Baseline	3 (25.0)	3 (25.0)*	4 (33.3)	0	0	2 (16.7)	41.00	-1.29
Follow-up	2 (20.0)	0	3 (30.0)*	1 (10.0)	2 (20.0)	2 (20.0)		
Follow-up between-ward results								
Ward BI	1 (14.3)	4 (57.1) [†]	0	0	2 (28.6)	0	23.00	-1.19
Ward BC	2 (20.0)	0	3 (30.0) [†]	1 (10.0)	2 (20.0)	2 (20.0)		

[†]Median value

*Median value = midway between this category and the above category

7. Measures of culture and environment

Summary of findings

Baseline intervention ward mean scores were higher than those for the control ward for five of the subscales and lower for seven subscales. Two of these differences were statistically significant. The overall safety culture composite score, the *“Patient safety grade”* and the *“Number of event reports”* were higher on the intervention ward than the control ward but these differences were not statistically significant.

The mean for eight subscales and the overall safety composite score increased on the intervention ward following participation in the CAS. One of these increases, *“Overall perceptions of safety”*, was statistically significant. The *“Number of event reports”* increased but this difference was not statistically significant. The *“Patient safety grade”* remained unchanged.

The mean for eleven subscales and the overall safety composite score had also increased on the control ward by follow-up. One of these increases, *“Non-punitive response to error”*, was statistically significant. Median values for the *“Patient safety grade”* and the *“Number of event reports”* increased but these differences were not statistically significant.

The intervention ward mean for four subscales were higher than the control ward at follow-up. The control ward mean for eight subscales, the overall safety culture composite score and the median for the *“Number of event reports”* were higher than the intervention ward at follow-up. There were no statistically significant differences. The median for the *“Patient safety grade”* was *“Very good”* on both wards.

The summarised findings for matched pair B are shown below in Table 64.

Table 64: Summarised findings matched pair B

Subscale/dimension	Baseline between-ward	Within-ward BI	Within-ward BC	Follow-up between-ward
<i>"Teamwork across units"</i>	(C)	(-)	(+)	(C)
<i>"Supervisor expectations and actions promoting safety"</i>	(C)	(-)	(-)	(C)
<i>"Organisational learning"</i>	(C)	(+)	(+)	(C)
<i>"Hospital management support for patient safety"</i>	(I/C)	(+)	(+)	(C)
<i>"Feedback and communication about error"</i>	(C)	(+)	(+)	(C)
<i>"Communication openness"</i>	(I)	(-)	(+)	(C)
<i>"Teamwork across units"</i>	(C)	(+)	(+)	(C)
<i>"Staffing"</i>	I	(+)	(+)	(I)
<i>"Hospital handoffs and transitions"</i>	(C)	(-)	(+)	(C)
<i>"Non-punitive response to error"</i>	I	(+)	+	(I)
<i>"Overall perceptions of safety"</i>	(C)	+	(+)	(I)
<i>"Frequency of event reporting"</i>	(I)	(+)	(+)	(I)
Safety culture composite score	(I)	(+)	(+)	(C)
Patient safety grade	(I)	(#)	(+)	(I/C)
Number of event reports	(I)	(-)	(+)	(C)

Legend:

I = Intervention ward mean score/median higher than control ward mean score/median

C = Control ward mean score/median higher than intervention ward mean score/median

I/C = Intervention and control ward mean score/median are the same

+/- = increase/decrease in mean score/median

= unchanged mean score/median

() non-significant difference; absence of parenthesis = significant difference

7. Measures of culture and environment

Overall, findings show intervention ward and control ward respondents had similar perceptions of their ward's safety culture at both baseline and follow-up. However, findings also show a general pattern of increasing subscale mean scores on the intervention ward following participation in the CAS. There was a similar pattern of increased control ward subscale mean scores at follow-up.

Enrolment of the control ward into the CAS occurred four weeks prior to the follow-up survey administration. The control ward process evaluation found the interview participant perceived there to be wide team involvement in the preparations for the CAS review. Culture is rooted in the ward's history; it develops over a period of time and reflects the shared beliefs, values, rules norms and traditions of the ward staff (Northouse 1997). Changing a culture takes time and it is questionable whether the finding of a pattern of change in the safety values and assumptions under which the control ward team was operating arose as a consequence of four weeks participation in the CAS. Thus, the finding of a general pattern of increasing control ward subscale mean scores was not attributed to participation in the CAS. Consequently, the similar general pattern of increasing intervention ward subscale mean scores was not attributed to participation in the CAS.

Nonetheless, the intervention ward increase in mean score for one subscale, *"Overall perceptions of safety"*, was statistically significant. The magnitude of this change was large. Consequently, findings suggest that participation in the CAS increased ward staffs' agreement with the *"Overall perceptions of safety"* subscale.

7.2.4 Matched pair C

Sample sizes were inadequate to perform statistical tests of differences. Intervention ward results, in the form of descriptive statistics, were interpreted as contextual factors that supported description of the ward environment and indicated potential explanations for outcomes arising from implementation of the CAS. All matched pair C survey responses were included in the statistical analysis of the combined intervention ward and combined control ward groups.

Descriptive statistics for the scales and safety culture composite score, and for the single item outcome dimensions, are presented in Tables 65 and 66 respectively.

7.2.4.1 Intervention ward CI descriptive statistics

The baseline respondent showed an overall favourable perception of their ward safety culture with all subscale scores and an overall safety culture composite score greater than 3.00. The *“Patient safety grade”* was *“Very good”* and the *“Number of event reports”* was *“11-20”*.

The mean for eight subscale scores following participation in the CAS was greater than 3.00, showing agreement with the subscales. A mean score of 3.00 indicated a neutral response to the *“Overall perceptions of safety”* subscale. The mean for four subscale scores showed disagreement with the *“Teamwork across units”* (mean 2.89 SD 0.66), *“Staffing”* (mean 2.28 SD 0.74), *“Hospital handoffs and transitions”* (mean 2.48 SD 0.68) and *“Non-punitive response to error”* (mean 2.82 SD 0.72) subscales. The overall safety culture composite score (mean 3.17 SD 0.42) showed respondents had a positive perception of the overall safety culture on their ward. The *“Patient safety grade”* median was *“Acceptable”* however a category of *“Failing”* was awarded by two out of the 11 respondents. The median for the *“Number of event reports”* fell between *“1-2”* and *“3-5”*.

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7.2.4.2 Control ward CC descriptive statistics

The baseline mean for eight subscale scores was greater than 3.00, showing agreement with these subscales. A mean score of 3.00 indicated a neutral response to the *“Overall perceptions of safety”* subscale. Disagreement was shown with the *“Staffing”* (mean 2.37 SD 0.80), *“Hospital handoffs and transitions”* (mean 2.70 SD 0.45), *“Non-punitive response to error”* (mean 2.67 SD 0.62) and *“Hospital management support for patient safety”* (mean 2.90 SD 1.27) subscales. The overall safety culture composite score (mean 3.22 SD 0.34) showed respondents had a positive perception of the overall safety culture on their ward. The median for the *“Patient safety grade”* was *“Acceptable”* and for the *“Number of event reports”* was *“3-5”*.

By follow-up the mean for ten subscale scores was greater than 3.00. A neutral perception of *“Hospital handoffs and transitions”* (mean 3.00 SD 0.35) was shown. Disagreement with the *“Staffing”* (mean 2.75 SD 0.35) continued to be shown. The overall safety culture composite score (mean 3.85 SD 0.04) showed respondents had a positive perception of the overall safety culture on their ward. The median for the *“Patient safety grade”* was *“Acceptable”* and for the *“Number of event reports”* fell between *“1-2”* and *“3-5”*.

Table 65: HSoPSC baseline and follow-up descriptive statistics matched pair C

HSoPSC dimensions & subscales	Baseline		Follow-up	
	Mean (SD)	Median	Mean (SD)	Median
Safety culture dimensions				
<i>Teamwork within units</i>				
Intervention ward (CI)	4.25 (-)	4.25	3.50 (0.73)	3.50
Control ward (CC)	3.45 (0.27)	3.50	4.50 (0.71)	4.50
<i>Supervisor expectations and actions promoting safety</i>				
Intervention ward (CI)	4.25 (-)	4.25	3.51 (0.43)	3.50
Control ward (CC)	4.00 (0.40)	4.00	4.63 (0.18)	4.63
<i>Organisational learning</i>				
Intervention ward (CI)	4.00 (-)	4.00	3.42 (0.50)	3.67
Control ward (CC)	4.00 (0.41)	4.00	4.33 (0.00)	4.33
<i>Hospital management support for patient safety</i>				
Intervention ward (CI)	3.33 (-)	3.33	3.12 (0.90)	3.00
Control ward (CC)	2.90 (1.27)	3.00	3.50 (0.71)	3.50
<i>Feedback and communication about error</i>				
Intervention ward (CI)	4.33 (-)	4.33	3.85 (0.41)	4.00
Control ward (CC)	3.33 (0.71)	3.33	4.00 (0.47)	4.00
<i>Communication openness</i>				
Intervention ward (CI)	4.67 (-)	4.67	3.51 (0.66)	3.67
Control ward (CC)	3.20 (0.38)	3.33	4.17 (0.24)	4.17
<i>Teamwork across units</i>				
Intervention ward (CI)	4.00 (-)	4.00	2.89 (0.66)	3.00
Control ward (CC)	3.05 (0.51)	3.25	3.25 (0.35)	3.25
<i>Staffing</i>				
Intervention ward (CI)	3.00 (-)	3.00	2.28 (0.74)	2.25
Control ward (CC)	2.37 (0.80)	2.33	2.75 (0.35)	2.75
<i>Hospital handoffs and transitions</i>				
Intervention ward (CI)	3.75 (-)	3.75	2.48 (0.68)	2.25
Control ward (CC)	2.70 (0.45)	2.75	3.00 (0.35)	3.00
<i>Non-punitive response to error</i>				
Intervention ward (CI)	3.67 (-)	3.67	2.82 (0.72)	3.00
Control ward (CC)	2.67 (0.62)	2.33	3.33 (0.47)	3.33
Safety culture outcome dimensions				
<i>Overall perceptions of safety</i>				
Intervention ward (CI)	3.75 (-)	3.75	3.00 (0.71)	3.00
Control ward (CC)	3.00 (0.75)	3.25	3.75 (0.35)	3.75
<i>Frequency of event reporting</i>				
Intervention ward (CI)	4.00 (-)	4.00	3.73 (0.83)	3.83
Control ward (CC)	4.17 (0.19)	4.17	5.00 (0.00)	5.00
Safety culture composite score				
Intervention ward (CI)	3.92 (-)	3.92	3.17 (0.42)	3.88
Control ward (CC)	3.22 (0.34)	3.15	3.85 (0.04)	3.85

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Table 66: HSoPSC matched pair C single item dimensions

Patient safety grade						
	Failing <i>n</i> = (%)	Poor <i>n</i> = (%)	Acceptable <i>n</i> = (%)	Very Good <i>n</i> = (%)	Excellent <i>n</i> = (%)	
Baseline results						
Ward CI	0	0	0	1 (100.0) [†]	0	
Ward CC	0	1 (20.0)	2 (40.0) [†]	2 (40.0)	0	
Follow-up results						
Ward CI	2 (18.18)	0	6 (54.5) [†]	3 (27.3)	0	
Ward CC	0	0	2 (100.0) [†]	0	0	
Number of event reports						
	0 <i>n</i> = (%)	1-2 <i>n</i> = (%)	3-5 <i>n</i> = (%)	6-10 <i>n</i> = (%)	11-20 <i>n</i> = (%)	21+ <i>n</i> = (%)
Baseline results						
Ward CI	0	0	0	0	1 (100.0) [†]	0
Ward CC	1 (20.0)	2 (40.0) [†]	0	0	1 (20.0)	1 (20.0)
Follow-up results						
Ward CI	3 (30.0)	2 (20.0) [*]	2 (20.0)	1 (10.0)	2 (20.0)	0
Ward CC	0	1 (50.0) [*]	1 (50.0)	0	0	0

[†]Median value

^{*}Median value = midway between this category and the above category

7.2.5 Pooled analysis: intervention wards versus control wards³⁹

7.2.5.1 Baseline between-group tests of differences

The results of the baseline between-group subscale tests of differences are presented in Table 67; the single item outcomes dimensions are presented in Table 72.

Intervention group mean scores were higher than the control group for seven subscales and lower than the control group for five subscales. Differences ranged from 0.03 to 0.35. One of these differences was statistically significant: *“Staffing”* (intervention group mean 2.83, control group mean 2.48, difference 0.35, 95% CI 0.01 to 0.69, $p = 0.044$, Hedge’s g 0.54). The magnitude of change for this subscale is moderate.

The overall safety culture composite mean score was higher for the control group (mean 3.50) compared to the intervention group (mean 3.33) but this difference was not statistically significant ($p = 0.30$).

The *“Patient safety grade”* median was *“Very good”* for both groups. The *“Number of event reports”* median was higher for the control group (*“3-5”*) compared to the intervention group (*“1-2”*) but this difference was not statistically significant ($p = 0.35$).

No overall pattern of difference between the intervention ward group and control ward group results was indicated.

³⁹ In order to establish the potential effect of enrolment of control ward BC into the CAS, the group tests of mean differences were also run with control ward BC included in the intervention group sample. This was found to make no significant difference to the intervention group results. Therefore, the results presented above, and the following results, retain the intervention/control wards in their original groupings.

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Table 67: HSoPSC baseline between-group independent *t* tests pooled analysis

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Intervention wards	4.00 (0.55)	4.00					
Control wards	3.85 (0.59)	3.87	1.15	77	0.26	0.15	-0.11 to 0.41
<i>Supervisor expectations and actions promoting safety</i>							
Intervention wards	3.89 (0.61)	4.00					
Control wards	4.13 (0.45)	4.00	-1.92	77	0.06	-0.25	-0.50 to 0.01
<i>Organisational learning</i>							
Intervention wards	3.83 (0.44)	4.00					
Control wards	3.89 (0.64)	4.00	-0.45	76	0.65	-0.05	-0.30 to 0.19
<i>Hospital management support for patient safety</i>							
Intervention wards	3.40 (0.82)	3.67					
Control wards	3.43 (0.56)	3.67	0.69	45.19	0.49	0.16	-0.31 to 0.64
<i>Feedback and communication about error</i>							
Intervention wards	3.56 (0.88)	3.67					
Control wards	3.71 (0.68)	3.67	-0.86	72.85	0.39	-0.15	-0.51 to 0.20
<i>Communication openness</i>							
Intervention wards	3.73 (0.71)	3.67					
Control wards	3.61 (0.64)	3.67	0.77	77	0.44	0.12	-0.19 to 0.44
<i>Teamwork across units</i>							
Intervention wards	3.37 (0.64)	3.50					
Control wards	3.40 (0.77)	3.25	-0.19	77	0.85	-0.03	-0.35 to 0.29
<i>Staffing</i>							
Intervention wards	2.83 (0.76)	3.00					
Control wards	2.48 (0.71)	2.50	2.05	77	0.044*	0.35	0.01 to 0.69
<i>Hospital handoffs and transitions</i>							
Intervention wards	3.06 (0.75)	3.00					
Control wards	3.01 (0.88)	3.00	0.26	77	0.80	0.05	-0.32 to 0.42
<i>Non-punitive response to error</i>							
Intervention wards	3.24 (0.70)	3.58					
Control wards	3.10 (0.85)	3.33	1.79	76	0.08	0.32	-0.35 to 0.67
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Intervention wards	3.44 (0.81)	3.50					
Control wards	3.55 (0.77)	3.50	-0.62	77	0.54	-0.11	-0.48 to 0.25
<i>Frequency of event reporting</i>							
Intervention wards	3.90 (0.71)	4.00					
Control wards	3.88 (1.00)	4.00	0.12	72	0.90	0.24	-0.37 to 0.42
Safety culture composite score							
Intervention wards	3.33 (0.46)	3.60					
Control wards	3.50 (0.47)	3.47	0.30	77	0.77	0.30	-0.18 to 0.25

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.5.2 Within-group tests of differences: intervention group

Table 68 presents the within-group subscale tests of differences for the intervention group; Table 72 presents the single item outcomes dimensions.

The mean for seven subscale scores increased and for five subscales decreased following participation in the CAS. The range of increases was 0.01 to 0.36. The range of decreases was 0.03 to 0.11. A single increase, showing increasing agreement with the *“Feedback and communication about error”* subscale, was statistically significant (difference 0.39, 95% CI 0.04 to 0.69, $p = 0.03$, Hedge’s g 0.47).

The overall safety culture composite mean score increased following participation in the CAS (difference 0.03, 95% CI -0.17 to 0.23) but this increase was not statistically significant ($p = 0.77$).

The “Patient safety grade” and “Number of event reports” medians remained unchanged.

No overall pattern in the results was observed.

Respondents continued to show disagreement with the *“Staffing”* (mean 2.71) subscale following participation in the CAS. Additionally, disagreement with the *“Hospital handoffs and transitions”* (mean 2.89) was also shown. The remaining ten subscale mean scores were above 3.00 and showed continuing agreement with these subscales.

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Table 68: HSoPSC within-group independent *t* tests intervention wards

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Baseline	4.00 (0.55)	4.00					
Follow-up	3.94 (0.65)	4.00	-0.47	81	0.64	-0.06	-0.33 to 0.20
<i>Supervisor expectations and actions promoting safety</i>							
Baseline	3.89 (0.61)	4.00					
Follow-up	3.93 (0.64)	3.88	0.30	81	0.77	0.04	-0.23 to 0.32
<i>Organisational learning</i>							
Baseline	3.83 (0.44)	4.00					
Follow-up	3.88 (0.54)	4.00	0.45	80	0.65	0.05	-0.17 to 0.27
<i>Hospital management support for patient safety</i>							
Baseline	3.44 (0.81)	3.67					
Follow-up	3.47 (0.74)	3.33	0.22	80	0.82	0.04	-0.31 to 0.39
<i>Feedback and communication about error</i>							
Baseline	3.56 (0.89)	3.67					
Follow-up	3.92 (0.62)	4.00	2.20	80.987	0.03*	0.36	0.04 to 0.69
<i>Communication openness</i>							
Baseline	3.73 (0.71)	3.67					
Follow-up	3.75 (0.64)	3.67	0.07	81	0.95	0.01	-0.29 to 0.31
<i>Teamwork across units</i>							
Baseline	3.37 (0.64)	3.50					
Follow-up	3.34 (0.71)	3.25	-0.21	81	0.84	-0.03	-0.33 to 0.27
<i>Staffing</i>							
Baseline	2.83 (0.76)	3.00					
Follow-up	2.71 (0.75)	2.75	-0.66	81	0.51	-0.11	-0.45 to 0.22
<i>Hospital handoffs and transitions</i>							
Baseline	3.06 (0.74)	3.00					
Follow-up	2.89 (0.70)	3.00	-1.04	81	0.30	-0.17	-0.49 to 0.15
<i>Non-punitive response to error</i>							
Baseline	3.42 (0.70)	3.58					
Follow-up	3.34 (0.90)	3.33	-0.49	80	0.65	-0.08	-0.43 to 0.27
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Baseline	3.44 (0.81)	3.50					
Follow-up	3.58 (0.71)	3.75	0.82	81	0.42	0.14	-0.20 to 0.48
<i>Frequency of event reporting</i>							
Baseline	3.90 (0.71)	4.00					
Follow-up	4.16 (0.71)	4.30	1.62	78	0.11	0.26	-0.06 to 0.58
Safety culture composite score							
Baseline	3.53 (0.46)	3.60					
Follow-up	3.56 (0.45)	3.63	0.30	81	0.77	0.03	-0.17 to 0.23

*Statistically significant at $p < 0.05$ (unadjusted value)

7.2.5.3 Within-group tests of differences: control group

Table 69 presents the within-group subscale tests of differences for the control group; Table 72 presents the single item outcomes dimensions.

There were no significant differences between baseline and follow-up subscale scores. The mean for ten subscale scores had increased and for two subscale scores had decreased by follow-up. The range of increases was 0.08 to 0.37. The range of decreases was 0.07 to 0.16. The overall safety culture composite score increased (difference 0.15, 95% CI -0.12 to 0.42) but the change was not statistically significant ($p = 0.27$). An overall pattern of a majority of increasing subscale mean scores, and increasing respondent agreement, with subscale items was shown.

The “Patient safety grade” and “Number of event reports” medians remained unchanged.

Respondents continued to show disagreement with the “*Staffing*” (mean 2.78) subscale. The remaining eleven subscale mean scores were greater than 3.00 and showed agreement with these subscales.

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Table 69: HSoPSC within-group independent *t* tests control wards

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Baseline	3.85 (0.59)	3.87					
Follow-up	4.11 (0.49)	4.00	1.69	50	0.10	0.26	-0.05 to 0.57
<i>Supervisor expectations and actions promoting safety</i>							
Baseline	4.13 (0.45)	4.00					
Follow-up	3.98 (0.92)	4.00	-0.73	28.309	0.47	-0.16	-0.59 to 0.28
<i>Organisational learning</i>							
Baseline	3.89 (0.64)	4.00					
Follow-up	3.97 (0.46)	4.00	0.51	50	0.62	0.08	-0.24 to 0.40
<i>Hospital management support for patient safety</i>							
Baseline	3.27 (1.12)	3.67					
Follow-up	3.64 (0.77)	3.67	1.38	48.566	0.17	0.37	-0.17 to 0.90
<i>Feedback and communication about error</i>							
Baseline	3.71 (0.68)	3.67					
Follow-up	3.84 (0.78)	3.83	0.64	50	0.53	0.13	-0.28 to 0.54
<i>Communication openness</i>							
Baseline	3.61 (0.64)	3.67					
Follow-up	3.85 (0.53)	4.00	1.41	50	0.16	0.24	-0.10 to 0.57
<i>Teamwork across units</i>							
Baseline	3.40 (0.77)	3.25					
Follow-up	3.33 (0.57)	3.25	-0.36	50	0.72	-0.07	-0.46 to 0.32
<i>Staffing</i>							
Baseline	2.48 (0.71)	2.50					
Follow-up	2.78 (0.66)	3.00	1.60	50	0.12	0.31	-0.08 to 0.70
<i>Hospital handoffs and transitions</i>							
Baseline	3.01 (0.88)	3.00					
Follow-up	3.11 (0.66)	3.00	0.44	49	0.66	0.10	-0.36 to 0.56
<i>Non-punitive response to error</i>							
Baseline	3.11 (0.85)	3.33					
Follow-up	3.27 (0.73)	3.33	0.72	49	0.48	0.16	-0.30 to 0.62
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Baseline	3.55 (0.77)	3.50					
Follow-up	3.70 (0.54)	3.63	0.80	50	0.43	0.15	-0.23 to 0.53
<i>Frequency of event reporting</i>							
Baseline	3.88 (1.00)	4.00					
Follow-up	4.14 (0.79)	4.17	1.02	47	0.31	0.27	-0.26 to 0.79
Safety culture composite score							
Baseline	3.50 (0.47)	3.47					
Follow-up	3.65 (0.48)	3.73	1.11	50	0.27	0.15	-0.12 to 0.42

7.2.5.4 Follow-up between-group tests of differences

The follow-up combined intervention and combined control group subscale tests of differences results are presented in Table 70; the single item outcome dimensions are presented in Table 71.

Intervention group and control group respondents indicated similar perceptions of their ward safety culture by follow-up. There were no significant differences between the groups in any of the subscales. Intervention group mean scores were higher than those for the control group for six subscales and lower for six subscales.

The overall safety culture composite score for the intervention group (mean 3.56) was lower than that for the control group (mean 3.65) but this difference was not statistically significant ($p = 0.49$).

The *“Patient safety grade”* median was *“Very good”* for both the groups. The *“Number of event reports”* was lower for the intervention group (*“1-2”*) compared to the control group (*“3-5”*) but this difference was not statistically significant ($p = 0.18$).

No overall pattern in the non-significant results was observed.

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Table 70: HSoPSC follow-up between-group independent *t* tests pooled analysis

HSoPSC dimensions and subscales	Mean (SD)	Median	<i>t</i>	df	<i>p</i>	Difference	95% CI of the Difference
Safety culture dimensions							
<i>Teamwork within units</i>							
Intervention wards	3.94 (0.65)	4.00					
Control wards	4.11 (0.49)	4.00	-1.07	54	0.29	-0.17	-0.50 to 0.15
<i>Supervisor expectations and actions promoting safety</i>							
Intervention wards	3.92 (0.64)	3.88					
Control wards	3.40 (0.92)	4.00	0.23	54	0.82	0.05	-0.47 to 0.37
<i>Organisational learning</i>							
Intervention wards	3.88 (0.54)	4.00					
Control wards	3.40 (0.46)	4.00	0.62	54	0.54	0.09	-0.37 to 0.19
<i>Hospital management support for patient safety</i>							
Intervention wards	3.47 (0.74)	3.33					
Control wards	3.64 (0.77)	3.67	-0.78	53	0.44	-0.16	-0.58 to 0.25
<i>Feedback and communication about error</i>							
Intervention wards	3.92 (0.62)	4.00					
Control wards	3.84 (0.78)	3.83	0.43	54	0.67	0.08	-0.30 to 0.46
<i>Communication openness</i>							
Intervention wards	3.75 (0.64)	3.67					
Control wards	3.85 (0.53)	4.00	-0.63	54	0.53	-0.10	-0.43 to 0.22
<i>Teamwork across units</i>							
Intervention wards	3.34 (0.71)	3.25					
Control wards	3.33 (0.57)	3.25	0.05	54	0.96	0.01	-0.35 to 0.37
<i>Staffing</i>							
Intervention wards	2.72 (0.75)	2.75					
Control wards	2.78 (0.66)	3.00	-0.35	54	0.73	-0.07	-0.46 to 0.32
<i>Hospital handoffs and transitions</i>							
Intervention wards	2.89 (0.70)	3.00					
Control wards	3.11 (0.66)	3.00	-1.15	53	0.26	-0.19	-0.60 to 0.16
<i>Non-punitive response to error</i>							
Intervention wards	3.34 (0.90)	3.33					
Control wards	3.27 (0.73)	3.33	0.31	53	0.76	0.23	-0.39 to 0.54
Safety culture outcome dimensions							
<i>Overall perceptions of safety</i>							
Intervention wards	3.58 (0.71)	3.75					
Control wards	3.70 (0.54)	3.63	-0.71	54	0.48	-0.13	-0.48 to 0.23
<i>Frequency of event reporting</i>							
Intervention wards	4.16 (0.71)	4.30					
Control wards	4.14 (0.79)	4.17	0.09	53	0.93	0.17	-0.39 to 0.43
Safety culture composite score							
Intervention wards	3.56 (0.45)	3.63					
Control wards	3.65 (0.48)	3.73	-0.69	54	0.49	-0.09	-0.34 to 0.17

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Table 71: HSoPSC pooled analysis single item outcome dimensions

Patient safety grade								
	Failing <i>n</i> = (%)	Poor <i>n</i> = (%)	Acceptable <i>n</i> = (%)	Very Good <i>n</i> = (%)	Excellent <i>n</i> = (%)	Mann-Whitney U	Z score	<i>p</i>
Baseline between-group results								
Intervention wards	0	0	12 (25.5)	27 (57.5) [†]	8 (17.0)	620.00	-0.73	0.50
Control wards	0	2 (6.9)	8 (27.6)	14 (48.3) [†]	5 (17.2)			
Within-group results: intervention group								
Baseline	0	0	12 (25.5)	27 (57.5) [†]	8 (17.0)	780.50	-0.19	0.85
Follow-up	2 (5.9)	0	9 (26.5)	15 (44.1) [†]	8 (23.5)			
Within-group results: control group								
Baseline	0	2 (6.9)	8 (27.6)	14 (48.3) [†]	5 (17.2)	245.50	-1.32	0.18
Follow-up	0	0	2 (9.5)	16 (76.2) [†]	3 (14.3)			
Follow-up between-group results								
Intervention wards	2 (5.9)	0	9 (26.5)	15 (44.1) [†]	8 (23.5)	315.00	-0.81	0.42
Control wards	0	0	2 (9.5)	16 (76.2) [†]	3 (14.3)			
Number of event reports								
	0 <i>n</i> = (%)	1-2 <i>n</i> = (%)	3-5 <i>n</i> = (%)	6-10 <i>n</i> = (%)	11-20 <i>n</i> = (%)	21+ <i>n</i> = (%)	Mann-Whitney U	Z score <i>P</i>
Baseline between-group results								
Intervention	9 (19.2)	17 (36.2) [†]	15 (31.9)	1 (2.1)	4 (8.5)	1 (2.1)	618.00	-0.94
Control	6 (20.0)	8 (26.7)	8 (26.7) [†]	1 (33.3)	4 (13.3)	3 (10.0)		
Within-group results: intervention group								
Baseline	9 (19.2)	17 (36.2) [†]	15 (31.9)	1 (2.1)	4 (8.5)	1 (2.1)	721.50	-0.32
Follow-up	5 (16.7)	13 (43.3) [†]	6 (20.0)	1 (3.3)	5 (16.7)	0		
Within-group results: control group								
Baseline	6 (20.0)	8 (26.7)	8 (26.7) [†]	1 (33.3)	4 (13.3)	3 (10.0)	297.50	-0.34
Follow-up	4 (19.1)	4 (19.1)	7 (33.3) [†]	1 (4.8)	3 (14.3)	2 (9.5)		
Follow-up between-group results								
Intervention	5 (16.7)	13 (43.3) [†]	6 (20.0)	1 (3.3)	5 (16.7)	0	264.00	-1.35
Control	4 (19.1)	4 (19.1)	7 (33.3) [†]	1 (4.8)	3 (14.3)	2 (9.5)		

[†]Median value

*Median value = midway between this category and the above category

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7.2.5.5 Summary of findings

Table 72 presents the summarised findings for the intervention and control ward groups.

Half of the intervention group mean scores were higher than those for the control group at baseline. One of these differences was statistically significant. The overall safety culture composite score and the “*Number of event reports*” were higher in the control group than the intervention group but these differences were not statistically significant. The “*Patient safety grade*” was the same for both groups.

The mean for seven subscales and the overall safety culture composite score increased in the intervention group following participation in the CAS. One of these increases “*Feedback and communication about error*” was statistically significant. The mean for ten subscales and the overall safety culture composite score also increased in the control group by follow-up but none of these increases were statistically significant. The “*Patient safety grade*” and “*Number of event reports*” remained unchanged for both groups.

Similar to baseline, half of the intervention group mean scores were higher than those for the control group at follow-up. The overall safety culture composite score and the “*Number of event reports*” remained higher in the control group than the intervention group. The “*Patient safety grade*” remained the same for both groups. There were no statistically significant differences.

Overall, findings showed the intervention group and control group respondents had similar perceptions of their safety culture at both baseline and follow-up. There was a general pattern of intervention group increasing subscale scores following participation in the CAS. Yet, there was a similar pattern in the control group. This, therefore, prevents attribution of the intervention group pattern to participation in the CAS. Nonetheless, the increase in the “*Feedback and communication about error*” intervention group scale mean score was statistically significant. Whilst there was also an increase in the control ward scale mean score this was not statistically significant. Whilst the intervention group’s increasing agreement with this subscale may be

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potentially attributed to participation in the CAS the evidence is weak given this is a product of multiple testing. Furthermore, the magnitude of change is small.

Table 72: Summarised findings pooled analysis

Scale/dimension	Baseline between-group	Within-intervention group	Within-control group	Follow-up between-group
<i>"Teamwork across units"</i>	(I)	(-)	(+)	(C)
<i>"Supervisor expectations and actions promoting safety"</i>	(C)	(+)	(-)	(I)
<i>"Organisational learning"</i>	(C)	(+)	(+)	(I)
<i>"Hospital management support for patient safety"</i>	(C)	(+)	(+)	(C)
<i>"Feedback and communication about error"</i>	(C)	+	(+)	(I)
<i>"Communication openness"</i>	(I)	(+)	(+)	(C)
<i>"Teamwork across units"</i>	(C)	(-)	(-)	(I)
<i>"Staffing"</i>	I	(-)	(+)	(C)
<i>"Hospital handoffs and transitions"</i>	(I)	(-)	(+)	(C)
<i>"Non-punitive response to error"</i>	(I)	(-)	(+)	(I)
<i>"Overall perceptions of safety"</i>	(C)	(+)	(+)	(C)
<i>"Frequency of event reporting"</i>	(I)	(+)	(+)	(I)
Safety culture composite score	(C)	(+)	(+)	(C)
Patient safety grade	(I/C)	(#)	(#)	(I/C)
Number of event reports	(C)	(#)	(#)	(C)

Legend:

I = Intervention ward mean score/median higher than control ward mean score/median
 C = Control ward mean score/median higher than intervention ward mean score/median
 I/C = Intervention and control ward mean score/median are the same
 +/- = increase/decrease in mean score/median
 # = unchanged mean score/median
 () non-significant difference; absence of parenthesis = significant difference

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7.3 Perceptions of the nursing practice environment (PES-NWI)

7.3.1 Preliminary analysis

7.3.1.1 Scale internal consistency

Cronbach alpha scores were calculated at the individual level, utilising all baseline survey data, for each of the PES-NWI scales (Table 73). Cronbach alpha greater than or equal to 0.50 was also adopted as being indicative of adequate scale internal consistency (Chapter 4, Section 4.6.1, Paragraph 3). All of the PES-NWI subscales showed adequate internal consistency (range 0.64 to 0.86): these values accord with those of previous studies (Chapter 4, Table 93).

Table 73: Cronbach alpha for PES-NWI survey data

PES-NWI subscale (<i>n</i> = subscale items)	Cronbach α
Nurse participation in hospital affairs (9)	0.82
Nursing foundations for quality of care (10)	0.84
Nurse manager ability, leadership and support (5)	0.64
Staffing and resource adequacy (4)	0.86
Collegial nurse-physician relations (3)	0.80

7.3.1.2 Missing values analysis

36.1% (*n* = 26/72) of respondents failed to answer all survey items at the baseline administration. Item missing counts ranged between 3.2% (*n* = 1/31) and 61.3% (*n* = 19/31) per survey. 26.9% (*n* = 7) of those respondents failing to answer all baseline survey items omitted a single item; 53.8% (*n* = 14) failed to answer between two and five items; 19.2% (*n* = 5) failed to answer more than five items.

18.8% (*n* = 9/48) of respondents failed to answer all survey items at the follow-up administration. Item missing counts ranged between 3.2% (*n* = 1/31) and 58.1% (*n* = 18/31). 22.2% (*n* = 2) of those respondents failing to answer all baseline survey items omitted a single item; 55.5% (*n* = 5) failed to answer between two and five items; 22.2% (*n* = 2) failed to answer more than five items.

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Two respondents failed to answer more than half of the items on the baseline administration (54.80% and 61.30% missing items). One respondent failed to answer more than half of the items on the follow-up administration (58.1% missing items). Computation of the “*Nursing Participation*” (9 item) subscale mean score, utilising baseline data and with adjustment of the denominator in accordance with the number of missing items, showed that inclusion of cases with missing items had little impact upon results (inclusion of all cases mean 2.54 SD 0.50, exclusion of cases with > 70% missing data mean 2.54 SD 0.50, exclusion of cases with > 40% missing data mean 2.55 SD 0.50). Therefore, all surveys and subscales were included in the analysis.

7.3.1.3 Measures of association

Measures of association between each PES-NWI subscale and respondent demographics/workforce characteristics were explored using Kendall’s tau b correlation coefficient and the aggregated baseline and follow-up samples (Table 74). Correlation coefficients ranged from -0.23 to 0.29 (weak negative association through little or no association to weak positive association). A number of correlations ($n = 10/42$) were statistically significant at either $p < 0.05$ or $p < 0.01$ (unadjusted values).

Table 74: Kendall’s tau b correlations for PES-NWI survey data

PES-NWI subscales	Respondent demographics/workforce characteristics					
	Band	Sex	Age	Working hours	Years in hospital	Years on ward
<i>Nurse participation in hospital affairs</i>	0.13	0.02	-0.05	0.10	-0.16*	-0.17*
<i>Nursing foundations for quality of care</i>	0.16*	0.03	-0.16*	0.04	-0.18*	-0.23*
<i>Nurse manager ability, leadership and support</i>	0.12	-0.04	-0.13	0.03	-0.10	-0.17*
<i>Staffing and resource adequacy</i>	0.09	-0.06	0.08	-0.01	-0.06	-0.07
<i>Collegial nurse-physician relations</i>	0.12	-0.09	0.12	0.09	-0.08	-0.15
<i>PES-NWI composite score</i>	0.29**	-0.05	-0.17**	-0.03	-0.13	-0.18**

*Statistically significant at $p < 0.05$ (unadjusted value)

**Statistically significant at $p < 0.01$ (unadjusted value)

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7.3.1.4 Longitudinal data analysis

Response rates for respondents answering both survey administrations and completing the code to enable data linkage were:

- Ward AI $n = 4$; ward AC $n = 3$
- Ward BI $n = 1$; ward BC $n = 3$

Sample sizes were insufficient to enable analysis as paired observations.

7.3.1.5 Open question comments

See section 7.2.1.5

7.3.2 Matched pair A

7.3.2.1 Baseline between-ward tests of differences⁴⁰

Results of baseline between-ward tests of differences are presented in Table 75.

All Intervention ward subscale mean scores were lower than those for the control ward. Differences ranged from 0.09 to 0.54. One of these differences was statistically significant: "*Collegial nurse-physician relations*" (intervention ward mean 2.81, control ward mean 3.25, difference 0.54, 95% CI -1.00 to 0.07, $p = 0.024$, Hedge's g 0.98).

The PES-NWI composite mean score was higher on the control ward (mean 2.94) than the intervention ward (mean 2.74) but this difference was not statistically significant ($p = 0.20$). These scores showed perceptions of a positive nursing practice environment on both wards.

⁴⁰ **Interpretation of subscale mean scores:** the items in each PES-NWI subscale are scored on a four-part Likert scale with values above 2.5 indicating agreement, a value of 2.5 corresponding to a neutral midpoint, and values below 2.5 indicating disagreement that the subscale items are present in the current work environment (Lake 2002). Consequently, mean scores above 2.5 represent perceptions of a more positive nursing practice environment whilst mean scores of less than 2.5 indicate less favourable perceptions of the nursing practice environment.

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Four out of the five subscale mean scores on both the intervention and control ward were above 2.50, showing agreement that the subscale items were present in the practice environment. Both the intervention and control ward mean scores for “*Staffing and resource adequacy*” were less than 2.50 and showed disagreement that these subscale items were present in the practice environment.

Table 75: PES-NWI baseline between-ward independent *t* tests matched pair A

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention ward (AI)	2.60 (0.52)	2.67	-0.93	40	0.36	-0.18	-0.56 to 0.21
Control ward (AC)	2.76 (0.63)	2.73					
<i>Nursing foundations for quality of care</i>							
Intervention ward (AI)	2.91 (0.44)	2.89	-1.30	40	0.20	-0.19	-0.48 to 0.10
Control ward (AC)	3.10 (0.36)	3.05					
<i>Nurse manager ability, leadership and support</i>							
Intervention ward (AI)	2.96 (0.47)	3.00	-1.01	40	0.31	-0.15	-0.46 to 0.15
Control ward (AC)	3.11 (0.34)	3.00					
<i>Staffing and resource adequacy</i>							
Intervention ward (AI)	2.37 (0.76)	2.33	-0.85	40	0.40	-0.09	-0.89 to 0.36
Control ward (AC)	2.46 (0.77)	2.25					
<i>Collegial nurse-physician relations</i>							
Intervention ward (AI)	2.81 (0.54)	3.00	-2.35	40	0.024*	0.54	-1.00 to -0.07
Control ward (AC)	3.25 (0.43)	3.00					
<i>PES-NWI composite score</i>							
Intervention ward (AI)	2.74 (0.47)	2.79	-1.30	40	0.20	-0.21	-0.53 to 0.11
Control ward (AC)	2.94 (0.44)	2.81					

*Statistically significant at $p < 0.05$ (unadjusted value)

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7.3.2.2 Within-ward tests of differences: intervention ward AI

The results of the intervention ward baseline and follow-up tests of differences are presented in Table 76.

There were no statistically significant differences between the intervention ward baseline and follow-up subscale mean scores. The mean for all subscale scores increased following participation in the CAS: the range of increases was from 0.02 to 0.34. The PES-NWI composite score increased (difference 0.23, 95 % CI -0.07 to 0.52) but the change was not statistically significant ($p = 0.13$).

All subscale mean scores were above 2.50. Thus, respondents showed agreement that the subscale items were present in the practice environment following participation in the CA.

Table 76: PES-NWI within-ward independent t tests ward AI

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.60 (0.52)	2.67	1.64	43	0.11	0.27	-0.02 to 0.60
Follow-up	2.86 (0.48)	3.00					
<i>Nursing foundations for quality of care</i>							
Baseline	2.91 (0.44)	2.89	1.75	43	0.09	0.24	-0.04 to 0.52
Follow-up	3.15 (0.39)	3.10					
<i>Nurse manager ability, leadership and support</i>							
Baseline	2.96 (0.47)	3.00	1.95	43	0.06	0.28	-0.01 to 0.58
Follow-up	3.24 (0.40)	3.20					
<i>Staffing and resource adequacy</i>							
Baseline	2.37 (0.76)	2.33	1.48	41	0.15	0.34	-0.12 to 0.81
Follow-up	2.71 (0.57)	2.88					
<i>Collegial nurse-physician relations</i>							
Baseline	2.81 (0.54)	3.00	0.13	42	0.90	0.02	-0.33 to 0.38
Follow-up	2.83 (0.55)	3.00					
<i>PES-NWI composite score</i>							
Baseline	2.74 (0.47)	2.79	1.56	43	0.13	0.23	-0.07 to 0.52
Follow-up	2.96 (0.38)	2.89					

7.3.2.3 Within-ward tests of differences: control ward AC

The results of the control ward baseline and follow-up tests of differences are presented in Table 77.

There were no statistically significant differences between the control ward baseline and follow-up subscale mean scores. The mean for four subscale scores decreased and for one subscale increased. The range of decreases was from 0.09 to 0.15 and the increase was 0.18.

The PES-NWI composite score decreased (difference 0.06, 95 % CI -0.45 to 0.33) but the change was not statistically significant ($p = 0.75$).

By follow-up control ward respondents showed agreement with all the subscales (mean scores above 2.50).

Table 77: PES-NWI within-ward independent t tests ward AC

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.76 (0.63)	2.73	-0.34	17	0.74	-0.09	-0.68 to 0.49
Follow-up	2.67 (0.48)	2.78					
<i>Nursing foundations for quality of care</i>							
Baseline	3.10 (0.36)	3.05	-0.82	17	0.42	-0.13	-0.45 to 0.20
Follow-up	2.97 (0.24)	2.90					
<i>Nurse manager ability, leadership and support</i>							
Baseline	3.11 (0.34)	3.00	-0.81	17	0.43	-0.11	-0.40 to 0.18
Follow-up	3.00 (0.16)	3.00					
<i>Staffing and resource adequacy</i>							
Baseline	2.46 (0.77)	2.25	0.50	17	0.62	0.18	-0.59 to 0.96
Follow-up	2.64 (0.78)	2.75					
<i>Collegial nurse-physician relations</i>							
Baseline	3.25 (0.43)	3.00	-0.86	17	0.40	-0.15	-0.53 to 0.22
Follow-up	3.10 (0.25)	3.00					
<i>PES-NWI composite score</i>							
Baseline	2.94 (0.44)	2.81	-0.33	17	0.75	-0.06	-0.45 to 0.33
Follow-up	2.88 (0.28)	2.89					

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7.3.2.4 Follow-up between-ward tests of differences

Results of follow-up between-ward tests of differences are presented in Table 78.

At follow-up there were no statistically significant differences between intervention and control ward subscale mean scores. The intervention ward mean scores were higher than those for the control ward for four subscales and lower for one subscale. Differences between intervention and control mean scores ranged from 0.07 to 0.28.

The PES-NWI composite score was higher on the intervention ward (mean 2.96) compared to the control ward (mean 2.85) but this difference was not statistically significant ($p = 0.55$). These scores showed perceptions of a positive nursing practice environment on both wards.

Table 78: PES-NWI follow-up between-ward independent t tests matched pair A

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention ward (AI)	2.86 (0.48)	3.00	1.07	18	0.30	0.25	-0.24 to 0.75
Control ward (AC)	2.61 (0.50)	2.78					
<i>Nursing foundations for quality of care</i>							
Intervention ward (AI)	3.15 (0.40)	3.10	1.05	18	0.31	0.18	-0.18 to 0.55
Control ward (AC)	2.97 (0.27)	2.90					
<i>Nurse manager ability, leadership and support</i>							
Intervention ward (AI)	3.24 (0.40)	3.20	1.87	17.87	0.08	0.24	-0.03 to 0.52
Control ward (AC)	3.00 (0.18)	3.00					
<i>Staffing and resource adequacy</i>							
Intervention ward (AI)	2.71 (0.57)	2.88	0.41	18	0.69	0.07	-0.54 to 0.80
Control ward (AC)	2.64 (0.83)	2.75					
<i>Collegial nurse-physician relations</i>							
Intervention ward (AI)	2.83 (0.55)	3.00	-1.16	18	0.26	-0.28	-0.78 to 0.22
Control ward (AC)	3.11 (0.27)	3.00					
<i>PES-NWI composite score</i>							
Intervention ward (AI)	2.96 (0.38)	3.02	0.61	18	0.55	0.11	-0.26 to 0.48
Control ward (AC)	2.85 (0.30)	2.89					

7.3.2.5 Summary of findings

All intervention ward subscale mean scores, and the PES-NWI composite score, were lower than those for the control ward at baseline. One of these differences was statistically significant.

The mean for all intervention ward subscale scores, and the PES-NWI composite score, increased following participation in the CAS. None of these changes were statistically significant.

The mean for four out of the five subscale scores, and the PES-NWI composite score, had decreased on the control ward by follow-up. None of these changes were statistically significant.

The mean for four out of the five subscale scores, and the PES-NWI composite score, were higher than those for the control ward following participation in the CAS. None of these differences were statistically significant.

The summarised findings for matched pair A are shown below in Table 79.

Table 79: PES-NWI summarised findings matched pair A

Subscale	Baseline between-ward	Within-ward AI	Within-ward AC	Follow-up between-ward
<i>Nurse participation in hospital affairs</i>	C	(+)	(-)	(I)
<i>Nursing foundation for quality of care</i>	C	(+)	(-)	(I)
<i>Nurse manager ability, leadership and support</i>	C	(+)	(-)	(I)
<i>Staffing and resource adequacy</i>	C	(+)	(+)	(I)
<i>Collegial nurse-physician relations</i>	(C)	(+)	(-)	(I)
<i>PES-NWI composite score</i>	(C)	(+)	(-)	(I)

Legend:

I = Intervention ward mean score higher than control ward mean score

C = Control ward mean score higher than intervention ward mean score

I+/- = increase/decrease in mean score

() non-significant mean difference; absence of parenthesis = significant mean difference

The PES-NWI composite score showed intervention and control ward respondents had similar overall perceptions of a positive ward nursing practice environment at baseline and follow-up. Yet, all scale mean scores increased on

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the intervention ward following participation in the CAS whilst a majority of scale mean scores on the control ward decreased. Furthermore, all intervention ward subscale mean scores were lower than those for the control ward at baseline but following participation in the CAS four out of five intervention ward subscale mean scores were higher than those for the control ward. No statistically significant changes were identified. Nonetheless, a pattern for this intervention ward's participation in the CAS to be positively associated with perceptions of a more positive nursing practice environment was observed.

7.3.3 Matched pair B

7.3.3.1 Baseline between-ward tests of differences

Results of baseline between-ward tests of differences are presented in Table 80.

Intervention ward mean scores were higher than those for the control ward for three subscales and lower for two subscales showing no overall pattern in the results. Differences between intervention and control ward subscale mean scores ranged between 0.01 and 0.59. One difference was statistically significant: "*Staffing and resource adequacy*" (intervention ward mean 2.59, control ward mean 2.00, difference 0.59, 95% CI 0.07 to 1.10, $p = 0.027$, Hedge's g 0.98).

The PES-NWI composite mean score was higher on the intervention ward (mean 2.83) compared to the control ward (mean 2.71) but this difference was not statistically significant ($p = 0.43$).

Intervention ward respondents showed agreement with all subscales (mean scores greater than 2.50). Control ward respondents showed disagreement with the "*Nursing participation in hospital affairs*" (mean 2.37) and "*Staffing and resource adequacy*" (mean 2.00) subscales.

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Table 80: PES-NWI baseline between-ward independent *t* tests matched pair B

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention ward (BI)	2.65 (0.38)	2.67	1.97	22	0.06	0.28	-0.01 to 0.58
Control ward (BC)	2.37 (0.29)	2.33					
<i>Nursing foundations for quality of care</i>							
Intervention ward (BI)	2.88 (0.35)	2.89	-0.02	22	0.99	-0.01	-0.33 to 0.33
Control ward (BC)	2.89 (0.43)	2.92					
<i>Nurse manager ability, leadership and support</i>							
Intervention ward (BI)	3.06 (0.42)	3.00	0.47	22	0.64	0.08	-0.26 to 0.42
Control ward (BC)	2.98 (0.36)	3.10					
<i>Staffing and resource adequacy</i>							
Intervention ward (BI)	2.59 (0.66)	2.50	2.37	22	0.027*	0.59	0.07 to 1.10
Control ward (BC)	2.00 (0.50)	2.00					
<i>Collegial nurse-physician relations</i>							
Intervention ward (BI)	2.98 (0.61)	3.00	-1.50	22	0.15	-0.32	-0.77 to 0.12
Control ward (BC)	3.30 (0.37)	3.33					
<i>PES-NWI composite score</i>							
Intervention ward (BI)	2.83 (0.41)	2.93	0.80	22	0.43	0.12	-0.20 to 0.44
Control ward (BC)	2.71 (0.32)	2.72					

*Statistically significant at $p < 0.05$ (unadjusted value)

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7.3.3.2 Within-ward tests of differences: intervention ward BI

The results of the intervention ward baseline and follow-up tests of differences are presented in Table 81.

There were no statistically significant differences between baseline and follow-up intervention ward subscale mean scores. The mean score for all subscales increased following participation in the CAS. The range of increases was from 0.01 to 0.23.

The PES-NWI composite mean score increased (difference 0.13, 95% CI -0.26 to 0.51) but this change was not statistically significant ($p = 0.50$).

Respondents showed agreement with all subscales (mean scores greater than 2.50).

Table 81: PES-NWI within-ward independent t tests ward BI

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.65 (0.38)	2.67	1.32	18	0.20	0.23	-0.14 to 0.61
Follow-up	2.88 (0.32)	2.88					
<i>Nursing foundations for quality of care</i>							
Baseline	2.88 (0.35)	2.89	1.23	18	0.24	0.20	-0.14 to 0.55
Follow-up	3.09 (0.31)	3.15					
<i>Nurse manager ability, leadership and support</i>							
Baseline	3.06 (0.42)	3.00	0.04	18	0.97	0.01	-0.44 to 0.46
Follow-up	3.07 (0.50)	2.90					
<i>Staffing and resource adequacy</i>							
Baseline	2.59 (0.66)	2.50	0.55	18	0.59	0.16	-0.45 to 0.77
Follow-up	2.75 (0.39)	3.00					
<i>Collegial nurse-physician relations</i>							
Baseline	2.98 (0.61)	3.00	0.10	18	0.93	0.02	-0.50 to 0.55
Follow-up	3.00 (0.00)	3.00					
<i>PES-NWI composite score</i>							
Baseline	2.83 (0.41)	2.93	0.69	18	0.50	0.13	-0.26 to 0.51
Follow-up	2.96 (0.26)	2.99					

7.3.3.3 Within-ward tests of differences: control ward BC

The results of the control ward baseline and follow-up tests of differences are presented in Table 82.

There were no statistically significant differences between control ward baseline and follow-up subscale mean scores. The mean score for four subscales had increased and for one subscale had decreased by follow-up. The range of differences was 0.01 to 0.40. The PES-NWI composite mean score had increased from baseline (difference 0.26, 95% CI -0.11 to 0.63) but this change was not statistically significant ($p = 0.15$).

Disagreement with the “*Staffing and resource adequacy*” subscale (mean 2.34) continued to be shown. Agreement with the remaining four subscales (means greater than 2.50) was shown.

Table 82: PES-NWI within-ward independent t tests ward BC

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.37 (0.29)	2.33	1.74	16	0.10	0.40	-0.09 to 0.88
Follow-up	2.76 (0.65)	2.83					
<i>Nursing foundations for quality of care</i>							
Baseline	2.89 (0.43)	2.92	1.57	16	0.14	0.35	-0.12 to 0.83
Follow-up	3.24 (0.52)	3.10					
<i>Nurse manager ability, leadership and support</i>							
Baseline	2.98 (0.36)	3.10	1.51	16	0.27	0.22	-0.19 to 0.63
Follow-up	3.20 (0.45)	3.10					
<i>Staffing and resource adequacy</i>							
Baseline	2.00 (0.50)	2.00	1.47	16	0.16	0.34	-0.15 to 0.84
Follow-up	2.34 (0.48)	2.25					
<i>Collegial nurse-physician relations</i>							
Baseline	3.30 (0.37)	3.33	-0.05	16	0.97	-0.01	-0.40 to 0.38
Follow-up	3.29 (0.42)	3.33					
<i>PES-NWI composite score</i>							
Baseline	2.71 (0.32)	2.72	1.50	16	0.15	0.26	-0.11 to 0.63
Follow-up	2.97 (0.42)	2.97					

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7.3.3.4 Follow-up between-ward tests of differences

Results of follow-up between-ward tests of differences are presented in Table 83.

There were no statistically significant differences between intervention and control ward subscale mean scores at follow-up.

The intervention ward mean scores were higher than the control ward mean scores for two subscales and lower for three subscales: differences ranged from 0.12 to 0.41.

The PES-NWI composite mean score was lower on the intervention ward (mean 2.96) than the control ward (mean 2.97) but this difference was not statistically significant ($p = 0.96$).

Table 83: PES-NWI follow-up between-ward independent t tests matched pair B

PES-NWI subscales	Mean (SD)	Median	t	df	P	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention ward (BI)	2.88 (0.32)	2.88	0.42	12	0.68	0.12	-0.51 to 0.75
Control ward (BC)	2.76 (0.65)	2.83					
<i>Nursing foundations for quality of care</i>							
Intervention ward (BI)	3.09 (0.31)	3.15	-0.62	12	0.55	-0.15	-0.68 to 0.38
Control ward (BC)	3.24 (0.52)	3.10					
<i>Nurse manager ability, leadership and support</i>							
Intervention ward (BI)	3.07 (0.50)	2.90	-0.52	12	0.61	0.13	-0.69 to 0.42
Control ward (BC)	3.20 (0.45)	3.10					
<i>Staffing and resource adequacy</i>							
Intervention ward (BI)	2.75 (0.39)	3.00	1.69	12	0.12	0.41	-0.12 to 0.93
Control ward (BC)	2.34 (0.48)	2.25					
<i>Collegial nurse-physician relations</i>							
Intervention ward (BI)	3.00 (0.00)	3.00	-1.99	7.00	0.09	0.29	-0.64 to 0.06
Control ward (BC)	3.29 (0.42)	3.33					
<i>PES-NWI composite score</i>							
Intervention ward (BI)	2.96 (0.26)	2.99	-0.05	12	0.96	0.01	-0.44 to 0.42
Control ward (BC)	2.97 (0.42)	2.97					

7.3.3.5 Summary of findings

At baseline three intervention ward subscale mean scores and the PES-NWI composite mean score were higher than those for the control ward. One subscale difference was statistically significant.

The mean for all intervention ward subscale scores, and the PES-NWI composite score, increased following participation in the CAS. None of these changes were statistically significant.

The mean for four out of the five subscale scores, and the PES-NWI composite score, had also increased on the control ward by follow-up. None of these changes were statistically significant.

There were no statistically significant differences between intervention and control ward subscale mean scores at follow-up. Intervention ward mean scores were higher than those for the control ward for two out of the five subscales. The intervention ward PES-NWI composite score was lower than that for the control ward.

The summarised findings for matched pair B are presented below in Table 84.

Table 84: PES-NWI summarised findings matched pair B

Subscale	Baseline between-ward	Within-ward AI	Within-ward AC	Follow-up between-ward
<i>Nurse participation in hospital affairs</i>	(I)	(+)	(+)	(I)
<i>Nursing foundation for quality of care</i>	(C)	(+)	(+)	(C)
<i>Nurse manager ability, leadership and support</i>	(I)	(+)	(+)	(C)
<i>Staffing and resource adequacy</i>	I	(+)	(+)	(C)
<i>Collegial nurse-physician relations</i>	(C)	(+)	(-)	(C)
<i>PES-NWI composite score</i>	(I)	(+)	(+)	(C)

Legend:

I = Intervention ward mean score higher than control ward mean score

C = Control ward mean score higher than intervention ward mean score

I+/- = increase/decrease in mean score

() non-significant mean difference; absence of parenthesis = significant mean difference

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The PES-NWI composite score showed intervention and control ward respondents had similar overall perceptions of a positive ward nursing practice environment at baseline and follow-up. A trend of a non-significant increase in all intervention ward subscale mean scores and the PES-NWI composite mean score was observed at follow-up. However, a similar trend of a non-significant increase in four of the five control ward subscale mean scores and the PES-NWI composite mean score was also observed at follow-up⁴¹. Therefore, it is not possible to attribute the intervention ward trend to participation in the CAS.

Overall, there was no evidence indicating participation in the CAS by this intervention ward was positively associated with increasing agreement with subscale items or a more favourable perception of a positive nursing practice environment.

⁴¹ Interpretation of enrolment of the control ward into the CAS four weeks prior to the follow-up survey administration was the same as that for interpretation of the HSoPSC results (section 0)

7.3.4 Matched pair C

7.3.4.1 Data analysis

Sample sizes were inadequate to perform statistical tests of differences. Intervention ward results, in the form of descriptive statistics, were interpreted as contextual factors that supported description of the ward environment and indicated potential explanations for outcomes arising from implementation of the CAS. All matched pair C survey responses were included in analysis of the combined intervention ward and combined control ward groups. Descriptive statistics for the scales and composite score are presented in Table 85.

Table 85: PES-NWI baseline and study descriptive statistics matched pair C

PES-NWI subscales	Baseline		Follow-up	
	Mean (SD)	Median	Mean (SD)	Median
<i>Nursing participation in hospital affairs</i>				
Intervention ward (CI)	2.44 (-)	2.44	2.45 (0.43)	2.49
Control ward (CC)	2.33 (0.26)	2.33	3.00 (0.16)	3.00
<i>Nursing foundations for quality of care</i>				
Intervention ward (CI)	3.20 (-)	3.20	2.76 (0.23)	2.80
Control ward (CC)	2.66 (0.33)	2.70	3.21 (0.02)	3.21
<i>Nurse manager ability, leadership and support</i>				
Intervention ward (CI)	2.80 (-)	2.80	2.79 (0.27)	2.80
Control ward (CC)	2.75 (0.19)	2.70	3.60 (0.00)	3.60
<i>Staffing and resource adequacy</i>				
Intervention ward (CI)	2.50 (-)	2.50	2.31 (0.45)	2.25
Control ward (CC)	2.12 (0.72)	2.13	2.25 (0.00)	2.25
<i>Collegial nurse-physician relations</i>				
Intervention ward (CI)	2.67 (-)	2.67	2.81 (0.47)	3.00
Control ward (CC)	2.50 (0.58)	3.00	3.08 (0.60)	3.08
<i>PES-NWI composite score</i>				
Intervention ward (CI)	2.72 (-)	2.72	2.16 (1.09)	2.64
Control ward (CC)	2.47 (0.38)	2.47	3.03 (0.09)	3.03

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7.3.4.2 Intervention ward CI descriptive statistics

The single baseline respondent showed agreement with the *“Nursing foundations for quality of care”* (mean 3.20), *“Nurse manager ability, leadership and support”* (mean 2.80) and *Collegial-nurse physician* (mean 2.67) subscales, a neutral perception of the *“Staffing and resource adequacy”* (mean 2.50) subscale, and disagreement with the *Nursing participation in hospital affairs* (mean 2.44) subscale. The PES-NWI composite mean score (mean 2.72) showed a perception of a positive nursing practice environment.

Follow-up respondents also showed agreement with the *Nursing foundations for quality of care* (mean 2.76 SD 0.23), *“Nurse manager ability, leadership and support”* (mean 2.79 SD 0.27) and *Collegial-nurse physician* (mean 2.81 SD 0.47) subscales. Disagreement with the *“Nursing participation in hospital affairs”* (mean 2.45 SD 0.43) and *“Staffing and resource adequacy”* (mean 2.31 SD 0.45) subscales was shown. The PES-NWI composite mean score (mean 2.16 SD 1.09) showed unfavourable perceptions of the nursing practice environment.

7.3.4.3 Control ward CC descriptive statistics

Baseline respondents showed agreement with the *“Nursing foundations for quality of care”* (mean 2.66 SD 0.33) and *“Nurse manager ability, leadership and support”* (mean 2.75 SD 0.19) subscales. A neutral perception of *“Collegial nurse-physician relations”* (mean 2.50 SD 0.58) and disagreement with the *“Nursing participation in hospital affairs”* (mean 2.33 SD 0.26) and *“Staffing and resource adequacy”* (mean 2.12 SD 0.72) subscales was shown. The PES-NWI composite mean score (mean 2.47 SD 0.38) showed unfavourable perceptions of the nursing practice environment.

Whilst all subscale mean scores had increased by follow-up, disagreement with the *Staffing and resource adequacy* (mean 2.25 SD 0.00) subscale continued to be shown.

7.3.5 Pooled analysis: intervention wards versus control wards⁴²

7.3.5.1 Baseline between-group tests of differences

Results of baseline between-group tests of differences are presented in Table 86.

The intervention group mean scores were higher than those for the control group two subscales and lower for three subscales. Differences ranged between 0.02 and 0.36. A single difference was statistically significant: *“Collegial nurse-physician relations”* (intervention group mean 2.86, control group mean 3.15, difference 0.36, 95% CI -0.67 to -0.05, $p = 0.024$, Hedge’s g 0.68).

The PES-NWI composite mean score was lower on the intervention ward (mean 2.76) than the control ward (mean 2.78) but this difference was not statistically significant ($p = 0.87$).

Disagreement with the *“Staffing and resource adequacy”* subscale was shown (intervention group mean 2.45, control group mean 2.23).

⁴² In order to establish the potential effect of enrolment of control ward BC into the CAS, the group tests of mean differences were also run with control ward BC included in the intervention group sample. This was found to make no significant difference to the intervention group results. Therefore, the results presented above, and the following results, retain the intervention/control wards in their original groupings.

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Table 86: PES-NWI baseline between-group tests of differences pooled analysis

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention wards	2.61 (0.47)	2.67					
Control wards	2.54 (0.51)	2.56	0.49	69	0.63	0.06	-0.18 to 0.30
<i>Nursing foundations for quality of care</i>							
Intervention wards	2.91 (0.41)	2.89					
Control wards	2.95 (0.40)	2.95	-0.42	69	0.68	-0.04	-0.24 to 0.16
<i>Nurse manager ability, leadership and support</i>							
Intervention wards	2.99 (0.45)	3.00					
Control wards	3.01 (0.34)	3.00	-0.20	69	0.84	-0.02	-0.22 to 0.18
<i>Staffing and resource adequacy</i>							
Intervention wards	2.45 (0.72)	2.50					
Control wards	2.23 (0.68)	2.25	1.47	69	0.11	0.21	-0.30 to 0.50
<i>Collegial nurse-physician relations</i>							
Intervention wards	2.86 (0.55)	3.00					
Control wards	3.15 (0.50)	3.00	-2.32	69	0.024*	-0.36	-0.67 to -0.05
<i>PES-NWI composite score</i>							
Intervention wards	2.76 (0.46)	3.60					
Control wards	2.78 (0.47)	3.47	-0.16	69	0.87	-0.02	-0.23 to 0.20

*Statistically significant at $p < 0.05$ (unadjusted value)

7.3.5.2 Within-group tests of differences: intervention group

Table 87 presents the within-group tests of differences for the intervention group.

There were no statistically significant differences between the intervention group baseline and follow-up subscale mean scores. The mean score for four subscales increased whilst that of the remaining subscale remained unchanged. The range of increases was between 0.08 and 0.15.

The PES-NWI composite mean score increased (difference 0.10, 95% CI -0.10 to 0.29) but this change was not statistically significant ($p = 0.33$).

Agreement with all follow-up subscales was shown (mean scores greater than 2.50).

Table 87: PES-NWI within-group tests of differences intervention group

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.61 (0.47)	2.67	1.24	72	0.22	0.14	-0.08 to 0.36
Follow-up	2.75 (0.46)	2.76					
<i>Nursing foundations for quality of care</i>							
Baseline	2.91 (0.41)	2.89	1.17	73	0.25	0.11	-0.08 to 0.30
Follow-up	3.02 (0.37)	3.00					
<i>Nurse manager ability, leadership and support</i>							
Baseline	2.99 (0.45)	3.00	0.78	73	0.44	0.08	-0.13 to 0.29
Follow-up	3.07 (0.42)	3.00					
<i>Staffing and resource adequacy</i>							
Baseline	2.45 (0.72)	2.50	0.96	71	0.34	0.15	-0.16 to 0.46
Follow-up	2.59 (0.52)	2.50					
<i>Collegial nurse-physician relations</i>							
Baseline	2.86 (0.55)	3.00	0.02	72	0.98	0.00	-0.24 to 0.25
Follow-up	2.86 (0.46)	3.00					
<i>PES-NWI composite score</i>							
Baseline	2.76 (0.45)	3.60	0.97	73	0.33	0.10	-0.10 to 0.29
Follow-up	2.86 (0.35)	2.80					

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7.3.5.3 Within-group tests of differences: control group

Table 88 presents the within-group tests of differences for the control group.

There were no statistically significant differences between the control group baseline and follow-up subscale mean scores. All subscale mean scores had increased by follow-up. The range of increases was between 0.03 and 0.23.

The PES-NWI composite mean score increased (difference 0.16, 95% CI -0.08 to 0.40) but this change was not statistically significant ($p = 0.18$).

At follow-up four subscale mean scores were greater than 2.50, showing agreement with these subscales. *“Staffing and resource adequacy”* (mean 2.46) was the subscale for which disagreement continued to be shown.

Table 88: PES-NWI within-group tests of differences control group

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Baseline	2.54 (0.51)	2.56	1.29	41	0.20	0.21	-0.12 to 0.53
Follow-up	2.75 (0.53)	2.89					
<i>Nursing foundations for quality of care</i>							
Baseline	2.95 (0.40)	2.95	1.42	41	0.16	0.18	-0.08 to 0.43
Follow-up	3.12 (0.40)	3.10					
<i>Nurse manager ability, leadership and support</i>							
Baseline	3.01 (0.34)	3.00	1.44	41	0.16	0.16	-0.06 to 0.38
Follow-up	3.16 (0.37)	3.00					
<i>Staffing and resource adequacy</i>							
Baseline	2.23 (0.68)	2.25	1.11	41	0.27	0.23	-0.18 to 0.63
Follow-up	2.46 (0.59)	2.25					
<i>Collegial nurse-physician relations</i>							
Baseline	3.15 (0.50)	3.00	0.23	41	0.82	0.03	-0.25 to 0.32
Follow-up	3.19 (0.36)	3.00					
<i>PES-NWI composite score</i>							
Baseline	2.78 (0.41)	3.47	1.35	41	0.18	0.16	-0.08 to 0.40
Follow-up	2.94 (0.33)	2.97					

7.3.5.4 Follow-up between-group tests of differences

Results of follow-up between-group tests of differences are presented in Table 89.

By follow-up the intervention group mean scores were higher than those for the control group for two subscales and lower for three subscales. Differences ranged from 0.01 to 0.34. One of these differences was statistically significant: “*Collegial nurse-physician relations*” (intervention group mean 2.86, control group mean 3.20, difference 0.34, 95% CI -0.62 to -0.07, $p = 0.02$, Hedge’s g 0.81).

The PES-NWI composite score was lower for the intervention group than the control group (difference 0.07, 95% CI -0.29 to 0.15) but this difference was not statistically significant ($p = 0.54$).

Table 89: PES-NWI follow-up between-group tests of differences pooled analysis

PES-NWI subscales	Mean (SD)	Median	t	df	p	Difference	95% CI of the Difference
<i>Nursing participation in hospital affairs</i>							
Intervention wards	2.75 (0.47)	2.76	-0.09	41	0.92	-0.01	-0.30 to 0.33
Control wards	2.74 (0.54)	2.89					
<i>Nursing foundations for quality of care</i>							
Intervention wards	3.02 (0.37)	3.00	-0.90	42	0.38	-0.11	-0.35 to 0.14
Control wards	3.13 (0.41)	3.10					
<i>Nurse manager ability, leadership and support</i>							
Intervention wards	3.07 (0.43)	3.00	-0.81	42	0.42	-0.11	-0.37 to 0.16
Control wards	3.18 (0.38)	3.00					
<i>Staffing and resource adequacy</i>							
Intervention wards	2.60 (0.53)	2.50	1.07	42	0.29	0.19	-0.17 to 0.54
Control wards	2.42 (0.60)	2.25					
<i>Collegial nurse-physician relations</i>							
Intervention wards	2.86 (0.47)	3.00	-2.50	42	0.02*	-0.34	-0.62 to -0.07
Control wards	3.20 (0.37)	3.00					
<i>PES-NWI composite score</i>							
Intervention wards	2.86 (0.36)	2.80	-0.62	42	0.54	-0.07	-0.29 to 0.15
Control wards	2.93 (0.34)	2.97					

*Statistically significant at $p < 0.05$ (unadjusted value)

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7.3.5.5 Summary of findings

At baseline two intervention group subscale mean scores were higher than those for the control group. One subscale difference was statistically significant. The PES-NWI composite mean score was lower for the intervention group than for the control group.

The mean for four intervention group subscale scores, and the PES-NWI composite score, increased following participation in the CAS. None of these changes were statistically significant.

All subscale mean scores, and the PES-NWI composite score, had also increased for the control group by follow-up. None of these changes were statistically significant.

Intervention group mean scores were higher than those for the control ward for two out of the five subscales. One of these differences was statistically significant. The intervention group PES-NWI composite score was lower than that for the control group.

Table 90 presents the summarised findings for the intervention and control ward groups

Table 90: PES-NWI summarised findings pooled analysis

Scale	Baseline between-group	Within-intervention group	Within-control group	Follow-up between-group
<i>Nurse participation in hospital affairs</i>	(I)	(+)	(+)	(I)
<i>Nursing foundation for quality of care</i>	(C)	(+)	(+)	(C)
<i>Nurse manager ability, leadership and support</i>	(C)	(+)	(+)	(C)
<i>Staffing and resource adequacy</i>	(I)	(+)	(+)	(I)
<i>Collegial nurse-physician relations</i>	C	(unchanged)	(+)	C
<i>PES-NWI composite score</i>	(C)	(+)	(+)	(C)

Legend:

I = Intervention ward mean score higher than control ward mean score

C = Control ward mean score higher than intervention ward mean score

I+/- = increase/decrease in mean score

() non-significant mean difference; absence of parenthesis = significant mean difference

The PES-NWI composite mean scores showed the intervention group and control group respondents had similar perceptions of a positive nursing practice environment at baseline and at follow-up. The significant follow-up difference between intervention group and control group respondents' perceptions of *"Collegial nurse-physician relations"* was also present at baseline. Whilst a trend of a non-significant increase in a majority of intervention group subscale mean scores and the PES-NWI composite mean score was observed at follow-up, a similar trend was also observed for the control group. Therefore, it was not possible to attribute the intervention group trend to participation in the CAS.

Overall, there was no evidence indicating participation in the CAS by the intervention group was positively associated with increasing agreement with subscales or a more favourable perception of a positive nursing practice environment.

7.4 Chapter summary

Intervention ward mean scores showed disagreement with the following subscales:

- HSoPSC *"Staffing"* (all wards at baseline and follow-up)
- HSoPSC *"Hospital handoffs and transitions"* (ward BI at baseline/follow-up, CI at baseline, intervention group at baseline/follow-up)
- HSoPSC *"Non-punitive response to error"* (ward CI at follow-up)
- HSoPSC *"Teamwork across units"* (ward CI at follow-up)
- PES-NWI *"Staffing and resource adequacy"* (ward AI at baseline, ward BI at baseline, ward CI at follow-up, intervention group at baseline)
- PES-NWI *"Nursing participation in hospital affairs"* (ward BI at baseline, ward CI at baseline/follow-up)

Statistical tests of differences found positive but weak evidence that participation in the CAS was associated with increasing agreement with the following HSoPSC subscales:

- *"Supervisor expectations and actions promoting safety"* (ward AI)
- *"Organisational learning"* (ward AI)

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- *“Feedback and communication about error”* (ward AI & intervention group)
- *“Frequency of event reporting”* (ward AI)
- *“Overall perceptions of safety”* (ward BI)

Additionally, there was an overall pattern of participation in the CAS being associated with:

- increasing staff agreement with the HSoPSC subscales (ward AI)
- perceptions of a more positive nursing practice environment (ward AI)

Having presented the findings of the measures of culture and environment in this chapter the following chapter moves on to present the qualitative process evaluation findings.

8. Findings: process evaluation

This chapter presents the findings of the qualitative data analysis, that is, the process evaluation for the three intervention wards. Findings for each intervention ward are first presented individually. This is followed by a summary of findings across the wards as a whole.

Each wards' findings, and the overall summary, are presented within the framework of the NPT core domains. Table 91 provides a brief summary; for comprehensive details refer to the Methods Chapter 4, section 4.7.1.

Table 91: NPT core domains	
<i>Coherence</i>	Relates to how people make sense of the intervention and the ways in which it is understood to be meaningful, achievable and desirable Sub-concepts: <i>differentiation, communal specification, individual specification, internalisation</i>
<i>Cognitive participation</i>	Explores how and whether the people required to participate in the scheme are enrolled into it Sub-concepts: <i>initiation, enrolment, legitimisation, activation</i>
<i>Collective action</i>	Considers the work that people need to do in order to bring the intervention into use Sub-concepts: <i>skill set workability, interactional workability, relational integration, contextual integration</i>
<i>Reflexive monitoring</i>	Refers to the processes of ongoing appraisal of the intervention and of making adjustments that are required to sustain effective implementation Sub-concepts: <i>systemisation, communal appraisal, individual appraisal, reconfiguration</i>
Based on May and Finch (2009)	

8. Process Evaluation

8.1 Intervention ward AI findings

8.1.1 Interview participants

Four interviews were conducted: two with the ward leader, one with the housekeeper and one with the clinical matron. Interviewees were female and aged between 40 to 59 years old⁴³. Interviews lasted between 25 and 40 minutes.

8.1.2 Coherence

Interview participants had made sense of the CAS through a variety of work activities. The ward leader was the actor playing a key role. The clinical matron and housekeeper were effective actors making lesser but still substantial contributions. The ward leader's extensive understanding of their tasks and responsibilities required by the CAS was acquired through being enrolled in the scheme and utilising the scheme resources. The housekeeper acquired task specific knowledge through working collaboratively with the ward leader. Consulting experienced others was a sense making strategy used by the ward leader and clinical matron. Drawing upon previous experiential learning, for example experience of peer review and previous Trust quality improvement activities, and relating the CAS to national quality assurance drivers such as the CQC, facilitated sense making.

A number of elements contributed to the coherence of the CAS. The function of providing the Trust with assurance of ward quality of care was considered meaningful. The in-depth ward appraisal was felt to support ward performance; this had potential to improve quality of care, support meaningful data use and enhance staff experience. The CAS was differentiated from other Trust assurance processes through its provision of a more comprehensive and integrated assessment of ward quality of care.

"I suppose it's the one that pulls everything together ... in some ways sometimes we look at things independently so, for example, we may

⁴³ Participant workforce characteristics have been withheld in order to maintain anonymity

look at appraisal rates ... but I suppose it's [CAS] a peer review of everything altogether" (clinical matron)

It was primarily the ward leader who facilitated the team learning activities about the CAS. A range of approaches including sharing the CAS resource file with senior staff⁴⁴, tapping into existing processes such as the ward newsletter, and educational strategies such as facilitating discussions and putting up an information display highlighting the four quality dimensions, were employed. Despite these activities interview respondents felt that the wider team had little or no knowledge of the CAS. Barriers preventing the wider team from embarking upon a process of sense making were staff availability and staff receptivity.

"... there is always so much going on on the ward at one time, it's very difficult to communicate with all staff personally, em, so we, you know, yes, we have displays on the ward, we had it in our newsletter, I talked to plenty of people but quite probably missed some, and some people walk round with their eyes closed a bit as well don't they? So if then someone came on the ward and asked that member of staff "What do you think about the CAS?" they'd probably say "I don't know anything" ..." (ward leader)

In summary, attempts to build coherence were limited. A strong sense of individual specification and coherence had developed amongst the key actors. However, this process had not spread across the wider team and communal specification had not been achieved.

8.1.3 Cognitive participation

Key initiating activities employed by the ward leader in moving the tasks and processes required by the CAS forwards included planning their individual contribution and managing that of others. Mandatory enrolment of the sisters and housekeeper via delegation of work occurred. The ward leader felt

⁴⁴ Senior staff = ward leaders (Band 7 registered nurses), senior sisters (Band 6 registered nurses); junior staff = junior nurses (Band 5 registered nurses), all other unqualified staff (Bands 1-4)

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personal communication with all staff had not been practicable in raising team awareness of the CAS. However, a range of team, individual and role dependent discussions were facilitated. Throughout the accreditation process written and verbal reminders were utilised to encourage the wider ward team to voluntarily engage with the CAS. However, interview participants perceived staff as having varying levels of motivation and participation approaches ranged from a few who were effective actors to those who acted as by-standers.

“I’m very enthusiastic about my job, and um, you know, might sort of say about the visit [CAS ward accreditation visit] ... Actually I’ve had a few people say “Oh, what visit’s that?” ... even though it’s all up in the office and we’ve had, like, newsletters about it, and it’s up on the board in the office ...” (housekeeper)

Although some staff were engaged and motivated, overall, there was no evidence that these strategies were successful in building cognitive participation amongst the ward team. There was no indication that a collective view of whether the CAS was a legitimate scheme in which to participate had been developed. There was no suggestion that the wider ward team were being activated to broaden their contribution to, and continue their support for, the CAS processes and tasks.

8.1.4 Collective action

A range of tasks and processes were performed in relation to the CAS. Collation of the portfolio of evidence was seen as a management role and the responsibility of the ward leader. Tapping into existing ward processes, for example delegating some evidence collection to the sisters with relevant Link Roles⁴⁵, and seeking additional information from external teams such as the Infection Control Team, supported the process. Having staff with sufficient

⁴⁵ Nurses who held Link Roles had additional responsibility for developing a greater knowledge of a specialist area, such as tissue viability, and for liaising with the associated external team/specialists, collecting relevant ward data, and disseminating associated information to the ward team

experience to be able to collect the correct data was highlighted by the clinical matron as key to securing a good review outcome.

A change in activities for the ward leader included communicating more explicitly to staff about the dimensions of quality. Work associated with the use of the CQD data, and linked processes such as the use of Root Cause Analyses to explore adverse events, continued as usual. The ward leader did not place a great deal of emphasis upon preparing the environment for the ward review: she felt it should be observed in its normal working state. However, she did work collaboratively with the housekeeper in a practical role to complete a small number of existing environmental projects; in so doing they developed new skills in the use of the 15 Steps⁴⁶. Environmental changes facilitated by the housekeeper had potential to improve safety and enhance patient experience, for example through ensuring ward cleanliness and improving signage. This preparatory work was found to be time consuming and extra hours were worked as a short-term strategy to overcome this challenge. Key actors on the day of the review were the ward leader and the housekeeper. The ward leader facilitated the follow-up actions required by the review recommendations; these focussed on improving staff experience through enhancing the ward office environment.

In summary, a small number of actors performed the material practices required by the CAS. In NPT terms they demonstrated high skill set workability and interactional workability but crucially this work was not extended to others.

Implementation of the CAS did not change the division of labour on the ward. For a majority of the ward staff routine activities continued as usual with implementation of the CAS providing a vehicle by which key actors could reinforce good practice. Consequently, the dynamics of relational integration within this ward team did not change. Yet, the clinical matron felt that in other instances participation in the CAS had enhanced leadership qualities.

⁴⁶ Evidence based environmental assessment tool provided in the CAS resource file

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"I see a different leadership style ... I know, um, that it's [participation in the CAS] really boosted their confidence, it's sort of empowered their leadership ..." (clinical matron, talking about other ward leaders following their participation in the CAS)

The ward leader and housekeeper worked on the processes and tasks associated with the CAS largely in isolation. This was partly because the ward leader felt accountable and wanted to maintain control of the process but also to protect 'overburdened' ward staff.

"... there isn't much time on the ward for other members of staff to do much more. I mean they all have, like, Link Nurse responsibilities, the time pressure on them doing that is quite intense, so to give them something else ...there'd probably also be something else going on the ward at the same time that other people are sorting out ..." (ward leader)

The CAS facilitator was talked about in positive terms as a useful resource given the peer support they could provide. However, the remaining CAS processes were frequently talked about in negative terms. The ward leader reflected that, in return for their mandatory enrolment, those organising and managing the CAS should ensure all processes were achieved in accordance with the scheme guidelines. Less favourable perceptions of factors such as the review panel organisation, preparation and thoroughness, and the ability of the panel members to interpret data correctly, were suggested to have potential to promote negative emotions and leave unmet expectations on the part of the key ward actors. Failures on the part of the peer review panel to fully discuss their recommendations at the desktop review and to provide timely formal written feedback were highlighted as having a negative emotional impact on key participants.

Inclusion on the peer review panel of a directorate level nurse manager was important as it accorded with a perception that implementation of the CAS was being driven by directorate level managers. A service user representative's perspective on the review panel was welcomed and their absence was linked to the promotion of negative emotions.

"I think it's only fair to say that I felt a bit of disappointment in that we only had two people on our panel and I was expecting four, including the patient representative ... we all know the theory and the policies and the bits and pieces ... we want an educated, different perspective, and so I think without a patient perspective on the ward, part of the CAS, it loses a lot of its authenticity" (ward leader)

Overall, perceptions of inadequate performance reduced key ward actors' trust and confidence in the CAS processes and consequently negatively impacted upon their response to the review recommendations. Formal written accreditation survey feedback with recommendations that were specific and realistic, that recognised shared responsibilities and gave recognition to staff efforts, were preferred. When this was not achieved the clinical matron sought clarification and worked to boost staff morale. In essence, relational integration between some of the key actors in the chains of interactions and performance of the CAS processes had yet to be fully achieved.

A number of contextual factors such as the failure to receive timely formal feedback, juggling priorities, constant change and seasonal effects were highlighted as hindering successful embedding of the CAS into routine practice; no strategies to overcome these barriers were discussed. Whilst the need for resources to action the review recommendations for this ward was raised, in other instances the review recommendations had provided the clinical matron with leverage for requesting resources.

8.1.5 Reflexive monitoring

Limited information about the CAS was sought or shared following participation in the review process. Ward staff initially enquired about the success of the ward accreditation survey and limited written information was provided via the ward newsletter. Interview participants perceived the ward staff to have experienced positive team effects, such as feelings of pride, following their participation in the CAS; the clinical matron also highlighted other wards in which less successful accreditation survey outcomes resulted in demoralised ward teams.

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There was no team commitment to continuing engagement in the tasks and processes associated with the CAS. The only work pattern supporting continuing activity was the continued use by the ward leader of the four quality dimensions in staff communication. The driving force in supporting the ward to maintain momentum in working towards the CAS was felt to be the formal written accreditation survey feedback, but this had not been received at the time of the first round interviews.

“... I’ve no deadline, I’ve nobody coming back wanting to see a formal action plan, so I haven’t written one because I, I haven’t received the formal feedback, so I don’t know exactly what I’m responding to. I’ve got many other things to deal with too, um, and I think having the little kind of hiatus that Christmas always brings, and winter pressures, you know, it does seem to have dissolved ...” (ward leader, first round interview)

In essence there was no reflexive monitoring and the CAS was lost from sight.

Interview participants’ judgements about the overall scheme effectiveness and usefulness were based on their experience of participating in the accreditation survey processes. Impressions were that participating in the CAS was a positive experience and that the CAS was a useful monitoring tool providing reassurance about ward quality of care. The process of evidence collection supported identification of overlooked issues whilst structuring the process around the four quality dimensions focused ward priorities.

“I like the way it sets it out in the four areas, that made it a lot clearer, because something you’re thinking can get quite jumbled in everything that you’re dealing with and actually if you start thinking of patient safety, patient experience, staff and environment, it kind of shows you what you need to think about” (ward leader)

For the housekeeper use of the 15 Steps, which supported *“thinking outside of the box”*, was a significant process; conversely, this was viewed as an insignificant process by the ward leader. There was a general view that, in relation to the wider ward team, only those staff working on the day of the ward visit benefitted. Publication of the accreditation results was seen as a

positive process ensuring transparency but also with potential to incur dysfunctional effects such as negative reputational impacts.

Interview participants had yet to determine the overall usefulness and effectiveness of the CAS. For the ward leader, there was a perception of unfulfilled potential and commitment to continuing engagement was linked to a need to overcome disappointments experienced during the accreditation survey. A number of potential reconfiguring actions were discussed: for example, improving patient and public involvement through providing meaningful explanations of the scheme and inviting ward patients to participate in the 15 Steps, improving the credibility of the standards with the development of area specific standards and inclusion of staff feedback on their ward via a staff survey, and improving the credibility of the review panels through provision of reviewer training.

8.2 Intervention ward BI findings

8.2.1 Interview participants

Four interviews were conducted: one with the ward leader, two with the same senior sister, and one with a healthcare assistant. Interviewees were female and aged between 20 to 49 years old⁴⁷. Interviews lasted between 10 and 35 minutes.

8.2.2 Coherence

Interview participants had achieved varying degrees of individual specification of the CAS. The ward leader was the actor playing a key role whilst the ward sister was an effective participant playing a lesser role. They both demonstrated extensive understanding of the tasks and responsibilities associated with the CAS.

Key elements of the CAS that contributed to the sister's specification of the coherence of the CAS were similar to those identified for ward AI. For

⁴⁷ Participant workforce characteristics have been withheld in order to maintain anonymity

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example, she related the CAS to the activities of the CQC but then differentiated the CAS as a scheme which provided a context specific, or ward level, measure of quality of care. Similarly, meaningfulness was related to the support the CAS provided for ward performance and its potential to improve quality of ward care and to support staff experience.

"... I think the staff would be really interested to read it [CAS formal accreditation survey feedback]. And again just give them a bit more positive reinforcement that actually we do do a really good job and it's not always bad news, especially with the press recently about the Trust, the [newspaper name] got something to say every day about how awful we are, so I think it would help them to read it and, see what an outside body thought of the ward. Especially also because with things like the CQC we never really get a ward feedback it's always a Trust feedback" (sister)

Similar to ward AI, it was primarily the ward leader who facilitated the team learning activities about the CAS. A range of approaches were employed including sharing the CAS resource file and tapping into the existing ward meeting processes to facilitate discussions. Educational strategies, such as increased dissemination of audit/CQD data to junior staff and introducing the 15 Steps to junior staff, were more interactive than the strategies employed by ward AI. Despite these activities, the healthcare assistant acted as a bystander with limited understanding of the CAS. In contrast to the sister, they concluded that it lacked distinction from the activities of the CQC. Overall, the ward leader and sister perceived that the wider team understanding of the CAS was limited to that of it being a one-off process.

Attempts to build coherence, although still limited, were more extensive than those for ward AI. The sister, as a key participant, had achieved an individual specification of the CAS. The ward leader was unavailable for follow-up interview. Therefore, determination of whether a sense of coherence had been collectively formed amongst the key actors was not possible. Similar to ward AI, the process of communal specification across the wider ward team had not been achieved.

8.2.3 Cognitive participation

Similar to ward AI, initiating activities by the ward leader to move the CAS processes forwards included managing themselves through planning their individual contribution and the mandatory enrolment of sisters and some senior nurses via delegation of work. Educating others about the CAS was the key activity employed in managing the ward team. A range of team, individual and role dependent discussions were facilitated, often utilising the existing discussion forum of ward meetings. The voluntary enrolment of the wider ward team was promoted through an additional strategy of explaining the CAS in a relevant context and then modelling the CAS processes/activities for others to observe. The ward leader felt this strategy had increased team engagement.

“They [staff] needed to understand and we needed to make sure that we put it in a way that they knew it would benefit not only them but the patients and relatives ... I think some of the staff didn’t understand what we were trying to say at the beginning, how, how we were trying to explain the scheme ... but they realised what it was about as they watched us doing the work” (ward leader)

Throughout the accreditation process verbal reminders were employed to encourage the wider ward team to voluntarily engage with the CAS. However, the evidence indicating whether these strategies were successful in building cognitive participation amongst the ward team is mixed. Wide voluntary team enrolment was reported by the ward leader and sister. Factors supporting wide team enrolment were perceived as having proactive staff with a positive team spirit. Staff planning their careers, and the identification of natural participation opportunities, were highlighted as motivational factors. Yet, varying levels of staff motivation and participation were also reported. Furthermore, the healthcare assistant suggested that not all staff were successfully enrolled.

“... we were told, sort of, last couple of weeks of when we were, it was going through ... sister told us what it’s about, and it was all, you know, um, to with what people see, what people feel, smell, er, how the

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ward works initially when they first come onto the ward. And that's as ... much as I know really" (healthcare assistant)

Similar to ward AI, there was no indication that the wider ward team had developed a collective view of the CAS as a legitimate scheme in which to participate. However, in contrast to ward AI, the processes of seeking opinions, promoting joint reflection and inviting shared goal setting, were employed in seeking voluntary enrolment; these may also have been methods by which staff were encouraged to feel they had a valid and legitimate role to play.

There was also no suggestion that the team were being activated to broaden their contribution to, and continue their support for, the CAS processes and tasks. Yet, a desire to aim higher and continue work towards the CAS was discussed by both the ward leader and sister in the first round interviews.

"I need to reinforce the fact this is a continuing process and that we will be re-evaluated, that we still need to work towards further goals, and maintain where we are at the moment, and that I expect us to be working towards the exemplar" (ward leader)

8.2.4 Collective action

Staff performed a range of tasks and processes in implementing the CAS. Similar to ward AI, collation of the portfolio of evidence was seen as a management role and the responsibility of the ward leader. Work associated with collecting information for the portfolio was delegated to sisters and senior nurses with relevant Link Roles. Additional information from external teams was sought but identifying whom to ask was challenging. The ward leader's assessment of the utility of the CAS resource file was mixed: it provided clear process information but did not indicate how much evidence was required. Consequently, the process of information collection was stressful. Yet, as an inexperienced ward leader, the challenge of this process was also felt to have enhanced their skills, facilitated their personal development and provided them with a challenge to step up to.

In contrast to ward AI, it was only the ward leader who developed new skills in the use of the 15 Steps. Use of the 15 Steps was enhanced through linkage to

an external resource, that is, the Productive Ward quality improvement tool⁴⁸. A more extensive range of environmental changes with potential to increase safety, enhance patient experience and improve clinical practice were undertaken. For example, existing projects such as updating patient noticeboards were completed and new projects such as increasing compliance with medication storage were embarked upon. In contrast to ward AI, a number of junior staff voluntarily participated in practical roles and worked extra hours to provide this additional input.

“... we reconfigured our whole storage area. Um, again we used the 15 Steps to identify that that was an area that really needed changing, but we used a Productive Ward to help us identify ways in which that could work, and actually that was the major task ... that took me completely off my office days, and actually two of my staff came in on their days off and did overtime ...” (ward leader)

This preparatory work was regarded as stressful and time consuming. However, due to imminent staffing changes the ward had additional management input into this preparatory phase. Furthermore, in contrast to ward AI, senior staff changed their management priorities by reducing their clinical hours and undertaking more office based work. The clinical matron gave support for this short-term change in activities. It was only the ward leader who was a key actor in the desktop review and ward visit.

Roles for junior staff were limited to supporting practical roles because senior staff wanted to maintain control of the process due to the short timescales. For a majority of staff routine ward activities continued as usual. Yet, implementation of the CAS was also used as a vehicle by which senior staff could reinforce good practice and support those junior staff performing less effectively to improve their clinical practice. Additionally, the sister felt this preparatory work had supported the team to successfully manage a change of ward leadership. She also reported increased data dissemination and widened team engagement with CQD/audit data in her first round interview. This was

⁴⁸ Quality improvement tool previously rolled out across the Trust; also developed by the NHS Institute for Innovation and Improvement

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perceived as having broadened the horizons of junior staff by promoting increased understanding of senior staff roles and raising awareness of the wider Trust activities.

“I think they’re [junior staff] just more aware really of everything else that goes on ... I think it’s, sort of, opened their eyes actually to what else goes on around them, sort of behind the scenes, what holds it all together and how we fit into the [directorate name], but really how we fit into the Trust as well” (sister)

By the time of the second round interview this process of increased data dissemination had ceased. However, she felt there had been a sustained improvement in environmental awareness amongst ward staff.

The ward leader and sister talked about participation in a majority of the CAS processes in terms of initially promoting negative emotions, for example worry and nervousness. Yet, these expectations were largely unmet and participation ultimately resulted in positive emotions such as pleasure and pride. Overall, in contrast to ward AI, the tasks and processes associated with the CAS were discussed in positive terms. Ensuring objectivity through inclusion of an external clinical matron on the peer review panel, and ensuring peer review panel members understood the CAS processes and had effective questioning skills, was raised.

“The patient representative was a very pleasant gentleman but quite intense and from first meeting him I wasn’t quite sure what he wanted to gain from it. He seemed to go off on several tangents that I didn’t feel were necessarily linked with the CAS scheme ...” (ward leader)

“... there was one nurse that was really quite intimidated on being questioned, and that ... she was questioned by um, one of the panel that it’s her first time of doing a CAS inspection, so I think she was quite intense when she was questioning, and then that made my staff nurse really nervous ... and she was really worried that she wouldn’t have given the right information ...” (ward leader)

The ward leader’s experience of the desktop review was one of receiving constructive verbal feedback.

Similar to ward AI, participation in the CAS comprised the processes of data collection and environmental preparations. Whilst the work associated with the CAS was extended to more of the ward team than on ward AI, the overall number of actors performing these processes remained small. Once again, high skill set workability and interactional workability was demonstrated by these actors. Implementation of the CAS did not change the division of labour. Yet, the personal development of participants, and the broadening of horizons, potentially had a positive effect upon the dynamics of relational integration within the ward team, and between the ward team and the wider Trust. In contrast to ward AI, relational integration with the other key actors in the chains of interactions and the CAS processes was largely achieved.

The lack of work taking place in relation to the CAS at the time of the first round interviews was attributed to forthcoming leadership changes. Changing responsibilities, with the sisters introducing the CAS to the new ward leader and leading the process of developing an action plan was highlighted as a possible solution. Constant change and the need to juggle priorities were further factors felt to hinder successful embedding of the CAS: no strategy to overcome these barriers was discussed.

8.2.5 Reflexive monitoring

There was little evidence of ward staff collecting or receiving information about the CAS following participation in the accreditation survey. The evidence folder was shared with the ward team and a brief verbal feedback was provided by the clinical matron. Increasing engagement with the CAS combined with a desire to improve on the standards achieved in the preparatory phase was discussed by interview participants in relation to their own and the team's early reactions to the ward's successful accreditation.

Similar to ward AI, timely receipt of the formal written accreditation survey feedback, which had not occurred at the time of the first round interviews, was considered to be a driving force in supporting the ward to maintain momentum. By the time of the second round interview there was no team commitment to continuing engagement with the tasks and processes associated with the CAS. Equally, the sister (second round interview) highlighted the need for ongoing discussions about the CAS but there were no

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work patterns supporting this activity. A number of reconfiguring actions were proposed including widening ward staff participation in the preparatory phase. Similar to ward AI, there was no reflexive monitoring and the CAS had disappeared.

The ward leader's and sister's overall impressions were that participating in the CAS was a positive experience with the benefits of the process outweighing the negatives. The sister felt the CAS to be a useful tool in supporting the management of change and in providing reassurance about the ward's performance; the 15 Steps process reinvigorated practice whilst preparing the portfolio of evidence brought clarity to the ward data. Publication of the accreditation results was a positive process ensuring transparency and promoting positive competition but also with potential to incur dysfunctional effects. Her views on the usefulness and effectiveness of the CAS were not yet fully determined but she also felt it to be the most effective tool yet for improving patient experience.

“they [ward staff] think it's [the CAS] just something that the big bodies said that we've got to do, and it's not actually going to impact on the patients, and actually I think the CAS probably does have more of an impact on the experience of our patients than anything else that we have done” (sister)

8.3 Control ward BC findings

8.3.1 Interview participant

One interview was conducted with the ward leader. The extended interview topic guide (Methods Chapter 4, section 4.7.6.3) was utilised and the interview duration was 1 hour and 15 minutes. The interview participant was female, aged between 30 and 39 years old⁴⁹.

⁴⁹ Participant workforce characteristics have been withheld in order to maintain anonymity

8.3.2 Coherence

The ward leader was a key actor who demonstrated extensive understanding of their tasks and responsibilities. Her process of sense making and individual specification of the CAS contrasted with those of ward AI's and BI's interview participants. Experiential learning as she became an active participant in the CAS underpinned her process of sense making.

"I think the way it [the CAS] was explained and when I was first sort of introduced to ... I didn't really get it at that stage, I wasn't really sure what the purpose of it was, and I saw our sort of sister ward, if you like, go through it and I still didn't really sort of ... understand it. And then obviously we went through it this year ... and I found it useful to bring absolutely everything together into one place in front of me ..."

She differentiated the CAS from other schemes through the fact that it offered team recognition.

"I think recognition is something that has not gone on board for a very long time from a, like a ward as a whole – individual IPRs etc. they happen, but wards as a whole ..."

Meaningfulness was related to the support the CAS provided to the Trust in ensuring that there was standardised performance across the hospital.

Similar to wards AI and BI, she facilitated the team learning activities about the CAS by employing activities such as tapping into the existing ward meeting processes to facilitate discussions and sharing the CAS resource file. There was no evidence that understanding of the CAS by the wider team improved or increased as a result. Communal specification had not been achieved.

8.3.3 Cognitive participation

A number of the initiating activities the ward leader used to move the CAS processes forward contrasted with those for wards AI and BI. For example, she ring-fenced time in order to plan the activities she undertook to contribute towards the tasks and processes required by the CAS; this process was supported by linking the planning process to the outcomes of a recent ward

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peer review⁵⁰. In contrast to ward AI, she also communicated personally with all staff about the forthcoming CAS review via an explanatory letter.

“... I sort of wrote a letter to everybody explaining what it was and what it would mean over the next sort of six weeks, and at, in that I put a date for a ward meeting ...”

Voluntary enrolment activities were similar to those employed on wards AI and BI. Whilst she perceived there to have been wide team engagement varying levels of staff motivation and staff acting as by-standers were also discussed. Factors perceived as supporting wide team engagement and motivating staff were identical to those identified for ward BI.

In contrast to wards AI and BI, there was an indication that the ward team had potentially commenced upon the process of forming a collective view as to whether the CAS was a legitimate scheme in which to participate through making peer comparisons.

“... once they also knew that our next-door-neighbour ward had gone through it ... who did very well and got full accreditation – it was a bit like “Oh well, if they’re going to get full accreditation we’re”, so when you saw someone else go through it that kind of ramped it up a little bit more even”

However, there was no evidence suggesting this was a completed process. Similar to wards AI and BI, there was no suggestion that the team were being activated to broaden their contribution to, and continue support for, the CAS processes and tasks.

8.3.4 Collective action

Similar to wards AI and BI, participation in the CAS comprised a process of data collection and environmental preparations. Once again the ward leader adopted a management role and performed a majority of the tasks and processes associated with preparing the portfolio of evidence and facilitating

⁵⁰ Note: this was not a CAS peer review but another peer review activity

the ward accreditation survey; this was felt to be necessary in order to ensure the work standard. Similar to ward AI, extra hours were worked to ensure clinical duties continued as usual and management priorities remained unchanged.

The CAS resource file was considered to provide clear process information. All the skills for performing the tasks and processes required by the CAS, including use of the 15 Steps, were already present on the ward. Work associated with collecting information for the portfolio was delegated to sisters and senior nurses with relevant Link Roles; performance of these tasks was suggested to have facilitated their personal development. The process of seeking information from external teams and knowing whom to contact was challenging. However, this relatively inexperienced ward leader also felt this process had facilitated her personal development and broadened her horizons through increasing her awareness of different facilities/resources across the hospital. This work did not result in changed use of the CQD data.

Similar to ward BI, a small number of junior staff also worked extra hours to voluntarily participate in practical roles: for example, existing environmental projects were completed, some clinical activities were reviewed and documentation was improved.

"I've got a couple of very, very um, enthusiastic Band 5s who took on a clinical role ... part of our speciality on our ward is sort of, um, line care, um, for nutrition. Um, and this really sparked a lot of, in their own time coming in, doing spot audits on paperwork and sort of technique, and so that's really brought our levels of line care up"

Such activities had the potential to improve safety, enhance patient experience and improve clinical practice. Once again, the small number of actors performing these processes demonstrated high skill set workability and interactional workability.

In accordance with wards AI and BI, implementation of the CAS did not change the division of labour and for a majority of ward staff normal ward activities continued as usual. Yet, the personal development and broadening of horizons for some actors potentially had a positive effect upon the dynamics of

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relational integration within the ward team, and between the ward team and the wider Trust.

Participation in the CAS processes was talked about in a mixture of positive and negative emotions. For example, the constructive nature of the peer review panel's verbal feedback at the desktop review was welcomed. However, less favourable perceptions of the review panel composition (the absence of a service user representative and the ward's clinical matron), their organisation and thoroughness, and the timeliness of receipt of the formal written feedback, had potential to promote negative emotions and leave unmet expectations on the part of key ward actors. Similar to ward A1, relational integration with the other key actors in the chains of interactions and the CAS processes had not yet been fully achieved. Barriers highlighted as hindering successful contextual integration were the same as those identified by the other wards. Once again, no strategies to overcome these barriers were identified.

8.3.5 Reflexive monitoring

This interview occurred six weeks after the ward had undergone their CAS review. Some early reflexive monitoring actions by ward staff, such as making judgements of "fairness" in relation to the ward's accreditation results and those of their peers, had occurred. The ward leader felt there to have been positive team effects such as boosted morale. However, a delay in award of the accreditation decision was felt to have had a negative impact upon the team's overall appraisal of the CAS. A perception of a potential for negative team effects to occur in response to less positive accreditation results was also raised. The ward leader gave no description of a team commitment to ongoing engagement with the CAS.

Her overall impression of participating in the accreditation process was that it was a positive experience supporting her role development and providing reassurance as to the ward's quality of care. The process of evidence collection brought clarity to the ward data, provided a reflective opportunity supporting identification of achievements, highlighted overlooked issues and provided a direction for future activities; yearly trends in the CQD data could

be highlighted and linked to other quality management systems such as Root Cause Analyses for adverse events.

“It reminded me of all those things that I had kind of let slip and actually the importance of them as well. And that just, you know, just because we have a Health and Safety spot check once a year doesn’t mean that they can get shelved until next year thinking “Oh, my goodness, we’ve got a lot of ambers and reds there”, it’s “No, actually, come on you’ve got to do something about this and it’s got to stay up there ...”

Dysfunctional effects, such as reduced staff retention and satisfaction, were perceived to be a potential consequence of the publication of accreditation results for less successful wards; explaining the results in the context of the ward was discussed as a potential strategy by which to minimise these effects.

The CAS was thought to require constant effort to be an effective tool for managing ward quality of care.

“I think it’s a useful tool if you are using it all the time. If it sits in the folder on the top shelf, right at the back until you suddenly have to produce your next 18 month or yearly report, it may as well not be there”

The need to continue activities to maintain the standards achieved in the preparatory phase was discussed but aiming to achieve “exemplar” status was not felt necessary. Utilising the ward monthly clinical focus to facilitate continuous discussions about the CAS was suggested but was not actually occurring.

A number of potential reconfiguring actions were proposed. These included improving public and patient involvement through providing meaningful explanations of the CAS to service users and broadening the publication of accreditation results. The timescales for the preparatory phase were felt to be adequate but the process guidelines required clarification to ensure a standardised process of evidence preparation was followed. Improvement in the peer review panels’ organisational processes, inclusion of a panel member with relevant clinical skills (ward leaders), widening panel membership to

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enable skill development opportunities for sisters/junior nurses and clarification of the hierarchy of accreditation categories were suggested.

8.4 Intervention ward CI findings

8.4.1 Interview participants

Two interviews were conducted: one with the ward leader and one with a senior sister. The extended interview topic guide (Methods Chapter 4, section 4.7.6.3) was utilised. Interview durations were approximately 45 minutes. Interview participants were female, aged between 20 and 39 years old⁵¹.

8.4.2 Coherence

A variety of work activities were embarked upon which supported interview participants to develop an extensive understanding of their roles and responsibilities in relation to the tasks and processes required by the CAS. Once again, the ward leader was the actor playing a key role whilst the ward sister was an effective actor playing a lesser role. Similar to wards AI and BI, their sense making activities included comparing the CAS to other external national regulatory bodies, including the CQC, but for the sister, this also included Ofsted the regulator of schools. The remaining elements of coherence were similar to those for the other wards.

It was primarily the ward leader who facilitated the team learning activities about the CAS. A range of processes were employed including tapping into the morning “Top-Tips” forum and the use of educational strategies such as facilitating discussions, developing an information display, sharing the CAS resource file and introducing the 15 Steps.

The sense making process for this ward’s housekeeper, drawing upon their experiential learning of participation in previous Trust quality improvement activities, corresponded with that of ward AI’s housekeeper.

⁵¹ Participant workforce characteristics have been withheld in order to maintain anonymity

“... she [housekeeper] looked a bit at um, sort of the work we’d previously done on ... the Releasing Time to Care project ...” (sister)

Attempts to build coherence reflect a combination of the activities used on all the other wards but were still limited in their extent. The interview participants had achieved an individual specification of the CAS but there was insufficient evidence to determine whether they had collectively formed a sense of communal specification. Similar to all the other wards, the process of communal specification across the wider ward team had not been achieved.

8.4.3 Cognitive participation

Initiating activities the ward leader used to move the CAS processes forwards accorded with those used by ward BC: the process of planning and organising the activities required to support a successful review was linked to the outcomes of a recent peer review⁵². Delegation of work to the sisters was a key management activity. Strategies seeking voluntary enrolment of the wider team included inviting participation, seeking opinions and providing continuous verbal reminders about the CAS. Yet, limited team engagement and varying levels of motivation and participation were once again reported.

Overall, there was no evidence that these strategies were successful in building cognitive participation amongst the ward team. However, the process of seeking opinions from ward staff was potentially a strategy by which individual staff could be made to feel they had a valid and legitimate role to play in the CAS processes. There was no suggestion that the team were being activated to broaden their contribution to, and continue support for, the CAS processes and tasks.

8.4.4 Collective action

Similar to the preceding wards, participation in the CAS comprised a process of data collection and environmental preparations facilitated by a small number of staff. A management role was adopted by the ward leader who delegated

⁵² Note: this was not a CAS peer review but another peer review activity

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work associated with collecting evidence for the portfolio to the sisters and the ward secretary. Her experiences reflected those of the other ward leaders with this process of information collection being found to be time consuming. Additionally, she, like the ward leader for ward BI, found the process to be worrisome. Short-term strategies adopted to overcome this barrier accorded with those used by ward BI.

This was a relatively inexperienced ward leader who, like the ward leaders for wards BI and BC, also found the process challenging but concluded that this had facilitated her personal development. In her case this had arisen through increased understanding and use of the CQD data, and being able to more clearly identify her role as a ward leader. In reflecting on the contribution made by the ward secretary to the process of evidence collection she concluded that selecting the correct data for the portfolio required a higher level of experience.

It was the ward leader who, with support from their matron, developed new skills in the use of the 15 Steps. This was the only ward demonstrating collaborative work with their matron in preparing for the review. A range of junior staff participated in practical roles. Similar to the other wards they carried out activities that had potential to improve safety and enhance patient experience but also improve clinical practice.

“... our healthcare assistants looked at the quality of care. They were looking at the percentage of Turnaround results we were getting ... they looked to increase that ... and they also looked at making sure that the end-of-bed paperwork was up-to-date ...” (sister)

For a majority of the staff routine ward activities were indicated to have continued as usual with implementation of the CAS providing a vehicle by which key participants could reinforce good practice.

“... it was making them [ward staff] think about their daily practice, what they were doing more so than giving them extra work ...” (ward leader)

Similar to the other wards, roles for junior staff were limited partly because the ward leader wanted to maintain control of the process but also because she wanted to protect 'overburdened' ward staff.

"... maybe I should have let go a bit more but when the ward is really busy all the time it's then giving staff who were stretched already more work to do ... so I'm not giving as much away to sort of protect them as well ..." (ward leader)

Additionally, a lack of staff with sufficient experience to contribute towards the tasks and processes required by the CAS was indicated as a barrier to wider participation.

Once again, the small number of actors performing these processes demonstrated high skill set workability and interactional workability. Implementation of the CAS did not change the division of labour. Yet, the personal development of the ward leader had potentially had a positive effect upon relational integration within the ward team.

The ward leader experienced anxiety in anticipating the desktop review. However, her expectations were unmet and initial negative emotions were replaced by positive emotions as a result of the effective questioning style of the peer review panel members. At the time of her interview (study month 11) she had not received the formal written accreditation survey feedback (the survey took place in study month 3) but her experience of the desktop review was one of receiving constructive verbal feedback with realistic recommendations to which she responded positively. Yet, the sister questioned the accreditation results thus indicating reduced trust and confidence in the CAS processes. A peer review panel that demonstrated thoroughness, and results that acknowledged the ward context and fully identified the challenges or problems a ward may be experiencing thus ensuring transparency was preferred. Hence, similar to wards AI and BC relational integration with the CAS processes had not been fully achieved.

The ward leader took responsibility for facilitating the follow-up action recommended by the peer review panel. This focussed on making environmental improvements with potential to enhance patient experience.

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Factors identified as hindering successful embedding of the CAS accorded with those identified by the other wards but also included having sufficiency of resources. Once again, no successful counteractive strategies were indicated.

8.4.5 Reflexive monitoring

The early reaction to the ward's successful accreditation was perceived to be positive team effects such as pride and boosted morale. Making peer comparisons with wards which had achieved exemplar status was the only activity by which one interview participant was indicated to be collecting or receiving information about the CAS. The need for work patterns that supported continuous discussion of the CAS and ongoing evidence collection was discussed. Nonetheless, there was no evidence of the adoption of work patterns to support this. There was a perception that the standards achieved in the preparatory phase may not have been maintained.

"... once we came towards the CAS ... we were very keen on making sure that our data was collected and we were very keen on working towards the 15 Steps and a tidy ward. I think probably we could easily dip again, um, we may have, I'm not sure what they would assess if they gave us a spot check today, or if they looked at our data, sort of, six months afterwards, I'm not sure whether it would have dropped off" (sister)

The ward leader's overall impressions of participation in the accreditation process were positive and reflected those of ward BC's ward leader. In contrast, the sister felt that the CAS brought nothing new and provided only part of the picture by which ward quality of care should be judged.

"...probably it wasn't a useful process for, for us as individuals, or us as a team; it wasn't a particularly useful thing 'cos it was data we already knew, we were just telling somebody else, and it was also available to them, it was in the public domain, so for us the learning from that point of view was minimal" (sister)

Interview participants' views on the publication of the accreditation results reflected those expressed for the other wards.

Suggestions for potential reconfiguring actions accorded with those suggested by the other wards. Additional suggestions included improving patient and public involvement through inviting patients to provide feedback on their named nurse and relatives/carers to provide ward feedback, sharing experiential learning between accredited wards and those preparing for accreditation, and changing the emphasis from assessment of the overall patient experience to assessment of individual patient's experiences of specific episodes of care.

8.5 NPT across the wards

8.5.1 Coherence across the wards

In each ward sense making about the CAS was achieved for a small number of participants who successfully enrolled and undertook tasks required by the CAS processes. A strong sense of individual and communal specification and coherence appears had developed amongst the interview participants but crucially not beyond them. As a consequence of the limited number of participants, the wider ward teams were not provided with the opportunity to work towards a shared process of sense making or to collectively form a consensus of opinion regarding the legitimacy of participation in the CAS. Successful embedding of the CAS would require greater coherence across the teams.

8.5.2 Cognitive participation across the wards

Ward leaders were the key actors initiating implementation of the CAS. Even where there was a perception of mandatory participation all the ward leaders strove to achieve full accreditation. Ward leaders adopted similar strategies in initiating the CAS processes and enrolling others to participate. Some used mandatory processes to enrol ward sisters to collate the portfolio of evidence. Voluntary strategies used by three of the wards to enrol members of the wider ward team included seeking opinions and/or inviting participation; two of these wards demonstrated moderate to limited success in the use of these strategies. Overall, there was a perception by interview participants of varying

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levels of motivation on the part of the wider ward teams to participate in the tasks and processes required by the CAS.

Successful enrolment is required to support the activation of a sustained and broadened team contribution to the CAS tasks and processes: this was not occurring on any of the wards. However, activation requires a foundation of coherence and a process of legitimation neither of which had occurred on any of the wards.

8.5.3 Collective action across the wards

Participation in the CAS was reduced on all wards to the processes of data collection and environmental preparations. Overall, the staff skill set was adequate to meet the demands of these activities which were predominantly undertaken by senior staff. Participation in the CAS facilitated work that potentially supported the development of leadership skills, improved safety, enhanced patient experience, improved clinical practice, supported staff experience and enabled a small number of junior staff to enhance their skills. Those wards having the greatest success in voluntary staff enrolment were also those which participated in the greatest range and number of activities. Second round interviews suggested the benefits of a number of these activities, such as improved environmental awareness, were sustained.

The material practices of the CAS were workable. However, the way in which they were operationalised, with key participants working extra hours and changing working practices, were not sustainable. Successful embedding of the CAS would require a widening of collective purpose, and organisation into a shared purpose, across the ward teams; this would have improved the sustainability of the workload. Furthermore, the effort which key ward actors are prepared to invest in the CAS is influenced by their trust and confidence in the CAS processes: this varied across the wards. Therefore, refinement of the CAS processes is required to support successful relational integration.

Finally, the work of embedding the CAS is also shaped by factors that promote or inhibit the key ward actors from enacting the tasks and processes required by the CAS. Hence, strategies to address the range of factors identified by all

wards as hindering embedding of the CAS into their routine practices are required to enable contextual integration.

8.5.4 Reflexive monitoring across the wards

Embedding of the CAS requires a process of ongoing appraisal and adjustment of the associated material practices. For a majority of the wards, there was recognition of the need to invest continuing time and effort to keep the tasks and processes associated with the CAS in everyday use. Yet, there was no evidence of the adoption of supporting work patterns. Whilst many elements of the CAS were felt to be valid and worthwhile, individual commitment to ongoing engagement was limited. In a majority of cases the lack of ongoing engagement was linked to the failure to receive timely formal written feedback. For some this was also linked to reduced trust and confidence in the CAS processes and a number of potential reconfiguring actions were highlighted. In other cases this was linked to the challenges imposed by a number of contextual factors.

In general, the overall effectiveness and utility of the CAS had not yet been determined by interview participants. The ongoing collection and receipt of information about the CAS would provide opportunities for formalisation of judgements about utility and effectiveness to underpin embedding of the CAS. However, there was only limited evidence of ward staff participating in ongoing discussions about the CAS. Commitment to the process of reflexive monitoring is determined by the degree of cognitive participation and collective action; by study end this had not yet developed. Consequently, there was a lack of reflexive monitoring and the CAS had disappeared from the wards.

The following chapter presents a discussion of the integrated qualitative and quantitative findings for this study, a consideration of the strengths and limitations of this study, and recommendations for clinical practice and future research.

9. Discussion

9.1 Summary of findings

This study aimed to explore the impact of implementation of an innovative clinical accreditation scheme, the CAS, on NHS hospital ward nursing quality of care. The goals of the CAS were to assure quality of ward care and to provide a framework that enabled ward staff to engage more effectively with the range of performance data collected for their wards consequently stimulating continuous quality improvements. Thus, successful implementation of the CAS would be demonstrated by:

- assurance of ward quality of care
- embedding⁵³ of the CAS assurance framework as a tool to structure a ward's data collection processes
- use of the framework and CAS standards to generate continuous quality improvement activities

A controlled before-and-after study was employed to explore the impact of the CAS on quantitative measures of ward safety, patient experience, safety culture and the nursing practice environment. Normalisation Process Theory provided a systematic framework for the qualitative process evaluation alongside this study. Three matched pairs of wards were studied over a 12 month period.

Answers to the following research questions were sought:

- What is the impact of implementation of a ward based accreditation scheme on safety and patient experience?
- How do key participants receive and view such a scheme?
- What are the critical determinants that influence effective implementation and potential integration of an accreditation scheme into ward based clinical practice?

⁵³ Embedding refers to the process of continuing engagement with the CAS; this would take the form of ongoing use of the CAS framework and standards to structure the ward's routine data collection and review activities and to facilitate participation in quality improvement activities

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Whilst the CAS appeared to achieve the goal of quality assurance, overall, the quantitative findings did not provide evidence of quality improvement. Participation in the CAS had no effect on pressure ulcers or falls but was associated with deteriorating patient experience on one ward. Whilst this decline was not necessarily a result of participating in the CAS the possibility could not be fully discounted. There was no effect upon a ward's overall safety culture as measured by the HSoPSC but weak evidence was found indicating a positive association between participation in the CAS and increasing respondent agreement with a small number of HSoPSC subscales. This suggests the CAS may improve aspects of the patient safety culture. Additionally, a pattern of increasing agreement with some HSoPSC subscales following participation in the CAS was found but the effect of multiple testing cannot be discounted. No effect upon the nursing practice environment, as measured by the PES-NWI, was found.

The process evaluation showed that the CAS accreditation review process prompted participation in a range of short term quality improvement activities. Key participants valued the assurance and sense of recognition the accreditation process gave. Whilst they personally experienced a number of beneficial effects there was also evidence of dysfunctional effects. There was no evidence of embedding of the tasks and processes required by the CAS. A number of factors with potential to either support or hinder embedding were identified. These included ward leaders' perceptions of staff workloads, constant change and competing priorities.

Overall, the quantitative findings did not provide evidence of quality improvement. However, the study inferences were changed and moderated when the quantitative findings were looked at alongside the qualitative findings which provided evidence of small scale short term quality improvement activities. This suggested that, if changes are made, the CAS might have potential to stimulate quality improvement over the longer term.

9.2 Discussion

9.2.1 The CAS accreditation review process

Participation in the CAS accreditation review process was intended to assure quality of ward care. There are many definitions of the term quality assurance. Seale (2005 p8) states the term may be interpreted as a “*formal guarantee of a degree of excellence*”. Participation in the first three components of the CAS model (Figure 55) was the process by which ward quality of care was assured.

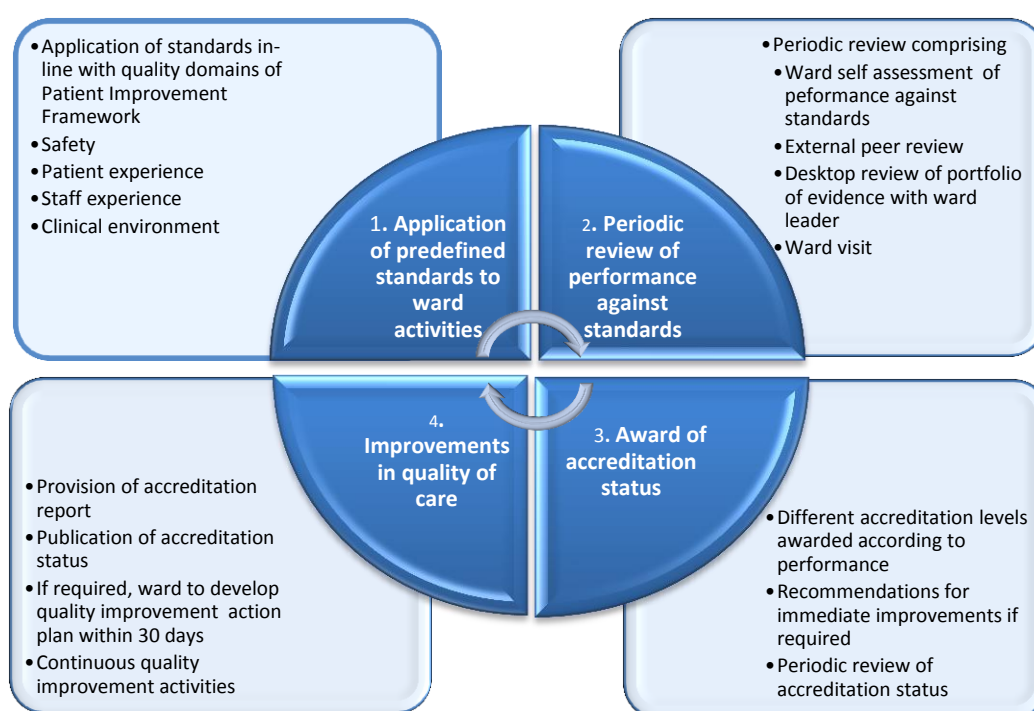


Figure 55: The CAS model

The process evaluation showed that ward leaders led the preparations for the CAS accreditation review and that they viewed this as a legitimate activity in which to participate. Whilst they performed a majority of the tasks and processes required for the CAS accreditation survey, they all also worked to enrol other staff members. Mandatory enrolment of senior nurses on all wards was successful but voluntary enrolment of more junior staff achieved varying degrees of success. Ward leaders attempted to influence and motivate staff by facilitating discussions, using educational strategies and collaborative working.

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The ward reporting the greatest success in voluntary enrolment, and the most extensive participation in short term quality improvement activities, employed the widest range of strategies including role modelling and putting the CAS into context. Such interactive approaches are powerful motivators (Gill 2006). This was the ward with two ward leaders in place, one of whom as a retiring member of staff had significantly more nursing and leadership experience than any of the other study ward leaders.

People with a greater sense of community are more likely to offer their time and resources towards collective interests (Aveling et al. 2012). Data from the HSoPSC showed that on all intervention wards, at baseline and follow-up, survey respondents agreed that the *“Teamwork within units”* subscale items were present on their wards. Furthermore, all of the ward teams were described in positive terms by their ward leaders. Thus, the data did not highlight any differences between the ways in which ward staff worked as teams which might have contributed towards the varying degrees of success in voluntary enrolment. Consequently, findings suggest that ward leaders’ experience/skills are critical determinants in the effective enrolment of staff.

Overall, the material practices required by the CAS accreditation review were workable. Preparations for the CAS accreditation review focused on the processes of data collection demonstrating immediate compliance with the CAS standards and preparing the ward environment such that a good impression was made. For the ward leaders, these processes prompted identification of problem areas and associated work to implement immediate change. Activities included work to improve Turnaround⁵⁴ results, increase compliance with medication storage, de-clutter and improve the ward cleanliness, revise and update patient documentation and assessments, improve the dispatching of specimens and the standard of nutritional care. Previous studies have also shown that the process of preparing for accreditation and becoming accredited is associated with improvements in a broad range of activities associated with safety practices and systems (Al Awa et al. 2011, Sekimoto et al. 2008, Sekimoto et al. 2009).

⁵⁴ Intentional rounding process used to support staff to reduce rates of falls and pressure ulcers

Whilst some wards were assessed as achieving full accreditation with no conditions others were awarded accreditation with conditions and required to make further immediate changes in preparation for an accreditation re-review. All wards achieved full accreditation with no conditions at their re-reviews. Previous studies by Pomey et al. (2004, 2010) indicate that accreditation recommendations can be an effective tool in stimulating change. However, as previously noted by Urden and Ecoff (2013), there was also a suggestion that positive changes arising as a result of preparing for accreditation were not necessarily maintained post accreditation.

Previous studies have found accreditation to be positively associated with staff empowerment (Baskind et al. 2010), improved leadership (Braithwaite et al. 2010) and a more favourable nursing practice environment (Choi & Boyle 2014). Key participants in the CAS accreditation review also experienced a number of unintended positive effects. Those ward leaders who were relatively inexperienced found their knowledge and understanding of the CQD data was increased. Junior staff who participated in the CAS accreditation review also experienced personal development outcomes such as increased understanding of audit data. Thus, key participants' ability to measure, understand and integrate that information into ward activities was increased. These abilities have been identified as key characteristics enabling microsystems to continuously improve quality of care (Donaldson & Mohr 2001). Consequently, the skill set workability of the key participants was enhanced.

Equally, for those ward leaders who were relatively inexperienced, participation in the CAS accreditation review process was described as being empowering and supported them to develop a more comprehensive understanding of their leadership role. This finding has positive implications given effective leaders empower other people to do what needs to be done (Gill 2006). Effective leadership, and alignment of role and training, have been highlighted as key characteristics of high performing microsystems (Barach & Johnson 2006). Furthermore, for registered nurses, nurse manager leadership is a critical determinant of a healthy work environment and consequently job satisfaction (Kramer & Schamlenberg 2008). Job satisfaction has been shown to be linked to NHS staff wellbeing (Maben et al. 2012). Hence, whilst there was no direct evidence here, the potential to improve nurse manager leadership identified

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here suggests the CAS may generate mechanisms through which a ward environment more fully supportive of staff wellbeing can be realised.

9.2.2 Quality and credibility of the CAS assurance

Overall, the process evaluation showed that the CAS accreditation review process was completed and on each intervention ward there was some evidence of the process stimulating change. In common with an earlier study by Greenfield et al. (2011) key participants felt participating in the CAS accreditation review was worthwhile: they valued the recognition and reassurance that CAS accreditation provided. Yet, whilst the term “assurance” conveys a sense of guaranteeing consistent delivery of high quality care (Deane & Biro 2008) the extent to which the CAS provides a reliable measure of best practice is unclear.

There are numerous challenges associated with the development of sets of standards, or indicators (for fuller details refer to Chapter 2, section 2.3.2) and there is no clear overall guidance on what constitutes best quality care in acute hospital wards. Therefore, the CAS standards are based on this Trust’s interpretation of quality of care. The choice of standards is crucial in determining the acceptability of an accreditation scheme (Scrivens 1997). Effective microsystems are underpinned by similar optimal characteristics such as leadership, staff and patient focus (Kosnik & Espinosa 2003). Thus, the domains of “*Safety*”, “*Patient experience*”, “*Staff and team experience*” and “*Our ward*” embodied in the CAS framework are applicable to all the Trust’s wards.

However, the wards provide different services and have diverse clinical aims. Consequently, quality assurance systems need to recognise that different settings and services require different approaches (Dixon et al. no date). Yet, the same CAS standards are applied to all the wards. Hence, key participants did not always perceive the CAS standards as being fully credible and some recommended the development of area specific standards. Best practice in developing accreditation standards is for this to be a continuous and evolutionary process thus ensuring they remain up to date, relevant and comprehensive (Shaw 2004). In general, key participants appraised a majority of the CAS processes and outcomes with reference to concepts such as credibility, reciprocity and truthfulness.

Whilst the CAS accreditation review processes accord with many of the fundamental components of healthcare accreditation schemes (for fuller details refer to Chapter 2, section 2.4) there is limited evidence demonstrating their reliability. Key participants questioned the objectivity of the CAS accreditation review surveys and their consistency across wards. Thus, questions were raised about the overall reliability of the CAS accreditation review processes. This finding contrasts with that of a study by Greenfield et al. (2009) who found that key ACHS accreditation scheme stakeholders perceived the ACHS surveys to be reliable. However, some of the CAS standards are qualitative and the potential for qualitative standards to give rise to inconsistency amongst peer reviewers has been noted in other accreditation schemes (Joshi 2003). Best practice in accreditation programmes includes surveyor training and continuing education to ensure technical competence to conduct an accreditation survey (Shaw 2004). Whilst healthcare accreditation schemes such as that of the ACHS provide a comprehensive peer reviewer training programme (ACHS 2014), the CAS does not. Key participants identified a need for reviewer training.

In common with a previous study by O'Connor et al. (2007), this study found that key participants considered service user representation on the peer review panel to be crucial in ensuring the credibility of the CAS accreditation review results. Consequently, the CAS peer review panel was perceived as lacking credibility in instances when a service user representative was not present, as happened in two reviews. Perceptions of the degree of fairness of the decision making process were also reduced in instances where the ward's clinical matron was not present at the desktop review. Perceptions of the extent of procedural fairness influence the degree of trust in the decisions made and consequently determine reactions to those decisions (Brockner & Siegel 1996 cited Gilson 2003). Hence, this finding has significant implications for the manner in which a ward may respond to any review recommendations and highlights the importance of ensuring attainment of the full range of CAS review panel members.

Factors such as these may explain why key participants had to determine the overall utility of the CAS. In essence, the quality of the assurance component of the CAS had yet to be fully established.

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9.2.3 Ongoing quality improvement

Effective accreditation schemes are those which encourage continuous quality improvement (Rooney & van Ostenberg 1999). Quality improvement is the ongoing process of quality enhancement activities (Donabedian 2003). In much of the literature there appears to be an inherent assumption that participation in a healthcare accreditation scheme will promote ongoing quality improvement. The process of quality improvement comprises a lengthy cycle of review of quality, goal setting and action planning, monitoring of achievement and further review (Deane & Biro 2008). The CAS framework of standards, or indicators, was intended as a mechanism to support this process.

A key quality improvement target of the NHS is the reduction of avoidable harm and the improvement of patient experience (NHS Improving Quality 2014). Consequently, whilst the rates of some adverse events were low and patient experience ratings were variable prior to implementation of the CAS there was still room for improvement. Although the evidence is not strong, some previous studies have suggested healthcare accreditation is associated with reduced rates of falls (Dunton et al. 2007, Everhart et al. 2014, Lake et al. 2010) and improved patient experience (Aiken et al. 1999).

Preparations for the CAS accreditation review required wards to collate and review a range of quantitative and qualitative ward data and to take action to raise standards. Ward leaders identified a range of benefits arising from employment of the CAS framework. Yet, this study found no evidence of reflexive monitoring⁵⁵, a core element of the normalisation of interventions into routine practice, even at the time of the first round interviews: this suggests that ward staffs' attentions, resources and practices were only briefly focused upon this activity. Improvements in safety performance or patient experience was contingent upon participation in the CAS prompting wards to develop long term programmes of activity that sought to change their existing systems/practices. This short term approach may explain why no quantitative evidence was found demonstrating a positive association between participation

⁵⁵ The presence of reflexive monitoring provides evidence of embedding of the CAS

in the CAS and rates of falls or pressure ulcers, and ratings of patient experience.

The CAS, through the inclusion of safety standards has potential to have a positive effect upon safety culture. Yet, no evidence was found to suggest an association between participation in the CAS and a ward's overall safety culture⁵⁶ as measured by the HSoPSC. Whilst this accords with the finding of a previous study that explored the relationship between accreditation status and hospital level safety culture (El-Jardali et al. 2011, El-Jardali et al. 2010) Hughes et al. (2009) also concluded that nurses in hospitals with Magnet accreditation were significantly more likely to communicate about errors than nurses in hospitals without Magnet accreditation.

For one ward, participation in the CAS was associated with increasing overall perceptions of safety (on the HSoPSC subscale). The magnitude of this change was large. For another ward, participation in the CAS was associated with an increase in safety culture measured by four of the HSoPSC subscales. The magnitude of these changes ranged between medium (one subscale) and large (three subscales) although differences in response rates and associated bias between the baseline survey sample ($n = 33$) who were actively recruited by their ward leader and the self-selected follow up sample ($n = 15$) may have contributed to this finding. Only the association between participation in the CAS and increases on the *"Feedback and communication about error"* subscale was significant in the pooled analysis. The magnitude of this change was small but this does echo the finding of Hughes et al. (2009).

In essence, there was limited evidence indicating that participation in the CAS had an effect upon safety culture and multiple testing further reduces confidence in this evidence. The process evaluation found limited evidence of cognitive participation and collective action amongst the wider ward team. Crucially, cultural change comes about through actively negotiated and cooperative change in the actions and behaviours of all the members of a

⁵⁶ As a consequence of low survey response rates, the effect of the CAS upon context was explored for only two of the intervention wards; survey data from all three intervention wards was included in the pooled analysis

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group (Anderson-Wallace & Blantern 2005). Furthermore, this process of changing a group's values, attitudes and beliefs requires time (Northouse 1997). Thus, the limited team engagement and short term approach to the CAS may explain the lack of evidence of cultural change.

Overall, little evidence of change associated with any of the quantitative measures was found. The process evaluation found some evidence of short term change made in order to demonstrate performance against the CAS standards but no direct evidence that it resulted in improvements in quality of care. Thus, the predicted short term outcomes of the CAS logic model (Figure 56, boxes 19-23) were achieved. However, these short term outcomes were not necessarily sustained and there was no evidence of the predicted medium/long term outcomes of ongoing quality improvement (Figure 56, boxes 24-29).

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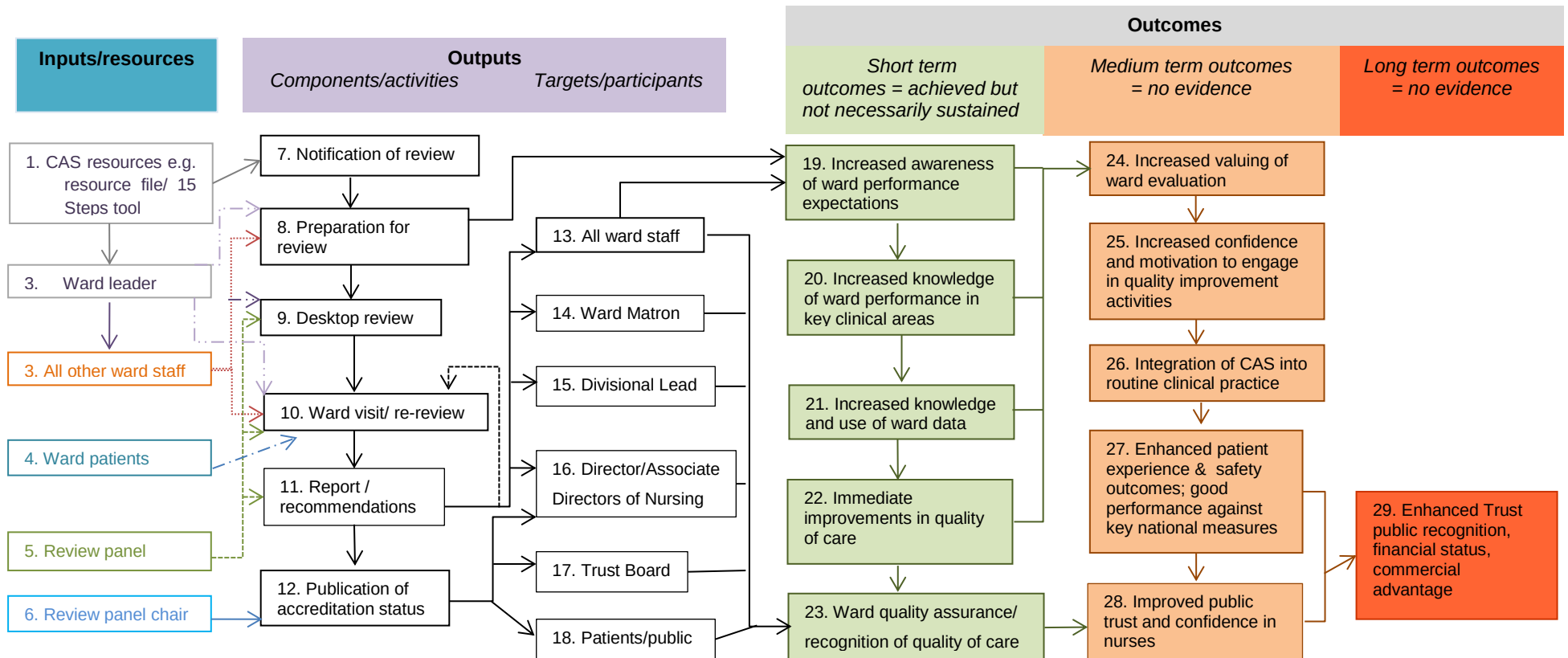


Figure 56: The CAS logic model

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9.2.4 Dysfunctional effects

When it came to participation in the CAS assurance process, key participants had the motivation, positive attitudes and knowledge identified as being critical determinants for successful implementation of quality improvement activities (de Vos et al. 2010, Koh et al. 2008). However, embedding of a complex intervention such as the CAS framework and consequent participation in quality improvement activities, is dependent upon a range of contextual influences which determine the behaviours, choices and reasoning of key participants (Pawson 2006). It is clear that key participants also experienced a number of dysfunctional effects which may have contributed to the absence of ongoing quality improvement.

In accordance with a previous study by Elkins et al. (2010), many key participants experienced the process of preparing for the CAS accreditation review as stressful, worrisome and anxiety provoking. Additionally, whilst the high level of clinical expertise of the peer review panel members was valued, factors such as peer reviewer questioning styles and knowledge of the CAS processes were not always perceived favourably. This also provoked anxiety and disappointment on the part of key participants and their wider ward teams. A previous study showed that the style and approach adopted by surveyors influences the motivation of staff to maintain active participation in an accreditation scheme (Greenfield et al. 2011). Thus, for some, participation had a negative impact upon their wellbeing and potentially upon their motivation to continue their engagement with the CAS.

Ward leaders also experienced the process of collecting and reviewing data in accordance with the CAS framework to be time consuming and burdensome. This resulted in a need to work additional hours and to take additional office/management time at the expense of clinical time. A similar finding has been noted in a study of the ACHS accreditation self-assessment process by Fairbrother and Gleeson (2000). Quality improvement initiatives are more likely to fail if they are seen to require diversion of resources away from patient care (Wilkinson et al. 2010) or use existing resources inefficiently (Dixon-Woods et al. 2012). Whilst this finding contributes towards an explanation of the lack of evidence of ongoing quality improvement associated with the CAS,

key participants' sense making processes and the presence of associated dysfunctional behaviours contribute towards a fuller explanation.

The CAS, in providing wards with a framework of standards/indicators and assessing performance by an external review process, closely resembles the activities of the CQC. For a majority of the key participants it was the activities of the CQC that supported them in making sense of the CAS. Information about the CQC is commonly phrased in such a way that its primary purpose is indicated to be to monitor, inspect and regulate quality of care (NHS Choices 2013). Thus, the CQC is widely understood to be an externally owned top-down quality assurance system. This close association between the CQC processes and the CAS processes may have undermined some of the presumed benefits of the CAS for the following reasons.

Assurance systems, such as the CQC, tend to use performance indicators prescriptively in order to make summative judgements of compliance with targets; this can generate suspicion and fear (Freeman 2002). Within the NHS this combination of factors has been shown to result in dysfunctional target driven "*shame and blame*" cultures (The King's Fund 2013) focused on displays of unquestioning compliance (Francis 2010). Crucially, fear can undermine the trust that is required for quality improvement activities (Sitkin & Roth 1993). This in turn can result in reactive and defensive behaviours that limit identification of opportunities to improve quality of care (Dixon-Woods et al. 2014). In such situations individuals may become disempowered and as a consequence intrinsic motivation is decreased (Gill 2006). Ultimately, creativity, a key factor underpinning innovation, may be reduced (Gill 2006).

Consequently, the introduction of performance indicators, particularly as external summative systems, has potential to give rise to a range of dysfunctional behaviours as shown in Table 92. These behaviours may explain why previous studies have shown that neither the measurement of performance via indicator data nor the provision of performance feedback automatically result in quality improvement activities (de Vos et al. 2009, Jamtvedt et al. 2006).

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Table 92: Dysfunctional behaviours associated with the introduction of performance indicators, public reporting and rating systems

Tunnel Vision	Concentration on the clinical areas being measured
Sub-optimisation	Pursuit of local objectives to the detriment of long-term criteria
Myopia	Concentration on short-term targets and issues
Measure fixation	Pursuit of strategies to enhance the measure rather than the wider objectives
Misrepresentation	Deliberate manipulation of data
Misinterpretation	Drawing misleading inferences
Gaming	Alteration of behaviour to gain strategic advantage
Ossification	Lack of application of new and innovative approaches to reduce risk of appearing to perform poorly
Erosion of public trust and reduced staff morale	Experienced by services with low ratings
Ghettoisation	Low performing services experience greater difficulties with staff recruitment and retention than high performing services

From (Freeman 2002, Lester et al. 2011, Mannion et al. 2005, Smith 1995)

This study found that:

- wards pursued strategies to attain the CAS standards but there was no evidence of further efforts to attain a “gold standard”
- ward leaders identified the benefits of employing the CAS framework but there was no evidence of embedding of this process
- there was no evidence of prolonged engagement in quality improvement
- standards demonstrated for the CAS accreditation review were not necessarily maintained

Hence, there was evidence of the dysfunctional behaviours of measure fixation, tunnel vision and myopia although it is not clear whether these behaviours arose as a consequence of implementation of the CAS. Many of the behaviours associated with clinical practice are habitual (Nilsen et al. 2012) and these may have been previously established behaviours. Nonetheless, their presence may explain why there was no evidence of use of the CAS framework as a descriptive formative mechanism to support ongoing quality improvement activities.

Overall, this sense making process and associated dysfunctional behaviours could explain why enactment of the CAS reflected the common microsystem approach to CQC inspections of immediate external impression management and seeking reassurance. This resembles the “*comfort seeking*” behaviour frequently associated with data collection activities in NHS organisations (Dixon-Woods et al. 2014). A significant adverse consequence of this behaviour is the potential for inhibition of the process of translating information into long term goals for improving quality and safety (Dixon-Woods et al. 2014).

9.3 Developing the CAS

9.3.1 Embedding the CAS framework

Although it was not used to identify ongoing quality improvement goals, ward leaders identified that use of the CAS framework clarified their ward’s data, provided a comprehensive overview of ward performance for the past year, enabled observation of yearly trends in the CQD data which could be linked to occurrences of adverse events, highlighted overlooked issues and provided a direction for future activities. Thus, the CAS framework does have potential to enhance a ward’s routine data collection and review activities in the following ways.

Reviewing CQD data longitudinally is a departure from the norm of reviewing monthly data in isolation. The benefit is that meaningful patterns can be revealed which support more systematic learning (Edmondson 2004). Equally, the collection of both qualitative and quantitative data provides wards with not just a range of data but with high quality intelligence (Dixon-Woods et al. 2014). High quality intelligence is a key factor supporting the development of clear goals for improvement (Dixon-Woods et al. 2014). Furthermore, high quality intelligence supports ongoing fine-grained performance analysis. This has been identified as a key strategy in learning about and improving patient safety (National Advisory Group on the Safety of Patients in England 2013). Such enhanced use of performance measurement and tracking underpins the

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attainment of peak microsystem performance and the delivery of high quality care (Batalden et al. 2003).

However, realisation of these benefits requires progression from a comfort seeking approach to data collection activities to the alternative more positive “*problem sensing*” approach. This approach involves continuously and actively utilising multiple sources of data to seek out problem areas or weaknesses within the organisation (Dixon-Woods et al. 2014). It would provide an opportunity for ward staff to take ownership of the high quality intelligence provided by the CAS framework and to translate it into ongoing quality improvement actions. Additionally, it would support wards to behave more responsively in maintaining standards post CAS accreditation and to detect failings at an earlier point in time. Furthermore, this approach reduces the tendency for staff to view data collection and review activities, such as those required by the CAS, as burdensome and fruitless (Dixon-Woods et al. 2014).

In essence, if the CAS framework could be successfully embedded and embraced as a bottom up improvement mechanism, it could provide a mechanism that supports wards to work towards attaining peak performance through ongoing quality improvement.

9.3.2 Microsystem factors influencing successful embedding

All the wards participated in short term quality improvement activities. However, there was no evidence of the ward teams organising themselves into the shared purposeful activity, or participatory collaborative approach, that is required to realise embedding of the CAS framework and participation in ongoing quality improvement. In this approach all grades of staff within the community coordinate their activities through a shared commitment to work towards an ultimate goal (RCN 2011). Thus, by reducing the burden on ward leaders and using resources (staff) more efficiently, this approach may overcome some of the dysfunctional effects associated with the CAS. Equally, such an approach improves willingness to change and increases a team’s ability to maintain an effective response (Batalden et al. 2003), fosters problem solving and social learning, and increases the chance of detection of potential for innovation (Wilkinson et al. 2010). Hence, this approach increases capacity to participate in ongoing quality improvement.

Time constraints have been identified as being one of the most significant barriers to the implementation of quality improvement activities (de Vos et al. 2010). It was partly ward leaders' perceptions of overburdened staff that prevented them from facilitating a participatory collaborative approach in preparing for the CAS accreditation review. This implies that staffing levels were inadequate to support wide collective action. This accords with the findings of the HSoPSC "*Staffing*" and the PES-NWI "*Staffing and resource adequacy*" subscales which showed that in general survey respondents did not view this aspect of their wards positively. This subjective staff experience is confirmed by the failure of the Trust to attain the CQC staffing standard⁵⁷ at study commencement. Thus, staffing levels at study commencement may have been inadequate to support collective action across the ward teams.

As previously noted by Pongpirul et al. (2006), adequate staffing levels are required in order to achieve successful quality improvement activities associated with healthcare accreditation. By study end the Trust had successfully attained the CQC staffing standard and for some study wards there had been an influx of new staff. Although, capacity to embed the CAS framework and ongoing quality improvement activities appeared to have increased, the second round interview participants continued to perceive their wards as having inadequate capacity to support this activity. This may be because of the effects of constant change and competing priorities which were also perceived by key participants as factors hindering embedding.

Constant change and competing priorities are frequent occurrences within the NHS (Whitelaw et al. 2011). As publicly funded services NHS hospitals are faced with continual external pressures to improve quality of care, innovate, improve efficiency and effectiveness, measure performance and participate in performance assessment processes. Many of these external pressures are translated into internal pressures for each individual hospital ward. This plethora of initiatives, over which ward staff have no control, has potential to result in turbulence, confusion and conflicts of priorities (Whitelaw et al. 2011).

⁵⁷ CQC report reference withheld in order to maintain Trust anonymity

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During the piloting of the CAS, for example, the nationally mandated “Safety Thermometer” (HSCIC 2013b) and “Friends and Families Test” (NHS England 2014) placed two new performance measurement requirements upon the ward staff. This constant introduction of new initiatives has potential to result in initiative overload. Initiative overload can occur in instances where new changes are introduced in a simultaneous or overlapping fashion: consequently, there are no periods of stability in which changes can be evaluated (Stensaker et al. 2001). In such situations quality improvement interventions are less likely to succeed (Dixon-Woods et al. 2012).

While high staff workloads, constant change and competing priorities present significant challenges to embedding of the CAS framework and ongoing quality improvement some findings suggest their presence may not automatically prevent embedding. Key participants were familiar with the data utilised as standards within the CAS. Additionally, the CAS framework/standards and the existing internal and external performance measurement and management processes were in synergy: for example, outcomes relating to the newly introduced “Safety Thermometer” and the “Friends and Family Test” were included in the CAS standards.

Baseline and follow-up survey data from the HSoPSC *“Feedback and communication about error”* and *“Organisational learning – continuous improvement”* subscales also indicated intervention ward respondents perceived their environments as being ones which promoted self-assessment, reflection and learning around safety events. Hence, although preparing to join the CAS, as an unfamiliar and additional process, has potential to further contribute to perceptions of initiative overload once the CAS framework is embedded it has potential to enhance the effectiveness of existing ward activity.

Despite perceptions of high workload, junior staff who participated in the CAS accreditation review experienced a number of positive effects such as increased understanding of audit data and raised awareness of the wider Trust. Such personal development and learning outcomes are associated with an increased sense of personal accomplishment which in turn is related to reduced burnout and enhanced job satisfaction (Vahey et al. 2004). Crucially, staff wellbeing is an important antecedent for high quality patient care delivery

and is linked to patient experience (Maben et al. 2012). Thus, whilst there is no direct evidence here of enhanced job satisfaction and staff wellbeing, this finding suggests there is a need for ward leaders to achieve a balance between “protecting” staff in order to prevent negative effects and enabling participation which may realise positive effects. Achieving such a balance would support a broadened team contribution and progression towards a participatory collaborative approach.

9.3.3 The mesosystem role

The integration of leadership between the macrosystem and the microsystem levels is a key component of successful improvement initiatives (Wilkinson et al. 2010) (for an illustration of the systems levels in this study refer to Figure 57).

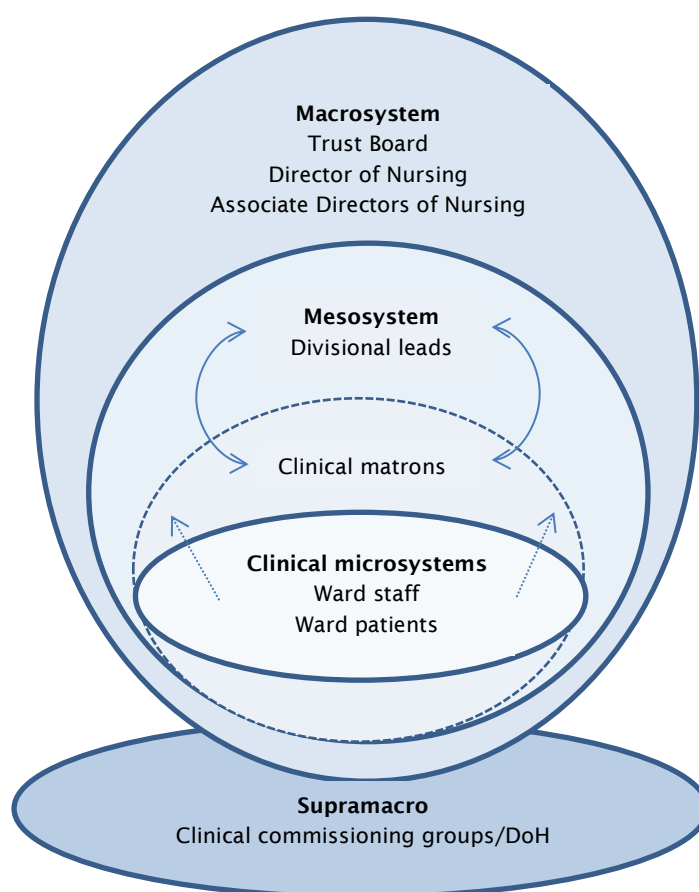


Figure 57: The CAS nested systems

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It is middle managers who occupy a pivotal position in developing an effective innovation implementation climate (Sitkin & Roth 1993): that is, ensuring staff perceive that the use of an innovation is expected, supported and rewarded (Birken et al. 2012). Activities include diffusing information to, and synthesising information for, microsystem staff, mediating between implementation requirements and day-to-day tasks, and ensuring microsystem staff consistently and effectively use an innovation (Birken et al. 2012).

A study by El-Jardali et al. (2008) concluded that ongoing senior management commitment and support are significantly associated with ensuring healthcare accreditation is accompanied by successful implementation of quality improvement practices. Thus, it is clinical matrons, in ensuring ongoing dissemination and reiteration of the goals of the CAS, who have a key role to play in demonstrating the expectations of embedding and in mediating the negative effects of contextual factors such as perceptions of initiative overload and competing priorities. Scant evidence was found of the clinical matrons playing an active leadership role in the implementation of the CAS. Review of fieldwork notes showed that implementation of the CAS did not change their strategic role expectations. Additionally, there was no evidence of the clinical matrons leading discussions that encouraged embedding of the CAS framework. Furthermore, the clinical matron participating in the process evaluation perceived the CAS as a short term quality assurance intervention.

It appears that the macrosystem's expectations for implementation and embedding of the CAS were insufficiently well articulated. A number of changes to pivotal macrosystem and mesosystem staff occurred during the pilot and initial implementation phases of the CAS: this may have negatively impacted upon the original vision of the CAS as a scheme to secure ongoing participation in quality improvement, and upon the clarity of the CAS goals and their effective communication across the system levels. Staffing instability is a major challenge facing the successful implementation of NHS quality improvement initiatives (Dixon-Woods et al. 2012).

Clarity of role expectations and well defined top-down goals are required to create a positive sense of agency, effective role enactment and focused work activities for middle managers (Mantere 2008). Incorporation of Magnet priorities into staff appraisals has been identified as a successful mechanism in

supporting middle managers to reiterate the goal of embedding of the processes underpinning Magnet reaccreditation (Goode et al. 2005).

9.4 Study strengths and limitations

When interpreting this study's findings consideration should be given to the following strengths and limitations.

9.4.1 Study design

This is the first study to explore the effects of a healthcare accreditation scheme at the microsystem level. Use of mixed methods, and collection of a wide range of data, supported a greater understanding of the effect of implementation of the CAS than would have been provided by either quantitative or qualitative methods alone.

The use of a controlled before-and-after study design with multiple matched pairs of wards, and random assignment to intervention/control group, sought to overcome some of the limitations of previous research that was largely cross-sectional. Nevertheless, the difficulty in getting fully matched pairs of wards posed a limitation with selection of study wards requiring the pragmatic approach of nearest pair matching. Consequently, there were minor differences between the attributes of pairs of wards before the study started. Allocation of wards to the study and their consequent participation in the CAS was concealed until study commencement. However, the CAS was piloted on other wards in the Trust and it is not known whether this produced anticipation bias on the study wards. Additionally, the erroneous enrolment of a control ward into the CAS changed the fidelity of one of the matched pairs. However, the potential for this to have negatively impacted upon the fidelity of the quantitative findings has been shown to be minimal.

9.4.2 Measures of safety and experience

In this study, measures of safety and patient experience were explored as a controlled time series in order to reduce threats to internal validity. It was not possible to view the Trust data in detail prior to study commencement. Hospital acquired infections and, for some wards, pressure ulcers were found

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to be relatively rare. Therefore, these indicators had limited power to detect real differences in quality of care. The Picker Inpatient Experience Survey has undergone extensive psychometric testing. However, patient experience is a complex construct to conceptualise and measure and the selected questions may also not have been sufficiently sensitive to detect real changes in quality of care. The collection of survey data by volunteers was a further limitation of this study. As a consequence sample sizes were variable and the extent to which the volunteers' recruitment activities introduced bias into the samples is unknown. The overall extent of potential non-response bias is unknown.

Nonetheless, the limitations of these measures of safety and patient experience also demonstrated the value of the process evaluation in providing alternative evidence of participation in other activities with potential to positively impact upon safety and patient experience. SPC charts were a useful tool in exploring the longitudinal data. However, the use of six months historical data did not allow for the effect of seasonal trends when calculating the stabilised centre line. Six or eight successive data points were required to provide evidence of trends or shifts in the data: the study duration of one year provided only 12 data points. Consequently, it was only those effects occurring almost immediately that would have been detected. Yet, changes to the systems for managing and preventing the occurrence of safety events, and for managing patient experience, are likely to take time to develop and embed. Therefore, any effects occurring later in the study would have been undetected. However, process evaluation data revealed no evidence of wards making ongoing changes to the systems for managing and preventing the occurrence of safety events or for managing patient experience.

9.4.3 Measures of culture and environment

Contextual effects were explored using US survey instruments which had undergone extensive prior psychometric testing. Safety culture and the nursing practice environment are complex constructs to conceptualise and measure and the following points indicate it is not clear how effective the surveys were at doing this. Both surveys had been successfully used in UK populations. However, some of the survey respondents, using the open ended question at the end of the survey, indicated a lack of understanding of some of

the PES-NWI scale items and a questioning of their relevance to their ward's practice setting and culture. In the case of the HSoPSC, the questions relating to communications and frequency of events reported were those most frequently missing. This suggests that some staff may have perceived such questions to have been of a sensitive nature. Thus, social response bias may also have been introduced into the survey results.

The potential survey sample sizes were limited by the number of staff on each ward. Survey recruitment was challenging and response rates across the wards were variable. This may have occurred for a number of reasons. First, staff turnover created a moving target. Second, staff also indicated, both verbally and through the withholding of demographic details and workforce characteristics, concerns over confidentiality. Third, perceptions of a lack of relevance to practice settings and potentially sensitive questions may have discouraged participation. Finally, some ward leaders reported their staff were overloaded with a requirement to participate in other surveys.

This was a self-selected sample of individuals who had their own motives for participating. Other than staff grades, information about non-responders was not available and therefore the extent of possible non-response bias is unknown. Survey response rates were insufficient to support the use of regression modelling techniques. Additionally, there was insufficient linked data to conduct a longitudinal analysis. Nevertheless, tests of mean differences and measures of association were sufficient to identify a small number of positive associations and subscale trends. Adjustments for multiple testing were not made due to their potential to increase the rate of Type II errors. Nonetheless, the overall Type I error rate for each of the HSoPSC and PES-NWI family of tests, p values and 95% confidence intervals are presented. Interpretation of results focused on 95% confidence intervals. Effect sizes, demonstrating the magnitude of change, were calculated for significant results.

9.4.4 Process evaluation

Whilst the interviews were fewer in number than anticipated, they produced rich detail that helped to explain the quantitative findings. The interview participants represented each ward's key participants. Use of NPT as a

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framework supported systematic and rigorous data analysis and this provided a useful way to examine participation in the CAS on each ward. This study only explored the effect of participating in the CAS on four wards but the process evaluation has enabled generalisations to be made across these wards. These identify enhancements to the processes and tasks required by the CAS, and suggest supporting mechanisms that may support ongoing engagement with, and promote embedding of, the CAS⁵⁸.

9.5 Conclusions

9.5.1 Summary

This study provides the first evidence demonstrating how an innovative healthcare accreditation scheme, operating at the microsystem level, is operationalised.

It has been shown that enactment of the CAS followed a similar pattern across the study wards. Preparations for the CAS accreditation review process prompted wards to collect a range of data that demonstrated compliance against the CAS standards. Where required, wards undertook a range of short term quality improvement activities prior to an accreditation review and participated in remedial actions following an accreditation review. Thus, this study has generated new knowledge showing that a healthcare accreditation scheme, the CAS, can assure microsystem quality of care and promote participation in short term quality improvement activities. Consequently, the CAS has potential to meet the requirement, recently highlighted by Keogh (2103), for a mechanism within the NHS that measures and monitors the overall quality of care provided by individual microsystems.

However, it was also demonstrated that, in its present format, the CAS has a number of signification limitations. The assurance provided by the CAS should be viewed with caution given the overall credibility and quality of the CAS assurance process has not yet been fully established. Furthermore, ward quality of care is only assured for the point in time at which the CAS

⁵⁸ For details see Section 9.5.1 Practice recommendations

accreditation review takes place and it should not be assumed that the standards demonstrated for the review will be maintained post accreditation. Equally, the CAS did not achieve its core goal of ongoing quality improvement. Thus, participation in the CAS cannot be relied upon to provide a solution to all issues of ward quality of care.

The CAS is a resource intensive scheme. These study findings do not present a clear picture as to whether the outcomes of participation in the CAS, chiefly the assurance of quality of care, merit this ongoing investment of resources. However, some evidence has been provided showing the potential for further work on the CAS to realise fuller implementation outcomes. It has been demonstrated that employment of the CAS framework improved key participants' ability to review, track and evaluate their ward's performance. Hence, whilst the quality of the CAS standards has yet to be fully established, embedding the CAS framework into a microsystem's routine data collection and review activities has potential to provide a mechanism that supports systematic learning about ward quality of care. Thus, an embedded CAS may support attainment of the following: "*The most important single change in the NHS in response to this report⁵⁹ would be for it to become, more than ever before, a system devoted to continual learning and improvement of patient care, top to bottom and end to end*" (National Advisory Group on the Safety of Patients in 2013 p5).

Crucially, the evidence contributing towards an explanation of the manner in which the CAS was operationalised demonstrates that embedding this process remains a significant challenge. New knowledge has been generated showing the potential for dysfunctional behaviours, previously associated with the use of performance indicators but apparently resulting from a perception of the CAS as a top down initiative, to hinder the potential for participation in a healthcare accreditation scheme to generate ongoing quality improvement. Additionally, it has been demonstrated that, whilst the key participants (ward leaders) were not themselves resistant to implementation of the CAS their perceptions of a range of contextual factors, including perceived workload,

⁵⁹ The report was a review of the Independent Inquiry into care provided by Mid Staffordshire NHS Foundation Trust January 2005 – March 2009 (Francis 2010)

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limited their willingness to offer extensive participatory opportunities to the wider team. However, whilst the challenge of these contextual factors should not be discounted, some evidence has been provided indicating they should not be automatically presumed to prevent embedding of the CAS.

Implementation of a number of practice recommendations, providing ongoing support and structural change, is required to overcome the challenges to embedding. This may transform the CAS into a mechanism with potential to promote participation in goal focused quality improvement activities.

9.5.2 Practice recommendations

9.5.2.1 Microsystem actions

The potential for implementation of the CAS to enable wards to continually engage in effective learning and improvement activities could be realised with adoption of an ongoing team approach to the tasks and processes required by the CAS. Such a collaborative participatory approach is a key characteristic of clinical communities in which quality improvement initiatives work well (Aveling et al. 2012). Therefore, it is important that ward leaders engage a wider range of team members in preparing for, and responding to, CAS accreditation reviews, and in the ongoing collection and review of data against the CAS framework. While it may not be feasible to actively involve all members of the team, a wider working group representing the range of job roles and staff bands within the ward team could facilitate wider engagement.

A broadened team contribution would also support the development of ward level horizontal leadership of the CAS. Horizontal leadership strengthens the cohesiveness of a group's response to the overall quality improvement goal (Aveling et al. 2012). This may be further enhanced by, for example, a junior nurse providing leadership on the CAS, or acting as a champion of the CAS, to their peers. There is a significant body of evidence demonstrating positive associations between the presence of project champions and successful quality improvement outcomes (Kaplan et al. 2010). Thus, it is a broadened team contribution that would provide the foundations for the realisation of fuller outcomes from embedding of the CAS.

9.5.2.2 **Mesosystem actions**

The potential for embedding the CAS could be increased through enrolment of the clinical matrons into stronger and more positive leadership roles related to the CAS. Enactment of this leadership role may occur in a number of ways. First, they are in a position to mediate between the resource requirements of day-to-day activities and those required for implementation of the CAS. Second, they have a role to play in activities that support ward staff to translate the requirements of the CAS into concrete tasks. Third, they occupy a key position in providing ongoing dissemination of information about the CAS and selling the CAS in a manner which provides support to overcome some of the contextual factors and dysfunctional behaviours identified as hindering embedding and ongoing quality improvement. Overall, these processes, in signalling middle management “buy-in”, have an important role to play in legitimising participation in a quality improvement intervention (Birken et al. 2012).

9.5.2.3 **Macrosystem actions**

Ensuring the clinical matrons provide stronger and more positive leadership of the CAS requires clarification of their role expectations by senior managers. There is also a requirement for more well-defined top-down goals that explicitly articulate the expectations for implementation and embedding of the CAS.

Inclusion of the CAS in the Trust supervisory, appraisal and personal development planning processes would provide a mechanism by which to achieve this across the systems levels. For example, supervision’s task oriented content (Pearce et al. 2013) may be employed to introduce contextual cues that change the habitual manner in which ward leaders collect and review their routine data or to identify special roles that motivate members of the wider ward team to participate. The identification of individuals with special roles is advantageous given this has been shown to strengthen the effectiveness of quality improvement initiatives (Aveling et al. 2012). Furthermore, structuring supervision’s quality control function (Milne 2007) around the CAS framework would provide consistent communication across

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the systems levels about the quality measurement dimensions. Clarity of goals would also serve to mitigate some of the effects of staffing instability.

Further technical work on the CAS is required to ensure the quality of the assurance process and to ensure that the intrinsic motivation of staff to participate is not undermined through a lack of trust and confidence in the CAS processes. The key outstanding requirements for technical work are as follows. Work to ensure the immediate credibility of the CAS standards and long term work to ensure their ongoing trustworthiness. Implementation of a peer reviewer programme which provides training on interpretation of the standards, knowledge of the survey process, interviewing and observation skills, documentation review skills and report writing techniques, as identified by Shaw (2004). This would reduce the potential for ward staff participating in a CAS accreditation review to experience unintended negative effects and provide a mechanism by which to demonstrate the trustworthiness of the review findings.

9.5.3 Enacted changes

Preliminary study feedback, combined with additional staff feedback alongside progression of the Trust wide roll out, has already led to the following amendments. The review process now includes a workshop to obtain staff feedback on their ward. Ward visits have changed to short notice surveys; this accords with the practice of the JC (JC 2012c) and provides a more accurate picture of day-to-day performance. A more robust process has been implemented to ensure the review panel membership is of the correct composition and includes a service user representative.

A Quality Assurance Review Panel has been implemented to monitor the quality and timing of the accreditation review panel formal written reports and the decisions made. Nominations for award of Exemplar status are provided to the Quality Assurance Review Panel on a six monthly basis. The panel decide which wards will be awarded the Exemplar status based on evidence of sustained high quality care. A CAS website has been established on the staff intranet; this provides more detailed information to assist panel members in undertaking their roles and acts as a forum for sharing of best practice and learning across the wards.

9.5.4 Research recommendations

Current healthcare accreditation research provides sparse and weak evidence of ongoing quality improvement resulting from accreditation related quality assurance. This study found no evidence that the CAS quality assurance process resulted in ongoing quality improvement.

A key feature in any behaviour change, including those directed to quality improvement, is the presence of generative mechanisms that prompt the required activity. Thus, the presence or absence of such mechanisms will determine the success of change implementation and the outcomes achieved. Accordingly, the revised MRC guidance on developing and evaluating complex interventions (Craig et al. 2008) states that intervention evaluations should seek to understand such generative processes. The evidence base for healthcare accreditation provides only hints of potential generative mechanisms which may support change and quality improvement activity. This is an area that requires further research.

Realist synthesis can help identify underlying causal mechanisms (Pope et al. 2007) and could be usefully employed to examine the implementation of healthcare accreditation schemes. Future healthcare accreditation research, in the form of a further exploratory trial, should then test the effectiveness of the mechanisms and change processes identified. This study provides important baseline information to support a further exploratory trial but the parameters for a full RCT have yet to be fully established. Therefore, research should continue in accordance with Phase II of the MRC guidance on developing and evaluating complex interventions and seek to refine the study design. Such a trial should adopt a quasi-experimental approach in order to evaluate effectiveness but also incorporate a nested process evaluation which supports a realist evaluation (Craig et al. 2008).

On the basis of this study's findings, the process evaluation would benefit from expansion to include key participants operating across the systems levels. Study methods should be broadened to include an ethnographic approach in which data on a wider range of activities encompassing the accreditation process is collected via observation, interviews and documentary analysis. Measures of safety, patient experience and culture/environment

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should be refined. Collaborative work should be undertaken with clinicians in order to identify more sensitive safety measures and more specific measures of culture/environment. Collaborative work should also be undertaken with service users and clinicians to identify methods for undertaking more specific qualitative exploration of patient experience. Any further studies should be of a sufficient duration to capture more than one complete cycle of the accreditation scheme.

If such change mechanisms are identified and exploratory work suggests that they are functioning, progression to Phase III of the MRC framework, a full trial or definitive RCT, may be warranted as this is the most robust method to reducing study bias which has plagued a majority of the healthcare accreditation research to date. However, such research should continue to employ a nested process evaluation to identify contextual factors and causal explanations for variations in outcomes (Craig et al. 2008). Finally, this study has shown that the implementation and management of healthcare accreditation schemes, such as the CAS, is resource intensive. The costs to healthcare organisations undertaking accreditation are an under researched area (Greenfield & Braithwaite 2008). Therefore, future research, such as a Phase III trial, should also aim to provide a cost effectiveness analysis.

Whilst this study has explored one particular approach to healthcare accreditation, the recommendations for a future programme of research could equally well be applied to other approaches to healthcare accreditation. The importance of understanding generative mechanisms and exploring whether the broader aims of improvement beyond assurance are being realised applies to established hospital level schemes, such as the JC and the Magnet accreditation scheme, and to aspects of other mandatory regulatory schemes such as the Care Quality Commission.

10. Appendices

Appendix 1 – Pilot test amendments

- A requirement to include accreditation standards assessing the dimensions of leadership and team effectiveness was highlighted.
- Inclusion of additional documentary evidence, such as copies of matrons peer review forms, for the previous 12 months, was considered to be required to strengthen the ward documentary evidence.
- Guidance for the peer review panel on determining review outcomes was clarified. The peer review panel size was reduced to a maximum of four members.
- Criteria for the accreditation levels were refined and a further category of “Working Towards Accreditation” to reflect a ward with failing status was added.
- Ward revisit timescales were revised and lengthened to ensure feasibility within available resources.
- The 15 Steps Challenge toolkit (NHSI 2012) was added to the CAS documentation to enable staff to understand the process underpinning the panel ward visit.
- A final outcomes report template, Accreditation certificate and letter of thanks to panel service user representatives were developed.

Appendix 2 – Summary of findings: healthcare accreditation research and CAS model

Study	Aim	Design	Sample	Methods	Main results
Alkhenzian & Shaw 2011	To evaluate the impact of accreditation programs on the quality of health care services	Systematic literature review	Single method: electronic database searching of Medline, Embase, Healthstar and Cinhal to June 2009	Quality assessment performed utilising standardised tool; results reported as narrative	26 studies identified; a majority of studies evidenced improvements in the structure and organisation of healthcare facilities, and improved clinical outcomes
Balogh & Cook 2006	To explore the Magnet accreditation process in an NHS acute care hospital Trust (UK)	Qualitative case study	Purposive sampling; senior staff ($n = 11$) in 1 Trust	Study duration = 2 years Face to face ($n = 23$) and telephone ($n = 3$) interviews; field notes; analysis of documents associated with project	Magnet accreditation can be successfully transferred to UK. Principle issues relate to terminology, cost and engagement of medical and allied professionals. Managers believed good practice, internal networks and sharing of good practice had increased. Impact on patient outcomes not assessed.
Baskind et al. 2010	To explore the effects of the RCP's Accreditation for Acute Inpatient Mental Health Services Programme on standards of care and explore how staff achieved change (UK)	Qualitative study	Purposive sample of 16 participating wards; convenience sampling of lead contacts from wards $n = 8$	Thematic analysis of telephone interview data	Staff perceived the accreditation process: improved communication; gave power to negotiate for resources; gave clear guidance on practice; rewarded good practice; led to additional unrelated improvements in care
Brasure et al. 2000	To explore factors influencing participation of rural hospitals in JC accreditation process (US)	Cross-sectional survey	Random sample of 299 rural hospital administrators, $n = 248$ (response rate = 92%)	Researcher developed self-administered survey instrument; descriptive statistics	A majority of respondents felt they did not have the resources to meet accreditation standards; only 4% felt the fees were appropriate and 8% felt the demands on staff time were reasonable; 80% listed cost as the reason they did not participate;

concern regarding publication of data was also raised

Choi & Boyle 2014	To examine differences in nursing practice environments in hospital units with/without Magnet status	Secondary data analysis of a cross-sectional survey using the PES-NWI	<i>N</i> = 5322 nursing units in 519 US acute care hospitals participating in the NDQI RN survey 2011	Self-administered survey instrument. Eligible units were those with 5+ participants and response at least 50% Linear regression analysis adjusted for hospital size, teaching status, Magnet status and geographical location	Magnet hospital status was a significant predictor of more favourable unit nursing practice environments; staffing and resource adequacy score lowest across all unit types
El Jardali et al. 2008	To assess nurses' perceptions of the impact of accreditation on quality of care (Lebanon)	Cross-sectional survey	<i>N</i> = all 59 hospitals that had passed both of the Lebanese national accreditation surveys	Self-administered survey instruments developed in previous studies (not validated) 50% of registered nurses in each participating hospital; <i>n</i> = 1968 (response rate = 75.5%, <i>n</i> = 1485) Descriptive and inferential statistics Use of multiple self-administered standardised and non-standardised survey instruments Data analysis: tests of independence (Hotellings <i>t</i> squared test)	Nurses perceived an improvement in quality of care during and after the accreditation process; factors such as leadership and commitment/support were predictors of greater quality improvements
Elkins et al. 2010	To examine the effects of perceived stress on nursing hospital management and administrative employees before and after a JC survey (US)	Observational longitudinal survey	Random sampling of 100 hospital staff at 1 hospital	Use of multiple self-administered standardised and non-standardised survey instruments Data analysis: tests of independence (Hotellings <i>t</i> squared test)	Nurses in administrative roles perceived increased stress associated with a JC site visit
Fairbrother & Gleeson 2000	To gain organisations feedback about the AHCS programme (Australia)	Cross-sectional survey	Sample = all members of hospital executive, all department heads, all nursing unit managers and all senior clinical staff at 1 teaching hospital <i>n</i> = 200	Research developed self-administered post EQUIP accreditation process feedback survey; response rate = 44% <i>n</i> = 88; descriptive statistics and content analysis	The process was seen as a significant burden. Estimated cost in the final six months of preparing for accreditation = \$1 million. 50% respondents considered the process to be worthwhile; 25% expressed negative views. The process was viewed as being lengthy, repetitive, labour intensive with little evidence of impact on clinical care

Greenfield et al. 2007a	To provide an analysis of health sector accreditation literature	Systematic literature review	Multiple electronic database searching (Medline, EMBASE and Cinahl) to July 2007	No quality appraisal undertaken; concepts, their relationships and overarching themes identified; production of concept fieldmap; systematic review of identified literature; results reported as narrative	102 articles identified Accreditation research focus and settings identified; categories as in Greenfield & Braithwaite (2008) literature review
Greenfield et al. 2007c	To analyse the literature covering intra-rater and inter-rater reliability in healthcare accreditation	Systematic literature review	Multiple electronic database searching (Medline, EMBASE and Cinahl) to August 2007	No quality appraisal undertaken; concepts, their relationships and overarching themes identified; production of concept fieldmap; systematic review of identified literature; results reported as narrative	Reliability of accreditation surveyors remains an under-researched issue and has yet to be demonstrated empirically. Two studies examine the reliability of nursing home surveys; two studies consider reliability when examining other surveyor issues; five studies focus on the reliability of assessments made to accredit individual professions.
Greenfield et al. 2007b	To examine the healthcare accreditation literature related to unannounced surveys and the patient tracer methodology	Systematic literature review	Multiple electronic database searching (Medline, EMBASE and Cinahl) to August 2007	No quality appraisal undertaken; key concepts and themes presented as narrative	The unannounced survey literature search identified 83 articles, none of which were research articles. All refer to JC accreditation. The tracer methodology literature search identified 51 articles, 8 of which were research articles but unrelated to accreditation programmes. The value of both concepts within accreditation programs remains to be demonstrated empirically.
Greenfield & Braithwaite 2008	To identify and analyse research exploring accreditation and the accreditation process	Systematic literature review	Electronic database searching of Medline, EMBASE and Cinahl to May 2007; consultation with healthcare accreditation agencies; general internet searching	No quality appraisal performed; documents categorised under 10 topics; results reported as narrative	66 documents categorised under 10 categories: professions' attitudes, promote change, organisational impact, financial impact, quality measures, program assessment, consumer views or patient satisfaction, public disclosure, professional development, surveyor issues

Greenfield et al. 2008	To investigate how healthcare accreditation surveyors perform their role (Australia)	Observational study	<i>N</i> = 1 rural hospital undergoing an ACHS accreditation survey	Observation of survey team activities; survey team = 3 members	A typology identifying three surveyor styles of “interrogator”, “explorer” and “discusser” was identified
Greenfield & Pawsey 2009	To assess whether healthcare accreditation survey processes are reliable (Australia)	Mixed methods: cross-sectional survey, focus groups and interviews	Participants = key stakeholders in ACHS programme	Surveyors <i>n</i> = 91 in <i>n</i> = 20 focus groups; member organisation representatives <i>n</i> = 35 participants in <i>n</i> = 4 focus groups and <i>n</i> = 56 questionnaire participants; accreditation agency personnel <i>n</i> = 8 in <i>n</i> = 1 focus group and <i>n</i> = 3 interviews Thematic analysis	Six emerging themes identified as shaping the reliability of surveys: the accreditation programme, member relationship with the accreditation agency and survey team, accreditation agency personnel, surveyor workforce renewal, managing the surveyor workforce, and survey team conduct. Stakeholders perceived healthcare accreditation surveys to be a reliable activity.
Greenfield et al. 2011	To explore the experiences of key personnel participating in an accreditation process (Australia)	Qualitative study	Purposive sample of <i>n</i> = 30 health executives, managers and frontline clinicians at <i>n</i> = 1 large public teaching hospital	Semi-structured interviews Thematic analysis: accreditation response, survey issues and documentation issues identified as categories; each category had a number of sub-themes	Participation in the accreditation process was viewed as promoting a quality and safety culture; participants valued the opportunity for learning and validation which could be a motivational process; survey time was viewed as insufficient; the skill and credibility of surveyors was assessed in a number of ways
Greenfield et al. 2012a	To evaluate the effectiveness of utilising patient journey survey methods in accreditation surveys (Australia)	Randomised trial, mixed methods	<i>N</i> = all 39 healthcare organisations scheduled for EQUiP accreditation survey; random selection of a stratified sample <i>n</i> = 21; participants <i>n</i> = 18	Patient journey survey tested in parallel with usual accreditation methods; each survey conducted simultaneously by different survey teams; <i>n</i> = 38 patient journey surveys Research developed self-administered cross-sectional survey – <i>n</i> = 28 organisational staff, <i>n</i> = 8 surveyors, <i>n</i> = 4 patients Interviews <i>n</i> = 28 staff (13/17)	Patient journey survey not as comprehensive and less effective in evaluating corporate and support standards; the two methods reached different assessments as to whether the organisation met the accreditation threshold; participants endorsed the use of the method

Greenfield et al. 2012b	To evaluate the use of short notice surveys in accreditation programmes (Australia)	Randomised trial, mixed methods	<i>N</i> = all 184 member organisations in self-assessment year of accreditation cycle and not due for survey visit within following 9 months; randomised stratified sample of <i>n</i> = 39 (21%) agreeing to participate; final sample <i>n</i> = 20	participating organisations), <i>n</i> = 5 surveyors Descriptive statistics and thematic analysis <i>N</i> = 20 organisations, 301 ratings produced giving 241 matched items (short notice survey and last conducted advanced notice surveys) Research developed self-administered cross-sectional survey: <i>n</i> = 95 responses (survey staff and representatives from organisations) Inferential statistics and thematic analysis	The short notice survey produced results similar to those of the advanced notice surveys; short notice surveys assessed more organisations as not meeting accreditation threshold compared to previous advanced notice survey assessments; participants endorsed the use of the short notice survey with some reservations
Hinchcliff et al. 2012	To systematically identify and synthesis accreditation literature	Systematic literature review	Electronic database searching of Medline, EMBASE, and Cinahl to January 2012; consultation with healthcare accreditation agencies; general internet searching	Quality appraisal performed utilising standardised tool; themes identified as in 2008 narrative review	122 empirical studies identified meeting the inclusion criteria; limited evidence base with a majority of studies being of moderate quality and a majority of study designs prevented generation of strong evidence
Ito & Sugawara 2005	To examine the association between accreditation scores and the disclosure of accreditation reports (Japan)	Cross-sectional study	All hospitals participating in the Japan Council for Quality Health Care by January 2003	Research developed self-administered survey instrument: <i>n</i> = 817 (response rate = 67%, <i>n</i> = 547). Public disclosure status and accreditation scores from JCQCH database. Inferential statistics	Public hospitals and hospitals in urban areas were significantly more likely to disclose their accreditation reports; a positive correlation between public disclosure and accreditation scores was found
O'Connor et al.	To evaluate the role and participation of the consumer surveyor (Northern Ireland)	Mixed methods	All consumer surveyors involved in the seven surveys conducted in 2005 <i>n</i> = 5; <i>n</i> = 7 participating organisations; <i>n</i> = all 30 professional surveyors participating in	Focus groups with surveyors (professional and consumer) and organisations being surveyed Interviews <i>n</i> = 3 accreditation scheme staff Research developed self-administered	The inclusion of consumer surveyors was considered to lend credibility and objectivity to the survey process; characteristics such as good communication and interpersonal skills were required; further clarification and

			2005 surveys	cross-sectional survey; surveyors $n = 35$, response rate $n = 20$; hospital staff $n = 191$, response rate = 29%, $n = 56$ 6 levels of analysis: departments, ten groups each completing one section of accreditation manual's standards, operational, strategic, hospital, administrative bodies Interviews $n = 67$; survey instruments $n = 3,248$ (response rate = 52%) Framework analysis using model of Dimensions of Change	development of their role was required
Pomey et al. 2004	To examine the organisational changes that occurred following the self-assessment and preparatory phase in the accreditation process (France)	Mixed methods case study	Sample $n = 1$ hospital; all hospital full-time professionals and members of Quality Commission		The accreditation preparation process was viewed as bureaucratic by many staff but also gave an opportunity to express opinions. Clinical and medico-technical staff participated most in the process; nurse managers were the most motivated to participate in the process and assumed the leadership roles whilst physicians had a tendency to disengage. Sharing of information and greater service integration with other hospitals occurred.
Pomey et al. 2012	To explore organisation characteristics and identify changes linked to the accreditation process (Canada)	Multiple case studies	$N = 5$ Canadian hospitals selected to represent a range of hospital characteristics	Participants = staff directly involved in the accreditation process Interviews $n = 25$; $n = 42$ participants in $n = 10$ focus groups; documentary analysis Framework analysis using model of Dimensions of Change	The context in which accreditation takes place, including the organisational context, influences the type of change dynamics; different changes occur in different phases of the accreditation process; benefits incurred from participation in an accreditation scheme dwindle over time.
Pongpirul et al. 2006	To explore the problems and obstacles experienced in implementing quality management systems according to accreditation standards (Thailand)	Cross-sectional survey	Random multistage cluster sampling of $n = 39$ hospitals	Research developed self-administered survey instrument Purposive sampling of $n = 728$ health professionals (response rate = 94.9%) and $n = 41$ surveyors (response rate = 73.2%) Descriptive and inferential statistics	Surveyors rated integration and utilization of accreditation feedback as a key barrier; health professionals rated this second to adequacy of staff
Urden & Ecoff 2013	To describe the impact of the Magnet journey upon registered nurses	Qualitative study	$N = 1$ community hospital and 1 healthcare system in SW US with recent Magnet	8x focus groups, with 8-10 participants each Grounded theory	Themes of: relationships with leaders, Magnet continuum, professional relationships, professional development, staff voice, resources/support, Magnet

			accreditation; $n = 9$ settings		slippage, Recommendations for nurses
Walsh et al. 2011	To examine the factors perceived to promote or hinder implementation of the Baby Friendly Hospital accreditation scheme (Australia)	Qualitative study	$N = 6$ hospitals (mixture of private/public/rural/urban/credited/working towards accreditation/non-accredited)	Focus groups (number not given) with $n = 31$ key hospital staff stakeholders in the scheme (clinical, managerial, administrative, educational) Thematic analysis of data	Staffs' understanding and personal views are often not in accordance with BHFI aims; perceived difficulties include accreditation process and hospital dynamics; one hospital decided against accreditation because of cost, another because of budgetary constraints

Appendix 3 – CAS supporting documentation

The documentation developed to support ward staff in the accreditation process had the following composition:

Section one: explanation of the process of accreditation including full details of the review process and timescales.

Section two: self-assessment tool, detailing accreditation standards, for completion by ward leaders prior to attending the review panel; tool for completion during ward visit by members of the review panel. Development of the ward environmental assessment tool was based on the toolkit, The 15 Steps Challenge, developed by the NHS Institute for Innovation and Improvement (NHSI 2012) which seeks to support healthcare professionals to view hospital care from the perspectives of patients and relatives. A copy of the 15 Steps Challenge was included in each ward resource pack for their use in preparing for the ward visit.

Section three: marking framework for levels of accreditation and accreditation report form.

Appendix 4 – Safety: summary of findings and risk of bias tables

Summary of findings table: safety						
Category: Safety Systems						
Study	Aim	Method	Sample	Statistical risk adjustment/ control of confounders	Main results	Risk of bias
Al Awa et al. (2011)	Assess nurses' perceptions of the impact of accreditation on quality of care and safety	Cross-sectional survey; non-standardised questionnaire administered pre- and post-accreditation to registered nurses	22 units, and 870 nurses, in a single Saudi Arabian University Hospital; response rate 82.87% ($n=721$) to both surveys, 93.62% ($n=675$) meeting eligibility criteria	Not applicable for level of analysis	Accreditation was significantly associated with increased compliance in use of risk management information and increased compliance with nursing actions to reduce risk	Serious
Hosford (2008)	Investigate impact of JC accreditation, state medical error reporting and public awareness on hospital medical error management systems	Cross-sectional survey; non-standardised questionnaire administered to quality improvement managers	Stratified random sample of hospitals in all USA states ($n=793$); response rate 18% ($n=145$)	None stated	JC accreditation was associated with higher levels of progress in implementing medical error management systems (statistics not given). No statistically significant differences identified in the progress or effectiveness of medical error management systems between groups	Very serious
Longo et al. (2007)	Identify organisational characteristics that predict greater implementation of safety systems	Cross-sectional survey; non-standardised questionnaire administered on 2 occasions	Hospitals from 2 USA states; response rate 65.2% ($n=107$) to both surveys	Hospital characteristics: bed size, management type, urban/rural status, JC accreditation status	JC accreditation status was significantly associated with a higher level of safety system implementation and a higher level of improvement in implementation Management type and urban/rural status play minor roles; bed size was a non-significant predictor	Serious

Salmon et al. (2003)	Study the impact of the Council For Health Services Accreditation of South Africa accreditation programme	Randomised controlled trial utilising research developed safety/effectiveness indicators	20 South African public hospitals, stratified by size; control (joining accreditation scheme $n=10$) / intervention (accreditation pending $n=10$)	Tests of differences only	Little or no effect of the intervention was observed on the safety/effectiveness indicators	Serious
Sekimoto et al. (2008)	Identify the impact of accreditation on infection control infrastructure and performance	Cross-sectional survey; non standardised questionnaire administered to hospital directors on 2 occasions	All teaching hospitals in Japan ($n=638$); response rate 335 ($n=52\%$) to both surveys	Hospital characteristics: ownership, university hospital, number of acute care beds, number of employees, accreditation status in each year	New accreditation was significantly associated with an increase of 2.6 points on an infection control performance score (maximum score = 77 points)	Moderate
Sekimoto et al. (2009)	Analyse the associations among resources, infrastructures, activities and performance related to infection control	Cross-sectional survey; non standardised questionnaire administered to infection control practitioners or hospital managers	Stratified sampling of all teaching hospitals ($n=638$), response rate 66.3% ($n=423$), and all non-teaching hospitals ($n=882$), response rate 50.2% ($n=377$), in Japan	Hospital characteristics: teaching status, infection control staffing levels, accreditation status	Accreditation was significantly associated with a 2.3 point higher overall infection control performance score (maximum score = 68) Hospital size was associated with higher overall gains in infection control performance than accreditation	Serious

Category: Safety Culture

Study	Aim	Method	Sample	Risk adjustment/ confounders controlled	Main results	Risk of bias
El-Jardali et al. (2010)	Baseline assessment of patient safety culture in Lebanese hospitals	Cross-sectional survey; adapted version of standardised questionnaire administered to hospital staff	All 126 private Lebanese hospitals (response rate 54% $n=68$); random sample of 50% of hospital staff in participating hospitals (response rate 55.56% $n=6807$)	Hospital size and accreditation status	Safety culture composite scores were found to be significantly higher for those respondents working in accredited hospitals	Moderate
El-Jardali et al. (2011)	Explore the association between safety culture predictors and outcomes	Further analysis of El-Jardali et al. (2010) data (above)	As El-Jardali et al. (2010) (above)	Hospital size and accreditation status, staff position, patient safety composite scores	Staff perceptions of better patient safety were significantly associated with hospital accreditation	Moderate
Hughes et al. (2009)	Describe the patient safety climate on medical-surgical units and explore associated hospital and unit characteristics	Cross-sectional survey; 4 subscales of Safety Climate Scale and 3 subscales of Error Orientation Scale utilised – unclear whether standardised measures	Random sample of 146 JC accredited acute care hospitals from 2002 American Hospital Association Guide to Hospitals; all registered nurses meeting inclusion criteria (response rate = 58% $n = 3,689$)	None – t tests for independent samples performed	Nurses in Magnet hospitals participated in error related problem solving and communicated about errors to a greater extent than nurses in non-Magnet hospitals Greater managerial commitment to safety was reported in Magnet hospitals compared to non-Magnet hospitals	Serious

Category: Adverse events/complications

Study	Aim	Method	Sample	Risk adjustment/ confounders controlled	Main results	Risk of bias
Aiken et al. (1994)	Investigate whether Magnet designated hospitals have lower mortality rates than non-Magnet designated hospitals	Cross-sectional study: retrospective secondary data analysis	Magnet designated hospitals reporting to the Health Care Financing Administration Medicare hospital mortality rate file in 1988; $n = 39/41$ Magnet hospitals. Random order, nearest available pair matching used to create control sample of 5 non-Magnet hospitals per Magnet hospitals	Predicted mortality used as a proxy for patient composition/ characteristics	Magnet hospitals have a 4.6% lower 30-day mortality rate	Moderate
Aiken et al. (1999)	To compare differences in AIDS patients' 30-day mortality rates in a range of hospital unit types, including Magnet hospitals	Cross-sectional study	Two units in each of 20 hospitals; matched pairs of hospitals on basis of wide range of organisational/socio-economic characteristics; Magnet hospitals or equivalent $n = 3$ $n = 162$ patients in Magnet hospitals, $n = 1,043$ patients in other hospitals	Intravenous drug use, illness severity measures, Magnet status, dedicated AIDS unit, AIDS hospital with scattered bed unit, nurse-to-patient ratio, AIDS specialty physician, nurse autonomy	Hospital Magnet status was significantly associated with lower 30-day mortality rates (Odds Ratio 0.4)	Moderate
Barker et al. (2002)	Identify the prevalence of medication errors reaching patients	Cross-sectional study with direct observation of medication errors	Stratified random sample of 36 USA accredited and non-accredited hospitals and skilled nursing facilities; four nursing units from each site; 50 medication administrations per unit	Not applicable for level of analysis	There is no significant difference between medication error rates by facility type or size	Moderate

Chandra et al. (2009)	Evaluate the association between Society of Chest Pain Centers Accreditation and risk adjusted mortality for patients with unstable angina	Cross-sectional study: retrospective secondary data analysis	Patient data (2005) from hospitals ($n = 364$) participating in the "Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the American College of Cardiology Guidelines (CRUSADE) quality improvement initiative Included hospitals $n = 14$ accredited/323 non-accredited; patients $n = 33,328$	Generalised estimating equations Patient demographics, wide range of clinical variables, primary attending physician, insurance status, bed size, region, teaching status, facility type	No association was found between accreditation status and mortality rates	Moderate
Chen et al. (2003)	Assess whether JC hospital accreditation is associated 30 day mortality rates for acute myocardial infarction (AMI)	Cross-sectional study: retrospective secondary data analysis	Patient data (January 1994-February 1996) from the US wide Cooperative Cardiovascular project - 134,579 patients meeting inclusion criteria JC surveyed hospitals $n=3,179$ / non JC surveyed hospitals $n=1,042$	Patient characteristics in primary analyses; secondary analyses included adjustment for hospital and physician characteristics	Non JC surveyed hospitals had higher thirty day mortality rates than surveyed hospitals	Moderate
Dunton et al. (2007)	Describe the relationship of nursing workforce characteristics to patient fall rates and the rate of hospital acquired-pressure ulcers	Cross-sectional study: retrospective secondary data analysis	Quarterly data 2005-2006 from the NDNQI database $n = 1,610$ nursing units	Hospital bed size, teaching and Magnet status, unit type, workforce characteristics in relation to each unit's registered nurses	Fall rates in Magnet facilities were 10.3% lower than rates in non-Magnet facilities No association was found between hospital acquired pressure ulcer rates and Magnet status	Moderate
Evans et al. 2014	Compare survival rates in Magnet accredited vs non-Magnet accredited trauma centers	Cross-sectional s: retrospective secondary data analysis	Pennsylvania Trauma Outcome Study data for level I and II trauma centers (2009-2011); trauma centers with less than 500 admissions during study period excluded also study inclusion criteria for patients	Age, sex, temperature, paralytic drug, systolic blood pressure, mechanism of injury, Glasgow Coma Scale score, mortality prediction score; adjusted for clustering	Patients admitted to a Magnet hospital had significantly decreased odd of mortality when compared to non-Magnet hospitals (OR 0.83)	Moderate

Everhart et al. 2014	Describe the relationship of nurse staffing and hospital characteristics to hospitals with “consistently high” patient fall rates	Longitudinal (54 month) study: retrospective secondary data analysis	US acute care hospital patient falls monthly data from the NDNQI database <i>n</i> = 1,529 hospitals	Magnet status, bed size, teaching status, metropolitan status, census region, patient fall protocol, total nursing hours, RN skill mix	Hospitals with Magnet status were significantly less likely to be categorised in the “consistently high” fall rate group	Low
Goode et al. (2011)	Compare patient outcomes and staffing in Magnet and non-Magnet hospitals	Cross-sectional study: retrospective secondary data analysis	Patient data from 2005 University Health Systems Consortium operational and clinical database ; hospital level outcomes Sample = teaching/university hospitals; <i>n</i> = 19 Magnet hospitals and <i>n</i> = 35 non Magnet hospitals	Total nursing hours per patient day, registered nurse skill mix, hospital case mix index	There was a significant association between Magnet status and higher rates of postoperative sepsis; no associations with other outcomes were found	Moderate
He et al. (2012)	Examine trends in the rate of total inpatient falls in US hospitals	Cross-sectional study: retrospective secondary data analysis	Study population all nursing units reporting to the NDNQI database from 2004-2009. All adult critical care, step-down, medical, surgical, medical-surgical, and rehab units with >2 years of fall data included (<i>n</i> = 8915 nursing units, <i>n</i> = 1,171 US acute care hospitals)	Number of NDNQI years, hospital bed size, teaching status, Magnet status, total nursing hours per patient day and the percentage of total nursing hours provided by RNs	No significant differences were found in fall rates between Magnet and non-Magnet hospitals	Low
Hickey et al. (2010)	Examine the relationship of nurse staffing, skill mix and Magnet recognition to mortality for congenital heart surgery at paediatric hospitals	Cross-sectional study: retrospective secondary data analysis	Patient data from 2005 – 2006 Paediatric Health Information Database; <i>n</i> = 19,736 cases; <i>n</i> = 38/41 hospitals in database eligible; <i>n</i> = 16 hospitals with Magnet recognition Magnet Recognition data from ANCC website	Risk adjusted mortality; patient age at surgery, prematurity, presence of a major non-cardiac structural anomaly and combinations of cardiac surgical procedures	There was no signification association between Magnet recognition and mortality rates	Moderate

Lake et al. (2010)	Examine the relationship between hospital Magnet status, nursing unit staffing and patient fall rates	Cross-sectional study: retrospective secondary data analysis	Study population all hospitals reporting to the NDNQI database in 2004; $n = 5,388$ nursing units in 636 hospitals	Range of workforce characteristics, hospital Magnet status, hospital structural characteristics, nursing unit's patient age and gender mix, hospital case mix index	Magnet hospital status was associated with a 5% reduction in fall rate	Moderate
Lake et al. (2012)	Examine the relationships between hospital Magnet status and outcomes of very low birth weight infants	Cross-sectional study: retrospective secondary data analysis	Study population all 578 hospitals reporting to the Vermont Oxford Network database 2007-2008 Sample = all hospitals with in-born infants; Magnet hospitals $n = 119$, infant cases $n = 17,455$; non-Magnet hospitals $n = 439$, infant cases $n = 54,780$	Range of infant risk characteristics, neo-natal intensive care unit volume and level, hospital ownership and teaching status	Statistically significant positive relationships were found between Magnet status and very low birth weight infant outcomes (gestational age of 24+ weeks)	Moderate
McHugh et al. (2013)	Determine and explain the relationship between hospital Magnet status and mortality and failure-to-rescue rates	Cross-sectional study: retrospective secondary data analysis	Convenience sample of adult, general Magnet ($n = 56$) and non-Magnet hospitals ($n = 508$) in 4x US states. 2006-2007 linked data from multiple databases. Nursing survey data (mail survey of 272,783 registered nurses in 4 study states, response rate = 39%) from previous study utilised	Adjustment for wide range of patient characteristics, hospital factors and nursing characteristics, and clustering of observations within hospitals	Patients treated in Magnet hospitals had lower odd of mortality and failure-to-rescue	Moderate
Pasquale et al. (2001)	Evaluate the impact of trauma centre characteristics, including accreditation status, on survival outcome	Cross-sectional study: retrospective secondary data analysis	Study sample = 24 accredited trauma centres in Pennsylvania 1992-1996 data on patients older than 14 years of age assessed as meeting serious injury criteria and with a severity trauma score of < 0.5 , $n = 3,562$	Type of serious injury, volume of trauma admissions, presence of an in-house trauma surgeon or a surgical residency program or an on-site medical school	Logistic regression modelling indicated that trauma centre accreditation status was not significantly associated with trauma survival	Moderate

Category: Relationship between accreditation scores/standards and safety indicator performance

Study	Aim	Method	Sample	Risk adjustment/ confounders controlled	Main results	Risk of bias
Braithwaite et al. (2010)	To examine the relationship between accreditation performance and clinical indicator performance	Cross-sectional study: retrospective secondary data analysis	Stratified random sample of $n = 16$ (out of $n = 1050$) hospitals participating in the Australian EQuIP cycle Routinely collected clinical indicator data (2001 to 2006) for the participating hospitals; accreditation data from the latest EQuIP surveys for the participating hospitals	Sample stratified by organisational size, sector, location and jurisdiction	A weak association was found between accreditation and clinical performance	Moderate
Griffith et al. (2002)	To examine the relationship between accreditation performance (JC scores) and Medicare outcome measures	Cross-sectional study: retrospective secondary data analysis	742 hospitals in JC and Medicare data sets made publicly available in 1996-1998	Mortality index and complications index adjusted for patient risk and hospital characteristics. Adjustment for probable impact of systematic JC suppression of release of some data. Correlation analysis between overall JC evaluation score and performance indicator scores	There was a significant association between Medicare Mortality Index score and JC overall evaluation score. There was no significant association between Medicare Complication Index and JC overall evaluation score	Moderate
Joshi (2003)	To examine the association between JC accreditation scores and mortality rates	Cross-sectional study: retrospective secondary data analysis	All general, non-federally owned, acute care US hospitals with publicly reported JC accreditation survey reports and performance reports (May 1996 – April 1997). $N = 957$ hospitals	Risk adjusted mortality rate. Logistic regression modelling controlling for hospital ownership, teaching status, occupancy, bed size, total and Medicare discharges, location, and setting	A significant positive association was found between hospital accreditation decision and reduced mortality rate ($p < 0.10$)	Moderate

Miller et al. (2005)	To examine the relationship between JC accreditation scores and AHRQ in-patient quality and patient safety indicators	Cross-sectional study: retrospective secondary data analysis	Hospital accreditation and performance data from the JC database (1997-1999) and hospital performance data from the AHRQ intramural State Inpatient Databases (1997-1999). Sample = all 2116 US hospitals (24 states with data in both databases)	No adjustment. Regression analysis of individual indicator scores and overall JC evaluation score. Correlation analysis of individual JC operational and clinical grid elements and performance indicator scores performed	No significant relationships existed between JC categorical accreditation decisions and indicator performance. Few relationships existed between JC scores for individual standards and clinically related performance indicators	Moderate
Thornlow & Merwin 2009	To examine the relationship between accreditation standards/patient safety practices, and patient safety outcomes	Cross-sectional study: retrospective secondary data analysis	Stratified probability sample of $n = 115$ general medical surgical hospitals in 20 US states with both inpatient discharge data in Nationwide Inpatient Sample (NIS) survey database in 2002 and 2002 JC survey data. $n = 1,430,981$ discharge records	Risk adjustment for patient characteristics (age, gender, diagnoses, co-morbidities). Hospital characteristics in relation to location, size, teaching status, ownership and registered nurse staffing	Utilisation of patient safety practices, as measured by accreditation standards, was significantly associated with decreased rates of infection and decubitus ulcers but not post-operative respiratory failure or failure to rescue	Moderate

Risk of bias table: safety studies				
Risk of bias grading	Low	Moderate	Serious	Very serious
Number of elements judged as unclear	0-3	4-6	7-9	10+
Risk of bias	Interpretation of individual studies			
Low	Plausible low risk of bias for a small number of key domains within a study that is unlikely to seriously impact upon results			
Moderate	Plausible bias for a moderate number of key domains within a study that is sufficient to raise a moderate level of doubt about the results			
Serious	Plausible high risk of bias for a significant number of key domains within a study that raises serious concerns surrounding the results			
Very serious	Plausible very high risk of bias for a majority of key domains within a study that seriously weakens confidence in the results			
Impact of healthcare accreditation on safety				
Item	Judgement Clear / Unclear	Description		
Aiken et al. (1994): retrospective cross-sectional secondary data analysis				
Representative sample?	Clear	n = 39 out of original 41 Magnet hospitals.		
Free of sampling bias?	Clear	All original Magnet hospitals with relevant data 39/41; sampling of control group as below in study design.		
Adequate sample size?	Unclear	n = 39 original Magnet hospitals with 5 matched control hospitals per Magnet hospital; p>0.05; fairly large confidence intervals given.		
Use of reliable measures?	Unclear	Reliability of factors identified to create propensity scores not clear.		
Use of valid measures?	Unclear	Validity of factors identified to create propensity scores not clear.		
Free of outcome identification bias?	Unclear	Mortality data reported to Health Care Financing Administration Medicare data file not clear.		
Incomplete outcome data addressed?	N/A			
Confounding addressed in study design?	Clear	Random order, nearest available pair matching using propensity scores (based on 12 organisational characteristics) used to create control sample.		
Confounding assessed statistically?	Clear	Differences in patient characteristics between Magnet hospitals and matched control hospitals are adjusted for using hospital-specific predicted mortality.		
Free of selective reporting?	Clear	None evidenced.		
Free of other bias?	Clear	None identified.		
Overall risk of bias	Moderate (4 elements judged as unclear)			

Aiken et al. (1999): cross-sectional study		
Representative sample?	Unclear	Inclusion criteria limit generalizability of findings.
Free of sampling bias?	Unclear	Method of sample selection not given.
Adequate sample size?	Unclear	Two units in each of 20 hospitals, Magnet hospitals or equivalent $n = 3$ ($n = 6$ units), $p > 0.05$ and 0.01 but wide confidence interval.
Use of reliable measures?	Clear	30-day mortality clear measure.
Use of valid measures?	Clear	Valid measure if controlling for patient characteristics.
Free of outcome identification bias?	Unclear	No discussion of identification/management of mortality arising from causes other than AIDS.
Incomplete outcome data addressed?	Clear	Discussion of patients for whom mortality data are missing.
Confounding addressed in study design?	Clear	Matched pairs of hospitals based on wide range of relevant criteria.
Confounding assessed statistically?	Clear	Multivariate regression analysis controlling for HIV risk category, illness severity, hospital/unit type, organisational factors.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Al Awa et al. (2011): cross-sectional survey		
Representative sample?	Unclear	$n = 1$ hospital; not likely to be representative.
Free of sampling bias?	Unclear	No details given sampling process or inclusion/exclusion criteria.
Adequate sample size?	Clear	$n = 870$ nurses; response rate to both surveys 82.87%; ($n = 721$); those surveys meeting eligibility criteria $n = 675$; no confidence intervals as non-parametric tests; p values < 0.001 .
Use of reliable measures?	Unclear	Survey instrument developed for study - no details given regarding development process or reliability testing.
Use of valid measures?	Unclear	Survey instrument developed for study - no details given regarding development process or validity testing.
Free of outcome identification bias?	Unclear	Potential for information bias as survey based on perceptions.
Incomplete outcome data addressed?	Unclear	Not discussed.
Confounding addressed in study design?	Unclear	Sample from one hospital and sampling method for nurses/units not discussed.
Confounding assessed statistically?	Unclear	Not performed.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	None identified.
Overall risk of bias	Serious (8 elements judged as unclear)	

Barker et al. (2002): cross-sectional study		
Representative sample?	Unclear	$n = 36$ hospitals but large numbers approached declined to participate; appropriate exclusion criteria; up to 4 different high volume nursing units participating at each site.
Free of sampling bias?	Unclear	Stratified random sampling to obtain hospitals but method of randomisation not given; selected units within each hospital given as high volume (no details as to what this means or how units were selected if there were more than 4 judged as high volume in each sampled hospital); high volume of units declining to participate.
Adequate sample size?	Unclear	Large confidence intervals and non-significant p values ($p < .05$) obtained; sufficient sample size to support statistical methods; 50 medication doses per unit observed, no details as to how this figure was arrived at.
Use of reliable measures?	Clear	Intra- and inter-rater reliability for data collectors assessed as good using split-half reliability.
Use of valid measures?	Clear	Observation of medication administration suggested to be gold standard method but has potential for Hawthorne effect.
Free of outcome identification bias?	Clear	Medication errors clearly defined; extensive training given to observers; research pharmacist made blinded independent determination of error in addition to observer; degree of potential for harm determined by blinded expert panel and included consideration of individual patient details of relevance.
Incomplete outcome data addressed?	Clear	Instances identified and discussed in which difficulties were experienced in data collection; methods to ensure completeness of data given.
Confounding addressed in study design?	Clear	Sample of hospitals stratified by size: details given.
Confounding assessed statistically?	Unclear	Only simple descriptive statistics by site size (small/large), facility type and region.
Free of selective reporting?	Clear	Reporting appears thorough; findings with no statistical significance reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Braithwaite et al. (2010): retrospective secondary data analysis		
Representative sample?	Unclear	Only 16 health service organisations (out of 1050 member organisations) participating in the accreditation programme of the Australian Council on Healthcare Standards.
Free of sampling bias?	Clear	Stratified random selection of study sites (but randomisation process not given).
Adequate sample size?	Unclear	$n = 16$ hospitals; small sample size; p value < 0.05 but results generally have values considerably higher; no confidence intervals given.
Use of reliable measures?	Clear	ACHS routinely collected clinical indicators; details given regarding indicator development and reliability on ACHS website.
Use of valid measures?	Unclear	ACHS website demonstrates how indicators tested for validity but not empirically proven. Hospitals can select which, and how many, indicators they report on; no details given as to which indicators the study sample are reporting.
Free of outcome identification bias?	Clear	Processes by which ACHS check validity of indicator data given; ACHS use tracer methodology to assess validity of reported data; minimal opportunity for incorrect reporting. Secondary data analysis with potential for errors in data extraction but carried out by a team with checks in place so likely to be minimal.

Incomplete outcome data addressed?	Clear	3 hospitals excluded from data analysis due to having submitted insufficient data from timeframe.
Confounding addressed in study design?	Clear	Stratification of random sample.
Confounding assessed statistically?	Clear	Not necessary as sample size appropriately stratified.
Free of selective reporting?	Clear	Results lacking statistical significance are reported.
Free of other bias?	Unclear	Publication bias – study includes many elements, none of which appear to be reported in detail, for example how is the national average performance for each indicator calculated/where does the data come from?
Overall risk of bias	Moderate (4 elements judged as unclear)	
Chandra et al. (2009): retrospective cross-sectional secondary data analysis (also study of effectiveness)		
Representative sample?	Unclear	Only hospitals participating in CRUSADE initiative.
Free of sampling bias?	Unclear	All Society of Chest Pain Centres 2005 accredited hospitals and all relevant patient data – rationale and sampling process clearly presented. Exclusion and inclusion criteria given. Small sample size for accredited hospitals with only 9.2% of patients being treated at accredited hospitals.
Adequate sample size?	Unclear	$n = 33,238$ patients from 344 hospitals but only 14 accredited hospitals; $p < 0.05$ but generally large confidence intervals reported.
Use of reliable measures?	Clear	The dependents variables are based on evidence-based practice = clinical guidelines which are suggested to be reliable; mortality is reliable measure.
Use of valid measures?	Clear	Valid methods are used to determine the dependent variables e.g ECGs.
Free of outcome identification bias?	Clear	Trained data collectors at each hospital used standardised definitions and forms for retrospective data abstraction; mortality rates reviewed against expected rates and where these differed extra training was supplied for hospital data collectors.
Incomplete outcome data addressed?	Clear	Amount of missing data and management of such data identified.
Confounding addressed in study design?	Unclear	Not evidenced – all hospitals selected.
Confounding assessed statistically?	Clear	Regression models utilised generalised estimating equations and adjusted for a wide range of patient demographics, clinical variables and hospital characteristics.
Free of selective reporting?	Clear	Statistically non-significant findings reported.
Free of other bias?	Clear	Not evidenced.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Chen et al. (2003): retrospective cross-sectional secondary data analysis (also study of effectiveness)		
Representative sample?	Unclear	All fee-for-service Medicare hospitalisations from acute care non-governmental hospitals with a principal discharge diagnosis of AMI and with Cooperative Cardiovascular Project; January 1994-February 1996; does not indicate extent of hospital participation in CCP; potentially excludes hospitals not participating and excludes all non-governmental hospitals.
Free of sampling bias?	Unclear	Exclusion/inclusion criteria include patients whom hospitals defined as “ideal candidates but no definition of what this

		constitutes.
Adequate sample size?	Unclear	$n = 134,579$ patients treated at 4,221 hospitals but significant uneven distribution of patients between accredited and non-accredited hospitals and across accreditation levels; confidence intervals not given; p values > 0.05 often cited.
Use of reliable measures?	Clear	Risk-standardised mortality.
Use of valid measures?	Clear	Risk-standardised mortality.
Free of outcome identification bias?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed
Incomplete outcome data addressed?	Clear	All patient records with missing data excluded.
Confounding addressed in study design?	Clear	Stratification of hospitals by accreditation level.
Confounding assessed statistically?	Clear	Adjustments made for patient, hospital and physician characteristics.
Free of selective reporting?	Clear	None identified.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Dunton et al. (2007): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Only hospitals reporting to NDNQI database – self-selected sample, tend to be larger, not-for-profit, teaching/Magnet status hospitals.
Free of sampling bias?	Clear	All data from July 1, 2005 – June 30, 2006.
Adequate sample size?	Unclear	$n = 1,610$ hospital units, number of observations not given, p values and confidence intervals not given.
Use of reliable measures?	Clear	Rater-to-standard reliability study conducted on patient fall identification.
Use of valid measures?	Clear	Studies evidencing relationship between nurses and patient falls.
Free of outcome identification bias?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Incomplete outcome data addressed?	Unclear	Management of units with missing data not discussed.
Confounding addressed in study design?	Unclear	All hospitals reporting to the database selected.
Confounding assessed statistically?	Clear	Adjustments made for hospital and workforce characteristics.
Free of selective reporting?	Clear	None identified.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (5 elements judged as unclear)	
El-Jardali et al. (2011, 2010): cross-sectional survey		
Representative sample?	Clear	54% of all hospitals in Lebanon participated; response rates evenly distributed with approx. 50% response rate across categories of hospital size, geographic region and accreditation status.

Free of sampling bias?	Clear	All hospitals in Lebanon invited to participate.
Adequate sample size?	Unclear	$n = 68$ hospitals with 6,807 staff (55.56% response rate); $p>0.05$; confidence intervals given in 2011 paper often large.
Use of reliable measures?	Unclear	Hospital Survey on Patient Safety Culture adapted and therefore no longer accessed for reliability. Survey was piloted but some hospitals still declined to participate because they felt their staff may not understand some of the survey questions.
Use of valid measures?	Unclear	Hospital Survey on Patient Safety Culture adapted and therefore no longer accessed for reliability. Reliability of amended version was examined using Cronbach's alpha but low value returned for many composite items.
Free of outcome identification bias?	Unclear	Survey potentially subject to respondent bias – both social (due to cultural factors as highlighted by authors) and recall bias.
Incomplete outcome data addressed?	Clear	Management of missing data in creating composite level scores addressed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Multivariate regression modelling explored factors such as age, gender, years of experience, hospital size, geographic location and accreditation status; use of Generalised Estimating Equations in 2011 study to manage clustering effects.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Unclear	Study asks staff about organisational capabilities and performance in the same survey – can lead to false correlations in self-report data = bias due to common method variance.
Overall risk of bias	Moderate (6 elements judged as unclear)	
Evans et al. 2014: retrospective secondary data analysis		
Representative sample?	Unclear	Data from Pennsylvania Trauma Outcomes Study 2009-2011.
Free of sampling bias?	Clear	Appropriate eligibility criteria for patients.
Adequate sample size?	Unclear	$n = 10$ Magnet hospitals, $n = 17$ non-Magnet hospitals; $n = 73,830$ patients; wide confidence interval for OR.
Use of reliable measures?	Clear	Measures such as age, sex, BP and probit mortality model score (shown to be reliable)
Use of valid measures?	Clear	Relevance of all measures discussed.
Free of outcome identification bias?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Incomplete outcome data addressed?	Clear	Management of missing data discussed.
Confounding addressed in study design?	Unclear	All hospitals reporting to the database selected.
Confounding assessed statistically?	Clear	Control for a range of variables evidenced.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (4 elements judged as unclear)	

Everhart et al. (2014): longitudinal survey		
Representative sample?	Unclear	Approx. 1.3 rd of US hospitals report to the database.
Free of sampling bias?	Clear	All hospitals reporting monthly patient falls data and nursing hours.
Adequate sample size?	Clear	$n = 1,529$ hospitals; 28.5% hospitals with Magnet status; p values = 0.05 or 0.01; small CIs
Use of reliable measures?	Unclear	Dependent variable = count of number of reported falls for each hospital; NDNQI provide definition; potential for information bias due to differing interpretations of NDNQI definition of a fall or bias in self-reporting of falls.
Use of valid measures?	Clear	Fall rates calculated per 1,000 patient days (patient days clearly defined).
Free of outcome identification bias?	Unclear	Potential for errors in initial coding and data entry processes, and in data extraction process; potential for information bias due to differing interpretations of NDNQI definition of a fall or bias in self-reporting of falls.
Incomplete outcome data addressed?	Clear	Hospitals without full reporting of monthly patient falls rate data or nursing hours excluded.
Confounding addressed in study design?	Clear	N/A
Confounding assessed statistically?	Clear	Nurse staffing, organisational characteristics and process of care used as covariates.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	Not evidenced.
Overall risk of bias	Low (3 elements judged as unclear)	
Goode et al. (2011): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Data from University HealthSystems Consortium operational and clinical databases.
Free of sampling bias?	Clear	Appropriate eligibility criteria of participants reporting to both databases.
Adequate sample size?	Unclear	$n = 19$ Magnet hospitals, $n = 35$ non-Magnet hospitals; confidence intervals not given.
Use of reliable measures?	Clear	Patient safety and inpatient quality indicators developed by AHRQ.
Use of valid measures?	Clear	Use of outcomes shown in previous studies to reflect the quality of nursing care.
Free of outcome identification bias?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Incomplete outcome data addressed?	Unclear	Management of missing data not discussed.
Confounding addressed in study design?	Unclear	All hospitals reporting to the database selected.
Confounding assessed statistically?	Clear	Control for a range of variables evidenced.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (5 elements judged as unclear)	
Griffith et al. (2002): retrospective cross-sectional secondary data analysis		

Representative sample?	Unclear	All hospitals with Medicare reports in Solucient database for 1996-1998 and with JC accreditation scores (many hospitals requested suppression of their scores and were excluded from data supplied).
Free of sampling bias?	Clear	All hospitals with Medicare reports and JC accreditation included.
Adequate sample size?	Unclear	N=742 hospitals; <i>p</i> reported at <0.05; no confidence interval given.
Use of reliable measures?	Unclear	Complications Index = incidence of 43 negative events identified via by federally funded research study; shown to have substantially lower year-to-year variation for the same hospital than for variation across hospitals suggesting reliability of index. Secondary data analysis = potential for errors in coding, data extraction etc. Potential for ceiling effect with most institutions scoring highly on JC survey.
Use of valid measures?	Clear	Complications Index developed using broadly accepted definitions.
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with indicators but accuracy of JCAHO empirically reported to be greater than 90%.
Incomplete outcome data addressed?	Clear	Probable impact of systematic loss of JC data (suppression of data from JC may have been from low scoring hospitals) estimated by Heckman regression analysis. Characteristics of hospitals likely to be excluded from sample estimated are likely to be smaller, located in smaller states, less likely to have residency training, high RN staff turnover etc.
Confounding addressed in study design?	Clear	Solucient database risk adjusts for geographic location, size, teaching status, and urban versus rural within each ICD-9-CM category.
Confounding assessed statistically?	Clear	Solucient database risk adjusts for age, sex, procedures and comorbid patient characteristics within each ICD-9-CM category. Use of Heckman regression analysis to predict characteristics of missing data.
Free of selective reporting?	Clear	Statistically non-significant findings are reported.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (4 elements judged as unclear)	
He et al. (2012): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Only hospitals reporting to NDNQI database – self-selected sample, tend to be larger, not-for-profit, teaching/Magnet status hospitals.
Free of sampling bias?	Clear	All data from 2004-2009.
Adequate sample size?	Clear	<i>n</i> = 8915 hospital units, <i>n</i> = 37,000 observations, <i>p</i> <0.5, small confidence intervals given.
Use of reliable measures?	Clear	Rater-to-standard reliability study conducted on patient fall identification.
Use of valid measures?	Clear	Studies evidencing relationship between nurses and patient falls.
Free of outcome identification bias?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Incomplete outcome data addressed?	Clear	Management of units with missing data discussed.
Confounding addressed in study design?	Unclear	All hospitals reporting to the database selected.
Confounding assessed statistically?	Clear	Adjustments made for hospital and workforce characteristics.
Free of selective reporting?	Clear	None identified.

Free of other bias?	Clear	None evidenced.
Overall risk of bias	Low (3 elements judged as unclear)	
Hickey et al. (2010): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Primary source of data was the Paediatric Health Information System administrative data for 2005-2006.
Free of sampling bias?	Unclear	Not clear what the percentage of hospitals reporting to the database is.
Adequate sample size?	Unclear	$n = 41$ hospitals reporting to the database; those meeting inclusion criteria $n = 38$ hospitals and $n = 19,736$ cases; 16/38 hospitals had Magnet Recognition; $p < 0.05$ and confidence intervals given
Use of reliable measures?	Clear	Records reported in database.
Use of valid measures?	Clear	Inclusion/exclusion criteria for patient records given.
Free of outcome identification bias?	Clear	Records categorised into levels of surgical risk following standardised RACHS-1 method.
Incomplete outcome data addressed?	Clear	Cases that could not be assigned a risk category were excluded.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Adjustment for patient case mix and additional clinical variables but not for key hospital characteristics; generalised estimating equations used to adjust for cluster effects.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Hosford (2008): cross-sectional survey		
Representative sample?	Unclear	Selection of hospitals in all USA states but high rate of non-response and poor response rate.
Free of sampling bias?	Unclear	Stratified random sampling but method of randomisation not given.
Adequate sample size?	Unclear	Neither CI or p values given to support findings; sample size $n=145$ insufficient to support logistic regression.
Use of reliable measures?	Unclear	Researcher developed survey instrument.
Use of valid measures?	Unclear	Researcher developed survey instrument; based on Baldrige performance measurement system but insufficient detail given to assess quality of instrument developed.
Free of outcome identification bias?	Unclear	Survey is exploring medical error management - information given on survey suggests high potential for information bias from respondent feedback (recall/ social desirability) is high.
Incomplete outcome data addressed?	Unclear	Management of missing data within survey instrument not discussed.
Confounding addressed in study design?	Clear	Stratification of hospitals by accreditation status, funding, ownership, size.
Confounding assessed statistically?	Unclear	Not evidenced.

Free of selective reporting?	Unclear	Insufficient data presented; logistic regression reported to be used but no unadjusted/adjusted rates given; neither <i>p</i> values nor confidence intervals reported.
Free of other bias?	Unclear	Insufficient clear evidence presented throughout to be able to judge this accurately.
Overall risk of bias	Very serious (10 elements judged as unclear)	
Hughes et al. (2009): cross-sectional survey		
Representative sample?	Unclear	JC accredited acute care hospitals with more than 99 beds.
Free of sampling bias?	Unclear	Sample randomly selected from 2002 American Hospital Association Guide to Hospitals; all registered nurses who had worked on their unit for at least 3 months and provided direct patient care no less than 20 hours each week – safety climate group construct and members of group potentially excluded.
Adequate sample size?	Unclear	286 medical-surgical units from 146 hospitals; <i>n</i> = 3,689 surveys (response rate = 58%, response rate for individuals units between 4% and 100%); confidence intervals not given.
Use of reliable measures?	Clear	Reliability of survey scales statistically assessed and reliability of aggregated data demonstrated using ICC2.
Use of valid measures?	Unclear	Validity of survey measures utilised not clear.
Free of outcome identification bias?	Unclear	Survey contents mean responses potentially subject to social bias.
Incomplete outcome data addressed?	Unclear	Management of missing data not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Unclear	Data analysis utilising <i>t</i> test for independent samples; data analysis methods do not allow for adjustment for organisational or workforce characteristics.
Free of selective reporting?	Clear	Statistically none significant results reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Serious (8 elements judged as unclear)	
Joshi (2003): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	All general, non-federally owned acute care US hospitals that had a JC accreditation survey May 1996 to April 1997 and had publicly available reports. At this time some hospitals with held their reports from publication. Reports needed to be linked to data in the 1998 American Hospital Association Annual Hospital Guide database and to hospital mortality data in the CaduCIS Net database.
Free of sampling bias?	Clear	All hospitals meeting the data requirements above were included.
Adequate sample size?	Unclear	No confidence intervals given and <i>p</i> < 0.10 quoted as statistically significant.
Use of reliable measures?	Clear	Mortality reliable measure.
Use of valid measures?	Clear	Mortality data risk adjusted.

Free of outcome identification bias?	Unclear	Potential for errors in initial coding and data entry processes, and in data extraction process
Incomplete outcome data addressed?	Clear	Extent of missing data and management of missing data clearly reported.
Confounding addressed in study design?	Unclear	All hospitals meeting the inclusion criteria included.
Confounding assessed statistically?	Clear	Multivariate regression analysis controlling for key hospital characteristics.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	Nothing evidenced
Overall risk of bias	Moderate (4 elements judged as unclear)	
Lake et al. (2010): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	25% of USA hospitals participate in NDNQI database; all falls observations submitted by all nursing units for 2004 to the database; CMI suggests NDNQI hospitals care for more complex patients than the average hospital; hospitals reporting to NDNQI are self-selected, have an interest in quality and can finance participation.
Free of sampling bias?	Clear	All hospitals and all falls observations submitted to the NDNQI database in 2004.
Adequate sample size?	Clear	n=5388 nursing units in 636 hospitals; $p<0.05$ but lower p values often given; no confidence intervals.
Use of reliable measures?	Unclear	Dependent variable = count of number of reported falls for each hospital; NDNQI provide definition; potential for information bias due to differing interpretations of NDNQI definition of a fall or bias in self-reporting of falls.
Use of valid measures?	Clear	Nursing unit fall rates calculated per 1,000 patient days (patient days clearly defined).
Free of outcome identification bias?	Unclear	Potential for errors in initial coding and data entry processes, and in data extraction process; potential for information bias due to differing interpretations of NDNQI definition of a fall or bias in self-reporting of falls.
Incomplete outcome data addressed?	Clear	Amount of missing data in databases discussed (4%) identified and management of missing data discussed.
Confounding addressed in study design?	Unclear	All hospitals meeting the inclusion criteria included.
Confounding assessed statistically?	Clear	Effect sizes of independent variables related to hospital structural characteristics (size, teaching intensity and ownership) via Annual Hospital Survey database (problems with database data discussed). Justification given for choice of all variables. GEE used to correct for within hospital clustering. Staffing levels compared at hospital and unit levels for Magnet and non-Magnet hospitals.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidence
Overall risk of bias	Moderate (4 elements judged as unclear)	
Lake et al. (2012): retrospective cross-sectional secondary data analysis		

Representative sample?	Unclear	Hospitals with a neonatal intensive care unit reporting to the Vermont Oxford Network; self-selected membership of network.
Free of sampling bias?	Clear	Inclusion criteria clearly addressed and referenced to other studies.
Adequate sample size?	Unclear	$n = 558$ hospitals (Magnet = 119), $n = 72,235$ infants, fairly large 95% confidence intervals.
Use of reliable measures?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Use of valid measures?	Clear	Vermont Oxford Network data collected using standardised definitions.
Free of outcome identification bias?	Unclear	More details required regarding grading of intra-ventricular haemorrhage.
Incomplete outcome data addressed?	Clear	Exclusion of infants with incomplete data on infant characteristics or missing data on death; figures given.
Confounding addressed in study design?	Unclear	All hospitals meeting inclusion criteria included.
Confounding assessed statistically?	Clear	Multilevel random effects analysis including control infant risk adjustment, unit and hospital characteristics; adjusted Odds Ratios given.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (5 elements judged as unclear)	
Longo et al. (2007): cross-sectional survey		
Representative sample?	Unclear	Small number of hospitals from two states surveyed. No details given regarding characteristics of non-respondents.
Free of sampling bias?	Unclear	No details given regarding selection of hospitals.
Adequate sample size?	Unclear	$N=107$ hospitals; response rate 65.2%. No confidence intervals; p value not stated but assumed to be <0.05 .
Use of reliable measures?	Unclear	Survey instrument developed for study – no details given regarding development process or reliability testing.
Use of valid measures?	Unclear	Survey instrument developed for study – internal validity tested for each factor developed using Cronbach's alpha – high scores achieved. No details given regarding factor development.
Free of outcome identification bias?	Unclear	No details given as to who completed the surveys; not possible to gauge potential for information bias.
Incomplete outcome data addressed?	Unclear	Extent of missing survey data and management of missing survey data not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Data analysed at hospital level and bed size, management type, location and accreditation status considered.
Free of selective reporting?	Clear	Not evidenced; non-significant findings reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Serious (8 elements judged as unclear)	
McHugh et al. (2013): retrospective cross-sectional secondary data analysis		

Representative sample?	Clear	Only hospitals from 4x US states but largest states and characteristics of hospitals are similar to those across rest of US; responses from nurses in all but 4 hospitals
Free of sampling bias?	Clear	Sample of all hospitals in the selected 4x US states; all registered nurses in selected states sampled.
Adequate sample size?	Clear	$p > 0.05$, small confidence intervals; $n = 272,783$ nurses, response rate = 39%
Use of reliable measures?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc; data quality not discussed.
Use of valid measures?	Clear	Risk adjusted outcome data; PES-NWI survey
Free of outcome identification bias?	Clear	Mortality rates and failure to rescue – potential for information bias due to self-reporting but not likely.
Incomplete outcome data addressed?	Unclear	Not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Extensive control for patient, hospital and nursing characteristics. Adjustment for clustering.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall level of bias	Low (3 elements judged as unclear)	
Miller et al. (2005): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Examines relationship between JCAHO accreditation scores and some Agency for Healthcare Research Quality indicators. Sample is all hospitals surveyed by JCAHO 1997-1999 and with data in AHRQ database; covers 24 states. Many hospitals and states excluded.
Free of sampling bias?	Clear	$n =$ all 2116 hospitals surveyed by JCAHO 1997-1999 and with data in AHRQ database.
Adequate sample size?	Unclear	Confidence intervals not reported; p values > 0.05 often quoted
Use of reliable measures?	Unclear	Secondary data analysis = potential for errors in coding, data extraction etc. Potential for ceiling effect with most institutions scoring highly on JCAHO survey. Data manipulated using factor analysis – derivation of component factors may impact upon some outcome identification.
Use of valid measures?	Clear	Selected performance indicators subjected to rigorous testing and assessment.
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with indicators but accuracy of JCAHO empirically reported to be greater than 90%.
Incomplete outcome data addressed?	Unclear	Not discussed.
Confounding addressed in study design?	Unclear	All hospitals meeting inclusion criteria included.
Confounding assessed statistically?	Clear	Smoothed rate estimates of indicators used in analysis to adjust for hospitals with lower rates of cases; correlations between indicator performance and staffing/hospital procedures that felt to be salient to quality of care and safety performed.
Free of selective reporting?	Clear	Findings showing no statistical significance reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (7 elements judged as unclear)	

Pasquale et al. (2001): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Data from 24 accredited trauma centres; 1992 through to 1996; patients aged 14+ years of age.
Free of sampling bias?	Clear	All patient records meeting inclusion criteria as determined by ICD-9-CM codes.
Adequate sample size?	Unclear	$n = 13,942$ patient records from 24 accredited trauma centres; p values <0.05 ; confidence intervals not given; sample size varies according to injury category and appears too small for some categories.
Use of reliable measures?	Clear	Dependent variable survival outcome in nine serious injury categories as determined by discharge status (alive or dead) – reliable. Predicted survival determined by A Severity Characterisation of Trauma score – sensitivity and reliability of measure highlighted.
Use of valid measures?	Clear	Predicted survival versus survival outcome valid measure of outcome analysis.
Free of outcome identification bias?	Unclear	ICD-9-CM codes and A Severity Characterisation of Trauma score (sensitivity and reliability of outcome prediction by severity measures unclear used to compare observed survival with predicted survival. No details as to how this was done or by who i.e. use of expert panel? Potential for errors.
Incomplete outcome data addressed?	Unclear	Management of missing patient data not discussed.
Confounding addressed in study design?	Clear	Patient data stratified across a number of variables.
Confounding assessed statistically?	Unclear	Analysis by factors such as volume and presence or absence of an in-house trauma surgeon performed but not clear whether confounders such as co-morbidities, age etc. are considered.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (5 elements judged as unclear)	
Salmon et al. (2003): randomised controlled trial		
Adequate sequence generation?	Unclear	Process not described.
Allocation concealment?	Unclear	No allocation concealment.
Blinding?	Unclear	No blinding.
Adequate sample size?	Unclear	Sample size exceeded power calculation to enable adequate stratification $n= 10$ hospitals; large confidence intervals given; p values do not demonstrate signification findings for this aspect of the study.
Incomplete outcome data addressed?	Clear	Area of incomplete outcome data identified.
Free of selective reporting?	Clear	Non-significant findings reported.
Free of contamination?	Unclear	Not discussed: unclear whether hospitals were interacting with one another.
Baseline characteristics similar?	Clear	Stratification by hospital size to ensure similarity.
Baseline outcomes similar?	Clear	Average baseline scores on COHSASA standards similar.
Use of reliable measures?	Unclear	Reliability of clinical indicators used to measure safety (observation of adequate facilities associated with sanitation) not established and some discarded for second round of data collection.

Use of valid measures?	Unclear	Validity of clinical indicators used to measure safety (observation of adequate facilities associated with sanitation) not established and some discarded for second round of data collection.
Free of selective reporting?	Clear	Non-significant findings discussed.
Free of other bias?	Unclear	The time frame for data collection varied across sites and did not follow the protocol; other factors related to this being a developing country (such as differences in availability of water according to socioeconomic factors may have affected results).
Overall risk of bias	Serious (8 elements judged as unclear)	
Sekimoto et al. (2008): cross-sectional survey		
Representative sample?	Unclear	Studying impact of hospital accreditation on infection control programmes in teaching hospitals; low response rate of 52%.
Free of sampling bias?	Clear	Convenience sample of all 638 teaching hospitals.
Adequate sample size?	Unclear	Variable confidence intervals and <i>p</i> values < 0.05.
Use of reliable measures?	Unclear	Measure is survey instrument developed by researchers.
Use of valid measures?	Unclear	Measure developed from previously validated survey instrument but insufficient detail provided to assess instrument developed for this study.
Free of outcome identification bias?	Unclear	Potential for information bias from respondent feedback (recall/social desirability); no rationale given for assignment of responses on likert type scales to categories rating level of accomplishment of activities.
Incomplete outcome data addressed?	Unclear	Questionnaire administered on 2 separate occasions over 1 year and loss to follow up not mentioned; missing data within the questionnaire and how it is dealt with not detailed.
Confounding addressed in study design?	Unclear	Not evidenced
Confounding assessed statistically?	Clear	Multiple linear regression analysis to assess impact of accreditation status on infection control performance in each year with adjustment for number of beds and number of employees.
Free of selective reporting?	Clear	Not evidenced; non-significant findings reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (7 elements judged as unclear)	
Sekimoto et al. (2009): cross-sectional survey		
Representative sample?	Unclear	Teaching hospital response rate 66.3% (n=423) and non-teaching hospitals response rate 50.2% (n=377) – low response rate; significantly more accredited hospitals and larger hospitals responded.
Free of sampling bias?	Unclear	Questionnaire sent to 638 teaching hospitals and 882 out of 8000 non-teaching hospitals. No details as to how sample was selected for each stratum sampled.
Adequate sample size?	Unclear	Variable confidence intervals and <i>p</i> values < 0.05.
Use of reliable measures?	Unclear	Measure is survey instrument developed by researchers.

Use of valid measures?	Unclear	Measure developed from previously validated survey instrument but insufficient detail provided to assess instrument developed for this study.
Free of outcome identification bias?	Unclear	Potential for information bias from respondent feedback (recall/social desirability); no rationale given for assignment of responses on Likert type scales to categories rating level of accomplishment of activities.
Incomplete outcome data addressed?	Unclear	Missing data within the questionnaire and how it is dealt with not detailed.
Confounding addressed in study design?	Clear	Stratified sampling based on number of beds and accreditation status.
Confounding assessed statistically?	Clear	Multiple linear regression with independent variables including teaching status, size, infection control staffing levels and accreditation status; unadjusted and adjusted estimates reported.
Free of selective reporting?	Clear	Not evidenced; non-significant findings reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Serious (7 elements judged as unclear)	
Thornlow & Merwin (2009): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Aim of the study was to examine the relationship between patient safety related accreditation standards and related patient outcomes; general medical surgical community hospitals with both inpatient discharge data in Nationwide Inpatient Sample survey database (2002) and Joint Commission survey data (2002). Data from many hospitals excluded on basis of states prohibiting release of data and coding not meeting study requirements means this is not a representative sample.
Free of sampling bias?	Clear	Stratified probability sampling.
Adequate sample size?	Unclear	Confidence intervals not given but <i>p</i> values <0.05 given.
Use of reliable measures?	Unclear	Reliability of accreditation survey scores shown in other studies; reliability of indicators not necessarily evidenced.
Use of valid measures?	Unclear	Accreditation surveys shown to be valid in previous studies; validity of indicators not necessarily evidenced.
Free of outcome identification bias?	Unclear	Potential for errors in initial coding and data entry processes, and in data extraction process; potential for ceiling effect with most institutions scoring highly on JCAHO survey; data manipulated using factor analysis – derivation of component factors may impact upon outcome identification.
Incomplete outcome data addressed?	Clear	Management of missing data is discussed; some hospitals excluded due to coding limitations.
Confounding addressed in study design?	Clear	Stratified random probability sampling to reduce clustering.
Confounding assessed statistically?	Clear	Risk adjustment for factors such as co-morbidities, age and gender; regression analysis controlling for nurse staffing levels, teaching status, hospital location, size and ownership.
Free of selective reporting?	Clear	Not evidenced; non-significant finding reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (5 elements judged as unclear)	

Appendix 5 – Patient experience: summary of findings and risk of bias tables

Summary of findings: patient experience						
Category: Recommendation rate						
Study	Aim	Method	Sample	Risk adjustment/ confounders controlled	Main results	Risk of bias
Sack et al. (2010)	To assess the relationship between patient satisfaction and cardiology unit accreditation status	Cross-sectional survey: retrospective secondary data analysis utilising Picker questionnaire	25 German cardiology units (15 accredited) in one highly urbanised geographical region $n = 1,835$ patients discharged from accredited units, $n = 1,202$ patients discharged from non-accredited units Satisfaction measured by recommendation rate and satisfaction with care	No adjustments: data analysis utilised Chi square and Mann Whitney U	Accreditation is not linked to measurable better quality of care as perceived by the patient	Moderate
Sack et al. (2011)	To assess the relationship between patient satisfaction and cardiology unit accreditation status	Cross-sectional survey: retrospective secondary data analysis utilising Picker questionnaire	73 German hospitals (43 accredited) in one highly urbanised geographical region $n = 21,221$ patients discharged from accredited units, $n = 15,556$ patients discharged from non-accredited units Satisfaction measured by recommendation rate	Generalised estimating equations Covariates: gender, age, number of beds and hospital teaching status	Accreditation is not linked to measurable better quality of care as perceived by the patient	Moderate

Category: Expressed satisfaction

Aiken et al. (1999)	To compare differences in AIDS patients' satisfaction with care in a range of hospital unit types, including Magnet hospitals	Cross-sectional survey	Two units in each of 20 hospitals; matched pairs of hospitals on basis of wide range of organisational/ socio-economic characteristics; Magnet hospitals or equivalent $n = 3$ $n = 594$ patients	Patient characteristics, HIV risk categories, illness severity measures, Magnet status, dedicated AIDS unit, AIDS hospital with scattered bed unit, nurse-to-patient ratio, AIDS specialty physician, nurse autonomy	Patient satisfaction was strongly associated with Magnet hospital status	Serious
Salmon et al. (2003)	To study the impact of the Council For Health Services Accreditation of South Africa accreditation programme on patient satisfaction	Cross sectional surveys: repeated measures	20 South African public hospitals, stratified by size; control (joining accreditation scheme $n=10$) / intervention (accreditation pending $n=10$) $n = 954$ patients at baseline and $n = 969$ patients at study end	Tests of differences only	Patient satisfaction was not significantly associated with hospital accreditation status	Very serious

Category: Relationship between accreditation scores/standards and patient experience survey scores

Heuer (2004)	To examine the relationship between accreditation scores and independently measured satisfaction ratings	Cross-sectional study: retrospective secondary data analysis	Acute care hospitals: not-for-profit and with <200 beds in US states of New Jersey and Eastern Pennsylvania. Hospitals meeting inclusion criteria $n = 68$; $n = 41$ (60%) participated 1998 accreditation data from JC and survey data from hospitals using same survey instrument	None evidenced	No relationship was found between JC accreditation scores for standards reflecting patient experience and scores from patient experience surveys	Serious

Risk of bias table: patient experience studies				
Risk of bias grading	Low	Moderate	Serious	Very serious
Number of elements judged as unclear	0-3	4-6	7-9	10+
Risk of bias	Interpretation of individual studies			
Low	Plausible low risk of bias for a small number of key domains within a study that is unlikely to seriously impact upon results			
Moderate	Plausible bias for a moderate number of key domains within a study that is sufficient to raise a moderate level of doubt about the results			
Serious	Plausible high risk of bias for a significant number of key domains within a study that raises serious concerns surrounding the results			
Very serious	Plausible very high risk of bias for a majority of key domains within a study that seriously weakens confidence in the results			
Impact of healthcare accreditation on patient experience				
Item	Judgement Clear / Unclear	Description		
Aiken et al. (1999): cross-sectional survey				
Representative sample?	Unclear	Only large national hospitals selected.		
Free of sampling bias?	Clear	Inclusion criteria appropriate, details given of those who did not participate.		
Adequate sample size?	Unclear	$n = 594$ patients, $p>0.05$ but large confidence intervals.		
Use of reliable measures?	Unclear	Patient survey based on existing patient satisfaction scale and investigator developed items – development process not discussed; does not give timescales in which survey/interview conducted.		
Use of valid measures?	Unclear	As above.		
Free of outcome identification bias?	Unclear	Potential for respondent/social bias not discussed, method of administration etc. not clear.		
Incomplete outcome data addressed?	Unclear	Management of missing survey data not discussed.		
Confounding addressed in study design?	Clear	Matched pairs of hospitals on wide range of characteristics; all admitted patients meeting inclusion criteria eligible.		
Confounding assessed statistically?	Clear	Multivariate regression analysis controlling for HIV risk category, illness severity, hospital/unit type, organisational factors.		
Free of selective reporting?	Clear	None evidenced.		
Free of other bias?	Clear	None identified.		
Overall risk of bias	Moderate (6 elements judged as unclear)			

Heuer (2004): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Inclusion criteria has potential to limit representativeness however results of single sample <i>t</i> tests are suggested to indicate that the accreditation scores and patient satisfaction mean rating scores for sample hospitals were similar to those of all JC accredited hospitals; only 2 US states included.
Free of sampling bias?	Unclear	Only not-for-profit hospitals and those with more than 200 beds.
Adequate sample size?	Unclear	Sample population = 68 hospitals, n=41 (60%); no confidence intervals given; no significant findings for <i>p</i> value <0.05; no details regarding number of patient records included in each hospital's patient satisfaction survey.
Use of reliable measures?	Unclear	Two separate measures of quality being used; no details given concerning validity of survey instrument; survey instrument appears to be measuring patient satisfaction – the validity of satisfaction as a measure is questionable and equates indirectly to experience; validity of JC clinical indicators not always clear or evidenced; does not detail timescales within which survey administered or JC accreditation survey took place.
Use of valid measures?	Unclear	No details given concerning reliability of survey instrument; survey instrument appears to be measuring patient satisfaction; reliability of JC performance standards not always clear and evidenced; reliability of JC survey scores evidenced in subsequent research.
Free of outcome identification bias?	Clear	Survey of patient satisfaction which only indirectly equates to patient experience. Outcomes are JC summative and categorical accreditation survey scores, and summative and patient survey category scores; individual categories for JC accreditation and patient survey categories mapped onto each other – process details given and appear appropriate.
Incomplete outcome data addressed?	Unclear	Management of missing survey data not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Unclear	Correlation and regression analysis without controlling for potential confounders.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	Non-significant findings reported.
Overall risk of bias	Serious (8 elements judged as unclear)	
Sack et al (2010) : cross-sectional survey		
Representative sample?	Unclear	25 hospitals; patients discharged from dedicated cardiology departments; data taken from a larger patient experience survey with response rate of 57%; unlikely to representative sample due to self-selection.
Free of sampling bias?	Clear	Convenience sampling method appropriate but will have introduce some bias; data was taken from a larger patient experience survey; no indication as to whether this was some or all of the cardiology departments, and how they were selected if only some departments.
Adequate sample size?	Unclear	<i>n</i> = 3037 patients but comparator = hospitals where <i>n</i> = 25; small confidence intervals; <i>p</i> <0.05.
Use of reliable measures?	Clear	Survey instrument based on Picker questionnaire; paper does not indicate whether this has been assessed for reliability; Picker questionnaire mailed to patients between two and eight weeks after their discharge – variable timescales; subject to potentially variable levels of recall bias.

Use of valid measures?	Unclear	Validated survey instrument based on Picker questionnaire. Primary outcome reflecting overall satisfaction given as the “recommendation rate” of a specific healthcare provider.
Free of outcome identification bias?	Clear	Picker Inpatient Questionnaire patient satisfaction factors utilised.
Incomplete outcome data addressed?	Unclear	Management of missing questionnaire data not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Unclear	Details such as patient characteristics collected but not utilised.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (6 elements judged as unclear)	
Sack et al (2011): cross-sectional survey		
Representative sample?	Unclear	Regional survey of hospitals in densely populated region – 50% agreed to participate; 4 weeks after discharge survey instruments sent to all discharged patients from participating hospitals - response rate of 55%. Self-selected sample of both hospitals and patients not likely to be representative.
Free of sampling bias?	Clear	All hospitals in the region and all discharged patients from participating hospitals.
Adequate sample size?	Clear	$n = 36,777$ patients, 73 hospitals, 328 departments; small confidence intervals; p values <0.05 .
Use of reliable measures?	Clear	Use of standardised Picker questionnaire;
Use of valid measures?	Unclear	Patients sent questionnaire 4 weeks after discharge – timescales have potential to increase recall bias; 4 week timescale not justified.
Free of outcome identification bias?	Clear	Picker questionnaire shown to collect information on relevant concepts.
Incomplete outcome data addressed?	Unclear	Management of missing data in survey not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Age and gender assessed at patient level; number of beds and hospital teaching status assessed at hospital level; unadjusted and adjusted rates given.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Clear	None identified.
Overall risk of bias	Moderate (4 elements judged as unclear)	

Salmon et al. (2003): cross-sectional survey		
Representative sample?	Unclear	Does not give details of patient sample.
Free of sampling bias?	Unclear	Method of sampling patients is not given.
Adequate sample size?	Unclear	n= 954 patients 1 st round and n=969 patients 2 nd round; large confidence interval given; <i>p</i> values do not demonstrate signification findings for this aspect of the study.
Use of reliable measures?	Unclear	Not possible to assess reliability of concepts within survey instrument as no details given; long time lag between accreditation survey and collection of baseline data for some hospitals; potentially insufficient timeframe between accreditation survey and 2 nd round of data collection to allow for outcomes arising from accreditation process to arise. Point at which patient survey conducted not given.
Use of valid measures?	Unclear	Survey instrument developed to measure patient experience - no details given regarding either development or piloting or administration processes.
Free of outcome identification bias?	Unclear	Not possible to make a judgement due to lack of information on content of survey instrument.
Incomplete outcome data addressed?	Unclear	Management of missing survey data not discussed.
Confounding addressed in study design?	Unclear	Stratification of hospitals by size.
Confounding assessed statistically?	Unclear	Not evidenced.
Free of selective reporting?	Clear	Non-significant findings discussed.
Free of other bias?	Unclear	The high levels of reporting of patient satisfaction may have arisen as a result of cultural factors resulting in information/ respondent bias; lack of information regarding this aspect of the study may be due to publication bias.
Overall risk of bias	Very serious (10 elements judged as unclear)	

Appendix 6 – Effectiveness: summary of findings and risk of bias tables

Summary of findings: effectiveness						
Category: Effectiveness						
Study	Aim	Method	Sample	Risk adjustment/ confounders controlled	Main results	Risk of bias
Chandra et al. (2009)	Evaluate the association between Society of Chest Pain Centers Accreditation and evidence-based guideline adherence for patients with unstable angina	Cross-sectional study: retrospective secondary data analysis	Patient data (2005) from US hospitals ($n = 364$) participating in the “Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the American College of Cardiology Guidelines (CRUSADE) quality improvement initiative Included hospitals $n = 14$ accredited/323 non-accredited; patients $n = 33,328$	Generalised estimating equations Patient demographics, wide range of clinical variables, primary attending physician, insurance status, bed size, region, teaching status, facility type	Accredited status was associated with increased performance on 2/5 measures – administration of aspirin and beta-blockers	Moderate
Chen et al. (2003)	Assess whether JC hospital accreditation is associated with adherence to AMI quality performance indicators	Cross-sectional study: retrospective secondary data analysis	Patient data (January 1994-February 1996) from the US wide Cooperative Cardiovascular project - 134,579 patients meeting inclusion criteria JC surveyed hospitals $n=3,179$ / non JC surveyed hospitals $n=1,042$	Tests of differences only	Accredited status was associated with increased performance on 5/5 measures including aspirin and beta-blocker administration	Moderate
Juul et al. (2005)	Explore the impact of a Diabetic Postoperative Morbidity and Mortality RCT and international accreditation upon the availability and quality	Observational before-and-after study	$n = 51$ units in 9 hospitals in the Copenhagen area participating in the RCT; $n = 27$ units also undergoing international accreditation $n = 27$ units without guidelines at the	Tests of differences only	Among the units without a guideline at the beginning of the trial, significantly more accredited units had a guideline at the end of	Serious

	of perioperative care diabetes clinical guidelines in hospital units		beginning of the trial		the trial compared to non-accredited units	
Landon et al. (2006)	Explore the hospital characteristics associated with high quality performance on AMI, heart failure and pneumonia national performance measures	Cross-sectional study: retrospective secondary data analysis	US Centers for Medicare and Medicaid Services Hospital Compare and JC databases (January-June 2004) for general medical/surgical and specialty heart hospitals <i>n</i> = 4,059 hospitals	Random effects logistic regression modelling controlling for size, number of beds, ownership, region, teaching status, availability of advanced technologies, nurse staffing patterns, number of Medicaid and Medicare discharges	JC accredited hospitals consistently outperformed non-JC accredited hospitals on all measures	Low
Lutfiyya et al. (2009)	Assess whether JC rural critical access hospital accreditation is associated with adherence to AMI, heart failure, pneumonia and surgical infection performance indicators	Cross-sectional study: retrospective secondary data analysis	US Centers for Medicare and Medicaid Services Hospital Compare 2006 database JC accredited hospitals <i>n</i> = 205, non-accredited hospitals <i>n</i> = 525; patients <i>n</i> = 218,290	Tests of differences only	Accredited status was associated with increased performance on 1/4 AMI, 2/4 heart failure, 1/6 pneumonia, 1/2 surgical infection measures	Serious
Menachemi et al. (2008)	Identify whether there is an association between ambulatory surgical centre accreditation status and patient unexpected hospitalisation rates for the 5 most common surgical procedures	Cross-sectional study: retrospective secondary data analysis	Patient level ambulatory surgery data linked to hospital discharge data from Florida Agency for Health Care Administration for 2004 <i>n</i> = 95 JC accredited, 106 Accreditation Association for Ambulatory Health Care, 163 state regulatory agency facilities <i>n</i> = 720,472 patients	Logistic regression modelling controlling for race, age, gender, payer type, severity of illness, facility volume of procedure	Patients at JC accredited facilities were significantly less likely to be hospitalised following colonoscopy. No differences were identified for cataract removal, upper gastro-endoscopy, arthroscopy	Low

Ross et al. (2008)	Evaluate the association between Society of Chest Pain Centers Accreditation and AMI performance measures	Cross-sectional study: retrospective secondary data analysis	US Centers for Medicare and Medicaid Services Hospital Compare 2006 database SCPC accredited hospitals $n = 178$ / patients $n = 55,418$ Non-SCPC accredited hospitals $n = 4,019$; patients $n = 339,832$	Logistic regression using propensity-score adjustment factor; controlling for bed size, ownership, teaching status, US region, urban location	or prostate biopsy Accreditation status was associated with increased performance on 7/8 measures	Moderate
Schmaltz et al. (2011)	Examine the association between JC accreditation status and trends in quality indicator performance	Longitudinal retrospective secondary data analysis	US CMS Hospital Compare discharge data and JC discharge data on the selected 16 performance measures (2004-2008) Included hospitals never accredited (2004-2008) $n = 762$, hospitals accredited throughout the entire study period $n = 2,917$	Hospital characteristics, baseline hospital performance	Accredited hospitals had larger performance gains over time. Higher performance on 13/16 measures in 2008 was associated with JC accreditation status	Moderate
Williams et al. (2005)	Analyse the temporal trends in the quality of care associated with JC quality indicator performance	Longitudinal retrospective secondary data analysis	US hospital data submitted to the JC from the 3 rd quarter 2002 through the 2 nd quarter 2004 Included hospitals (those with an average daily census of more than 10 patients) $n = 1,404$ AMI, $n = 1,864$ heart failure, $n = 1,702$ pneumonia	Extensive range of analytic techniques used with, where applicable, risk adjusted measures	Performance on 15/18 of the measures demonstrated a significant trend of improvement. Hospitals with lower baseline rates tended to improve at faster rates than hospitals with higher baseline rates	Moderate

Risk of bias table: effectiveness studies				
Risk of bias grading	Low	Moderate	Serious	Very serious
Number of elements judged as unclear	0-3	4-6	7-9	10+
Risk of bias	Interpretation of individual studies			
Low	Plausible low risk of bias for a small number of key domains within a study that is unlikely to seriously impact upon results			
Moderate	Plausible bias for a moderate number of key domains within a study that is sufficient to raise a moderate level of doubt about the results			
Serious	Plausible high risk of bias for a significant number of key domains within a study that raises serious concerns surrounding the results			
Very serious	Plausible very high risk of bias for a majority of key domains within a study that seriously weakens confidence in the results			
Impact of healthcare accreditation on effectiveness				
Item	Judgement Clear / Unclear	Description		
Chandra et al. (2009): retrospective cross-sectional secondary data analysis (see safety section) – risk of bias still moderate for this aspect of data analysis				
Chen et al. (2003): retrospective cross-sectional secondary data analysis (see safety section) - risk of risk bias still moderate for this aspect of data analysis				
Juul et al (2005): before-and-after study				
Representative cohort/sample?	Unclear	RCT of 51 perioperative diabetic care units in 9 hospitals in the Greater Copenhagen region; details of units/hospitals not given but not likely to be representative of wider population.		
Free of sampling bias?	Unclear	Sample for primary outcome selected via RCT; some hospitals within the RCT then self-selected to undergo JCAHO accreditation- self-selection introduces potential for bias.		
Adequate sample size?	Unclear	N=51 units and 9 hospitals = small sample size; <i>p</i> value <0.05; very large confidence intervals given.		
Use of reliable measures?	Unclear	2 measures used to assess the quality of guidelines: a validated generic scale on the systematic development of clinical guidelines and a research developed (non-validated) scale on aspects of perioperative diabetic care.		
Use of valid measures?	Unclear	2 measures used: a validated generic scale on the systematic development of clinical guidelines and a research developed scale on aspects of perioperative diabetic care according to the Danish national consensus report.		
Free of outcome identification bias?	Unclear	Outcome of availability of guidelines unlikely to be biased but judgements of quality of clinical guidelines using the research developed scale likely to be biased; judgements of quality using the validated generic scale are likely to be unbiased.		
Incomplete outcome data addressed?	Clear	No losses to follow up reported.		
Confounding addressed in study design?	Unclear	This may have been achieved by RCT design but the process is not reported; non-accredited institutions as controls.		

Confounding assessed statistically?	Unclear	None evidenced; descriptive details of units/hospitals not supplied therefore can't ascertain potential confounders.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Unclear	Authors raise possibility of contamination with all units/hospitals being in close proximity with a high level of interaction between staff on different units.
Overall risk of bias	Serious (9 elements judged as unclear)	
Landon et al. 2006: retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	All hospitals reporting performance data to CMS and JC databases (January to June 2004) – small hospitals, rural hospitals and non-teaching hospitals less likely to report to databases.
Free of sampling bias?	Clear	All hospitals reporting to performance data to databases included in study.
Adequate sample size?	Clear	$n = 4,059$ (total hospitals in database = 4,856, 72.1% = JC accredited), p value 0.05, small confidence intervals.
Use of reliable measures?	Clear	Measures selected to include in study were those developed by JC; reliability of measures demonstrated through extensive testing.
Use of valid measures?	Clear	As above; validity of measures demonstrated through extensive testing.
Free of outcome identification bias?	Clear	90% agreement rates demonstrated at hospitals in which data was audited.
Incomplete outcome data addressed?	Unclear	Management of incomplete datasets for hospitals not discussed.
Confounding addressed in study design?	Unclear	None evidenced.
Confounding assessed statistically?	Clear	Adjustment for range of hospital characteristics; no adjustment for case mix.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Low (3 elements judged as unclear)	
Lutfiyya et al (2009): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Only rural access hospitals that reported to the Centres for Medicare and Medicaid Hospital Compare Database (56% of all rural access hospitals).
Free of sampling bias?	Clear	All 730 rural access hospitals that reported to the Hospital Compare Database in 2004. All 218,290 patient records pertaining to the 16 quality measure variables utilised by this study.
Adequate sample size?	Unclear	730 hospitals; number of patient cases by each quality indicator given (range = 1480-18,703); $p < 0.01$; large confidence intervals given for significant results; p value at 0.01 potentially too low for this sample size; p value adjusted to 0.5 for Odds Ratios for which smaller confidence intervals are given.
Use of reliable measures?	Clear	Process measure variables selected for analysis likely to be reliably identified.
Use of valid measures?	Unclear	Validity of selected process measures not discussed; not clear if all are evidence based and are the most relevant to critical access rural hospitals (indicator set developed for larger hospitals).
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with measures but accuracy of Hospital Compare

		Database measure data empirically reported; secondary data analysis = potential for errors in coding, data extraction etc.
Incomplete outcome data addressed?	Unclear	Management of missing information from patient records not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Unclear	Observations weighted in proportion to the total number of eligible patients for a specific indicator to account for the differences in eligible patients for each indicator. No adjustments for other confounders such as hospital size etc.
Free of selective reporting?	Clear	Not evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Serious (7 elements judged as unclear)	
Menachemi et al (2008): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	Patient level ambulatory surgery data linked to hospital discharge data from Florida Agency for Health Care Administration for 2004; five most common surgical procedures selected.
Free of sampling bias?	Clear	All patient records meeting the inclusion criteria; exclusion criteria appear appropriate.
Adequate sample size?	Clear	N=364 ambulatory surgical centers and 720,472 patients receiving treatment for the 5 conditions; 95% confidence rate and low confidence intervals reported for adjusted Odds Ratio.
Use of reliable measures?	Clear	Dependent variable of hospital admission following ambulatory surgery is a reliable indicator for reflecting perioperative complications.
Use of valid measures?	Clear	Unexpected hospital admission following ambulatory surgery likely to be a valid indicator for quality of care.
Free of outcome identification bias?	Clear	Expert panel evaluated all hospital admissions to exclude admissions not related to the ambulatory procedure; hospital admission not likely to be misclassified in patient records
Incomplete outcome data addressed?	Unclear	Management of missing data not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Multivariate analyses controlled for facility volume and patient characteristics.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Low (3 elements judged as unclear)	
Ross et al (2008): retrospective cross-sectional secondary data analysis		
Representative sample?	Unclear	All hospitals reporting Centers for Medicare and Medicaid Services core measures for acute myocardial infarction from January to December 2005. Not clear what the composition of this group is.
Free of sampling bias?	Clear	All hospitals reporting Centers for Medicare and Medicaid Services core measures for acute myocardial infarction (98% of US hospitals) from January to December 2005.
Adequate sample size?	Clear	N= 4197 hospitals and 395,250 patient records; small confidence intervals given; <i>p</i> values <0.05.
Use of reliable measures?	Clear	The dependents variables are based on evidence-based practice = Centers for Medicare and Medicaid Services core

		measures for acute myocardial infarction. Likely to be reliable measures. Note: Chen et al 2003 raise fact that not all patients are eligible for some of the AMI core measures – no indication how this is dealt with.
Use of valid measures?	Clear	The dependents variables are based on evidence-based practice = Centers for Medicare and Medicaid Services core measures for acute myocardial infarction. Likely to be valid measures.
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with measures but accuracy of data empirically evidenced to be greater than 90%.
Incomplete outcome data addressed?	Unclear	Management of missing data in patient records not discussed.
Confounding addressed in study design?	Unclear	Not evidenced.
Confounding assessed statistically?	Clear	Odds Ratios given with use of propensity score to adjust for differences between accredited and non-accredited centres. Bonferroni correction applied to counteract problem of multiple comparisons. Adjustment made for hospital characteristics only.
Free of selective reporting?	Clear	Statistically non-significant results reported.
Free of other bias?	Unclear	Validity and reliability of independent variable, the Society of Chest Pain Centers accreditation, is unknown. Secondary data analysis = potential for errors in coding, data extraction etc.
Overall risk of bias	Moderate (5 elements judged as unclear)	
Schmaltz et al. (2011): retrospective longitudinal secondary data analysis		
Representative sample?	Unclear	US CMS Hospital Compare discharge data (19% of hospitals reporting to the database excluded due to missing data in 2004 (majority of which were critical access hospitals).
Free of sampling bias?	Clear	All hospitals meeting eligibility criteria selected from database.
Adequate sample size?	Clear	Included hospitals $n = 3,891$, p value <0.05 , generally small confidence intervals.
Use of reliable measures?	Unclear	Specification of some measures changed in time period from which data was collected making longitudinal analysis less reliable.
Use of valid measures?	Clear	Processes of care recommended by the clinical treatment guidelines of professional societies.
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with measures but accuracy of data empirically evidenced to be greater than 90%.
Incomplete outcome data addressed?	Unclear	Not discussed.
Confounding addressed in study design?	Clear	All hospitals reporting to database and meeting inclusion criteria included in data analysis.
Confounding assessed statistically?	Clear	Regression analysis controlled for hospital characteristics and baseline performance levels.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (4 elements judged as unclear)	
Williams et al. (2005): retrospective longitudinal secondary data analysis		

Representative sample?	Unclear	Only JC accredited hospitals reporting to JC on selected process of care indicators.
Free of sampling bias?	Unclear	Hospitals reporting on more than 10 patients per indicator per day therefore excluding smaller hospitals.
Adequate sample size?	Clear	Hospital and patient level analysis, Included hospitals $n = 1404$ AMI, $n = 1864$ heart failure, $n = 1702$ pneumonia; p value set at 0.05.
Use of reliable measures?	Clear	Discussion of reliability testing of performance measures
Use of valid measures?	Clear	Discussion of development of performance measures suggesting validity of measures
Free of outcome identification bias?	Unclear	Potential for information bias due to self-reporting of compliance with measures but accuracy of data empirically evidenced to be greater than 90%.
Incomplete outcome data addressed?	Clear	Data limited to hospitals with complete data sets.
Confounding addressed in study design?	Clear	All hospitals reporting to JC and meeting inclusion criteria included in analysis.
Confounding assessed statistically?	Unclear	Regression analysis did not include controlling for key hospital characteristics.
Free of selective reporting?	Clear	None evidenced.
Free of other bias?	Clear	None evidenced.
Overall risk of bias	Moderate (4 elements judged as unclear)	

Appendix 7 – Baseline survey invitation letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear Sir/Madam

I am a PhD student at the Faculty of Health Sciences, University of Southampton. I would like to invite you to take part in a research study which is taking place on *ward name* at xxxx NHS Foundation Trust.

The title of this study is ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

Included with this letter is a summary sheet telling you briefly what the study is about, how it is being carried out and its relevance to you as a member of staff on *ward name*. Approval for this study has been received from the Faculty of Health Sciences Ethics Committee and has xxxx NHS Foundation Trust research governance approval.

All staff on *ward name* are invited to participate in the study through completing the enclosed questionnaire. This will contribute to part 3 of the study outlined on the enclosed summary sheet. Although the questionnaire is attached to this letter, there is no obligation for you to complete it. It will take approximately 20 minutes to answer the questionnaire which is anonymous.

I cannot guarantee this study will benefit you directly but the information collected will benefit xxxx NHS Foundation Trust by enabling development of an understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

If you decide to answer the questionnaire, please return it using the enclosed envelope by *date* at the latest.

If you would like any further information, have any queries or concerns, before or after completion of the questionnaire, please do not hesitate to contact myself on either the telephone number or e-mail address given below.

Thanking you in advance for your time and effort.

Yours faithfully

Helen Wharam
PhD student, Faculty of Health Sciences, University of Southampton
Telephone: xxxx ; e-mail: xxxx

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Ethics No: 2904

Version 1.1

21/06/12

10. Appendices

Appendix 8 – Follow-up survey invitation letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear Sir/Madam

I am a PhD student at the Faculty of Health Sciences, University of Southampton. I would like to invite you to take part in a research study which is taking place on *ward name* at xxxx NHS Foundation Trust.

The title of this study is ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

Included with this letter is a summary sheet telling you briefly what the study is about, how it is being carried out and its relevance to you as a member of staff on *ward name*. Approval for this study has been received from the Faculty of Health Sciences Ethics Committee and has xxxx NHS Foundation Trust research governance approval.

All staff on *ward name* are invited to participate in the study through completing the enclosed questionnaire. This will contribute to part 3 of the study outlined on the enclosed summary sheet. Although the questionnaire is attached to this letter, there is no obligation for you to complete it. It will take approximately 20 minutes to answer the questionnaire which is anonymous. If you have worked on *ward name* for a while you may have been asked to complete the same questionnaire in *date*. The reason you are being asked again is because this study is looking at whether the Clinical Accreditation Scheme (CAS) causes any changes to occur over a number of months. This will be done by comparing information from the earlier questionnaires with information from questionnaires completed this time round. Completion of this questionnaire is not dependent upon your having completed the questionnaire issued in *date*.

I cannot guarantee this study will benefit you directly but the information collected will benefit xxxx NHS Foundation Trust by enabling development of an understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

If you decide to answer the questionnaire, please return it using the enclosed envelope by *date* at the latest.

If you would like any further information, have any queries or concerns, before or after completion of the questionnaire, please do not hesitate to contact myself on either the telephone number or e-mail address given below.

Thanking you in advance for your time and effort.

Yours faithfully

Helen Wharam
PhD student, Faculty of Health Sciences, University of Southampton
Telephone: xxxx; e-mail: xxxx
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Ethics No :2904

Version 1.1

21/06/12

Appendix 9 – Baseline survey poster, intervention wards

Health
Sciences

UNIVERSITY OF
Southampton

ENHANCING QUALITY OF CARE



Did you know there is a study currently underway exploring whether the Clinical Accreditation Scheme (CAS) can help to enhance quality of care on *ward name*?

The CAS is an innovative scheme aimed at stimulating improvement in quality of hospital nursing care. This study aims to explore whether the CAS has potential to support improvements in quality of care; identify the factors that may contribute towards, or prevent, this happening; identify ward staff views and experiences of the CAS.

Part 1: collection of *ward name* patient safety data from the clinical quality dashboard (CQD)

Part 2: collection of *ward name* patient experience survey data

Part 3: two *ward name* staff surveys

Part 4: interviews with *ward name* ward staff



Your help is sought

Would you like to provide *your* perspective on aspects of patient safety and the nursing practice environment on *ward name*?

Part 3, the first collection of *ward name* staff survey data is underway

If you work on *ward name* you will shortly be receiving a questionnaire

IF YOU WORK ON *WARD NAME* AND DO NOT RECEIVE A QUESTIONNAIRE AND WOULD LIKE TO PARTICIPATE IN THIS STUDY, PLEASE CONTACT HELEN WHARAM ON

Xxxx OR XXXX

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Ethics No: 2904

Version 2.0

12/07/12

Appendix 10 – Baseline survey poster, control wards

ENHANCING QUALITY OF CARE

Did you know there is a study currently underway
exploring whether quality of nursing care on hospital wards
at xxxx can be enhanced
by an innovative Clinical Accreditation Scheme (CAS)?



This study aims to explore whether the CAS has potential to support improvements in quality of care; identify the factors that may contribute towards, or prevent, this happening; identify ward staff views and experiences of the CAS. Six wards are participating in this study. Three of the study wards are currently going through the CAS. The other three wards, including *ward name*, are contributing important information to this study whilst they wait to go through the CAS. All six wards, including *ward name*, are contributing the following information:

Part 1: ward patient safety data from the clinical quality dashboard (CQD)

Part 2: ward patient experience survey data

Part 3: two ward staff surveys

Your help is sought



Would you like to contribute to this study and provide **your** perspective on aspects of patient safety and the nursing practice environment on *ward name*?

Part 3, the first collection of *ward name* staff survey data is underway

If you work on *ward name* you will shortly be receiving a questionnaire

**IF YOU WORK ON *WARD NAME* AND DO NOT RECEIVE A QUESTIONNAIRE AND WOULD LIKE
TO PARTICIPATE IN THIS STUDY, PLEASE CONTACT HELEN WHARAM ON
XXXX OR XXXX**

Appendix 11 – Follow-up survey, intervention ward poster

Health
SciencesUNIVERSITY OF
Southampton

ENHANCING QUALITY OF CARE

Did you know there is a study currently
underway exploring whether the
Clinical Accreditation Scheme (CAS) can
help to enhance quality of care on *ward name*?



The CAS is an innovative scheme aimed at stimulating improvement in quality of hospital nursing care. This study aims to explore whether the CAS has potential to support improvements in quality of care; identify the factors that may contribute towards, or prevent, this happening; identify ward staff views and experiences of the CAS.

Part 1: collection of *ward name* patient safety data from the clinical quality dashboard (CQD)

Part 2: collection of *ward name* patient experience survey data

Part 3: two *ward name* staff surveys

Part 4: interviews with *ward name* staff



Your help is sought

Would you like to provide **your** perspective on aspects of patient safety and the nursing practice environment on *ward name*?

Part 3, the second collection of *ward name* staff surveys is underway

If you work on *ward name* you will shortly be receiving a questionnaire

IF YOU WORK ON WARD NAME AND DO NOT RECEIVE A QUESTIONNAIRE AND WOULD LIKE TO PARTICIPATE IN THIS STUDY PLEASE CONTACT HELEN WHARAM ON

Xxxx OR XXXX

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Ethics No: 2904

Version 2.0

12/07/12

Appendix 12 – Follow-up survey, control ward poster

ENHANCING QUALITY OF CARE

Did you know there is a study currently underway
exploring whether quality of nursing care on hospital wards
at xxxx can be enhanced
by an innovative Clinical Accreditation Scheme (CAS)?



This study aims to explore whether the CAS has potential to support improvements in quality of care; identify the factors that may contribute towards, or prevent, this happening; identify ward staff views and experiences of the CAS. Six wards are participating in this study. Three of the study wards are currently going through the CAS. The other three wards, including *ward name*, are contributing important information to this study whilst they wait to go through the CAS. All six wards, including *ward name*, are contributing the following information:



Part 1: ward patient safety data from the clinical quality dashboard (CQD)

Part 2: ward patient experience survey data

Part 3: two ward staff surveys

Your help is sought

Would you like to contribute to this study and provide **your** perspective on aspects of patient safety and the nursing practice environment on *ward name*?

Part 3, the second collection of *ward name* staff survey data is underway

If you work on *ward name* you will shortly be receiving a questionnaire

**IF YOU WORK ON *WARD NAME* AND DO NOT RECEIVE A QUESTIONNAIRE AND WOULD LIKE
TO PARTICIPATE IN THIS STUDY, PLEASE CONTACT HELEN WHARAM ON**

~~XXXX~~ OR XXXX

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Ethics No: 2904 Version 1.0

25/07/12

Appendix 13 – HSoPSC housekeeper/ward clerk survey

CLINICAL ACCREDITATION SCHEME (CAS) STAFF SURVEY

Xxxx ward, XXXX NHS FoundationTrust

Survey administration (*baseline or 2nd administration*)

Instructions

This survey asks for your opinions about patient safety issues, medical error, event reporting, and the nursing environment on your hospital ward and will take about 15 to 20 minutes to complete.

Please complete this survey if you are a housekeeper or ward clerk primarily working on xxxxx ward, Xxxx NHS Foundation Trust.

Please do not complete this survey if you are a member of the nursing team, bank or agency staff, or a student.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

An **“event”** is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm.

“Patient safety” is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

SECTION A: Your ward

In this survey, think of your “unit” as the work area, department, or clinical area of the hospital where

you spend **most of your work time or provide most of your clinical services.**

What is your primary work area or unit in this hospital? Select ONE answer.

a. Many different hospital units/No specific unit

b. Medicine (non-surgical)

c. Surgery

d. Obstetrics

e. Pediatrics

f. Emergency department

g. Intensive care unit (any type)

h. Psychiatry/mental health

i. Rehabilitation

j. Pharmacy

k. Laboratory

l. Radiology

m. Anesthesiology

n. Other, please specify:

Please indicate your agreement or disagreement with the following statements about your work area/unit.

Think about your hospital work area/unit...

Strongly Disagree Neither Agree Strongly

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	Disagree ▼	▼	▼	▼	Agree ▼
1. People support one another in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2. We have enough staff to handle the workload	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3. When a lot of work needs to be done quickly, we work together as a team to get the work done	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4. In this unit, people treat each other with respect	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5. Staff in this unit work longer hours than is best for patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6. We are actively doing things to improve patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7. We use more agency/temporary staff than is best for patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8. Staff feel like their mistakes are held against them	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9. Mistakes have led to positive changes here	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
10. It is just by chance that more serious mistakes don't happen around here	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11. When one area in this unit gets really busy, others help out	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12. When an event is reported, it feels like the person is being written up, not the problem	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13. After we make changes to improve patient safety, we evaluate their effectiveness	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14. We work in "crisis mode" trying to do too much, too quickly	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
15. Patient safety is never sacrificed to get more work done	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
16. Staff worry that mistakes they make are kept in their personnel file	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
17. We have patient safety problems in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
18. Our procedures and systems are good at preventing errors from happening	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION B: Your Supervisor/Manager

Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
My supervisor/manager seriously considers staff suggestions for improving patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
My supervisor/manager overlooks patient safety problems that happen over and over	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION C: Communications

How often do the following things happen in your work area/unit?

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
Think about your hospital work area/unit...					
We are given feedback about changes put into place based on event reports	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff will freely speak up if they see something that may negatively affect patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
We are informed about errors that happen in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff feel free to question the decisions or actions of those with more authority	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
In this unit, we discuss ways to prevent errors from happening again	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff are afraid to ask questions when something does not seem right	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION D: Frequency of Events Reported

In your hospital work area/unit, when the following mistakes happen, *how often are they reported?*

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
When a mistake is made, but is <u>caught and corrected before affecting the patient</u> , how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
When a mistake is made, but has <u>no potential to harm the patient</u> , how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
When a mistake is made that <u>could harm the patient</u> , but does not, how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION E: Patient Safety Grade

Please give your work area/unit in this hospital an overall grade on patient safety.

☐	☐	☐	☐	☐
A	B	C	D	E
Excellent	Very Good	Acceptable	Poor	Failing

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SECTION F: Your Hospital

Please indicate your agreement or disagreement with the following statements about your hospital.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
Think about your hospital...					
Hospital management provides a work climate that promotes patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital units do not coordinate well with each other	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Things “fall between the cracks” when transferring patients from one unit to another	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
There is good cooperation among hospital units that need to work together	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Important patient care information is often lost during shift changes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It is often unpleasant to work with staff from other hospital units	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Problems often occur in the exchange of information across hospital units	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The actions of hospital management show that patient safety is a top priority	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital management seems interested in patient safety only after an adverse event happens	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital units work well together to provide the best care for patients	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Shift changes are problematic for patients in this hospital	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION G: Number of Events Reported

In the past 12 months, how many event reports have you filled out and submitted?

☐ a. No event reports	☐ d. 6 to 10 event reports
☐ b. 1 to 2 event reports	☐ e. 11 to 20 event reports
☐ c. 3 to 5 event reports	☐ f. 21 event reports or more

SECTION H: Background Information

This information will help in the analysis of the survey results.

Are you male or female?

☐ a. Male	☐ b. Female

2. What is your age?

☐ a. 19 years old or less	☐ b. 20 to 29 years old	☐ c. 30-39 years old
☐ a. 40-49 years old	☐ b. 50 to 59 years old	☐ c. 60+ years

3. How long have you worked in this hospital?

☐ a. 1 to 2 years	☐ b. 3 to 4 years	☐ c. 5 years or more

4. How long have you worked in your current hospital work area/unit?

☐ a. 1 to 2 years	☐ b. 3 to 4 years	☐ c. 5 years or more

5. Typically, do you work full-time or part-time in this hospital?

- ☐ a. Full-time ☐ b. Part-time

What is your staff band and job title in this hospital?

- ☐ a. Band b. Job title

In your staff position, do you typically have direct interaction or contact with patients?

- ☐ a. YES, I typically have direct interaction or contact with patients ☐ b. NO, I typically do NOT have direct interaction or contact with patients

Section I: Background information (continued)

You will be asked to complete this questionnaire on two separate occasions nine months apart. Completion of the personal identification code below will enable us to link your two questionnaires. This will help us to see if there has been any change to your answers over time. We will then be able to assess the effects of the CAS more fully. Use of the code below ensures that the researchers are not able to identify you. However, if you choose to complete this code, we cannot guarantee that when we report the study findings other people will not be able to link you to your data. Therefore, we understand if you do not wish to complete this section. If you would like to complete this section please use the following procedure:

First initial of your mother's first name	→		Example: Mother: Kate	→	K
Month of your mother's birthday	→		born in November	→	11
First initial of your father's name	→		Father: Paul	→	P
Month of your father's birthday	→		born in August	→	08

SECTION J: Your Comments

Please feel free to write any comments about patient safety, error, or event reporting and the nursing environment on your hospital ward.

THANK YOU FOR COMPLETING THIS SURVEY.

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Appendix 14 – HSoPSC/PES-NWI nursing team survey

CLINICAL ACCREDITATION SCHEME (CAS) STAFF SURVEY

Xxxx ward, XXXX NHS FoundationTrust

Survey administration (*baseline or 2nd administration*)

Instructions

This survey asks for your opinions about patient safety issues, medical error, event reporting, and the nursing environment on your hospital ward and will take about 15 to 20 minutes to complete.

Please complete this survey if you are a member of the nursing team primarily working on xxxxx ward, Xxxx NHS Foundation Trust.

Please do not complete this survey if you are the ward housekeeper or clerk, bank or agency staff, or a student.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

An “**event**” is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm.

“**Patient safety**” is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

SECTION A: Your ward

In this survey, think of your “unit” as the work area, department, or clinical area of the hospital where

you spend most of your work time or provide most of your clinical services.

What is your primary work area or unit in this hospital? Select ONE answer.

a. Many different hospital units/No specific unit

b. Medicine (non-surgical)

c. Surgery

d. Obstetrics

e. Pediatrics

f. Emergency department

g. Intensive care unit (any type)

h. Psychiatry/mental health

i. Rehabilitation

j. Pharmacy

k. Laboratory

l. Radiology

m. Anesthesiology

n. Other, please specify:

Please indicate your agreement or disagreement with the following statements about your work area/unit.

Think about your hospital work area/unit...

Strongly Disagree Neither Agree Strongly

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	Disagree ▼	▼	▼	▼	Agree ▼
1. People support one another in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2. We have enough staff to handle the workload	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3. When a lot of work needs to be done quickly, we work together as a team to get the work done	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4. In this unit, people treat each other with respect	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5. Staff in this unit work longer hours than is best for patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6. We are actively doing things to improve patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7. We use more agency/temporary staff than is best for patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8. Staff feel like their mistakes are held against them	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9. Mistakes have led to positive changes here	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
10. It is just by chance that more serious mistakes don't happen around here	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11. When one area in this unit gets really busy, others help out	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12. When an event is reported, it feels like the person is being written up, not the problem	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13. After we make changes to improve patient safety, we evaluate their effectiveness	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14. We work in "crisis mode" trying to do too much, too quickly	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
15. Patient safety is never sacrificed to get more work done	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
16. Staff worry that mistakes they make are kept in their personnel file	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
17. We have patient safety problems in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
18. Our procedures and systems are good at preventing errors from happening	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

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SECTION B: Your Supervisor/Manager

Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
My supervisor/manager seriously considers staff suggestions for improving patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
My supervisor/manager overlooks patient safety problems that happen over and over	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION C: Communications

How often do the following things happen in your work area/unit?

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
Think about your hospital work area/unit...					
We are given feedback about changes put into place based on event reports	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff will freely speak up if they see something that may negatively affect patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
We are informed about errors that happen in this unit	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff feel free to question the decisions or actions of those with more authority	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
In this unit, we discuss ways to prevent errors from happening again	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Staff are afraid to ask questions when something does not seem right	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION D: Frequency of Events Reported

In your hospital work area/unit, when the following mistakes happen, *how often are they reported?*

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
When a mistake is made, but is <u>caught and corrected before affecting the patient</u> , how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
When a mistake is made, but has <u>no potential to harm the patient</u> , how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
When a mistake is made that <u>could harm the patient</u> , but does not, how often is this reported?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION E: Patient Safety Grade

Please give your work area/unit in this hospital an overall grade on patient safety.

☐	☐	☐	☐	☐
A	B	C	D	E
Excellent	Very Good	Acceptable	Poor	Failing

SECTION F: Your Hospital

Please indicate your agreement or disagreement with the following statements about your hospital.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
Think about your hospital...					
Hospital management provides a work climate that promotes patient safety	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital units do not coordinate well with each other	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Things “fall between the cracks” when transferring patients from one unit to another	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
There is good cooperation among hospital units that need to work together	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Important patient care information is often lost during shift changes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It is often unpleasant to work with staff from other hospital units	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Problems often occur in the exchange of information across hospital units	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The actions of hospital management show that patient safety is a top priority	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital management seems interested in patient safety only after an adverse event happens	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hospital units work well together to provide the best care for patients	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Shift changes are problematic for patients in this hospital	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION G: Number of Events Reported

In the past 12 months, how many event reports have you filled out and submitted?

☐ a. No event reports	☐ d. 6 to 10 event reports
☐ b. 1 to 2 event reports	☐ e. 11 to 20 event reports
☐ c. 3 to 5 event reports	☐ f. 21 event reports or more

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SECTION H: Your nursing environment

For each item, please indicate the extent to which you agree that the item is **PRESENT IN YOUR CURRENT JOB**. Indicate your degree of agreement by circling the appropriate number.

	Strongly Agree ▼	Agree ▼	Disagree ▼	Strongly Disagree ▼
Adequate support services allow me to spend time with my patients	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Physicians and nurses have good working relationships	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A supervisory staff that is supportive of the nurses	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Active staff development of continuing education programs for nurses	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Career development/clinical ladder for opportunity	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Opportunity for staff nurses to participate in policy decisions	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Supervisors use mistakes as learning opportunities, not criticism	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Enough time and opportunity to discuss patient care problems with other nurses	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Enough registered nurses to provide quality patient care	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A nurse manager who is a good manager and leader	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A chief nursing officer who is highly visible and accessible to staff	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Enough staff to get the work done	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Praise and recognition for a job well done	☐ ₁	☐ ₂	☐ ₃	☐ ₄
High standards of nursing care are expected by the administration	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A chief nursing office equal in power and authority to other top-level hospital executives.....	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A lot of team work between nurses and physicians	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Opportunities for advancement	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A clear philosophy of nursing that pervades the patient care environment	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Working with nurses who are clinically competent	☐ ₁	☐ ₂	☐ ₃	☐ ₄
A nurse manager who backs up the nursing staff in decision making,even if the conflict is with a physician	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Administration that listens and responds to employees concerns	☐ ₁	☐ ₂	☐ ₃	☐ ₄
An active quality assurance program	☐ ₁	☐ ₂	☐ ₃	☐ ₄
Staff nurses are involved in the internal governance of the hospital (e.g., practice and policy committees)	☐ ₁	☐ ₂	☐ ₃	☐ ₄

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SECTION H: Your nursing environment (continued)

	Strongly Agree ▼	Agree ▼	Disagree ▼	Strongly Disagree ▼
Collaboration (joint practice) between nurses and physicians	☐ 1	☐ 2	☐ 3	☐ 4
A preceptor program for newly hired RNs	☐ 1	☐ 2	☐ 3	☐ 4
Nursing care is based on a nursing, rather than a medical, model	☐ 1	☐ 2	☐ 3	☐ 4
Staff nurses have the opportunity to serve on hospital and nursing committees	☐ 1	☐ 2	☐ 3	☐ 4
Nursing administrators consult with staff on daily problems and procedures	☐ 1	☐ 2	☐ 3	☐ 4
Written, up-to-date nursing care plans for all patients	☐ 1	☐ 2	☐ 3	☐ 4
Patient care assignments that foster continuity of care, i.e, the same nurses care for the patient from one day to the next	☐ 1	☐ 2	☐ 3	☐ 4
Use of nursing diagnoses	☐ 1	☐ 2	☐ 3	☐ 4

SECTION I: Background Information

This information will help in the analysis of the survey results.

Are you male or female?

- ☐ a. Male ☐ b. Female

2. What is your age?

- ☐ a. 19 years old or less ☐ b. 20 to 29 years old ☐ c. 30-39 years old
☐ a. 40-49 years old ☐ b. 50 to 59 years old ☐ c. 60+ years

3. How long have you worked in this hospital?

- ☐ a. 1 to 2 years ☐ b. 3 to 4 years ☐ c. 5 years or more

4. How long have you worked in your current hospital work area/unit?

- ☐ a. 1 to 2 years ☐ b. 3 to 4 years ☐ c. 5 years or more

5. Typically, do you work full-time or part-time in this hospital?

- ☐ a. Full-time ☐ b. Part-time

What is your staff band and job title in this hospital?

- ☐ a. Band ☐ b. Job title

In your staff position, do you typically have direct interaction or contact with patients?

- ☐ a. YES, I typically have direct interaction or contact with patients ☐ b. NO, I typically do NOT have direct interaction or contact with patients

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Section I: Background information (continued)

You will be asked to complete this questionnaire on two separate occasions nine months apart. Completion of the personal identification code below will enable us to link your two questionnaires. This will help us to see if there has been any change to your answers over time. We will then be able to assess the effects of the CAS more fully. Use of the code below ensures that the researchers are not able to identify you. However, if you choose to complete this code, we cannot guarantee that when we report the study findings other people will not be able to link you to your data. Therefore, we understand if you do not wish to complete this section. If you would like to complete this section please use the following procedure:

First initial of your mother's first name	→		Example: mother: Kate	→	K
Month of your mother's birthday	→		born in November	→	11
First initial of your father's name	→		father: Paul	→	P
Month of your father's birthday	→		born in August	→	08

SECTION J: Your Comments

Please feel free to write any comments about patient safety, error, or event reporting and the nursing environment on your hospital ward.

THANK YOU FOR COMPLETING THIS SURVEY.

Appendix 15 – Baseline survey reminder letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear Sir/Madam

Study title ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

I am a PhD student at the Faculty of Health Sciences, University of Southampton. You may recall that a few weeks ago I wrote inviting you to take part in a research study. The results of this study will be improved by receipt of as many completed questionnaires as possible. Therefore, I am inviting you once again to take part in this research study if you have not done so already. It will take approximately 20 minutes of your time to complete the enclosed anonymous questionnaire. If you have already completed and returned the questionnaire, I would like to thank you and apologise for contacting you again; please discard this letter.

Included with this letter is a summary sheet telling you briefly what the study is about, how it is being carried out and its relevance to you as a member of staff on *ward name*. Approval for this study has been received from the Faculty of Health Sciences Ethics Committee and has xxxx NHS Foundation Trust research governance approval.

All staff on *ward name* are invited to participate in the study through completing the enclosed questionnaire. This will contribute to part 3 of the study outlined on the enclosed summary sheet. Although the questionnaire is attached to this letter, there is no obligation for you to complete it.

I cannot guarantee this study will benefit you directly but the information collected will benefit xxxx NHS Foundation Trust by enabling development of an understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

If you decide to answer the questionnaire, please return it using the enclosed envelope by *date* at the latest.

If you would like any further information, have any queries or concerns, before or after completion of the questionnaire, please do not hesitate to contact myself on either the telephone number or e-mail address given below.

Thanking you in advance for your time and effort.

Yours faithfully

Helen Wharam
PhD student, Faculty of Health Sciences, University of Southampton
Telephone:xxxx; e-mail: xxxx

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Ethics No: 2904

Version 1.1

21/06/12

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Appendix 16 – Follow-up survey reminder letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear Sir/Madam

Study title ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

I am a PhD student at the Faculty of Health Sciences, University of Southampton. You may recall that a few weeks ago I wrote inviting you to take part in a research study. The results of this study will be improved by receipt of as many completed questionnaires as possible. Therefore, I am inviting you once again to take part in this research study if you have not done so already. It will take approximately 20 minutes of your time to complete the enclosed anonymous questionnaire. If you have already completed and returned the questionnaire, I would like to thank you and apologise for contacting you again; please discard this letter. Included with this letter is a summary sheet telling you briefly what the study is about, how it is being carried out and its relevance to you as member of staff on *ward name*. Approval for this study has been received from the Faculty of Health Sciences Ethics Committee and has xxxx NHS Foundation Trust research governance approval.

All staff on *ward name* are invited to participate in the study through completing the enclosed questionnaire. This will contribute to part 3 of the study outlined on the enclosed summary sheet. Although the questionnaire is attached to this letter, there is no obligation for you to complete it. If you have worked on *ward name* for a while you may have been asked to complete the same questionnaire in *date*. The reason you are being asked again is because this study is looking at whether the Clinical Accreditation Scheme (CAS) causes any changes to occur over a number of months. This will be done by comparing information from the earlier questionnaires with information from questionnaires completed this time round. Completion of this questionnaire is not dependent upon your having completed the questionnaire issued in *date*.

I cannot guarantee this study will benefit you directly but the information collected will benefit xxxx NHS Foundation Trust by enabling development of an understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

If you decide to answer the questionnaire, please return it using the enclosed envelope by the *date* at the latest. If you would like any further information, have any queries or concerns, before or after completion of the questionnaire, please do not hesitate to contact myself on either the telephone number or e-mail address given below.

Thanking you in advance for your time and effort.

Yours faithfully

Helen Wharam

PhD student, Faculty of Health Sciences, University of Southampton

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Ethics No: 2904

Version 1.1

21/06/12

Appendix 17 - Baseline survey missing values analysis

Calculation of summary scores – missing values analysis					
PES Nursing Foundations Summary Score – all cases included (Ward AI)					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
31	1.3	2.6	3.9	2.9699	.36939
PES Nursing Foundations Summary Score – case 16 (all items scored the same value) excluded (Ward AI)					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
30	1.3	2.6	3.9	2.9688	.37567
PES Nursing Foundations Summary Score – cases 1 & 2 (40% missing values) excluded (Ward AI)					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
29	1.3	2.6	3.9	2.9793	.37787
PES Nursing Participation Summary Score – all cases included (Ward AI)					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
31	1.98	1.57	3.56	2.558	.49551
PES Nursing Participation Summary Score – case 16 (all items scored the same value) excluded					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
30	1.98	1.57	3.56	2.5432	.49702
PES Nursing Participation Summary Score – case 1 (7/9 77.78% missing values) excluded (Ward AI)					
<i>N</i>	Range	Min	Max	Mean	Std. Dev.
29	1.98	1.57	3.56	2.5432	.49702
PES Nursing Participation Summary Score – cases 1 & 2 (7/9 77.78% and 4/9 44.44% missing values) excluded (Ward AI)					
<i>n</i>	Range	Min	Max	Mean	Std. Dev.
29	1.98	1.57	3.56	2.5551	.50150

10. Appendices

Appendix 18 – Tests of normality

Tests of normality – Kolmogorov-Smirnov^a statistic

HSoPSC Safety Culture Dimensions				
Dimension	Matched pair A Statistic (Sig) df 42	Matched pair B Statistic (sig) df 23	Matched pair C Statistic (Sig) df 5	All wards Statistic (Sig) df 70
Teamwork within units	0.148 (0.22)	0.149 (0.200*)	0.330 (0.079)	0.129 (0.006)
Supervisor expectations	0.124 (0.101)	0.249 (0.01)	0.136 (0.200*)	0.154 (0.000)
Organisational learning	0.128 (0.133)	0.292 (0.000)	0.372 (0.022)	0.240 (0.000)
Hospital management support for patient safety	0.183 (0.001)	0.133 (0.200*)	0.180 (0.200*)	0.170 (0.000)
Feedback and communication	0.121 (0.131)	0.238 (0.02)	0.175 (0.200*)	0.158 (0.000)
Communication openness	0.170 (0.004)	0.188 (0.034)	0.228 (0.200*)	0.164 (0.000)
Teamwork across units	0.108 (0.200*)	0.124 (0.200*)	0.241 (0.200*)	0.099 (0.083)
Staffing	0.123 (0.111)	0.115 (0.200*)	0.184 (0.200*)	0.103 (0.063)
Hospital handoffs and transitions	0.115 (0.189)	0.131 (0.200*)	0.221 (0.200*)	0.097 (0.173)
Non-punitive response to error	0.114 (0.200)	0.159 (0.137)	0.310 (0.131)	0.128 (0.007)
Overall perceptions of safety	0.119 (0.143)	0.147 (0.200*)	0.252 (0.200*)	0.100 (0.770)
Frequency of event reporting	0.121 (0.132)	0.164 (0.111)	0.367 (0.026)	0.152 (0.000)
HSoPSC composite score	0.092 (0.200*)	0.077 (0.200*)	0.267 (0.200*)	0.094 (0.200*)
PES Dimensions				
Dimension	Matched pair A Statistic (Sig) df 42	Matched pair B Statistic (sig) df 24	Matched pair C Statistic (Sig) df 5	All wards Statistic (Sig) df 71
Nursing participation in hospital affairs	0.086 (0.200*)	0.142 (0.200*)	0.258 (0.200*)	0.081 (0.200*)
Nursing foundations for quality of care	0.135 (0.053)	0.130 (0.200*)	0.138 (0.200*)	0.127 (0.006)
Nurse manager ability, leadership and support	0.145 (0.027)	0.141 (0.200*)	0.231 (0.200*)	0.141 (0.001)
Staffing and resource adequacy	0.102 (0.200*)	0.182 (0.04)	0.179 (0.200*)	0.106 (0.048)
Collegial nurse-physician relations	0.234 (0.000)	0.209 (0.008)	0.254 (0.200*)	0.222 (0.000)
PES composite score	0.120 (0.135)	0.101 (0.200*)	0.233 (0.200*)	0.71 (0.200*)
a. Lilliefors significance correction				
^This is a lower bound of the true significance				

Appendix 19 – Independent *t* test sensitivity check

Matched Pair A scale dimensions with non-normal distributions ¹		
Scale dimensions	Mann- Whitney U <i>p</i> values	Independent <i>t</i> test <i>p</i> values
Organisational learning	1.00	0.879
Hospital management support	0.805	0.740
Communication openness	0.824	0.744
Nurse Manager (PES)	0.385	0.315
Collegial relations (PES)	0.006	0.024
Matched Pair B scale dimensions with non-normal distributions ¹		
Scale dimensions	Mann- Whitney U <i>p</i> values	Independent <i>t</i> test <i>p</i> values
Supervisor expectations	0.590	0.549
Organisational learning	0.683	0.435
Feedback and communication	0.600	0.328
Communication openness	0.223	0.381
Staffing adequacy (PES)	0.030	0.027
Collegial relations (PES)	0.174	0.148
Matched Pair C scale dimensions with non-normal distributions ¹		
Scale dimensions	Mann- Whitney U <i>p</i> values	Independent <i>t</i> test <i>p</i> values
Organisational learning	0.752	1.00
Frequency of reporting	0.414	0.495
Control/intervention ward group scale dimensions with non-normal distributions ¹		
Scale dimensions	Mann- Whitney U <i>p</i> values	Independent <i>t</i> test <i>p</i> values
Teamwork within units	0.224	0.225
Supervisor expectations	0.084	0.059
Organisational learning	0.674	0.650
Hospital management support	0.505	0.453
Feedback and communication	0.639	0.391
Communication openness	0.264	0.430
Non-punitive responses	0.045	0.077
Frequency of reporting	0.721	0.912
Nursing foundations (PES)	0.601	0.676
Nurse manager (PES)	0.972	0.844
Staffing and resource adequacy (PES)	0.269	0.641
Collegial relations (PES)	0.008	0.024

Normality assessed by Kolmogorov-Smirnov statistic

10. Appendices

Appendix 20 – Interview letter of invitation

Health
Sciences

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Southampton

20/02/13

Dear Sir/Madam

I am a PhD student at the Faculty of Health Sciences, University of Southampton. I would like to invite you to take part in an interview which forms part of a research study currently taking place on *ward name* at XXXX NHS Foundation Trust.

The title of this study is ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

Included with this letter is:

- a summary sheet telling you briefly what the study is about, how it is being carried out and its relevance to you as a member of staff on *ward name*
- a participant information sheet that explains the interviews in more detail and will help to answer any questions you may have

These interviews will form part 4 of the study outlined on the enclosed summary sheet.

If you have any questions that are not answered in the participant information sheet then please do not hesitate to contact myself on either the telephone number or e-mail address given below.

If, having read the participant information sheet you are interested in taking part in the study, I would be grateful if you could either:

e-mail me xxxx and we can arrange for me to contact you by telephone

telephone me on xxxx

I would also be grateful if you could contact me by *date*.

Thank you for taking the time to read this letter.

Yours faithfully

Helen Wharam
PhD student, Faculty of Health Sciences, University of Southampton
Telephone:xxxx; e-mail: xxxx

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Ethics No : 2904

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21/06/12

Appendix 21 – Interview invitation poster

Health
SciencesUNIVERSITY OF
Southampton**Have you worked on *ward name* since *date*?****Do you know about the Clinical Accreditation Scheme (CAS)?****Would you be interested in participating in the final phase of the CAS research study?****What is this study about?**

The CAS is an innovative scheme aimed at stimulating improvement in quality of hospital nursing care. This study aims to explore whether the CAS has potential to support improvements in quality of care; identify the factors that may contribute towards, or prevent, this happening; identify ward staff views and experiences of the CAS.

Part 1: collection of *ward name* patient safety data from the clinical quality dashboard (CQD)

Part 2: collection of *ward name* patient experience survey data

Part 3: two *ward name* staff surveys

Part 4: interviews with *ward name* staff



Now is your opportunity to share your views and experiences of the CAS

Why should I participate?

There will be no direct benefit to you from participating in this study.
However, hearing your views and experiences may help to shape future developments of the CAS

What would I have to do?

You would be asked to take part in an interview

IF YOU WORK ON *WARD NAME* AND WOULD LIKE FURTHER INFORMATION**PLEASE CONTACT****HELEN WHARAM ON XXXX OR XXXX**

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Ethics No: 2904

Version 2.0

12/07/12

Appendix 22 – Participant information sheet

PARTICIPANT INFORMATION SHEET

Study title: “*Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)*”

Researcher Name: Helen Wharam

Ethics No: 2904

I would like to invite you to take part in interviews occurring as part of this research study. Before you decide whether you would like to take part in the study it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Talk to others about the study if you wish.

What is the purpose of this study?

This study seeks to explore the potential benefits of the Clinical Accreditation Scheme (CAS) developed by xxxx NHS Foundation Trust. The CAS aims to stimulate improvement in quality of hospital nursing care and is being rolled-out across all hospital wards at xxxx NHS Foundation Trust. Six wards have been followed throughout the course of this study: three of these wards have participated in the CAS and the other three wards have not participated in the CAS yet. This means that measurements of patient safety and patient experience, and information collected from ward staff surveys, can be compared to see if participation in the CAS has caused any changes to occur in quality of care on the study wards. An important factor in exploring outcomes from participation in the CAS is consideration of how practical, useful and worthwhile ward staff found it to be. Interviews will be used to identify ward staff views and experiences, both positive and negative, of the CAS. Interviews will contribute towards stage 4 (see the enclosed summary sheet) of this study and will provide information to support a clear understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

Why have I been invited?

You have been contacted because you are a member of staff on *ward name*. *Ward name* is one of the three wards that have participated in the CAS and contributed data towards this study. All staff on the three wards that have participated in the CAS will have experienced the CAS in a variety of ways. This may range from collecting information together for the accreditation visit, being talked to by the review panel, being asked to make changes to ward activities as a result of the accreditation feedback or talking to patients about the scheme. Therefore, all staff on *ward name* are being invited to provide their feedback on the CAS via one-to-one interviews with the study researcher.

Do I have to take part?

No, you do not have to take part. It is up to you to decide if you would like to join the study. If you decide to take part, you are free to withdraw at any time, and do not have to give a reason why you wish to withdraw.

What will I have to do?

If you are interested in taking part in the study you can either:

e-mail me on xxxx and we can arrange for me to contact you by telephone

telephone me on xxxx

I would be grateful if you could contact me by *date*.

When I contact you by phone, I will go through this information sheet and answer any further questions you may have. I will also ask you brief screening questions to identify the ward you work on, your role and band. This stage of the study aims to interview 9 people from the three study wards that have participated in the CAS and it may not be possible to interview everyone expressing an interest in participating. The screening questions will help me to ensure that representatives from all of the wards, and from a range of staff roles and bands, have an opportunity to participate in the interviews.

If you are still interested in going ahead once we have spoken, and I am able to offer you an interview, you will be asked to indicate a convenient date and time, and whether you would prefer the interview to take place at xxxx or in your own home. However, you will be asked to agree to an interview in your own home should it not be possible to arrange a suitable venue at xxxx. You are free to change or cancel the interview appointment at any time.

Before the interview begins I will ask you to complete a consent form. Your permission will be asked to audio-tape the interview: if you are uncomfortable with this I can write down the content of the interview instead. You are also free to call a halt to the interview at any time should you wish to do so. I will also ask for your permission to use the interview data for the purposes of this study. If you would like, you will be sent a copy of your interview once it has been transcribed.

In the event that it is not possible to offer you an interview you will be sent a letter of thanks. You will also be asked if I may keep your contact details until all interviews have successfully been completed. This is because I may be able to offer you an interview at a later date should someone else subsequently decide to withdraw from the study. However, you do not have to agree to this.

What are the implications for me if I take part in the study?

You will be asked to participate in an interview which will take your time and energy. You are free to change or cancel the interview appointment at any time. You are also free to call a halt to the interview at any time should you wish to do so. It may also be that you find talking about aspects of your work frustrating or possibly upsetting. If this is the case you will be advised to contact your supervisor, professional body or occupational health department for support.

What are the possible benefits of taking part?

I cannot guarantee that this study will benefit you directly but the information collected will benefit xxxx NHS Foundation Trust by providing information to support a clear understanding of how beneficial the CAS may be, whether there is a need for review of the scheme, and guide future developments of the scheme.

What if there is a problem?

If you have a concern or a complaint about this study you should contact Martina Prude, Head of Research & Enterprise Services, at the Faculty of Health Sciences (Address: University of Southampton, Building 37, Highfield, Southampton, SO17 1BJ; Tel: +44 (0)23 8059 5058; Email: rgoinfo@soton.ac.uk). If you remain unhappy and wish to complain formally Martina will provide you with details of the University of Southampton Complaints Procedure.

Will my taking part in the study be kept confidential?

All of the information about your participation in the study will be kept confidential. Data from your interview will be allocated a pseudonym and your name and that of the ward on which you work will not be disclosed. The procedures for the handling, processing, storage and destruction of data your interview data will follow those of the University of Southampton and will meet the Data Protection Act 1998 requirements.

10. Appendices

What will happen if I don't want to carry on with the study?

You are free to withdraw from the study at any time without providing a reason. You do not have to complete the interview and you will not be contacted any further.

What will happen to the results of the research study?

When the study is completed I will produce a thesis (report) demonstrating my findings, conclusions and recommendations. I will explore possible avenues, such as conferences and research journals, where it may be possible to present the study to a wider audience of patients, health professionals and researchers. I will work with xxxx NHS Foundation Trust Communication Lead to identify the best way to ensure all staff and patients at xxxx have an opportunity to learn of the study findings. Whilst I will ensure that participants and wards in the study will only be referred to by their allocated pseudonyms or identification numbers, I cannot guarantee that other people will not be able to link data reported in the study findings to wards or individual participants.

Who is organising the study?

This research forms a PhD study through the Faculty of Health Sciences at the University of Southampton. I am being supervised by Professor Peter Griffiths and Dr Michael Simon, who are members of the Organisation and Delivery of Healthcare Research group, and who will oversee the process and ensure that the study is carried out according to appropriate standards.

Who has reviewed the study?

All research is looked at by an independent group of people to protect your interests and ensure the standard of the proposed study. The study has been reviewed by experienced researchers at the Faculty of Health Sciences and has also been approved by the Faculty of Health Sciences Ethics Committee. The study's ethics number is 2904. The study also has xxxx NHS Foundation Trust research governance approval.

Further information and contact details

If you have any further questions please do not hesitate to contact either myself on xxxx or telephone xxxx, Professor Peter Griffiths on xxxx or Dr Michael Simon on xxxx

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Appendix 23 – Clinical matron interview invitation letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear XXXX

I am a PhD student at the Faculty of Health Sciences, University of Southampton. I would like to invite you to take part in an interview which forms part of a research study currently taking place at XXXX NHS Foundation Trust.

The title of this study is ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

This study seeks to explore the potential benefits of the Clinical Accreditation Scheme (CAS). You have been contacted because you were a key member of staff involved in supporting and promoting activities associated with the CAS on *ward name* which has been participating in the research study and have undergone a CAS review. These interviews, due to take place in October 2013, comprise the final stage of the CAS research study. Included with this letter is a participant information sheet that explains the interviews in more detail and will help to answer any questions which you may have.

If you have any questions that are not answered in the participant information sheet then please do not hesitate to contact myself on either the telephone number or e-mail address given below.

If, having read the participant information sheet you are interested in taking part in the study, I would be grateful if you could either:

e-mail me on xxxxx

telephone me on xxxxx

I would also be grateful if you could contact me by *date*

Thank you for taking the time to read this letter.

Yours faithfully

Helen Wharam

PhD student, Faculty of Health Sciences, University of Southampton

Telephone: xxxx; e-mail: xxxx

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Ethics No : 2904

Version 1.0

29/05/13

Appendix 24 – Clinical matron participant information sheet

PARTICIPANT INFORMATION SHEET

Study title: *“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”*

Researcher Name: Helen Wharam

Ethics No: 2904

I would like to invite you to take part in interviews occurring as part of this research study. Before you decide whether you would like to take part in the study it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Talk to others about the study if you wish.

What is the purpose of this study?

This study seeks to explore the potential benefits of the Clinical Accreditation Scheme (CAS) developed by XXXX NHS Foundation Trust. The CAS aims to stimulate improvement in quality of hospital nursing care and is being rolled-out across all hospital wards at XXXX NHS Foundation Trust. Six wards have been followed throughout the course of this study: three of these wards have participated in the CAS and the other three wards have not participated in the CAS yet. This means that measurements of patient safety and patient experience, and information collected from ward staff surveys, can be compared to see if participation in the CAS has caused any changes to occur in quality of care on the study wards. An important factor in exploring outcomes from participation in the CAS is consideration of how practical, useful and worthwhile staff found it to be. Interviews will be used to identify staff views and experiences, both positive and negative, of the CAS. Interviews will provide information to support a clear understanding of the role of the CAS in supporting quality of patient care, identifying whether there is a need for review of the scheme and consequently guiding future developments of the scheme.

Why have I been invited?

You have been contacted because you were a key member of staff involved in supporting and promoting activities associated with the CAS. As a consequence you are being invited to provide feedback on your experiences of the CAS, and your views and opinions on the CAS, via one-to-one interviews with the study researcher.

Do I have to take part?

No, you do not have to take part. It is up to you to decide if you would like to join the study. If you decide to take part, you are free to withdraw at any time, and do not have to give a reason why you wish to withdraw.

What will I have to do?

If you are interested in taking part in the study you can either:

e-mail me on xxxxx and we can arrange for me to contact you by telephone

telephone me on xxxxx

I would be grateful if you could contact me by xxxxxx

When I contact you by phone I will go through this information sheet and answer any further questions you may have. If you are still interested in going ahead once we have spoken you will be asked to indicate a convenient date and time, and whether you would prefer the interview to take place at XXXX or in your own home. However, you will be asked to agree to an interview in your own home should it not be possible to arrange a suitable venue at XXXX. You are free to change or cancel the interview appointment at any time.

Before the interview begins I will ask you to complete a consent form. Your permission will be asked to audio-tape the interview: if you are uncomfortable with this I can write down the content of the interview instead. You are also free to call a halt to the interview at any time should you wish to do so. I will also ask for your permission to use the interview data for the purposes of this study. If you would like, you will be sent a copy of your interview once it has been transcribed.

What are the implications for me if I take part in the study?

You will be asked to participate in an interview which will take your time and energy. You are free to change or cancel the interview appointment at any time. You are also free to call a halt to the interview at any time should you wish to do so. It may also be that you find talking about aspects of your work frustrating or possibly upsetting. If this is the case you will be advised to contact your supervisor, professional body or occupational health department for support.

What are the possible benefits of taking part?

I cannot guarantee that this study will benefit you directly but the information collected will benefit XXXX NHS Foundation Trust by providing information to support a clear understanding of how beneficial the CAS may be, whether there is a need for review of the scheme, and guide future developments of the scheme.

What if there is a problem?

If you have a concern or a complaint about this study you should contact Martina Prude, Head of Research & Enterprise Services, at the Faculty of Health Sciences (Address: University of Southampton, Building 37, Highfield, Southampton, SO17 1BJ; Tel: +44 (0)23 8059 5058; Email: rgoinfo@soton.ac.uk). If you remain unhappy and wish to complain formally Martina will provide you with details of the University of Southampton Complaints Procedure.

Will my taking part in the study be kept confidential?

All of the information about your participation in the study will be kept confidential. Data from your interview will be allocated a pseudonym and your name and that of the ward on which you work will not be disclosed. The procedures for the handling, processing, storage and destruction of data your interview data will follow those of the University of Southampton and will meet the Data Protection Act 1998 requirements.

What will happen if I don't want to carry on with the study?

You are free to withdraw from the study at any time without providing a reason. You do not have to complete the interview and you will not be contacted any further.

What will happen to the results of the research study?

When the study is completed I will produce a thesis (report) demonstrating my findings, conclusions and recommendations. I will explore possible avenues, such as conferences and research journals, where it may be possible to present the study to a wider audience of patients, health professionals and researchers. I will work with XXXX NHS Foundation Trust Communication Lead to identify the best way to ensure all staff and patients at XXXX have an opportunity to learn of the study findings. Whilst I will ensure that participants and wards in the study will only be referred to by their allocated pseudonyms or identification numbers, I cannot guarantee that other people will not be able to link data reported in the study findings to wards or individual participants.

10. Appendices

Who is organising the study?

This research forms a PhD study through the Faculty of Health Sciences at the University of Southampton. I am being supervised by Professor Peter Griffiths and Dr Michael Simon, who are members of the Organisation and Delivery of Healthcare Research group, and who will oversee the process and ensure that the study is carried out according to appropriate standards.

Who has reviewed the study?

All research is looked at by an independent group of people to protect your interests and ensure the standard of the proposed study. The study has been reviewed by experienced researchers at the Faculty of Health Sciences and has also been approved by the Faculty of Health Sciences Ethics Committee. The study's ethics number is 2904. The study also has XXXX NHS Foundation Trust research governance approval.

Further information and contact details

If you have any further questions please do not hesitate to contact either myself on xxxx or Professor Peter Griffiths on xxxxx or Dr Michael Simon on xxxxx

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Appendix 25 – 1st round interview schedule (all ward staff)

Participant profile

Name:

Age:

Gender:

Ward:

Ward job title/role & band:

Length of service on ward:

Length of service in hospital:

Working patterns (full-time/part-time):

Date & time of interview:

Interview location:

I'd like to hear your views and experiences of the CAS.

Introduction

Can you start by telling me about your experiences of the CAS on your ward?

Implementation

How did you go about working towards the CAS?

How did doing this work affect your normal daily work on the ward?

Were there any specific things that you did to introduce the CAS to the ward?

What did your colleagues have to do when the ward started the CAS?

What impact did this have upon their normal daily work on the ward?

Enabling/inhibiting factors

What are some of the things that helped with working towards the CAS?

Was there anything you found particularly helpful? E.g. resources, time, other staff

Was there anything your colleagues/the ward staff found particularly helpful?

How would you describe your colleagues/the ward staff engagement with the CAS?

What are some of the key challenges that you encountered in working towards the CAS?

How did you overcome some of these problems?

What was their effect upon your colleagues?

How do you think they overcame some of these problems?

Learning

Can you tell me about the review panel?

How did you feel about the review panel and their visit to the ward?

How did your colleagues feel about the review panel?

Can you tell me about the review panel feedback for your ward?

What was your response to the review panel feedback?

How did your colleagues respond to the review panel feedback?

Operationalising

Can you tell me about the work that is now being done on the ward in relation to the CAS?

What are you doing?

How does this affect your daily work on the ward?

What are your colleagues doing?

What impact does this have upon their daily work on the ward?

Effects

What have you observed to be the overall effect of the CAS on your ward?

What has been the effect on the ward environment?

What has been the effect on your colleagues?

What has been the effect on the patients?

How has it affected you?

Overall, how do you feel about the CAS?

10. Appendices

I have asked all the questions I wanted to ask you. Is there anything you would like to mention which I haven't covered?

Are there any questions you would like to ask me?

Appendix 26 – Intervention ward interim summaries

Interim summary ward AI

The CAS processes

Review panel 6 weeks after enrolled in scheme
Accredited with recommendations
Unannounced visit due to occur sometime in study month 4

Contextual events/factors

Ward leader participating in Trust Leadership Training
Ward had a few difficult months with severe staffing issues resulting in negative impact upon quality of care (CAS working group meeting minutes 18/03/13)
Staff rate all survey scales except staffing positively

Indicator data indications

Falls –points above UCL post CAS implementation
Pressure ulcers 2 points above UCL
Hospital acquired infections – nothing

Patient experience data indications

5/7 question responses analysed show shift below the CL

Survey data

HSOPSC & PES-NWI trend of increasing scores; more favourable perceptions

1st round interview indications

Poor experience of review panel – late/disorganised
Disappointed no service user
Awaiting formal written feedback
Interview participants disappointed and feeling let down
Ward leader did most of the work; little delegation to others
Limited evidence of motivation to continue with work for CAS
No continuing engagement at present

Questions arising/gaps in data

How did they use the feedback when they got it?
Why was it only the ward leader who did the work?
Has there been any continuing engagement with the CAS?
Indications of shifts/special cause variation in indicator data –what has been the effect of the CAS upon the way staff use the CQD data?
Indications of changes in perceptions of safety culture/practice environment – what is causing this?
Need to seek evidence of reflexive monitoring
Need to explore cognitive participation further to identify why only ward leader did work

How to answer questions arising – additional second round interview questions

“How did you use the information fed back to you from the review panel?”

“My impression is that only a few key staff on each ward know about the CAS, what is your view on that?”

“Your ward appears to have enthusiastically embraced the assessment process but how do you feel about managing to maintain that level of engagement with each further review?”

“What effect has the CAS had on how you review and use your CQD data?”

“I wanted to discuss the safety culture survey and nursing practice environment surveys which were conducted on your ward when you first joined the CAS and then 9 months later. The results show that staff perceived your ward to be performing well in all areas but also that they perceived performance to have improved in all areas over the past 9 months. What is your view on that in relation to the CAS?”

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Interim summary ward BI

The CAS processes

Review panel 6 weeks after enrolled in scheme
Full accreditation without recommendations

Contextual events/factors

Long serving ward leader left as ward was reviewed; new Band 7 went off on long-term leave in month 3 and temporary Band 7 new to clinical area – period of significant change for ward staff

Staff show less favourable perceptions of survey scales “Staffing” and “Hospital handoffs and transitions” (HSOPSC) and “Staffing and resource adequacy” (PES-NWI)

Indicator data indications

Nothing indicated

Patient experience data indications

Nothing indicated

Survey data

HSOPSC & PES-NWI trend of increasing scores; more favourable perceptions

1st round interview indications

Positive experience of review panel and CAS processes

Awaiting formal written feedback

Huge amount of environmental preparations for the ward visit

Lots of talk of aiming for exemplar status now

No continuing engagement at present due to leadership changes but talk of Band 6s needing to support new Band 7 in understanding about the CAS, and working towards the CAS

Suggestion that implementation of the CAS resulted in increased data dissemination to junior staff thus giving them a greater awareness of indicator data

Impression given by interview participants that all ward staff were involved in different ways and understood about the CAS

Junior interview participant was nominated by ward leader as having good understanding of CAS but in fact did not do so

Questions arising/gaps in data

How did they use the feedback when they got it?

In reality how much involvement was there on the part of junior team?

Did the Band 6's introduce the CAS to the new ward leader?

Has there been any continuing engagement with the CAS?

No change in indicator/patient experience data– has implementation of the CAS had any effect upon the way staff use the CQD data?

Is the increased dissemination of data continuing?

What is their view on the results of the CAS reviews being disseminated across the Trust

Have the changes on the ward been sustained?

Need to seek evidence of reflexive monitoring

How to answer questions arising – additional second round interview questions

Questions above (ward AI)

“I have the impression that most of the effort that wards put into the CAS focused around preparing for the assessment, what do you think needs to happen in order to sustain the momentum that preparing for the CAS built up?”

“The results of your CAS review panel were shared across the wider Trust, what is your view on that?”

Interim summary ward CI

The CAS processes

Timescales for accreditation processes extended
 Review panel took place 12 weeks after enrolment in the scheme
 Accredited with recommendations
 Unannounced re-review due in 6 months due to extent of recommendations

Contextual events/factors

Fairly new inexperienced ward leader
 Ward had number of serious events and ward leader attended pressure ulcer and falls panels during study
 Ward had red matrons review prior to CAS review; concerns raised at CAS working group meeting (19/11/12) as to whether ward would pass accreditation process
 Ward had severe staffing shortages; survey respondents rate HSoPSC *"Staffing"* and PES-NWI *"Staffing and resource adequacy"* less favourably

Indicator data indications

Nothing indicated

Patient experience data indications

Nothing indicated

Survey data

Insufficient data for before and after effects

1st round interview indications – no participants; poor staff engagement with research

Questions arising/gaps in data

Need to cover all first round interview questions and second round questions identified for wards AI/BI
 How does CAS review process build on and supplement existing processes for managing safety events/quality of care issues?
 Have the changes on the ward been sustained?
 Need to seek evidence of reflexive monitoring

How to answer questions arising – additional second round interview questions

Questions above (ward AI/BI)

"Specifically thinking about safety, how do you think the CSA links with the process of root cause analysis that supports you to learn about and manage specific safety events?"

"How do you think the CSA links with the various patients experience initiatives, such as the Noise at Night initiative and the Friends and Family test, which are happening on the wards at present?"

"What about the matrons' walkabouts/peer review process? How do you think the CAS links with them?"

"How useful do you think the CAS is as a tool to support you to learn about and manage quality of care on your ward?"

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Appendix 27 –2nd round re-interview schedule (Bands 5-7)

Participant profile

Name:

Age:

Gender:

Ward:

Ward job title/role & band:

Length of service on ward:

Length of service in hospital:

Working patterns (full-time/part-time):

Date & time of interview:

Interview location:

I'd like to hear your views and experiences of the CAS.

Can you start by telling me about your experiences of the CAS on your ward since we last met?

Can you tell me about the review panel feedback for your ward?

What things were identified?

What was your response to (how did you feel) about the review panel feedback?

How did your colleagues respond to the review panel feedback?

How did you use the information fed back to you from the review panel?

What are some of the key factors that helped you to effectively use this information?

What are some of the key factors that hindered you from effectively using this information?

The results of your CAS review panel were shared across the wider Trust, what is your view on that?

What do you think are some of the benefits or disadvantages of this process?

My impression from other interviews is that only a few key staff on each ward know about the CAS, what is your view on that?

Why do you think that is the case? (limited contribution to tasks by other team members/roles/responsibilities)

How has the CAS been discussed with other staff since we last met?

Types of discussions?

Types of people? Ward staff/matrons etc

Is it on-going?

Can you tell me about the work that is now being done on the ward in relation to the CAS?

What are you doing?

How does this affect your daily work on the ward?

What are your colleagues doing?

What impact does this have upon their daily work on the ward?

What are some of the key factors that are helping you to continue this process?

What are some of the key factors that are hindering you from continuing this process?

Your ward appears to have enthusiastically embraced the process of self-assessment for the CAS, but how do you feel about managing to maintain that level of engagement with each further review cycle?

Is there anything that you would do differently when you come to your next CAS review? Why?

What do you feel would help?

Introduction of new tools, changing CAS standards etc

I also have the impression that most of the effort that wards put into the CAS is focused around preparing for the assessment, what do you think needs to happen in order to sustain the momentum that preparing for the CAS built up?

What have you now observed to be the overall effect of the CAS on your ward?

What has been the effect on the ward environment?

What has been the effect on your colleagues?

What has been the effect on the patients?

How has it affected you?

I wanted to discuss the safety survey and practice environment surveys which were conducted on your ward when you first joined the CAS and then 9 months later. The results show that staff perceived your ward to be performing well in all areas but also that they perceived performance to have improved in all areas over the past 9 months. What is your view on that in relation to the CAS?

What effect has the CAS had on how you review and use your CQD data?

Specifically thinking about safety, how do you think the CAS links with the process of root cause analysis that supports you to learn about and manage specific safety events?(Note: hasn't had a severe fall since February and nil pressure ulcers for a while)

How do you think the CAS links with the various patient experience initiatives, such as the Noise at Night initiative and the Friends and Family test, which are happening on the wards at present?

What about the matrons' walkabouts/peer review process? How do you think the CAS links with them?

How useful do you think the CAS is as a tool to support you to learn about and manage quality of care on your ward?

What do you see as being the goals of the CAS?

a. How well do you think these goals are being achieved?

b. What, if anything, do you think could be improved about the CAS?

Overall, how do you now feel about the CAS?

I have asked all the questions I wanted to ask you. Is there anything you would like to mention which I haven't covered?

Are there any questions you would like to ask me?

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Appendix 28 – Combined interview schedule (Bands 5-7)

Participant profile

Name:

Age:

Gender:

Ward:

Ward job title/role & band:

Length of service on ward:

Length of service in hospital:

Working patterns (full-time/part-time):

Date & time of interview:

Interview location:

I'd like to hear your views and experiences of the CAS.

Introduction

Can you start by telling me about your experiences of the CAS on your ward?

Implementation

How did you go about working towards the CAS?

How did doing this work affect your normal daily work on the ward?

Were there any specific things that you did to introduce the CAS to the ward?

What did your colleagues have to do when the ward started the CAS?

What impact did this have upon their normal daily work on the ward?

My impression from other interviews is that only a few key staff on each ward know about the CAS, what is your view on that?

Why do you think that is the case? (limited contribution to tasks by other team members/roles/responsibilities)

What are some of the things that helped with working towards the CAS?

Was there anything you found particularly helpful? E.g. resources, time, other staff

Was there anything your colleagues/the ward staff found particularly helpful?

How would you describe your colleagues/the ward staff engagement with the CAS?

What are some of the key challenges that you encountered in working towards the CAS?

How did you overcome some of these problems?

What was their effect upon your colleagues?

How do you think they overcame some of these problems?

Your ward appears to have enthusiastically embraced the process of self-assessment for the CAS, but how do you feel about managing to maintain that level of engagement with each further review cycle?

Is there anything that you would do differently when you come to your next CAS review? Why?

What do you feel would help?

Introduction of new tools, changing CAS standards etc

Learning

Can you tell me about the review panel?

How did you feel about the review panel and their visit to the ward?

How did your colleagues feel about the review panel?

Can you tell me about the review panel feedback for your ward?

What was your response to the review panel feedback?

How did your colleagues respond to the review panel feedback?

*How did you use the information fed back to you from the review panel?
What are some of the key factors that helped you to effectively use this information?
What are some of the key factors that hindered you from effectively using this information?*

The results of your CAS review panel were shared across the wider Trust, what is your view on that?

What do you think are some of the benefits or disadvantages of this process

Operationalising

Can you tell me about the work that is now being done on the ward in relation to the CAS?

What are you doing?

How does this affect your daily work on the ward?

What are your colleagues doing?

What impact does this have upon their daily work on the ward?

What are some of the key factors that are helping you to continue this process?

What are some of the key factors that are hindering you from continuing this process?

I have the impression that most of the effort that wards put into the CAS is focused around preparing for the assessment, what do you think needs to happen in order to sustain the momentum that preparing for the CAS built up?

Effects

What have you observed to be the overall effect of the CAS on your ward?

What has been the effect on the ward environment?

What has been the effect on your colleagues?

What has been the effect on the patients?

How has it affected you?

What do you see as being the goals of the CAS?

How well do you think these goals are being achieved?

What, if anything, do you think could be improved about the CAS?

What effect has the CAS had on how you review and use your CQD data?

Specifically thinking about safety, how do you think the CAS builds on and supplements the process of root cause analysis that supports you to learn about and manage specific safety events?

How do you think the CAS builds on and supplements the various patient experience initiatives, such as the Noise at Night initiative and the Friends and Family test, which are happening on the wards at present?

How useful do you think the CAS is as a tool to support you to learn about and manage quality of care on your ward?

Overall, how do you feel about the CAS?

I have asked all the questions I wanted to ask you. Is there anything you would like to mention which I haven't covered?

Are there any questions you would like to ask me?

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Appendix 29 – Clinical matron interview schedule

Participant profile

Name:

Age:

Gender:

Division:

Length of service as a clinical matron:

Length of service in hospital:

Working patterns (full-time/part-time):

Date & time of interview:

Interview location:

I'd like to hear your views and experiences of the CAS....

Can you start by telling me about your experiences of the CAS?

How did you learn about the CAS?

What did you do to develop an understanding of it?

What do you feel its overall purpose is?

How does this differ from other quality improvement/assurance initiatives?

National activities

Trust activities

What work are you doing, or have you had to do, in relation to the CAS?

For *study ward name* / your wards as they go through the accreditation process?

Across the wider Trust?

How did/does this affect your normal daily work?

How does this fit with the rest of your work?

What are the key things that you have found helpful in enabling you to do this work?

What are the key things that you have found challenging in carrying out this work?

How did you overcome these problems?

What have you observed to be the effects of the CAS on *study ward name* / the wards you are clinical matron for?

On the staff?

On clinical activities?

On the ward environment?

On the patients?

How do you think *study ward name* / your wards have benefited from participating in the CAS?

What disadvantages have you observed?

How have you benefited from your wards participating in the CAS?

What disadvantages have you observed?

How is the feedback from the CAS accreditation reviews being used by *study ward name* / your wards?

Activities

What do you think are some of the key factors that are helping them to effectively use this information?

What do you think are some of the key factors that are hindering them from effectively using this information?

How are you using the information from the CAS accreditation reviews?

Specific activities ...

What do you think are some of the key factors that are helping you to effectively use this information?

What do you think are some of the key factors that are hindering you from effectively using this information

How do you think the CAS links with other quality assurance/improvement processes occurring within the Trust?

Peer reviews/matron's walkabouts

Activities managing safety – Safety Thermometer, root cause analysis

Patient experience initiatives – Friends & Family Test

How is the information from the CAS reviews from your wards being used across the wider Trust?

Who is it being shared with?

What have you observed to be some of the effects of this process?

Benefits

Disadvantages

What, if anything, do you think could be improved about the CAS?

How well do you think its goals are being achieved?

What, if anything, do you think could be improved about the CAS?

Overall, how do you feel about the CAS?

I have asked all the questions I wanted to ask you. Is there anything you would like to mention which I haven't covered?

Are there any questions you would like to ask me?

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Appendix 30 - Interview thank you letter

Health
Sciences

UNIVERSITY OF
Southampton

Date

Dear Sir/Madam

Study title ***“Improving patients’ experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)”***

This research study aimed to interview nine staff members and due to the numbers of people volunteering it will unfortunately not be possible to offer you an opportunity to participate in an interview at this stage. However, as we discussed, there may be an opportunity for you to participate in later interviews.

If you expressed an interest in participating in the later interviews but change your mind over the next few months please feel free to contact me on either the telephone number or e-mail address given below. I will then ensure that your details are no longer retained and you will not be contacted any further.

Finally, I would like to express my thanks for your kind offer of support.

Yours faithfully

Helen Wharam
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Ethics No : 2904

Version 2.0

12/07/12

Appendix 31 - Categories and concepts for each NPT domain

Coherence (sense-making/attribution of meaning)		
Sub topic	Categories	Construct
Scheme differences	Comprehensive assessment Integrating everything Context specific Team recognition Lacking distinction	Distinguishing features
	No knowledge Limited understanding One-off-process Having different perspectives	Degrees of scheme understanding
Team understanding	Staff availability Staff receptivity	Barriers to team understanding
	Senior staff facilitation Ward newsletter Ward meetings Morning "Top Tips"	Learning facilitators Tapping into existing processes
Team learning activities	Resource sharing Facilitating discussions Information display Explanatory staff letter Disseminating data Introducing QI tool	Educational strategies
	Putting into context Seeing in action	Modelling activities
Individual understanding	Key actor(s) Effective actor(s) Bystander(s)	Levels of participation
	Extensive understanding Task specific understanding Limited understanding	Degrees of process understanding
Individual learning activities	Being enrolled Utilising scheme resources Consulting experienced others Working collaboratively	Individual learning activities
Sense making activities	Drawing on experiential learning Valuing external review	Drawing on self
	Relating to Trust activities	Relating to internal activities
	Referring to National drivers Balancing negative reporting Comparing to other regulatory bodies	Relating to external activities
Attribution of meaning	Improve quality of care Supporting staff experience Making performance comparisons Supporting meaningful data use In-depth ward appraisal Measuring ward performance Educating staff	Supporting ward performance
	Trust quality assurance Standardised performance	Facilitating Trust processes

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Cognitive participation (legitimising the scheme and enrolling into the scheme)		
Sub topic	Categories	Concepts
Activities to move things forwards	Ring-fencing time Utilising scheme resources Linking to other review processes Planning	Managing self
	Working collaboratively Facilitating discussions Seeking opinions Reflecting Goal setting	Leading others
	Delegating work Resource sharing Educating others	Managing others
Being informed about participation	Having to comply Being told Being asked	Process perceptions
Staff engagement strategies	Inviting participation Seeking opinions	Offering opportunities
	Communicating personally Raising quality awareness Raising process awareness Putting into context Modelling activities	Awareness raising
	Verbal reminders Written reminders	Providing reminders
	Tapping into existing meetings Role dependent discussions Team discussions Individual discussions	Facilitating discussion
Team engagement	Limited team engagement Wide team engagement Changing engagement	Degrees of engagement
	Effective actor(s) Bystander(s)	Participation approaches
	Continuing as usual Positive team spirit Pro-active staff	Supporting factors
	Varying levels of motivation	Levels of motivation
	Planning careers Natural opportunities	Motivational factors
	Having sufficient experience	Barriers
Individual engagement	Key actor(s) Effective actor(s)	Participation approaches
	Striving to achieve Continuing as usual	Supporting factors
Regulatory processes	Reinforcing routine practice	Providing valid leverage
Validating activities	Seeking opinions Making peer comparisons	Seeking opinions Making peer comparisons
Ensuring continuing support	Providing reminders Setting new goals Aiming higher	Practical activities
Development of collective understanding	Not evidenced	
Broadening team contribution	Not evidenced	

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Collective action (mobilising skills and resources)		
Sub topic	Categories	Concepts
Learning new skills or doing things differently	Using a new tool Learning about audits	Enhancing skills
	Improved communication	Improving communication
Availability of right skills	Increasing data dissemination Increased understanding of data Increased use of data Wider staff engagement with data Continuing as usual Identification of trends Linking processes	Changing data usage
	Tapping into existing processes Using existing skills	Tapping into existing processes Using existing skills
Specific activities undertaken	Senior staff Collecting information Tapping into existing processes Linking to external resources	Preparing the evidence
	Senior staff/Junior staff Utilising scheme resources Completing existing projects Linking to audit processes Improving safety Enhancing patient experience	Making environmental changes
	Selecting correct data Having sufficient experience Time consuming Promoting negative emotions	Assessment of the process
	Working extra hours Having additional input Changing management priorities Reducing clinical hours Seeking to motivate others	Short term changes
	Junior staff Revising patient documentation Revising audit documentation	Improving documentation
	Junior staff Linking to audit processes	Reviewing clinical activities
	Senior staff Attending review panel Showing round the ward	Participating on the day
	Senior staff Exploring the results Making environmental changes Improving staff experience	Taking follow-up action
Work undertaken with external staff	Collecting information Tapping into existing processes Knowing who to ask	Seeking information
Impact on normal ward activities	Continuing as usual Reinforcing good practice Becoming distanced	Continuing as usual
	Improving clinical practice Improved environmental awareness Increasing client centredness	Ensuring quality of care
	Supporting change management Raising performance awareness Becoming up-to-date	Team effects

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Impact on relationships with others	Increased role understanding Raising meso/macro system awareness	Broadening horizons
	Enhancing leadership qualities Facilitating personal development	Leadership development
Roles and responsibilities	Management roles Practical roles	Senior staff
	Practical roles	Junior staff
	Competing responsibilities Competing activities Maintaining control Ensuring work standard Overburdened staff Sufficiency of resources Protecting staff	Competing factors
	Self as accountable Seeing self as “expert”	Self as accountable Contributory factors
Authoritative others	Valuing peers Experienced others	The role of experiential learning
Assessment of the actions of key players, processes and outcomes	Giving autonomy Being approachable Welcoming patient's perspective Forming reciprocal relationships	Working relationships
	Being organised Making preparations Having right composition Understanding the process Promoting negative emotions Having unmet expectations	Review panel's preparatory work
	Ensuring full discussions Being consistent Acknowledging the context Ensuring full discussions Interpreting data correctly Ensuring objectivity Fully identifying challenges Questioning effectively Including matron's perspective Demonstrating thoroughness Promoting negative emotions Having unmet expectations Having positive emotions	Desktop review
	Questioning effectively Demonstrating thoroughness Obtaining staff feedback Promoting negative emotions Having positive emotions Having unmet expectations	Ward review
	Giving timely feedback Being constructive Being transparent Making realistic recommendations Setting right priorities Making specific recommendations Recognising shared responsibilities Giving recognition Responding positively to feedback Promoting negative emotions Having positive emotions Having unmet expectations Relating to external activities Questioning results Making performance comparisons	Review panel's feedback
	Ensuring continuity	Re-review process

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	Getting a realistic picture Promoting negative emotions Having positive emotions Having unmet expectations	
Strategies to overcome barriers	Seeking clarity Requesting formal feedback Feeding back information	Using initiative
Allocated external resources	Clear information Peer support	Useful resources
Additional resource requirements	Resources for recommendations Parity of resources Providing leverage	Resource requirements Providing leverage
Processes/individuals making it happen	Mesosystem support Macrosystem support Microsytem support	Supporting structures
Contextual factors hindering integration	Time constraints Juggling priorities Seasonal effects Leadership changes	Long term effects
Strategies to overcome barriers	Changing responsibilities	Short term changes

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Reflexive monitoring (appraising information and reconfiguring actions)		
Collecting/receiving scheme information	Making enquiries	Seeking information
	Sharing formal report Sharing evidence folder Providing written information Tapping into existing processes	Sharing information
	Comparing self with others Making "fairness" judgements	Making peer comparisons
Determining overall scheme effectiveness/usefulness	Lost from sight	The reality
	Not yet determined Most effective yet Unfulfilled potential Bringing nothing new Part of the picture	Degrees of effectiveness/usefulness
	Needing underpinning support	Requirements for effectiveness
Team appraisal of scheme validity/worth	Being proud Supporting management of change	Positive team effects
	Receiving timely feedback	Detrimental factors
Team commitment to continuing engagement	Changing engagement Aiming higher	Early reactions
	Lost from sight	The reality
	Juggling priorities Leadership changes Sufficiency of resources Having different perspectives	Detrimental factors
Individual appraisal of scheme validity/worth (tasks and processes)	Positive experience Providing reassurance/recognition Benefits outweigh negatives Useful monitoring tool Supporting role development Positive team effects	Overall impressions
	Thinking outside the box Reinvigorating practice Significant process	QI tool (15 Steps)
	Bringing clarity Refocussing priorities Identifying overlooked issues Broadening outlook Reflective opportunity Identification of achievements Giving direction Identifying trends Linking systems	Preparing evidence
Individual commitment to continuing engagement	Needing to be there	Ward visit
	Competitive effects Dysfunctional effects Ensuring transparency Putting into context	Results publication
	Aiming higher Overcoming disappointments	Early reactions
Individual commitment to continuing engagement	Lost sight of Maintaining momentum Maintaining standards	The reality

	Juggling priorities Sufficiency of resources Having different perspectives	Detrimental factors
	Harnessing monthly clinical focus On-going evidence collection Continuous discussion	Maintaining portfolio
Work patterns adopted	Adopting QI dimensions	Communication approach
	Continuous discussions Speedier process Relevant experiential learning Reduced negative impact	Thinking of the future
	Consistent QI language Linkage to "Walkabouts"	Enhancing Trust wide processes
	Providing meaningful explanations Broadening results publication Increased service user involvement	Patient and public involvement
Process modification	Sharing experiential learning Changing process emphasis Standardising processes Clarifying guidelines Putting into context Widening staff participation Timescales	Preparatory process
	Area specific standards Including staff feedback Clarifying response hierarchy	Standards
	Widening membership Reviewer training Having adequate clinical skills Improved organisational processes	Review panels

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Appendix 32 – Ward clustered matrices and meta-matrices for each NPT domain

Ward AI: Coherence (sense making/attribution of meaning)				
	Categories	Participant 2, ward leader	Participant 3, house keeper	Participant 8, matron
Scheme differences	Distinguishing features	Comprehensive assessment		Comprehensive assessment Integrating everything
Team understanding	Degrees of scheme understanding	No Knowledge	No knowledge Having different perspectives	
	Barriers to team understanding	Staff availability Staff receptivity		
Team learning activities	Learning facilitators	Senior staff facilitation		
	Tapping into existing processes	Ward newsletter	Ward newsletter	
	Educational strategies	Resource sharing Facilitating discussions Information display	Information display	
	Modelling activities			
Individual understanding	Levels of participation	Key actor	Effective actor	Effective actor
	Degrees of process understanding	Extensive understanding	Task specific understanding	Extensive understanding
Individual learning activities	Individual learning activities	Being enrolled Utilising scheme resources Consulting experienced others	Utilising scheme resources Working collaboratively	Consulting experienced others
Sense making activities	Drawing on self	Acknowledging value of external review	Drawing on experiential learning	
	Relating to internal activities		Relating to Trust activities	
	Relating to external activities	Referring to national drivers	Referring to national drivers	
Attribution of meaning	Supporting ward performance		Supporting meaningful data use	In-depth ward appraisal Improve quality of care Supporting staff experience
	Facilitating Trust performance	Trust quality assurance		Trust quality assurance
Ward BI: Coherence (sense making/attribution of meaning)				
	Categories	Participant 1, ward leader	Participant 4, sister	Participant 5, healthcare

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				assistant
Scheme differences	Distinguishing features	Context specific	Context specific	Lacking distinction
Team understanding	Degrees of scheme understanding	One-off process		
	Barriers to team understanding			
Team learning activities	Learning facilitators	Senior staff facilitation	Senior staff facilitation	Senior staff facilitation
	Tapping into existing processes		Ward meetings	
	Educational strategies	Facilitating discussions Resource sharing	Disseminating data	Introducing QI tool
	Modelling activities	Putting into context Seeing in action Key actor		
Individual understanding	Levels of participation		Effective actor	By-stander
	Degrees of process understanding	Extensive understanding	Extensive understanding	Limited understanding
Individual learning activities	Individual learning activities	Being enrolled Utilising scheme resources		
Sense making activities	Drawing on self			
	Relating to internal activities			
	Relating to external activities		Balancing negative reporting	Referring to national drivers
Attribution of meaning	Supporting ward performance		Improve quality of care Supporting staff experience	
	Facilitating Trust performance			
Ward CI: Coherence (sense making/attribution of meaning)				
	Categories	Participant 6, ward leader	Participant 7, sister	
Scheme differences	Distinguishing features	Comprehensive assessment		
Team understanding	Degrees of scheme understanding	Having different perspectives	Limited understanding	
	Barriers to team understanding			
Team learning	Learning facilitators	Senior staff facilitation	Senior staff facilitation	

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activities	Tapping into existing processes	Morning “Top-Tips”	Morning “Top-Tips”
	Educational strategies	Facilitating discussions	Facilitating discussions
		Information display	
		Resource sharing	
	Introducing QI tool		
	Modelling activities		
Individual understanding	Levels of participation	Key actor	Effective actor
	Degrees of process understanding	Extensive understanding	Extensive understanding
Individual learning activities	Individual learning activities	Being enrolled	Utilising scheme resources
Sense making activities	Drawing on self		Drawing on experiential learning
	Relating to internal activities		Relating to Trust activities
	Relating to external activities		Comparing to other regulatory bodies
Attribution of meaning	Supporting ward performance	Measuring ward performance	Improve quality of care
			Educating staff
	Facilitating Trust performance	Trust quality assurance	
		Standardised performance	
Ward CC: Coherence (sense making/attribution of meaning)			
	Categories	Participant 9, ward leader	
Scheme differences	Distinguishing features	Team recognition	
Team understanding	Degrees of scheme understanding		
	Barriers to team understanding		
Team learning activities	Learning facilitators	Senior staff facilitation	
	Tapping into existing processes	Ward meetings	
	Educational strategies	Explanatory staff letter	
		Facilitating discussions	
		Resource sharing	
	Modelling activities		

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Individual understanding	Levels of participation	Key actor			
	Degrees of process understanding	Extensive understanding			
Individual learning activities	Individual learning activities	Being enrolled			
Sense making activities	Drawing on self	Drawing on experiential learning			
	Relating to internal activities				
	Relating to external activities				
Attribution of meaning	Supporting ward performance				
	Facilitating Trust performance	Standardised performance (portfolio)			
All wards: Coherence (sense making/attribution of meaning) meta matrix					
	Categories	Ward AI	Ward BI	Ward CI	Ward BC
Scheme differences	Distinguishing features	Comprehensive assessment Integrating everything	Context specific Lacking distinction	Comprehensive assessment	
					Team recognition
Team understanding	Degrees of scheme understanding	No Knowledge	One-off process		
		Having different perspectives		Limited understanding Having different perspectives	
	Barriers to team understanding	Staff availability Staff receptivity			
Team learning activities	Learning facilitators	Senior staff facilitation	Senior staff facilitation	Senior staff facilitation	Senior staff facilitation
	Tapping into existing processes	Ward newsletter	Ward meetings		Ward meetings
				Morning “Top-Tips”	
		Educational strategies	Facilitating discussions Resource sharing Information display	Facilitating discussions Resource sharing	Facilitating discussions Resource sharing Information display
	Disseminating data Introducing QI tool		Introducing QI tool		

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					Explanatory staff letter
Individual understanding	Modelling activities		Putting into context Seeing in action		
	Degrees of process understanding	Extensive understanding Task specific understanding	Extensive understanding	Extensive understanding	Extensive understanding
			Limited understanding		
	Levels of participation	Key actor Effective actor	Key actor Effective actor By-stander	Key actor Effective actor	Key actor
Individual learning activities	Individual learning activities	Being enrolled Utilising scheme resources Consulting experienced others Working collaboratively	Being enrolled Utilising scheme resources	Being enrolled Utilising scheme resources	Being enrolled
Sense making activities	Drawing on self	Drawing on experiential learning Valuing external review		Drawing on experiential learning	Drawing on experiential learning
	Relating to internal activities	Relating to Trust activities		Relating to Trust activities	
	Relating to external activities	Referring to national drivers	Referring to national drivers Balancing negative reporting	Comparing to other regulatory bodies	
Attribution of meaning	Supporting ward performance	Improve quality of care Supporting staff experience Making performance comparisons Supporting meaningful data use In-depth ward appraisal	Improve quality of care Supporting staff experience	Improve quality of care	
				Measuring ward performance Educating staff	
	Facilitating Trust performance	Trust quality assurance		Trust quality assurance Standardised performance	Standardised performance

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Ward AI: Cognitive participation				
	Categories	Participant 2, ward leader	Participant 3, house keeper	Participant 8, matron
Activities to move things forwards	Managing self	Utilising scheme resources	Planning	
	Leading others	Working collaboratively Facilitating discussions	Working collaboratively	
	Managing others	Delegating work Resource sharing		
Being informed about participation	Process perceptions	Having to comply Being told		
Staff engagement strategies	Offering opportunities			
	Awareness raising	Communicating personally Raising quality awareness	Raising process awareness	
	Providing reminders		Verbal reminders Written reminders	
	Facilitating discussion	Role dependent discussions Team discussions Individual discussions		
	Degree of engagement	Limited team engagement	Limited team engagement	
Team engagement	Participation approaches	Effective actor(s)	Bystander(s)	
	Supporting factors			
	Levels of motivation	Varying levels of motivation	Varying levels of motivation	
	Motivational factors			
	Barriers			
Individual engagement	Participation approaches	Key actor	Key actor	
	Supporting factors	Striving to achieve	Striving to achieve	
Regulatory processes	Providing valid leverage	Reinforcing routine practice		
Validating activities	Validating activities			
Ensuring continuing support	Practical activities			
Development of collective understanding				
Broadening team contribution				
Ward BI: Cognitive participation				
	Categories	Participant 1, ward leader	Participant 4, sister	Participant 5, healthcare assistant
Activities to move things forwards	Managing self	Utilising scheme resources		

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		Planning		
	Leading others	Working collaboratively Facilitating discussions Seeking opinions Reflecting Goal setting		
	Managing others	Educating others	Educating others	
Being informed about participation	Process perceptions			
	Offering opportunities	Seeking opinions		
Staff engagement strategies	Awareness raising	Putting into context Modelling activities	Raising process awareness	Raising process awareness
	Providing reminders	Verbal reminders		
	Facilitating discussion	Utilising existing forums	Utilising existing forums	
		Team discussions	Team discussions	
				Role dependent discussions Individual discussions
Team engagement	Degree of engagement	Wide team engagement Changing engagement		
	Participation approaches	Effective actor(s)	Effective actor(s) Bystander(s)	
	Supporting factors	Continuing as usual Pro-active staff	Pro-active staff Positive team spirit	
	Levels of motivation		Varying levels of motivation	
	Motivational factors		Planning careers Natural opportunities	
	Barriers			
Individual engagement	Participation approaches	Key actor	Effective actor	Bystander
	Supporting factors	Striving to achieve		Continuing as usual
Regulatory processes	Providing valid leverage			
Validating activities	Validating activities	Seeking opinions		
Ensuring continuing support	Practical activities	Providing reminders Setting new goals Aiming higher	Providing reminders Setting new goals	
Development of collective understanding				
Broadening team contribution				

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Ward CI: Cognitive participation			
	Categories	Participant 6, ward leader	Participant 7, sister
Activities to move things forwards	Managing self	Planning; Linking to other review processes	
	Leading others	Facilitating discussions	Facilitating discussions
	Managing others	Delegating work	Educating others
Being informed about participation	Process perceptions	Being asked	Being told
Staff engagement strategies	Offering opportunities	Inviting participation Seeking opinions	
	Awareness raising	Raising process awareness	
	Providing reminders	Verbal reminders	Verbal reminders
	Facilitating discussion	Utilising existing forums Team discussions	Utilising existing forums Team discussions
	Degree of engagement	Limited team engagement	Limited team engagement
Team engagement	Participation approaches	Bystander(s)	Effective actor(s) By-stander(s)
	Supporting factors		
	Levels of motivation	Varying levels of motivation	Varying levels of motivation
	Motivational factors		
	Barriers	Having sufficient experience	
Individual engagement	Participation approaches	Key actor	Effective actor
	Supporting factors	Striving to achieve	
Regulatory processes	Providing valid leverage		
Validating activities	Validating activities	Seeking opinions	
Ensuring continuing support	Practical activities		
Development of collective understanding/ Broadening team contribution - not evidenced			
Ward BC: Cognitive participation			
	Categories	Participant 9, ward leader	Notes:

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Activities to move things forwards	Managing self	Ring-fencing time; Utilising scheme resources; Planning; Linking to other review processes			
	Leading others	Facilitating discussions			
	Managing others	Resource sharing			
Being informed about participation	Process perceptions				
Staff engagement strategies	Offering opportunities	Inviting participation			
	Awareness raising	Communicating personally Raising process awareness			
	Providing reminders				
	Facilitating discussion	Utilising existing forums; Team discussions			
Team engagement	Degree of engagement	Wide team engagement			
	Participation approaches	Effective actor(s); Bystander(s)			
	Supporting factors	Positive team spirit; Pro-active staff			
	Levels of motivation	Varying levels of motivation			
	Motivational factors	Natural opportunities			
	Barriers				
	Individual engagement	Participation approaches	Key actor		
	Supporting factors	Striving to achieve			
Regulatory processes	Providing valid leverage				
Validating activities	Validating activities	Making peer comparisons			
Ensuring continuing support	Practical activities				
Development of collective understanding					
Broadening team contribution					
All wards: Cognitive participation meta-matrix					
	Categories	Ward AI	Ward BI	Ward CI	Ward BC
Activities to move things forwards	Managing self	Utilising scheme resources	Utilising scheme resources	Planning Linking to other review processes	Utilising scheme resources
		Planning	Planning		Planning
					Linking to other review processes Ring-fencing time

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	Leading others	Working collaboratively Facilitating discussions	Working collaboratively Facilitating discussions Seeking opinions Reflecting Goal setting	Facilitating discussions	Facilitating discussions
	Managing others	Delegating work Educating others Resource sharing	Educating others	Delegating work Educating others	Educating others Resource sharing
Being informed about participation	Process perceptions	Having to comply Being told		Being told Being asked	
Staff engagement strategies	Offering opportunities		Seeking opinions	Inviting participation Seeking opinions	Inviting participation
	Awareness raising	Communicating personally Raising process awareness Raising quality awareness	Raising process awareness Putting into context Modelling activities	Raising process awareness	Communicating personally Raising process awareness
	Providing reminders	Verbal reminders Written reminders	Verbal reminders	Verbal reminders	
	Facilitating discussion	Role dependent discussions Team discussions Individual discussions	Tapping into existing meetings Role dependent discussions Team discussions Individual discussions	Tapping into existing meetings Team discussions	Tapping into existing meetings Team discussions
	Degree of engagement	Limited team engagement	Wide team engagement Changing engagement	Limited team engagement	Wide team engagement
Team engagement	Participation approaches	Effective actor(s) Bystander(s)	Effective actor(s) By-stander(s)	Effective actor(s) Bystander(s)	Effective actor(s) Bystander(s)
	Supporting factors		Continuing as usual Positive team spirit		Positive team spirit

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			Pro-active staff		Pro-active staff
	Levels of motivation	Varying levels of motivation	Varying levels of motivation	Varying levels of motivation	Varying levels of motivation
	Motivational factors		Planning careers Natural opportunities		Natural opportunities
	Barriers			Having sufficient experience	
Individual engagement	Participation approaches	Key actor	Key actor Effective actor	Key actor Effective actor	Key actor
	Supporting factors	Striving to achieve	Striving to achieve Continuing as usual	Striving to achieve	Striving to achieve
Regulatory processes	Providing valid leverage	Reinforcing routine practice			
Validating activities	Validating activities		Seeking opinions	Seeking opinions	Making peer comparisons
Ensuring continuing support	Practical activities		Providing reminders Setting new goals Aiming higher		
Development of collective understanding					
Broadening team contribution					
Ward A1: Collective action (mobilising skills and resources)					
	Categories	Participant 2, ward leader	Participant 3, house keeper	Participant 8, matron	
Learning new skills or doing things differently	Enhancing staff skills		Using a new tool		
	Improving communication	More explicit communication			
	Data usage	Continuing as usual			
Availability of right skills		Tapping into existing processes Using existing skills			
	Preparing the evidence	Senior staff Collecting information Tapping into existing processes			
	Assessment of process	Time consuming		Selecting correct data Having sufficient experience	
Specific activities undertaken	Short-term changes	Working extra hours	Working extra hours Seeking to motivate others		
	Making environmental changes	Senior/junior staff Completing existing projects Utilising scheme resources	Senior/junior staff Completing existing projects Utilising scheme resources		

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		Improving safety Enhancing patient experience		
	Improving documentation	Junior staff Revising audit documentation		
	Reviewing clinical activities			
	Participating on the day	Senior staff Attending review panel	Senior/junior staff	
			Showing round the ward	
	Taking follow-up action	Senior staff Improving staff experience	Senior staff	Improving staff experience Exploring the results
Work undertaken with external staff	Seeking information	Collecting information Tapping into existing processes		
	Continuing as usual	Continuing as usual	Continuing as usual	Continuing as usual Becoming distanced
Impact on normal ward activities	Ensuring quality of care		Reinforcing good practice	
	Team effects			
	Senior staff	Management roles	Management roles	
	Junior staff	Practical roles	Practical roles	
Roles and responsibilities	Competing factors	Competing responsibilities Time constraints Overburdened staff Competing activities Maintaining control		
Impact on relationships with others	Broadening horizons			
	Leadership development	Enhancing leadership qualities		
Who is accountable?	Self as accountable	Self as accountable	Self as accountable	
	Contributory factors	Ensuring work standard	Seeing self as "expert"	
Authoritative others	The role of experiential learning	Valuing peers Experienced others		
Assessment of the actions of key players, processes and outcomes	Working relationships	Welcoming patient's perspective Giving autonomy Being approachable Forming reciprocal relationships		Welcoming patient's perspective
	Review panel's preparatory work	Being organised Making preparations Having right composition Promoting negative emotions Having unmet expectations	Being organised Having right composition Promoting negative emotions Having unmet expectations	
	Desktop review	Ensuring full discussions Ensuring thoroughness		

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		Promoting negative emotions Having unmet expectations		Interpreting data correctly Acknowledging the context Being consistent
	Ward review	Demonstrating thoroughness Promoting negative emotions Having unmet expectations		
	Review panel's feedback	Giving timely formal feedback Setting right priorities Making realistic recommendations	Giving timely formal feedback	Setting right priorities Making specific recommendations Being transparent
		Recognising shared responsibilities Giving recognition Relating to external activities Making performance comparisons Responding positively to feedback Promoting negative emotions		Responding positively to feedback Promoting negative emotions
	Re-review process	Ensuring continuity Promoting negative emotions		
Strategies to overcome barriers	Using initiative	Seeking clarification Requesting formal feedback Feeding back information		
Allocated external resources	Useful resources	Peer support		
Additional resource requirements	Resource requirements	Resources for recommendations		Parity of resources Providing leverage
Processes/individuals making it happen	Supporting structures	Macrosystem support		Mesosystem support
Contextual factors hindering integration	Barriers	Receiving timely formal feedback Juggling priorities Seasonal effects Constant change		
Strategies to overcome barriers				

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Ward BI: Collective action (mobilising skills and resources)				
	Categories	Participant 1, ward leader	Participant 4, sister	Participant 5, healthcare support worker
Learning new skills or doing things differently	Enhancing staff skills	Using a new tool	Learning about audits	
	Improving communication			
	Data usage		Increasing data dissemination Increased understanding of data Wider staff engagement with data	
Availability of right skills		Tapping into existing processes Using existing skills		
Specific activities undertaken	Preparing the evidence	Senior staff Collecting information Linking to external resources	Senior staff Tapping into existing processes	
	Assessment of process	Time consuming Promoting negative emotions	Time consuming Promoting negative emotions	
	Short term changes	Working extra hours Changing management priorities Having additional input Reducing clinical hours	Reducing clinical hours	
	Making environmental changes	Senior/junior staff Utilising scheme resources Enhancing patient experience Improving safety Improving staff experience	Senior/junior staff Utilising scheme resources Enhancing patient experience Improving safety Improving staff experience	Making environmental changes
	Improving documentation	Revising patient documentation		Revising patient documentation
	Reviewing clinical activities			
	Participating on the day	Senior staff Attending review panel Showing round the ward		
	Taking follow-up action			
Work undertaken with external staff	Seeking information		Collecting information Tapping into existing processes Knowing who to ask	
Impact on normal ward activities	Continuing as usual	Continuing as usual	Continuing as usual	Continuing as usual
	Ensuring quality of care	Reinforcing good practice	Improved environmental awareness	

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		Increasing patient centredness Improved clinical practice	Increasing patient centredness
	Team effects	Becoming up-to-date	Supporting change management
Roles and responsibilities	Senior staff	Management roles Practical roles	Management roles Practical roles
	Junior staff	Practical roles	Practical roles
	Competing factors	Maintaining control	
Impact on relationships with others	Broadening horizons	Disseminating learning	Increased role understanding Raising meso/macro system awareness
	Leadership development	Facilitating personal development	
Who is accountable?	Self as accountable		
	Contributory factors		
Authoritative others	The role of experiential learning		
Assessment of the actions of key players, processes and outcomes	Working relationships		
	Review panel's preparatory work	Having right composition Understanding the process	
	Desktop review	Ensuring objectivity Promoting negative emotions Having positive emotions	
	Ward review	Questioning effectively	Questioning effectively Promoting negative emotions Having positive emotions Having unmet expectations
	Review panel's feedback	Being constructive Having positive emotions Responding positively to feedback	Giving timely formal feedback
	Re-review process		
	Strategies to overcome barriers	Using initiative	
Allocated external resources	Useful resources	Clear information	
Additional resource requirements	Resource requirements		

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Processes/individuals making it happen	Supporting structures		Mesosystem support
Contextual factors hindering integration	Barriers	Juggling priorities Leadership changes	Leadership changes Constant change
Strategies to overcome barriers			Changing responsibilities
Ward CI: Collective action (mobilising skills and resources)			
	Categories	Participant 6, ward leader	Participant 7, sister
Learning new skills or doing things differently	Enhancing staff skills	Using a new tool	
	Improving communication		
	Data usage	Increasing data dissemination Increased understanding of data Increased use of data Identification of trends Linking processes	
	Availability of right skills		
Specific activities undertaken	Preparing the evidence	Senior staff Collecting information Tapping into existing processes	Senior staff Collecting information
	Assessment of process	Selecting correct data Having sufficient experience Promoting negative emotions	
	Short term changes	Working extra hours Changing management priorities	Time consuming Working extra hours Changing management priorities Reducing clinical hours
	Making environmental changes	Senior/junior staff Utilising scheme resources Enhancing patient experience Improving safety Linking to audit processes	Senior/junior staff Utilising scheme resources Enhancing patient experience Improving safety
	Improving documentation		Junior staff Revising patient documentation
	Reviewing clinical activities		Junior staff Linking to audit processes
	Participating on the day	Senior staff Attending review panel Showing round the ward	

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	Taking follow-up action	Senior staff Enhancing patient experience	
	Seeking information	Collecting information Tapping into existing processes Knowing who to ask	
Impact on normal ward activities	Continuing as usual	Continuing as usual Reinforcing good practice	Continuing as usual Reinforcing good practice
	Ensuring quality of care	Improved environmental awareness	
	Team effects	Raising performance awareness	
Roles and responsibilities	Senior team	Management roles	Management roles
	Junior team	Practical roles	Practical roles
	Competing factors	Time constraints Overburdened staff Maintaining control Sufficiency of resources	
Impact on relationships with others	Broadening horizons		
	Leadership development	Facilitating personal development	
Who is accountable?	Self as accountable		
	Contributory factors		
Authoritative others	The role of experiential learning		
Assessment of the actions of key players, processes and outcomes	Working relationships		Welcoming patient's perspective
	Review panel's preparatory work		
			Demonstrating thoroughness Ensuring objectivity Acknowledging the context Fully identifying challenges
	Desktop review	Questioning effectively Promoting negative emotions Having unmet expectations Having positive emotions	
	Ward review		Welcoming patient's perspective
		Giving timely formal feedback Making realistic recommendations Being constructive	
	Review panel's feedback		Being transparent Promoting negative emotions Having positive emotions

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		Responding positively to feedback	Responding positively to feedback Questioning results
	Re-review process	Getting a realistic picture Having positive emotions	
Strategies to overcome barriers	Using initiative	Requesting formal feedback	
Allocated external resources	Useful resources		
Additional resource requirements	Resource requirements		Resources for recommendations
Processes/individuals making it happen	Supporting structures		
Contextual factors hindering integration	Barriers	Time constraints Seasonal effects Constant change	Time constraints
	Ward BC: Collective action (mobilising skills and resources)		
	Categories	Participant 9, ward leader	
Learning new skills or doing things differently	Enhancing staff skills		
	Improving communication		
	Data usage	Continuing as usual	
Availability of right skills		Tapping into existing processes	
		Using existing skills	
		Identification of trends	
Specific activities undertaken		Linking processes	
	Preparing the evidence	Senior staff	
		Collecting information	
		Tapping into existing processes	
	Assessment of the process		
	Short term changes	Working extra hours	
		Having additional input	
		Changing management priorities	
	Making environmental changes	Enhancing patient experience	
		Improving safety	
	Improving documentation	Junior staff	
		Revising patient documentation	
	Reviewing clinical activities	Junior staff	
		Linking to audit processes	
	Participating on the day	Senior staff	
		Attending review panel	
		Showing round the ward	
		Ensuring representativeness	
	Taking follow-up action		

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Work undertaken with external staff	Seeking information	Collecting information Tapping into existing processes Knowing who to ask
Impact on normal ward activities	Continuing as usual Ensuring quality of care Team effects	Continuing as usual Improved clinical practice Raising performance awareness Increased environmental awareness
Roles and responsibilities	Senior team Junior team Competing factors	Management roles Practical roles Ensuring work standard
Impact on relationships with others	Broadening horizons Leadership development	Raising meso/macro system awareness Facilitating personal development
Who is accountable?	Self as accountable Contributory factors	
Authoritative others	The role of experiential learning	
Assessment of the actions of key players, processes and outcomes	Working relationships	Welcoming patient's perspective
	Ward staff's preparatory work	
	Review panel's preparatory work	Being organised Having right composition
	Desktop review	Demonstrating thoroughness Being consistent Including matron's perspective Promoting negative emotions
	Ward review	Obtaining staff feedback Promoting negative emotions Having unmet expectations
	Review panel's feedback	Giving timely formal feedback Being constructive Promoting negative emotions Having positive emotions Responding positively to feedback
	Re-review process	
	Using initiative	Requesting formal feedback
	Useful resources	Clear information
	Resource requirements	
Processes/individuals making it happen	Supporting structures	Microsystem support
Contextual factors hindering integration		Juggling priorities Time constraints Seasonal effects

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Strategies to overcome barriers					
All wards: Collective action (mobilising skills and resources) meta-matrix					
	Categories	Ward AI	Ward BI	Ward CI	Ward BC
Learning new skills or doing things differently	Enhancing staff skills	Using a new tool	Using a new tool Learning about audits	Using a new tool	
	Improving communication	Improved communication			
		Continuing as usual	Continuing as usual Increasing data dissemination Increased understanding of data	Increasing data dissemination Increased understanding of data Increased use of data	Continuing as usual
	Data usage		Wider staff engagement with data	Identification of trends Linking processes	Identification of trends Linking processes
Availability of right skills		Tapping into existing processes Using existing skills	Tapping into existing processes Using existing skills		Tapping into existing processes Using existing skills
Specific activities undertaken	Preparing the evidence	Senior staff Collecting information Tapping into existing processes	Senior staff Collecting information Tapping into existing processes Linking to external resources	Senior staff Collecting information Tapping into existing processes	Senior staff Collecting information Tapping into existing processes
	Assessment of the process	Selecting correct data Having sufficient experience Time consuming	Time consuming Promoting negative emotions	Selecting correct data Having sufficient experience Promoting negative emotions	
	Short term changes	Working extra hours	Working extra hours Having additional input Changing management priorities Reducing clinical hours	Working extra hours Changing management priorities Reducing clinical hours	Working extra hours Having additional input Changing management priorities
		Seeking to motivate others			
	Making environmental changes	Senior/junior staff Utilising scheme resources Completing existing projects Enhancing patient experience Improving safety	Senior staff/junior staff Utilising scheme resources Enhancing patient experience Improving safety	Senior staff/junior staff Utilising scheme resources Enhancing patient experience Improving safety Linking to audit processes	Enhancing patient experience Improving safety

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	Improving documentation	Junior staff Revising audit documentation	Revising patient documentation	Junior staff Revising patient documentation	Junior staff Revising patient documentation
	Reviewing clinical activities			Junior staff Linking to audit processes	Junior staff Linking to audit processes
	Participating on the day	Senior staff Attending review panel Showing round the ward	Senior staff Attending review panel Showing round the ward	Senior staff Attending review panel Showing round the ward	Senior staff Attending review panel Showing round the ward
	Taking follow-up action	Senior staff Improving staff experience Making environmental changes Exploring the results		Senior staff Making environmental changes	
	Work undertaken with external staff	Seeking information Collecting information Tapping into existing processes	Collecting information Tapping into existing processes Knowing who to ask	Collecting information Tapping into existing processes Knowing who to ask	Collecting information Tapping into existing processes Knowing who to ask
Impact on normal ward activities	Continuing as usual	Continuing as usual Reinforcing good practice Becoming distanced	Continuing as usual Reinforcing good practice	Continuing as usual Reinforcing good practice	Continuing as usual
	Ensuring quality of care		Increasing client centredness Improved clinical practice Improved environmental awareness	Improved environmental awareness	Improved clinical practice Improved environmental awareness
	Team effects		Supporting change management	Raising performance awareness	Raising performance awareness
			Becoming up-to-date		
Roles and responsibilities	Senior staff	Management roles	Management roles Practical roles	Management roles	Management roles
	Junior staff	Practical roles	Practical roles	Practical roles	Practical roles
	Competing factors	Competing responsibilities Time constraints Overburdened staff Competing activities Maintaining control	Maintaining control	Time constraints Overburdened staff Maintaining control Sufficiency of resources	
	Impact on	Broadening	Increased role understanding		Ensuring work standard

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relationships with others	horizons	Raising meso/macro system awareness		Raising meso/macro system awareness
	Leadership development	Enhancing leadership qualities	Facilitating personal development	Facilitating personal development
Who is accountable?	Self as accountable	Self as accountable		
	Contributory factors	Seeing self as “expert”		
Authoritative others	The role of experiential learning	Valuing peers Experienced others		
Assessment of the actions of key players, processes and outcomes	Working relationships	Welcoming patient’s perspective Forming reciprocal relationships Giving autonomy Being approachable	Welcoming patient’s perspective	Welcoming patient’s perspective
	Review panel’s preparatory work	Being organised Having right composition Making preparations	Having right composition Understanding the process	Being organised Having right composition
	Desktop review	Promoting negative emotions Having unmet expectations		
		Demonstrating thoroughness Being consistent Acknowledging the context Ensuring full discussions Interpreting data correctly	Demonstrating thoroughness Acknowledging the context	Demonstrating thoroughness Being consistent
		Promoting negative emotions Having unmet expectations	Ensuring objectivity Promoting negative emotions Having positive emotions	Promoting negative emotions
	Ward review		Questioning effectively	Including matron’s perspective
		Demonstrating thoroughness Promoting negative emotions Having unmet expectations	Promoting negative emotions Having unmet expectations	Obtaining staff feedback Promoting negative emotions Having unmet expectations

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			Having positive emotions		
		Giving timely formal feedback	Giving timely formal feedback Being constructive	Giving timely formal feedback Being constructive Being transparent Making realistic recommendations	Giving timely formal feedback Being constructive
	Review panel's feedback/results	Being transparent Making realistic recommendations Setting right priorities Making specific recommendations Recognising shared responsibilities Giving recognition Responding positively to feedback Promoting negative emotions Having unmet expectations Relating to external activities Making performance comparisons	Responding positively to feedback Having positive emotions	Responding positively to feedback Having positive emotions Promoting negative emotions	Responding positively to feedback Having positive emotions
				Questioning results Getting a realistic picture	
	Re-review process	Ensuring continuity Promoting negative emotions Having unmet expectations			
				Having positive emotions	
Strategies to overcome barriers	Using initiative	Requesting formal feedback Seeking clarification Feeding back information		Requesting formal feedback	Requesting formal feedback
Allocated external resources	Useful resources	Peer support	Clear information		Clear information
Additional resource requirements	Resource requirements	Resources for recommendations Parity of resources Providing leverage		Resources for recommendations	
Processes/individuals making it happen	Supporting structures	Mesosystem support Macrosystem support	Mesosystem support		Microsystem support
				Time constraints	Time constraints
Contextual factors hindering integration	Barriers	Receiving timely formal feedback Juggling priorities	Juggling priorities		Juggling priorities

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		Seasonal effects		Seasonal effects	Seasonal effects
		Constant change	Leadership changes Constant change	Constant change	
Strategies to overcome barriers	Strategies		Changing responsibilities		

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Ward A1: reflexive monitoring (appraising information and reconfiguring actions)				
	Categories	Participant 2, ward leader	Participant 3, house keeper	Participant 8, matron
Collecting/receiving scheme information	Seeking information	Making enquiries	Making enquiries	
	Sharing information		Providing written information Tapping into existing processes	Tapping into existing processes Sharing formal report
	Making peer comparisons			Comparing self with others
	The reality	Lost from sight		
Determining overall scheme effectiveness/usefulness	Degrees of effectiveness/usefulness	Not yet determined Unfulfilled potential		
	Requirements for effectiveness			Needing underpinning support
Team appraisal	Positive team effects	Positive emotional impact		
	Detrimental factors			
Team commitment	Early reactions			
	The reality	Lost from sight		
	Detrimental factors			
Individual appraisal	Overall impressions	Positive experience Providing (re)assurance Supporting role development		Providing (re)assurance Useful monitoring tool Positive team effects
	QI tool	Significant process	Significant process Thinking outside the box	
	Preparing evidence	Bringing clarity Refocussing priorities		Refocussing priorities Identifying overlooked issues
	Ward visit	Needing to be there	Needing to be there	
	Results publication	Ensuring transparency Dysfunctional effects		
	Early reactions	Overcoming disappointments		
	The reality	Lost sight of Maintaining momentum		
Individual commitment	Detrimental factors	Receiving timely feedback		
	Maintaining portfolio			
	Communication approach	Adopting QI dimensions		
Work patterns adopted	Thinking of the future			
	Enhancing Trust wide processes	Consistent QI language		Linkage to "Walkabouts"
Process modification	PPI	Increased SU involvement		

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	Providing meaningful explanations		
	Preparatory process	Putting into context	
	Standards	Including staff feedback	
	Review panels	Area specific standards	
	Reviewer training		
Ward B1: reflexive monitoring (appraising information and reconfiguring actions)			
	Categories	Participant 1, ward leader	Participant 4, sister
	Participant 5, HCA		
Collecting/receiving scheme information	Seeking information		
	Sharing information	Sharing evidence folder Providing written information	
	Making peer comparisons		
Determining overall scheme effectiveness/usefulness	The reality	Lost from sight	
	Degrees of effectiveness/usefulness	Not yet determined Most effective yet	
	Requirements for effectiveness		
Team appraisal	Positive team effects	Being proud Supporting management of change	
	Detrimental factors		
Team commitment	Early reactions	Changing engagement Aiming higher	
	The reality	Lost from sight	
	Detrimental factors	Leadership changes Sufficiency of resources Juggling priorities Having different perspectives	
Individual appraisal	Overall impressions	Positive experience Benefits outweigh negatives Supporting role development Providing reassurance	Positive experience Benefits outweigh negatives Providing reassurance Positive team effects
	QI tool	Reinvigorating practice	
	Preparing evidence	Bringing clarity Broadening outlook	
	Ward visit		
	Results publication	Competitive effects Ensuring transparency Ensuring constructive process Dysfunctional effects	
Individual commitment	Early reactions	Aiming higher	Aiming higher
	The reality	Maintaining momentum Maintaining standards	Maintaining momentum Maintaining standards

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		Lost sight of
	Detrimental factors	Receiving timely feedback Juggling priorities
Work patterns adopted	Maintaining portfolio	
	Communication approach	
	Thinking of the future	Continuous discussions
Process modification	Enhancing Trust wide processes	Continuous discussions
	PPI	
	Preparatory process	Widening staff participation Changing process emphasis
	Standards	
	Review panels	
Ward CI: reflexive monitoring (appraising information and reconfiguring actions)		
	Categories	Participant 6, ward leader
		Participant 7, sister
Collecting/receiving scheme information	Seeking information	
	Sharing information	
	Making peer comparisons	
	The reality	
Determining overall scheme effectiveness/usefulness	Degrees of effectiveness/usefulness	Not yet determined
		Bringing nothing new Part of the picture
	Requirements for effectiveness	
Team appraisal	Positive team effects	Being proud
	Detrimental factors	
	Early reactions	
Team commitment	The reality	Lost from sight
	Detrimental factors	
	Overall impressions	Positive experience Supporting role development Benefits outweigh negatives Positive team effects
	QI tool	
Individual appraisal	Preparing evidence	Reflective opportunity Bringing clarity Giving direction Broadening outlook Linking systems Identification of trends
	Ward visit	
	Results publication	Ensuring transparency Putting into context

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			Competitive effects
Individual commitment	Early reactions		
	The reality	Lost sight of	Maintaining standards
	Detrimental factors	Juggling priorities Sufficiency of resources	
Work patterns adopted	Maintaining portfolio	On-going evidence collection Continuous discussions	
	Communication approach		
	Thinking of the future	Relevant experiential learning Speedier process Reduced negative impact	
Process modification	Enhancing Trust wide processes		
	PPI	Providing meaningful explanations	Providing meaningful explanations Broadening results publication
	Preparatory process	Widening staff participation Timescales	Widening staff participation
			Sharing experiential learning Changing process emphasis
	Standards	Area specific standards	
	Review panels	Widening participation	
	Ward BC: reflexive monitoring (appraising information and reconfiguring actions)		
	Categories	Participant 9, ward leader	
Collecting/receiving scheme information	Seeking information		
	Sharing information		
	Making peer comparisons	Making "fairness" judgements Comparing self with others	
	The reality		
Determining overall scheme effectiveness/usefulness	Degrees of effectiveness/usefulness	Requiring constant use	
	Requirements for effectiveness		
Team appraisal	Positive team effects	Being proud	
	Detrimental factors	Receiving timely feedback	
Team commitment	Early reactions		
	The reality		
	Detrimental factors		
Individual appraisal	Overall impressions	Positive experience Supporting role development Providing reassurance Positive team effects	
	QI tool		
	Preparing evidence	Giving direction	

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		Identifying overlooked issues Reflective opportunity Identification of achievements Bringing clarity Identification of trends Linking systems			
	Ward visit				
	Results publication	Competitive effects Ensuring constructive process Putting into context Dysfunction effects			
Individual commitment	Early reactions	Aiming higher			
	The reality	Maintaining standards			
	Detrimental factors	Juggling priorities Time constraints			
Work patterns adopted	Maintaining portfolio	On-going evidence collection Harnessing monthly clinical focus Continuous discussions			
	Communication approach				
	Thinking of the future	Relevant experiential learning Speedier process			
Process modification	Enhancing Trust wide processes				
	PPI	Providing meaningful explanations Broadening results publication			
	Preparatory process	Timescales Standardising processes Clarifying guidelines			
	Standards	Clarifying response hierarchy			
	Review panels	Widening membership Having adequate clinical skills Improved organisational processes			
All wards: reflexive monitoring (appraising information and reconfiguring actions) meta-matrix					
	Categories	Ward AI	Ward BI	Ward CI	Ward BC
Collecting/receiving scheme information	Seeking information	Making enquiries			
	Sharing information	Providing written information	Providing written information		
		Tapping into existing processes			
		Sharing formal report	Sharing evidence folder		
	Making peer comparisons				Making “fairness” judgements

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		Comparing self with others		Comparing self with others	
	The reality	Lost from sight	Lost from sight		
		Not yet determined	Not yet determined	Not yet determined	Not yet determined
	Degrees of effectiveness/usefulness	Unfulfilled potential		Bringing nothing new	
			Most effective yet	Part of the picture	
	Requirements for effectiveness	Needing underpinning support			
	Positive team effects	Being proud	Being proud	Being proud	Being proud
			Supporting management of change		
	Detrimental factors				Receiving timely feedback
	Early reactions		Changing engagement		
			Aiming higher		
	The reality	Lost from sight	Lost from sight	Lost from sight	
			Leadership changes		
	Detrimental factors		Sufficiency of resources		
			Juggling priorities		
			Having different perspectives		
	Overall impressions	Positive experience	Positive experience	Positive experience	Positive experience
		Providing (re)assurance	Providing reassurance		Providing reassurance
		Supporting role development	Supporting role development	Supporting role development	Supporting role development
		Useful monitoring tool			
			Benefits outweigh negatives	Benefits outweigh negatives	
			Positive team effects	Positive team effects	Positive team effects
	QI tool	Significant process			
		Thinking outside the box			
			Reinvigorating practice		
	Preparing evidence	Bringing clarity	Bringing clarity	Bringing clarity	Bringing clarity
		Refocussing priorities			
		Identifying overlooked issues		Reflective opportunity	Identifying overlooked issues
					Reflective opportunity
					Identification of achievements
				Giving direction	Giving direction
			Broadening outlook	Broadening outlook	
				Linking systems	Linking systems

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				Identification of trends	Identification of trends
	Ward visit	Needing to be there			
	Results publication	Ensuring transparency	Ensuring transparency	Ensuring transparency	
		Dysfunction effects	Competitive effects Dysfunctional effects	Competitive effects	Competitive effects Dysfunctional effects
				Putting into context	Putting into context
	Early reactions	Overcoming disappointments	Aiming higher		Aiming higher
	The reality	Maintaining momentum	Maintaining momentum		
		Lost sight of	Maintaining standards Lost sight of	Maintaining standards Lost sight of	Maintaining standards
	Detrimental factors		Juggling priorities	Juggling priorities Sufficiency of resources	Juggling priorities
		Receiving timely feedback	Receiving timely feedback		
	Maintaining portfolio			On-going evidence collection	On-going evidence collection
					Harnessing monthly clinical focus
	Communication approach	Adopting QI dimensions		Continuous discussions	Continuous discussions
			Continuous discussions		
	Thinking of the future			Relevant experiential learning Speedier process Reduced negative impact	Relevant experiential learning Speedier process
	Enhancing Trust wide processes	Consistent QI language Linkage to "Walkabouts"			
	PPI	Increased SU involvement Providing meaningful explanations		Providing meaningful explanations Broadening results publication	Providing meaningful explanations Broadening results publication
	Preparatory process	Putting into context			
			Widening staff participation	Widening staff participation	
			Changing process emphasis	Timescales Changing process emphasis Sharing experiential learning	Timescales
					Standardising processes Clarifying guidelines

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Standards	Including staff feedback Area specific standards	Area specific standards	Clarifying response hierarchy
Review panels	Reviewer training	Widening membership	Widening membership Having adequate clinical skills Improved organisational processes

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Appendix 33 – Effects/change matrix

Effects/change matrix					
Effects		Ward AI	Ward BI	Ward CI	Ward BC
Safety	Falls, (quan)	No change	No change	No change	N/A
	PUUs (quan)	No change	No change	No change	N/A
	HAIs (quan)	No change	No change	No change	N/A
Experience	Quan (Picker questions)	Decreased patient experience: <i>"trust and confidence", "respect and dignity", "control of pain", "cleanliness"</i>	No change	No change	N/A
General quality improvement activities	Qual data	De-cluttering Completing outstanding estates issues Ensuring ward cleanliness Improving signage	De-cluttering Updating notice boards Updating patients' assessments Revising patient documentation Increased compliance with medication storage	De-cluttering Updating noticeboards Linking to Turnaround results Revising patient documentation Improved clinical practice: improved dispatching of specimens Reinforcing routine practice	Revising patient documentation Improved clinical practice: brought standard of line care for nutrition up
		Reinforcing routine practice	Reinforcing routine practice		
Contextual effects	Safety culture (HSoPSC) (quan)	Increase in positive associations: <i>"Supervisor and actions promoting safety", "Organisational learning", "Feedback and communication about error", "Frequency of event reporting"</i> Pattern of more positive perceptions of all other subscales	Increase in positive association <i>"Overall perceptions of safety"</i>	No change	N/A
	Quan (PES-NWI)	Pattern of more positive perceptions of all subscales	No change	No change	N/A
	Qual (positive)	Enhancing staff skills: learning new tool	Enhancing staff skills: learning new tool (senior staff); learning	Enhancing staff skills: learning new tool	

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effects of participation = effect on contextual factors)		about audits junior staff Facilitating personal development (ward leader and others) Supporting development of junior staff	Facilitating personal development (ward leader)	Facilitating personal development (ward leader and others)
	Enhancing leadership qualities Improving staff experience: through making environmental changes (office/de-cluttering)	Improving staff experience: through making environmental changes (storage/de-cluttering) Raising meso/macro system awareness (junior staff)	Improving staff experience: Making environmental changes (storage/de-cluttering)	Raising meso/macro system awareness (ward leader) Broadening horizons (ward leader)
		Increased role understanding (junior staff of senior staff) Supporting change management Becoming-up-to-date	Broadening horizons (ward leader)	
	Improved communication Improved environmental awareness	Improved environmental awareness Increased client centeredness (15 Steps) Increasing data dissemination; increased understanding of data; Wider staff engagement with data	Raising performance awareness Improved environmental awareness Increasing data dissemination; Increased understanding of data Increased use of data	Raising performance awareness Improved environmental awareness

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Appendix 34 – Interview consent form

CONSENT FORM

Study title: Improving patients' experiences of quality and safety in hospital wards in the NHS through a Clinical Accreditation Scheme (CAS)

Ethics Number: 2904

Name of researcher: Helen Wharam

Please initial box

I confirm that I have read the participant information sheet (21/06/12 Version Number 1.1) for the above study. I have had the opportunity to consider the information and ask questions and these have been answered to my satisfaction.

I understand that the information I give will be kept strictly confidential.

I understand that my participation is voluntary and that I am free to change my mind and discontinue the interview or withdraw from the study at any time.

I am willing to be interviewed today.

I am willing to have the interview audio-taped.

I am willing for my interview to be transcribed and used in this research.

I am willing for my contact details to be kept so that I may be contacted about participation in the second round of interviews. I understand that my details will be destroyed once the second round of interviews have been completed but I may request for my details to be destroyed at any time before this.

Participant name:

Signature:

Date:

Name of person taking consent:

Signature:

Date:

Faculty of Health Sciences, University of Southampton, Building 67, Highfield Campus, Southampton SO17 1BJ
United Kingdom

Tel: +44 (0)23 8059 7979 Fax: +44 (0)23 8059 7900 www.southampton.ac.uk/healthsciences

Ethics No: 2904

Version 1.1

21/06/12

Appendix 35 – SPC charts for rates of falls

Ward AI

Ward AI: Number of falls (rate per 1,000 bed days) per month (historical data)

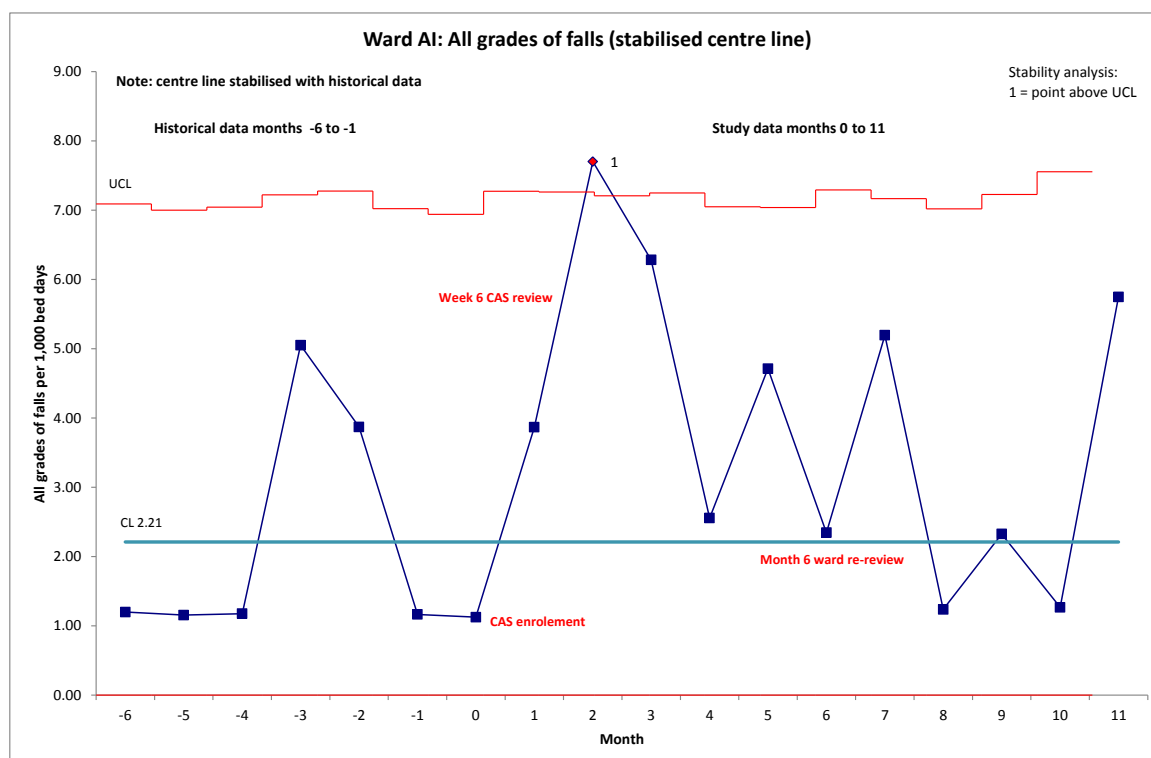
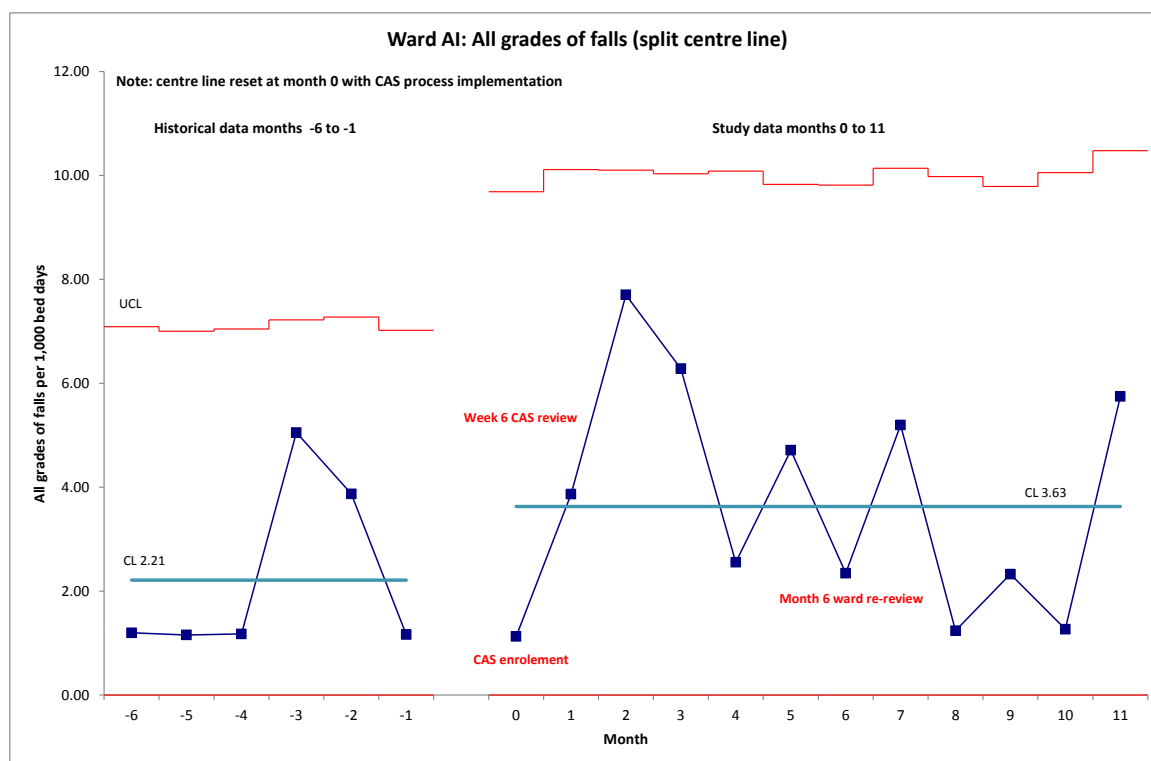
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	835	863	851	792	775	859
Fall severity						
No injury			1 (1.20)	1 (1.31)		
Low injury	1 (1.20)			3 (3.79)	3 (3.87)	1 (1.16)
Moderate		1 (1.20)				
Severe						
Total	1 (1.20)	1 (1.20)	1 (1.20)	4 (5.05)	3 (3.87)	1 (1.16)

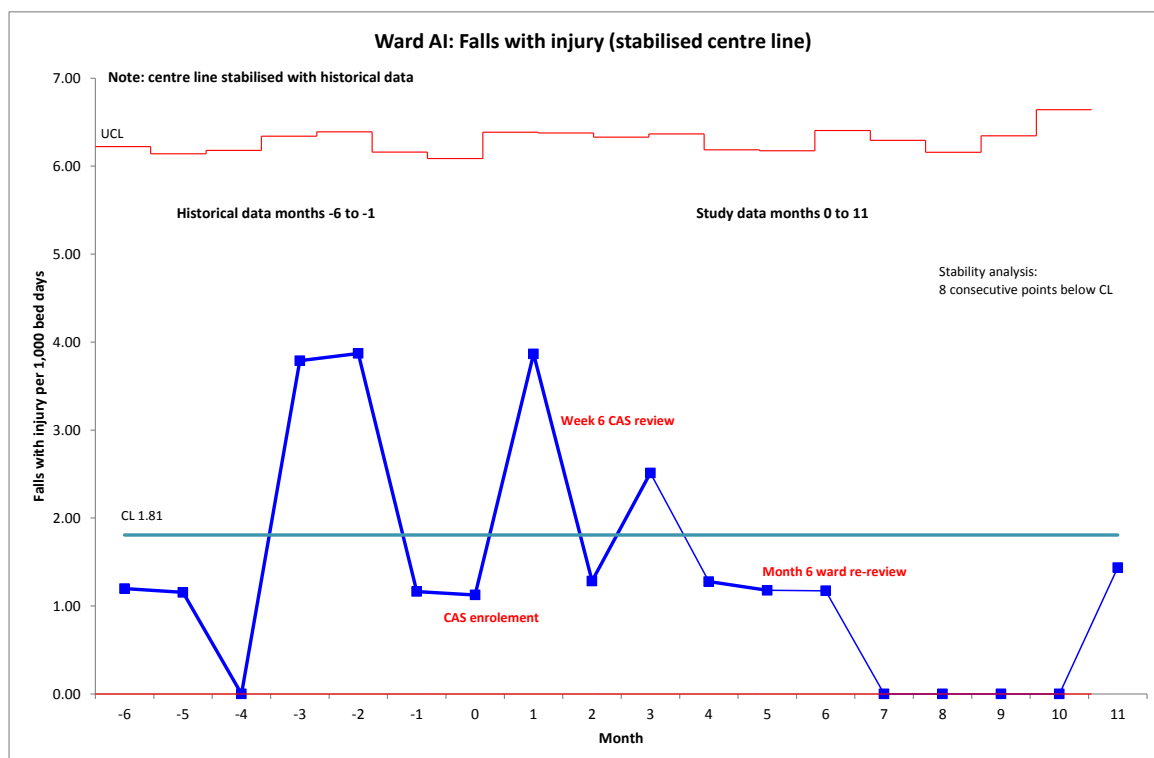
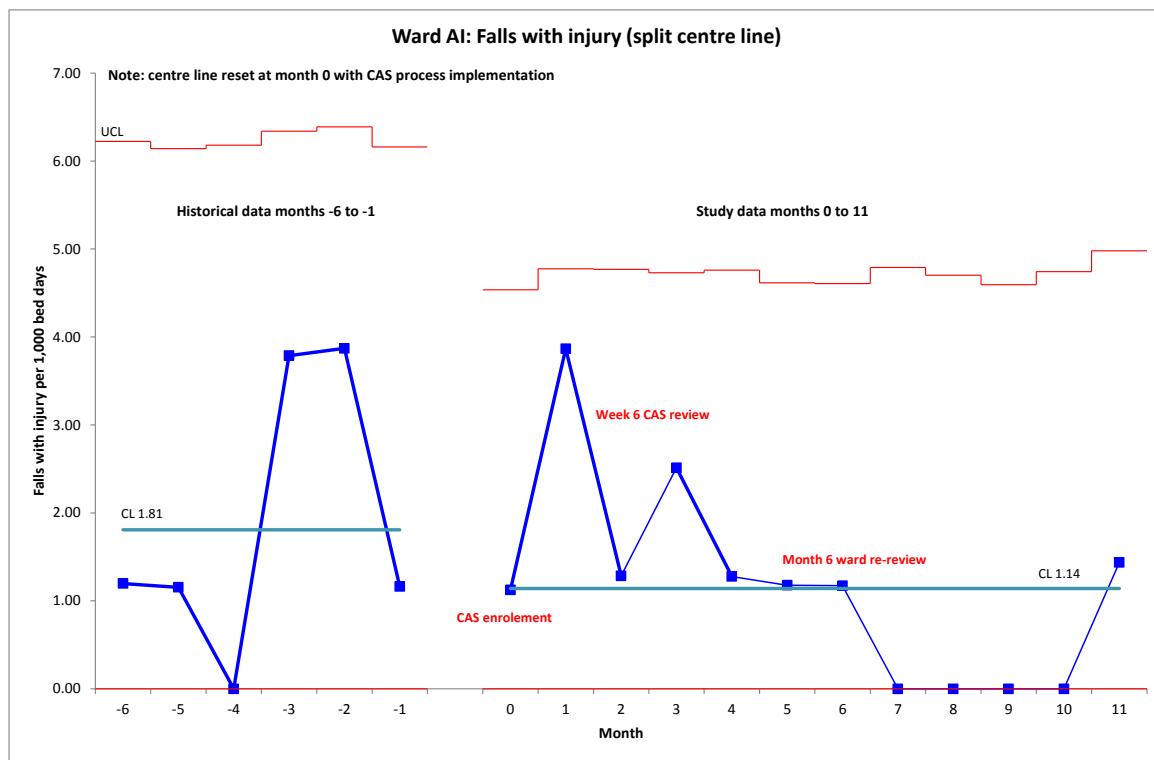
Ward AI: Number of falls (rate per 1,000 bed days) per month (study data)

Month	0	1	2	3	4	5
Occupied bed days	889	776	779	796	783	849
Fall severity						
No injury			5 (6.42)	3 (3.77)	1 (1.28)	3 (3.53)
Low injury	1 (1.12)	3 (3.87)	1 (1.28)	1 (1.26)	1 (1.28)	1 (1.18)
Moderate						
Severe				1 (1.26)		
Total	1 (1.12)	3 (3.87)	6 (7.70)	5 (6.28)	2 (2.55)	4 (4.71)

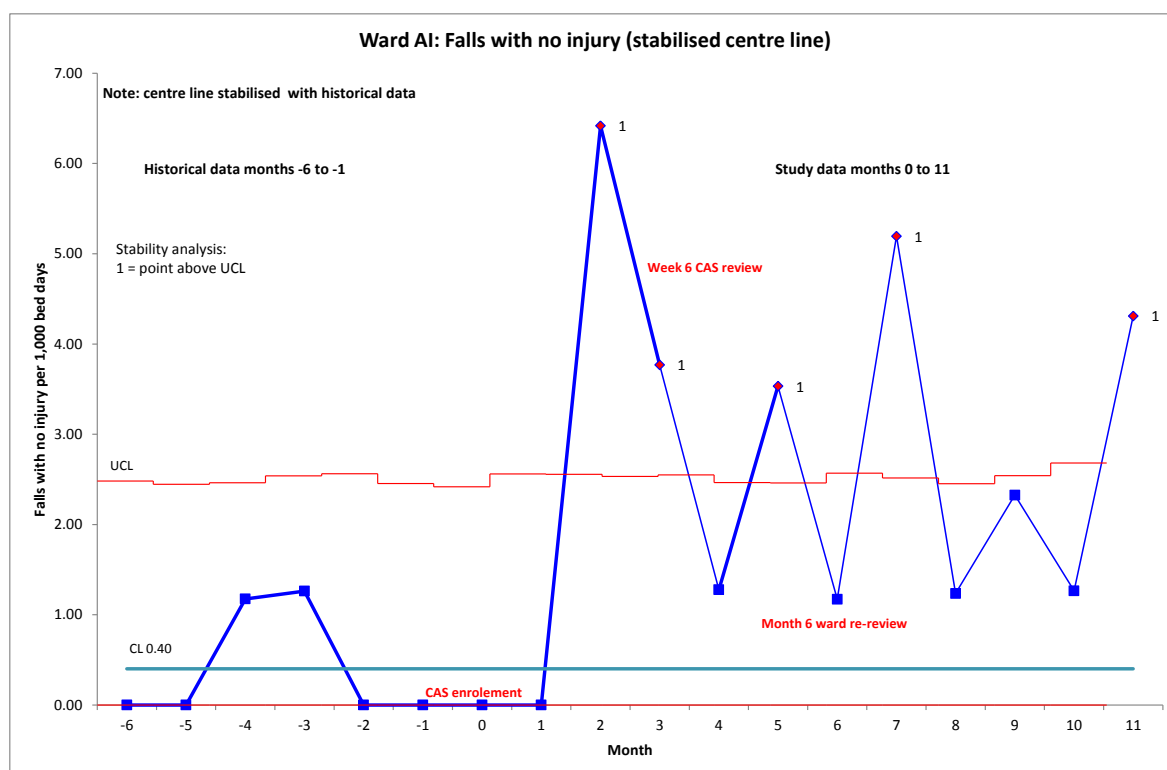
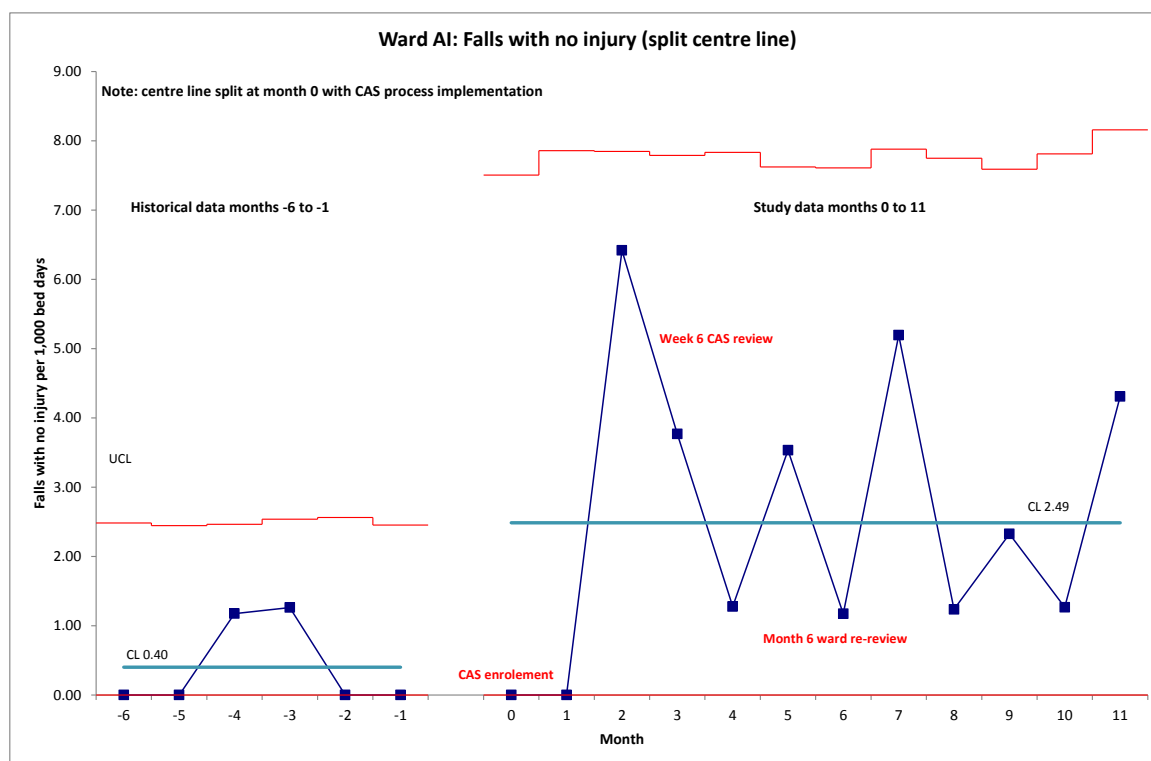
Month	6	7	8	9	10	11
Occupied bed days	853	770	809	860	790	696
Fall severity						
No injury	1 (1.31)	4 (5.19)	1 (1.23)	2 (2.33)	1 (1.27)	3 (4.31)
Low injury	1 (1.31)					1 (1.44)
Moderate						
Severe						
Total	2 (2.62)	4 (5.19)	1 (1.23)	2 (2.33)	1 (1.27)	4 (5.75)

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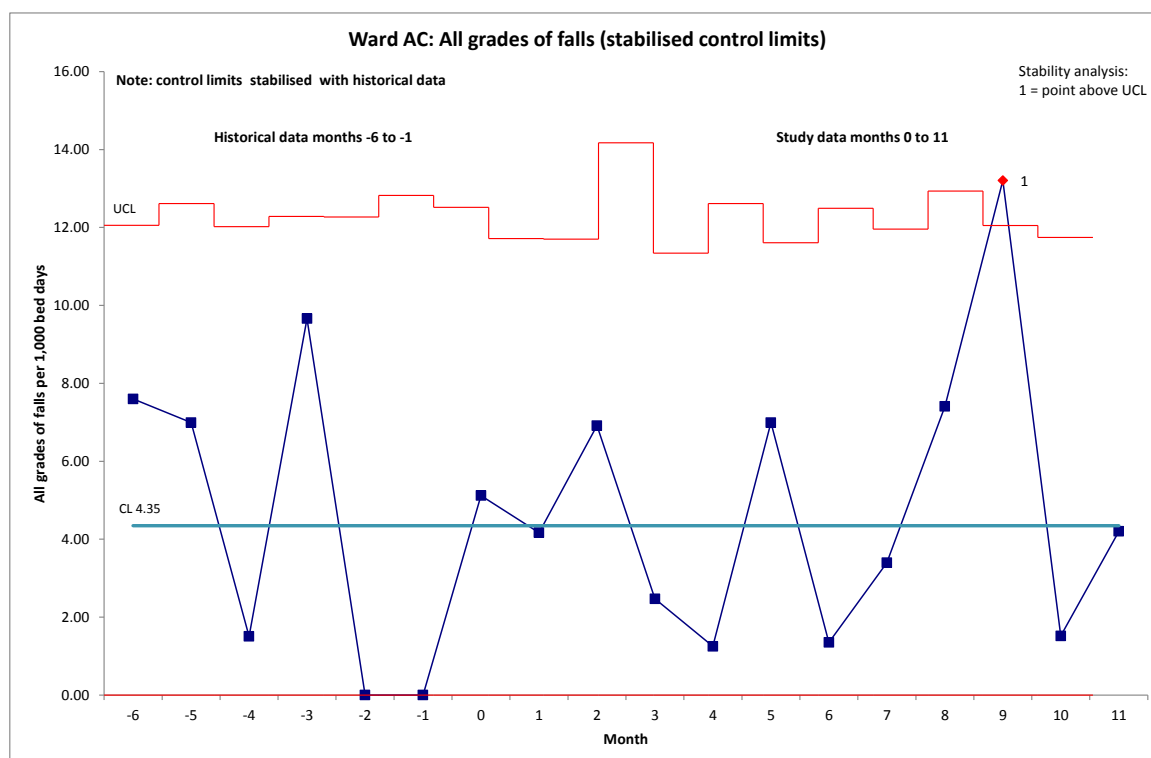
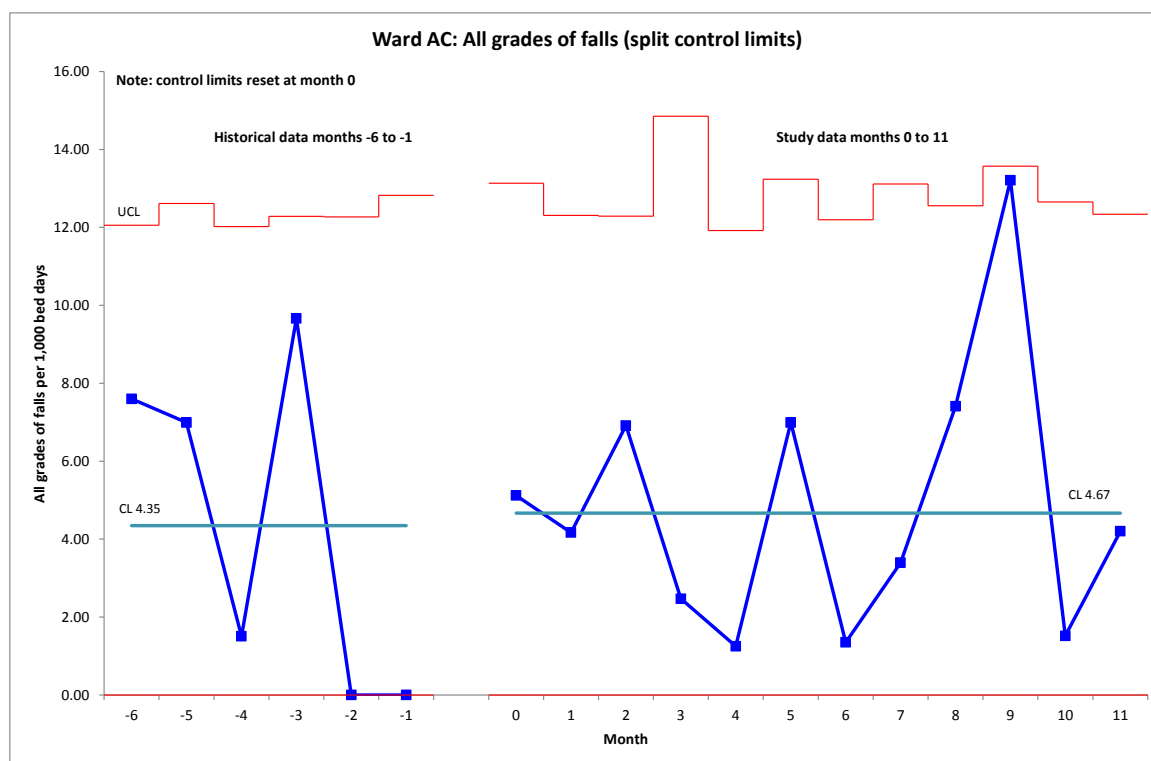
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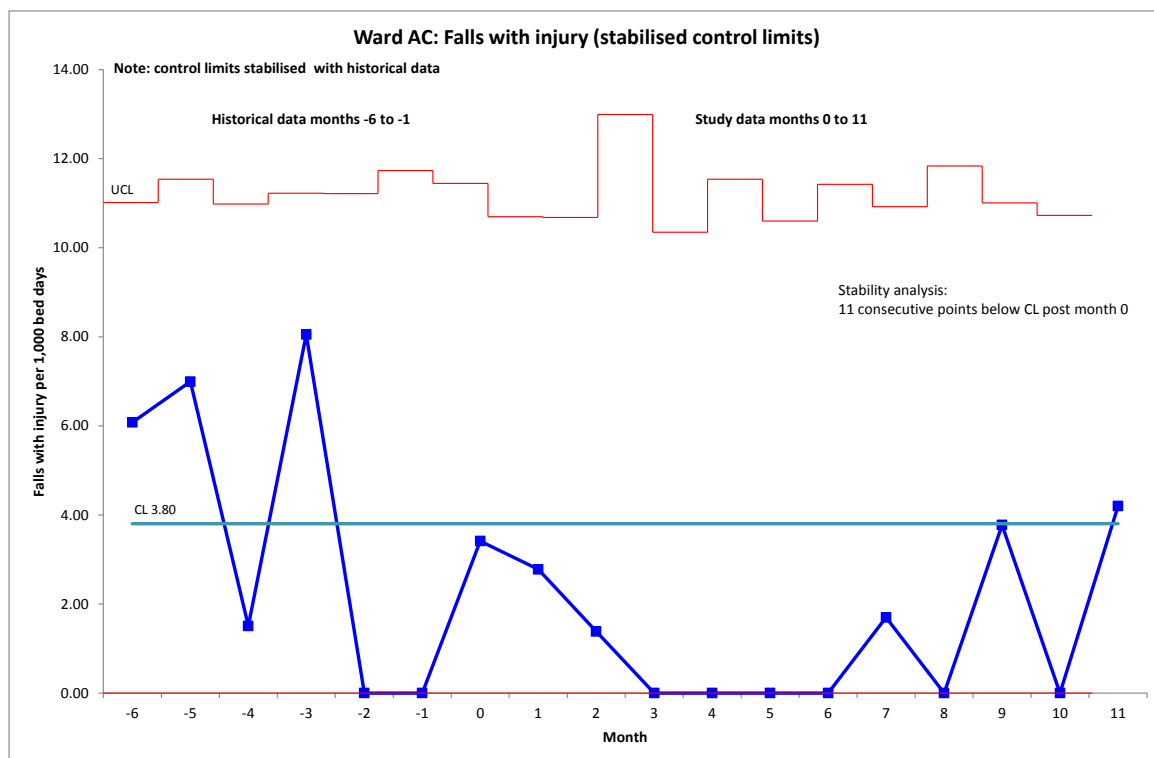
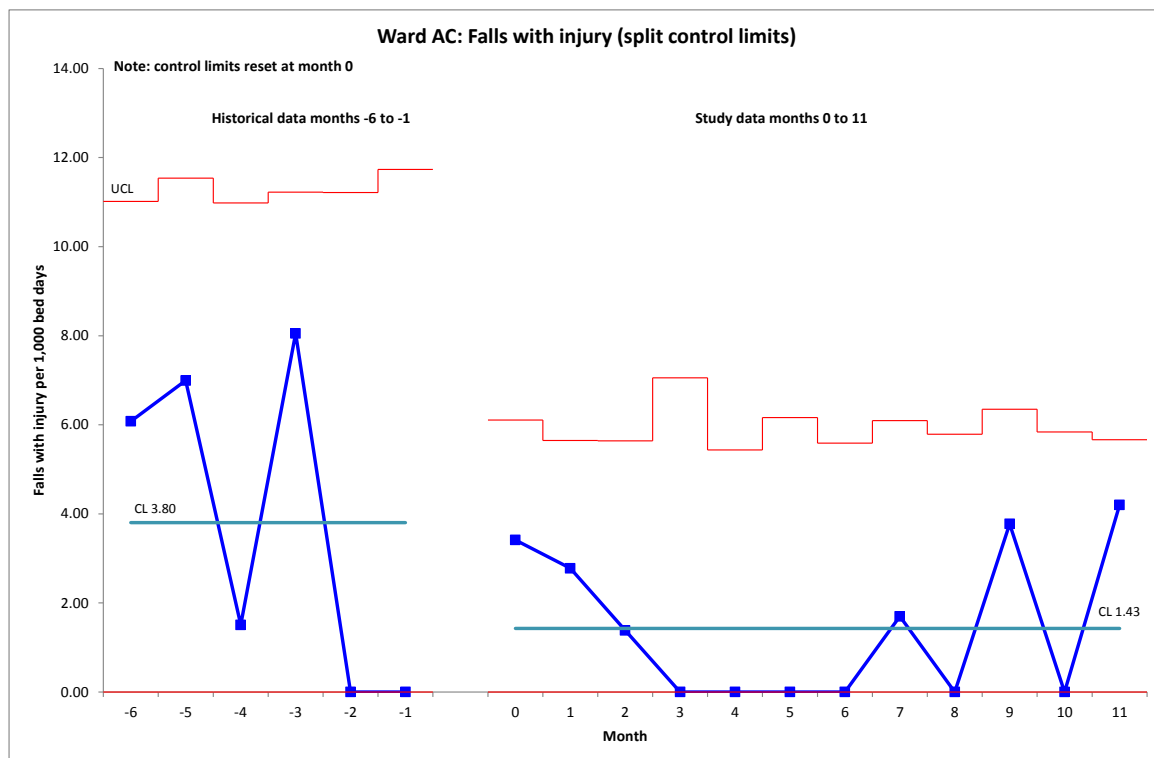
Ward AC: Number of falls (rate per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	658	572	664	621	623	544
Fall severity						
No injury	1 (1.52)			1 (1.61)		
Low injury	4 (6.08)	4 (6.99)		5 (8.05)		
Moderate			1 (1.51)			
Severe						
Total	5 (7.60)	4 (6.99)	1 (1.51)	6 (9.66)	0	0

Ward AC: Falls (rate per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	586	720	723	405	799	572
Fall severity						
No injury	1 (1.71)	1 (1.39)	4 (5.53)	1 (2.47)	1 (1.25)	4 (6.99)
Low injury		2 (2.78)	1 (1.38)			
Moderate						
Severe	2 (3.41)					
Total	3 (5.12)	3 (4.17)	5 (6.92)	1 (2.47)	1 (1.25)	4 (6.99)

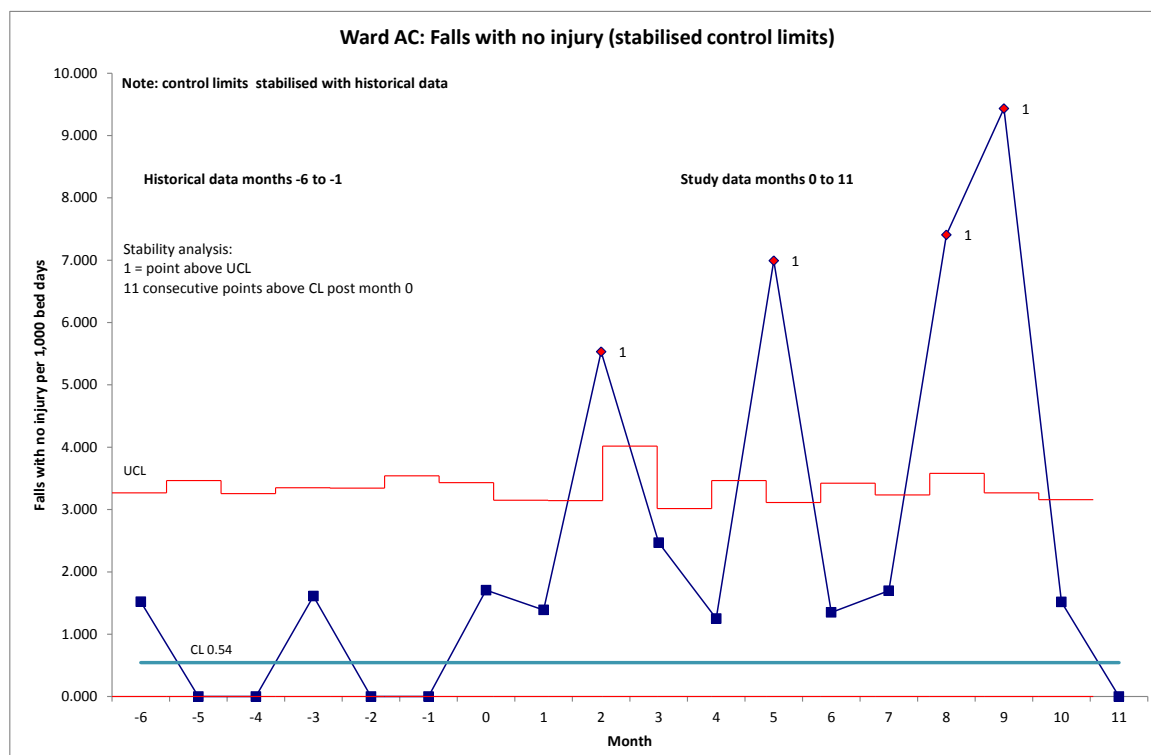
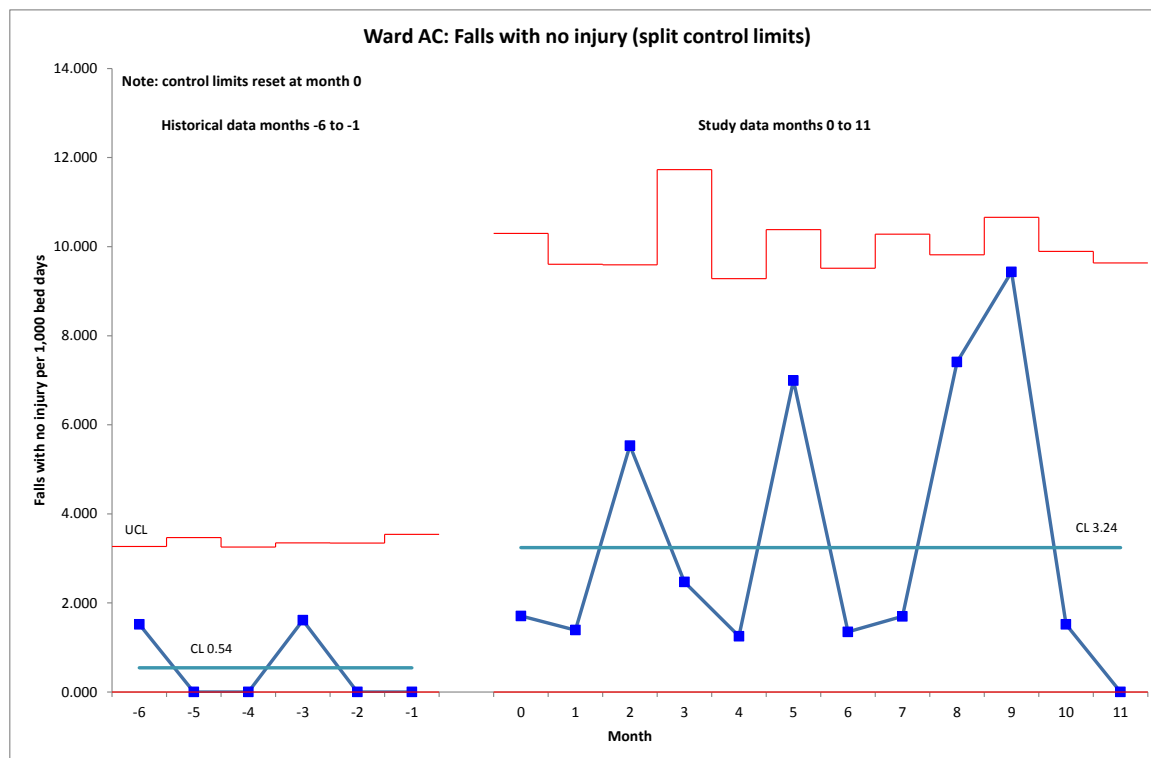
Month	6	7	8	9	10	11
Occupied bed days	741	589	675	530	659	714
Fall severity						
No injury	1 (1.35)	1 (1.70)	5 (7.40)	5 (9.43)	1 (1.52)	
Low injury		1 (1.70)		2 (3.77)		3 (4.20)
Moderate						
Severe						
Total	1 (1.35)	2 (3.40)	5 (7.40)	7 (13.2)	1 (1.52)	3 (4.20)

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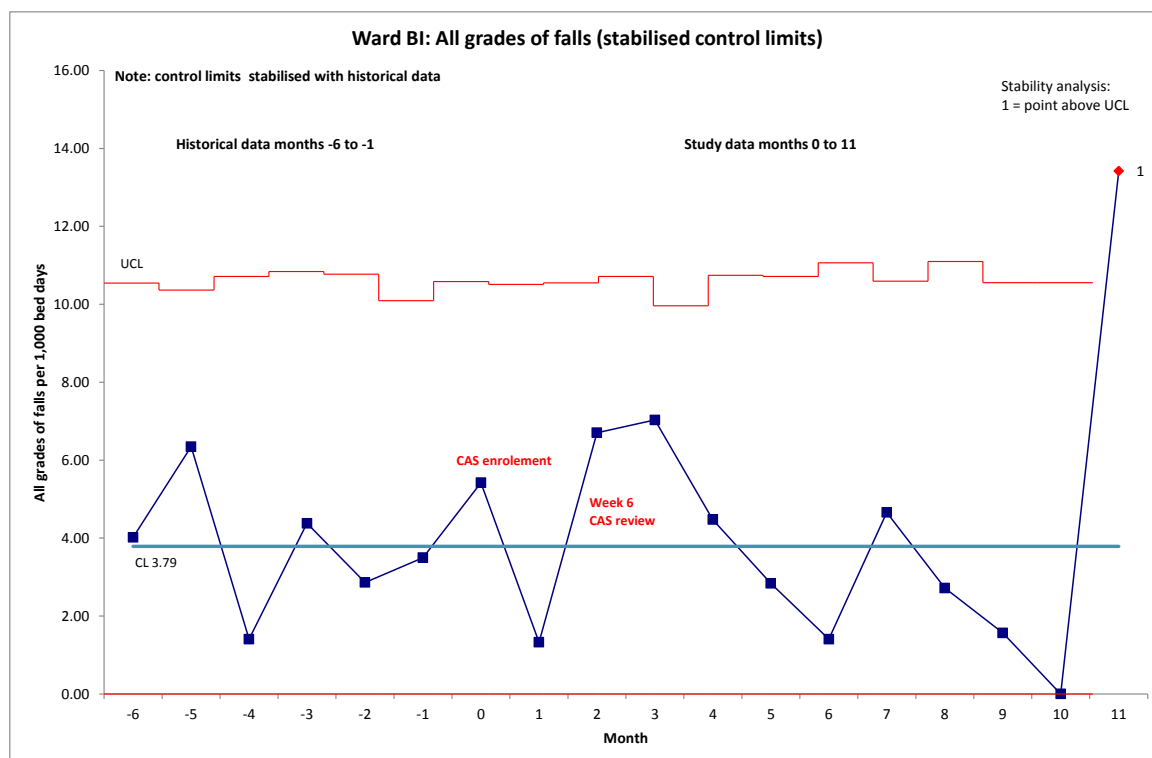
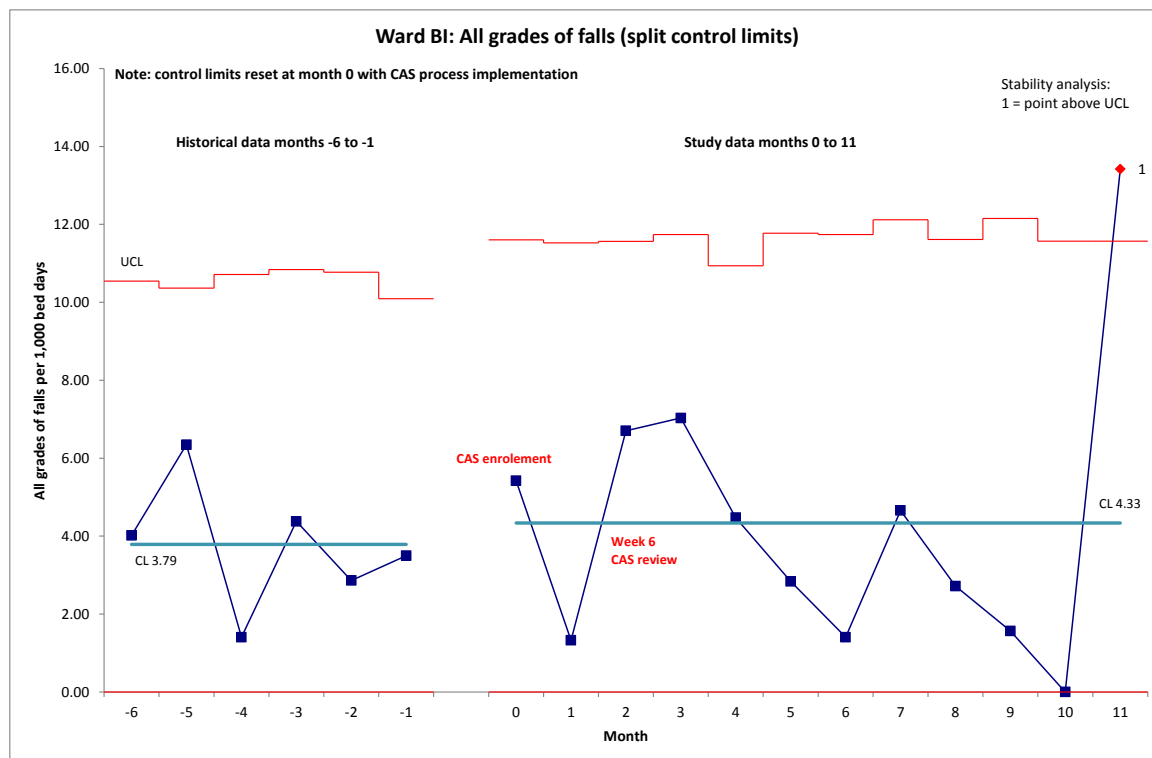
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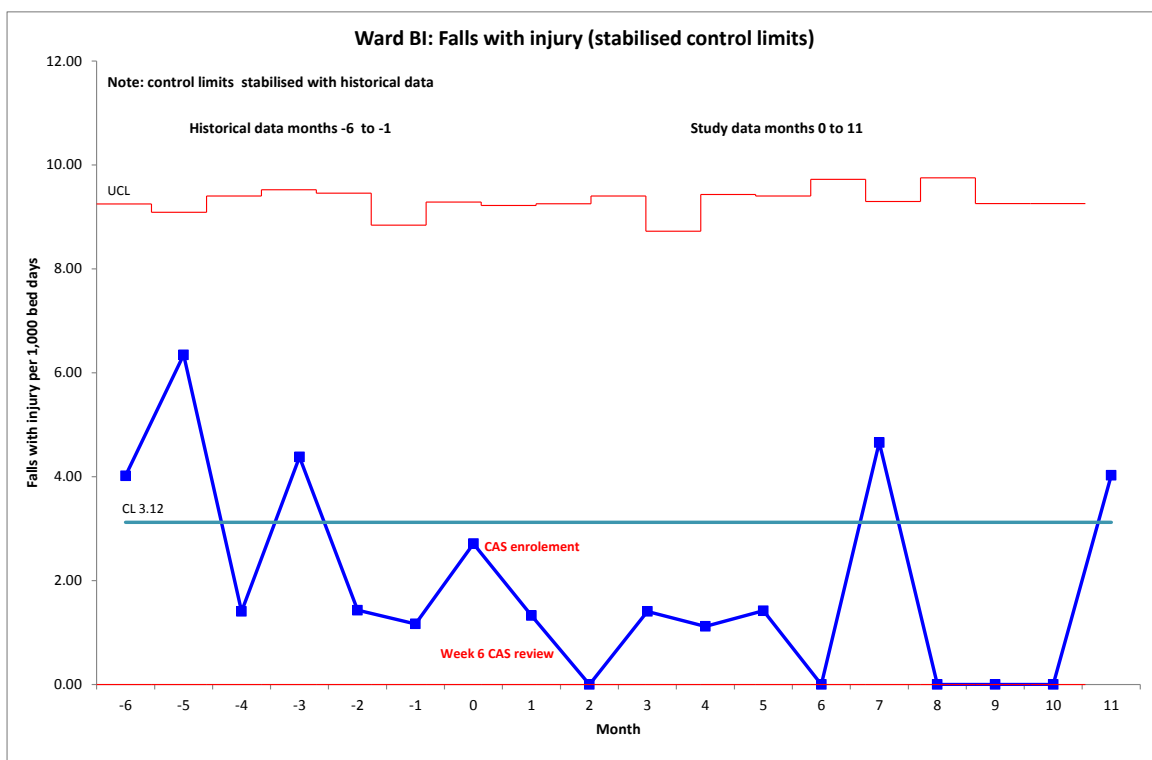
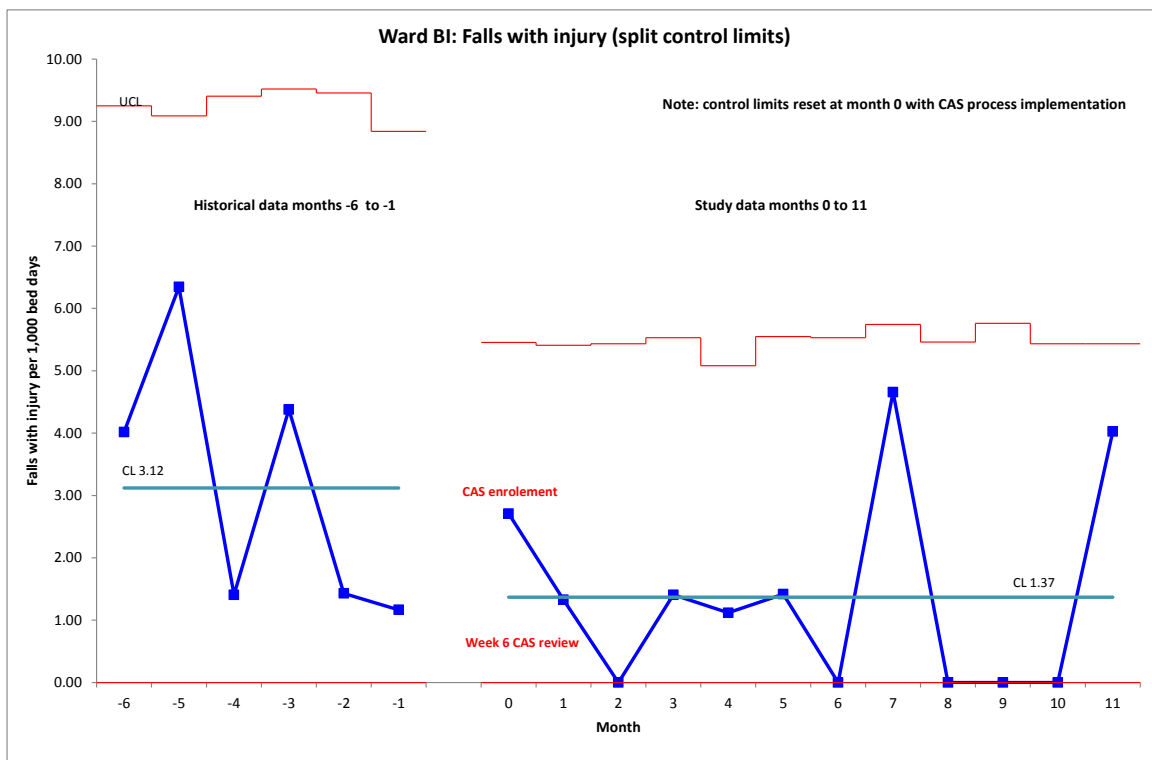


Ward BI

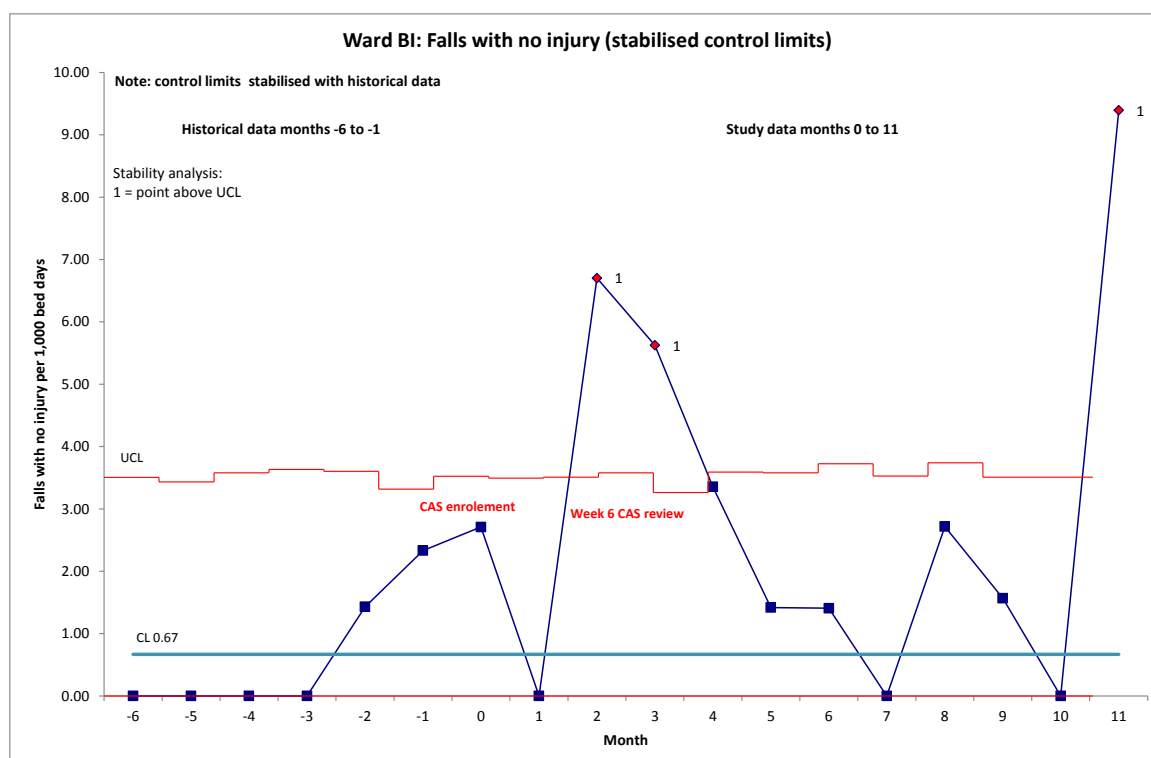
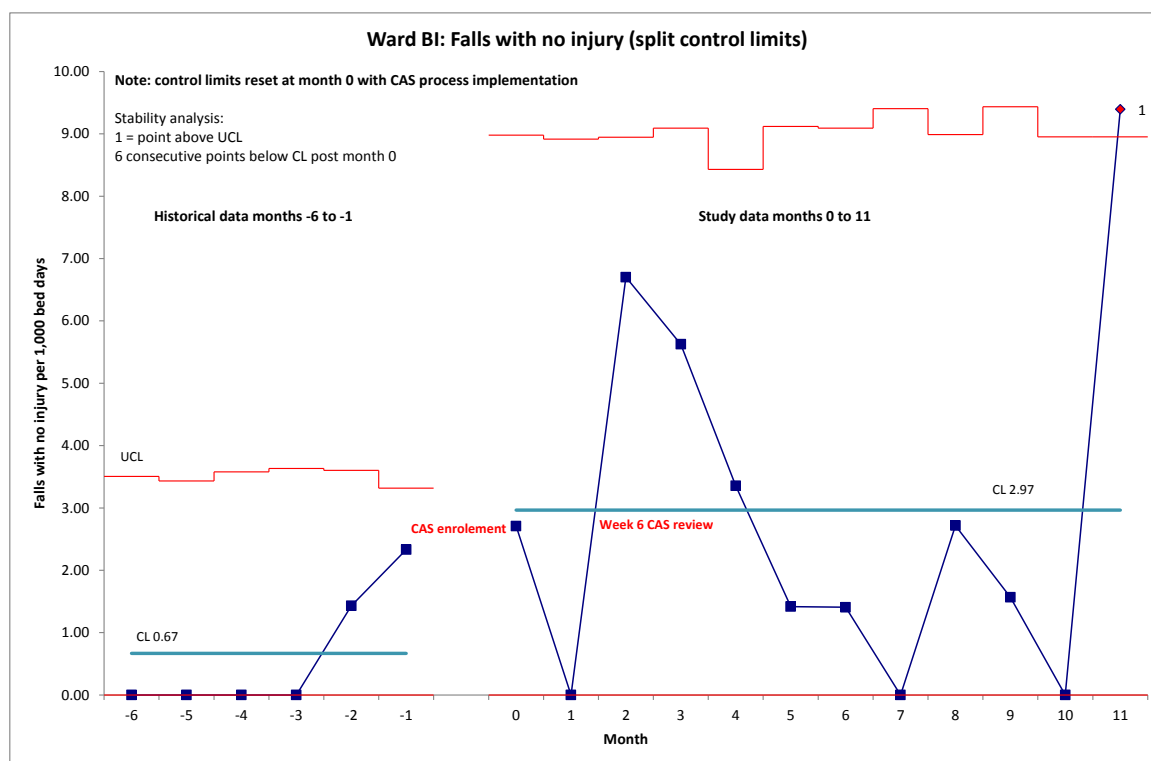
Ward BI: Falls (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	747	788	711	685	699	858
Fall severity						
No injury					1 (1.43)	2 (2.33)
Low injury	3 (4.02)	5 (6.35)		2 (2.99)		1 (1.17)
Moderate			1 (1.41)	1 (1.46)	1 (1.43)	
Severe						
Total	3 (4.24)	5 (6.35)	1 (1.41)	3 (4.38)	2 (2.86)	3 (3.50)
Ward BI: Falls (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	738	754	746	711	894	705
Fall severity						
No injury	2 (2.71)		5 (6.70)	4 (5.63)	3 (3.36)	1 (1.42)
Low injury	2 (2.71)	1 (1.33)		1 (1.41)	1 (1.12)	1 (1.42)
Moderate						
Severe						
Total	4 (5.42)	1 (1.33)	5 (6.70)	5 (7.03)	4 (4.48)	2 (2.84)
Month	6	7	8	9	10	11
Occupied bed days	711	644	736	638	745	745
Fall severity						
No injury	1 (1.41)		2 (2.71)	1 (1.57)		7 (9.40)
Low injury		2 (3.11)				2 (2.68)
Moderate						1 (1.34)
Severe		1 (1.55)				
Total	1 (1.41)	3 (4.66)	2 (2.71)	1 (1.57)	0	10 (13.42)

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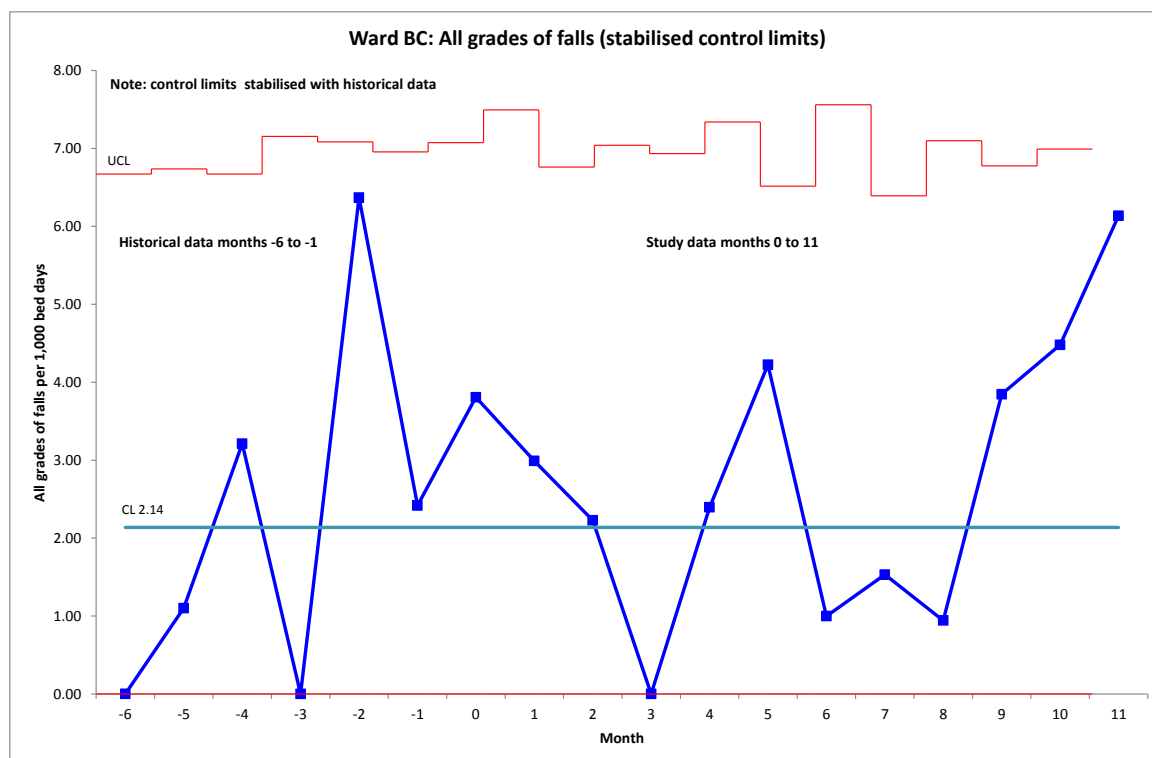
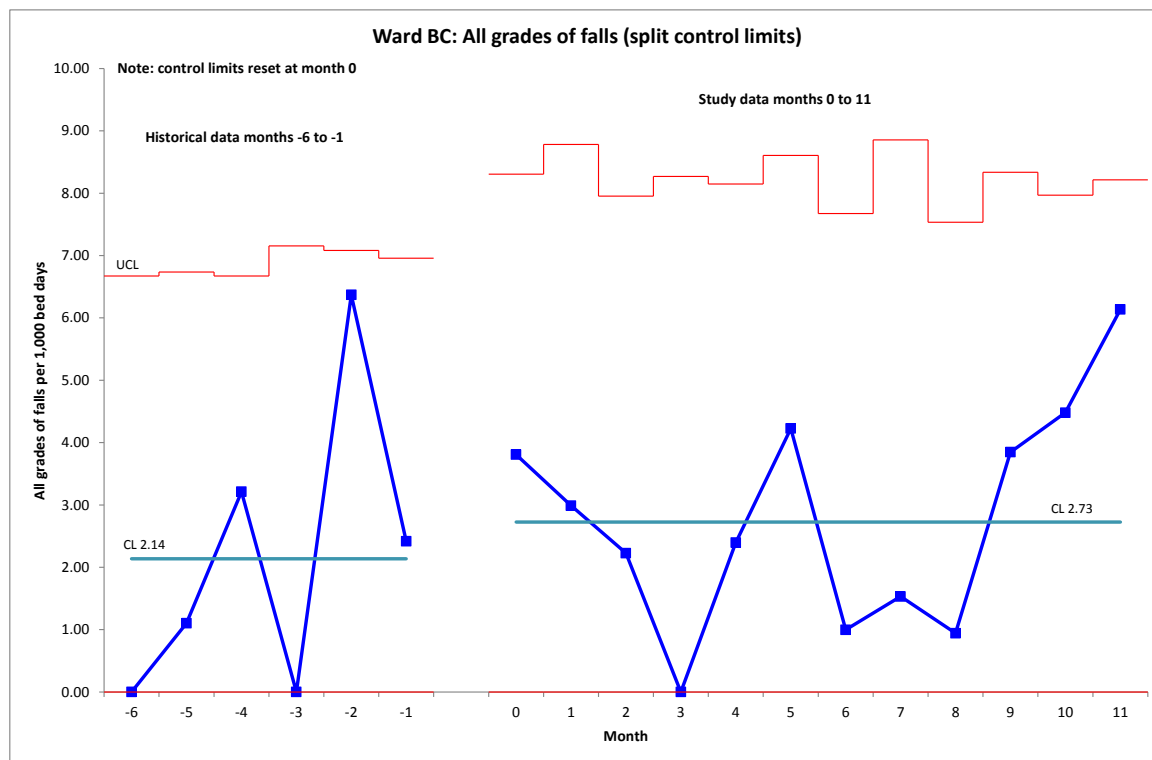
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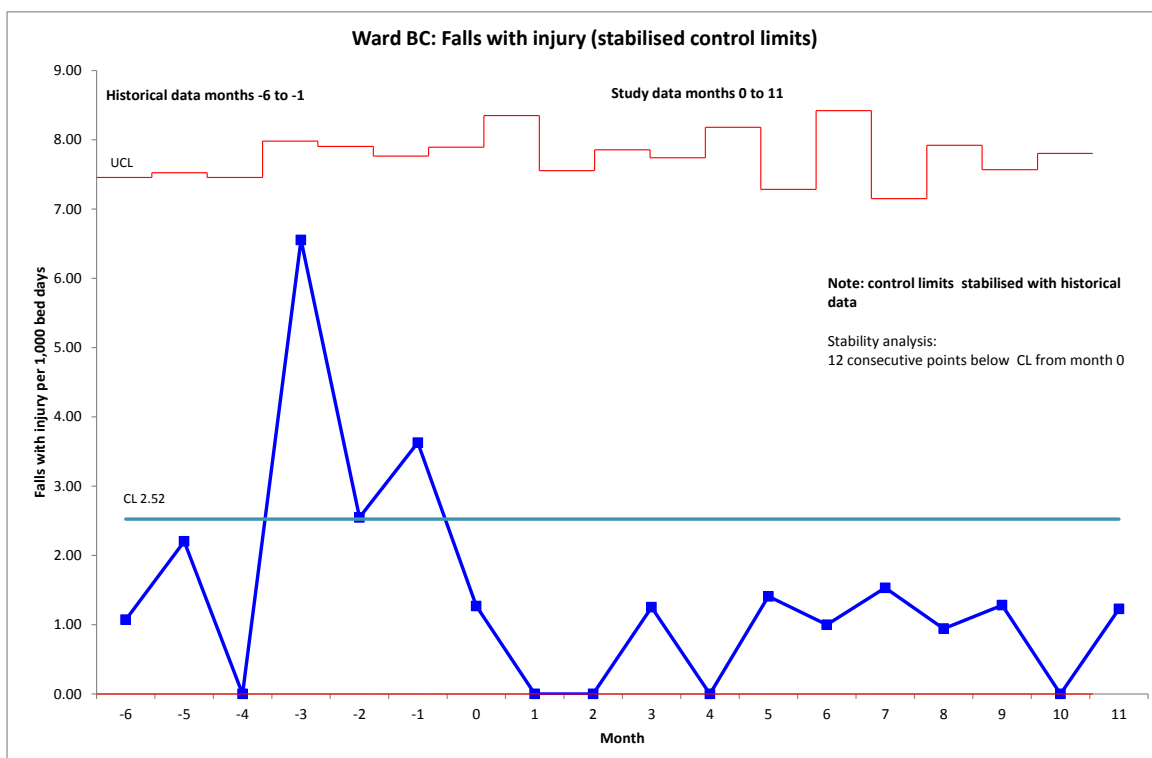
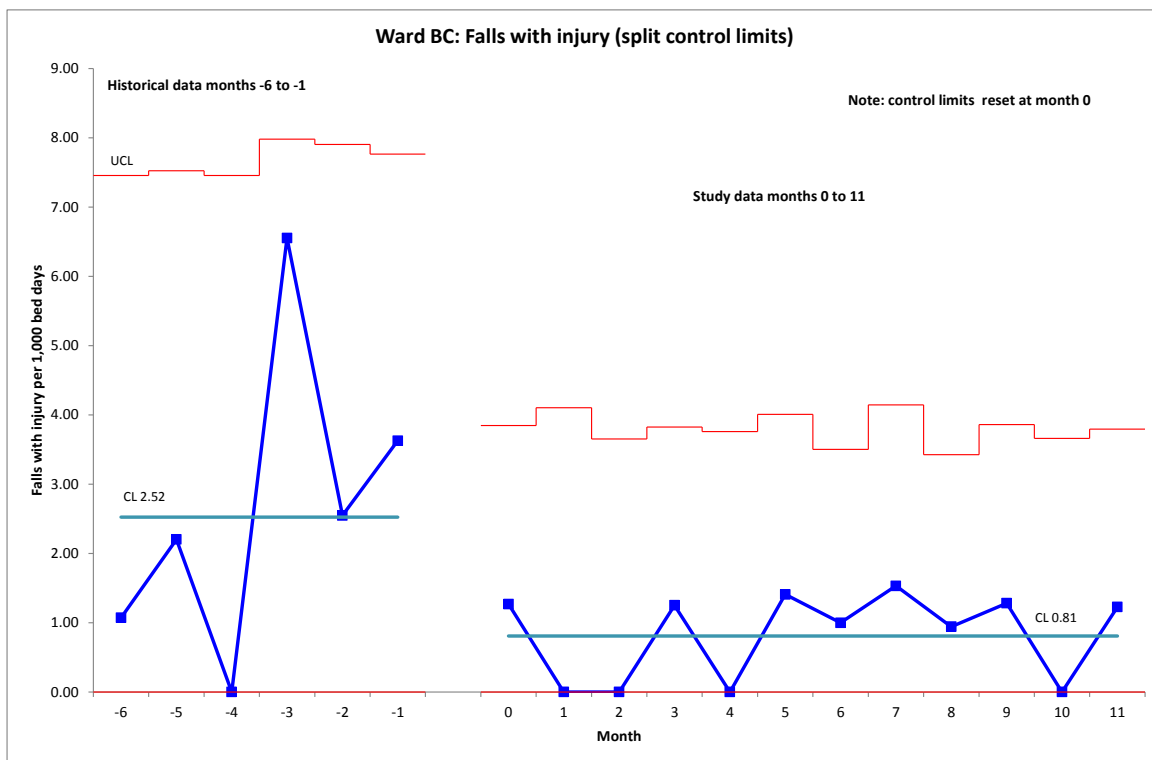


Ward BC

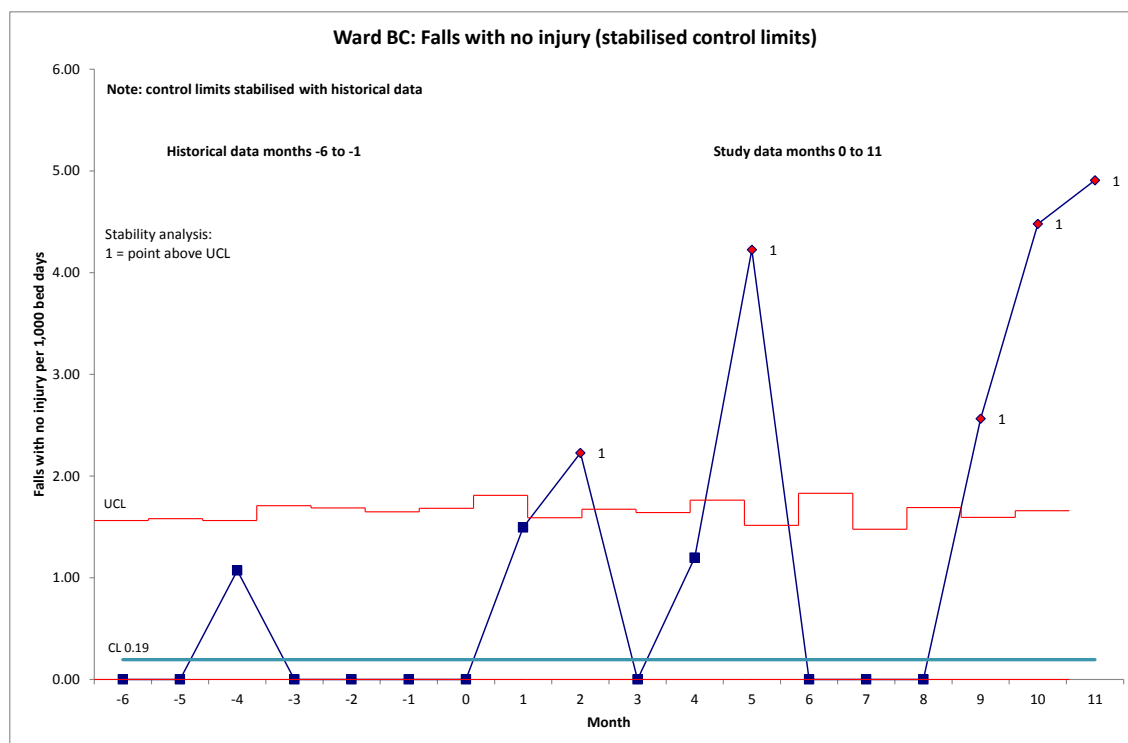
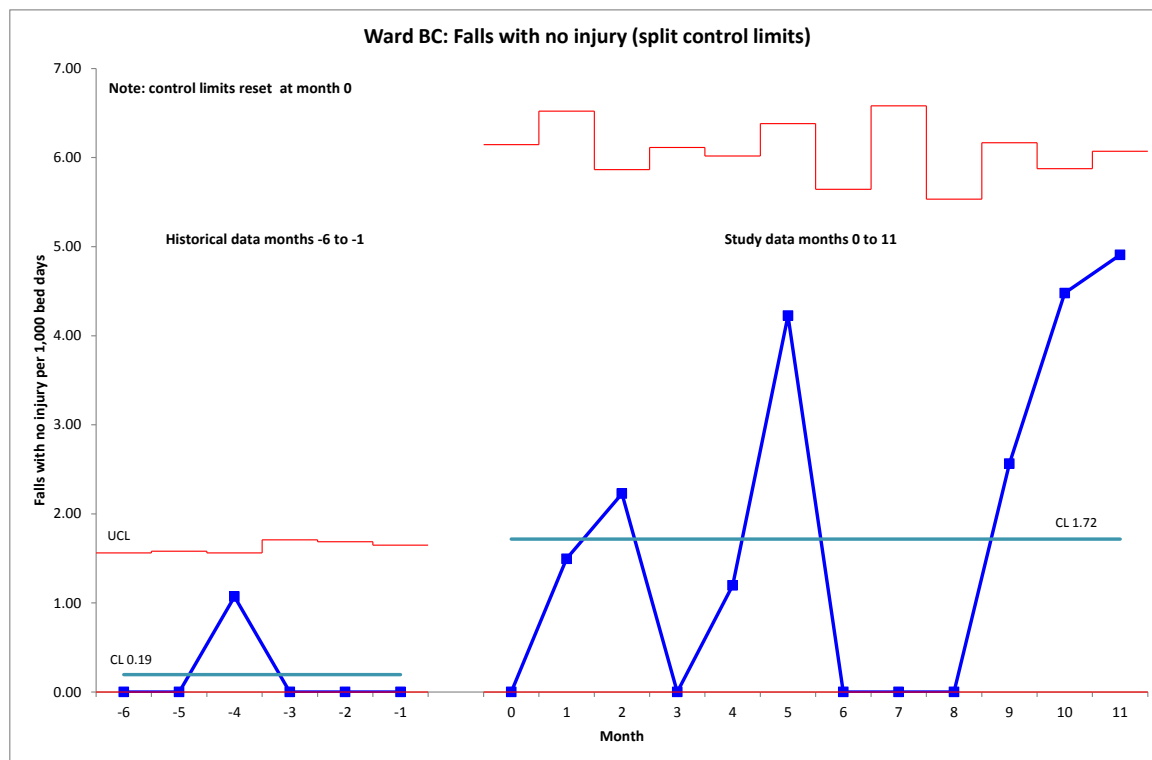
Ward BC: Number of falls (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	934	908	934	763	785	827
Fall severity						
No injury			1 (1.07)			
Low injury			1 (1.07)		3 (3.82)	1 (1.21)
Moderate		1 (1.10)	1 (1.07)		2 (2.55)	1 (1.21)
Severe						
Total	0	1 (1.10)	3 (3.21)	0	5 (6.37)	2 (2.42)
Ward BC: Number of falls (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	788	669	898	799	835	710
Fall severity						
No injury		1 (1.49)	2 (2.23)		1 (1.20)	3 (4.23)
Low injury	2 (2.54)				1 (1.20)	
Moderate	1 (1.27)	1 (1.49)				
Severe						
Total	3 (3.81)	2 (2.99)	2 (2.23)	0	2 (2.40)	3 (4.23)
Month	6	7	8	9	10	11
Occupied bed days	1002	653	1061	780	893	815
Fall severity						
No injury				2 (2.56)	4 (4.48)	4 (4.91)
Low injury	1 (1.00)	1 (1.53)	1 (0.94)	1 (1.28)		1 (1.23)
Moderate						
Severe						
Total	1 (1.00)	1 (1.53)	1 (0.94)	3 (3.85)	4 (4.48)	5 (6.13)

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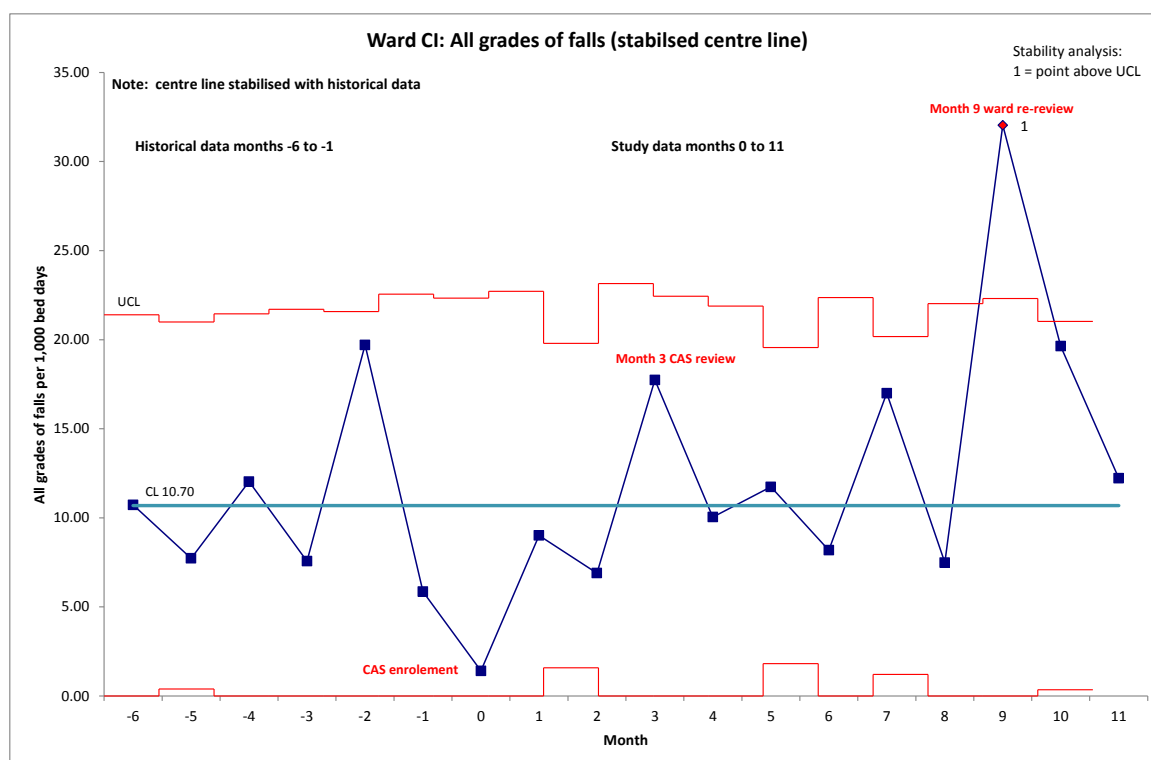
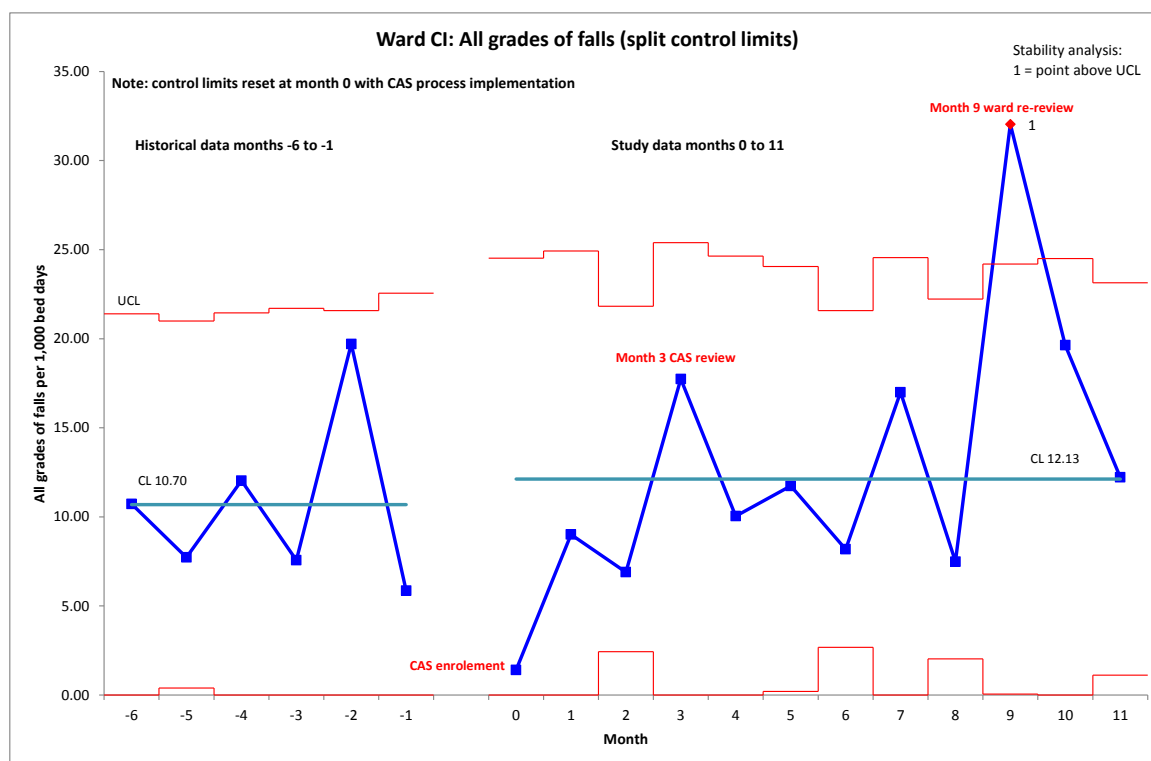
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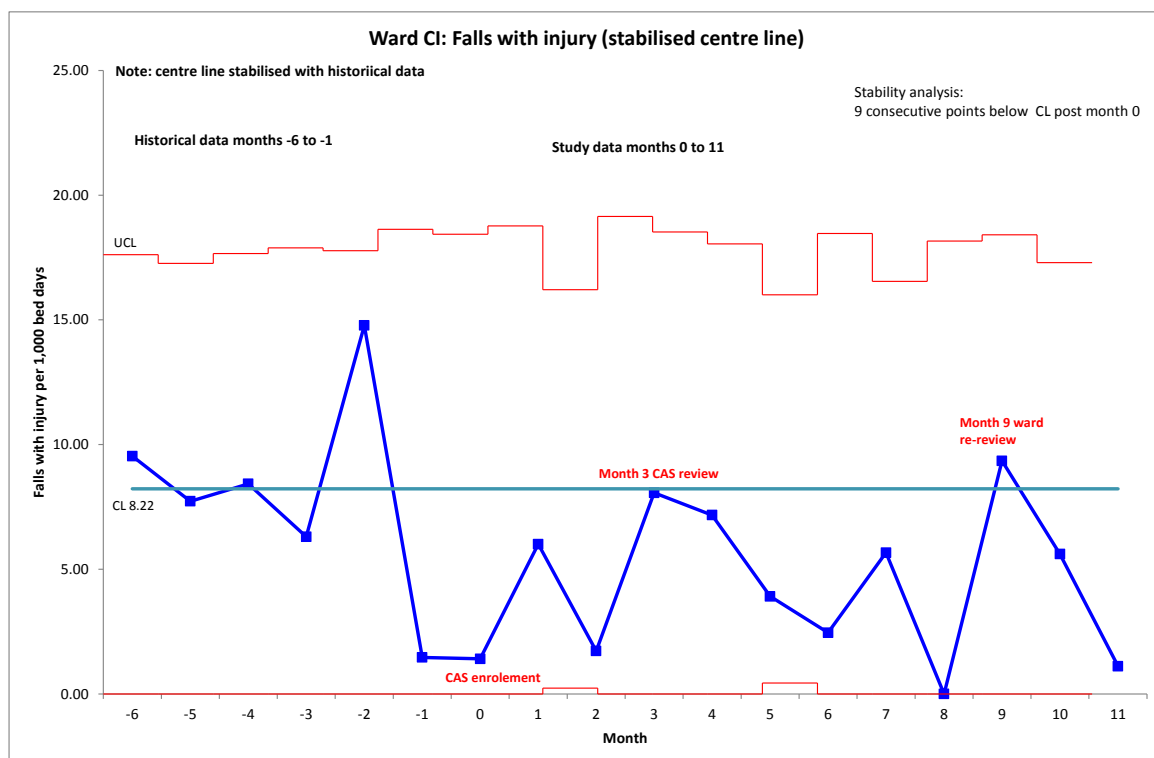
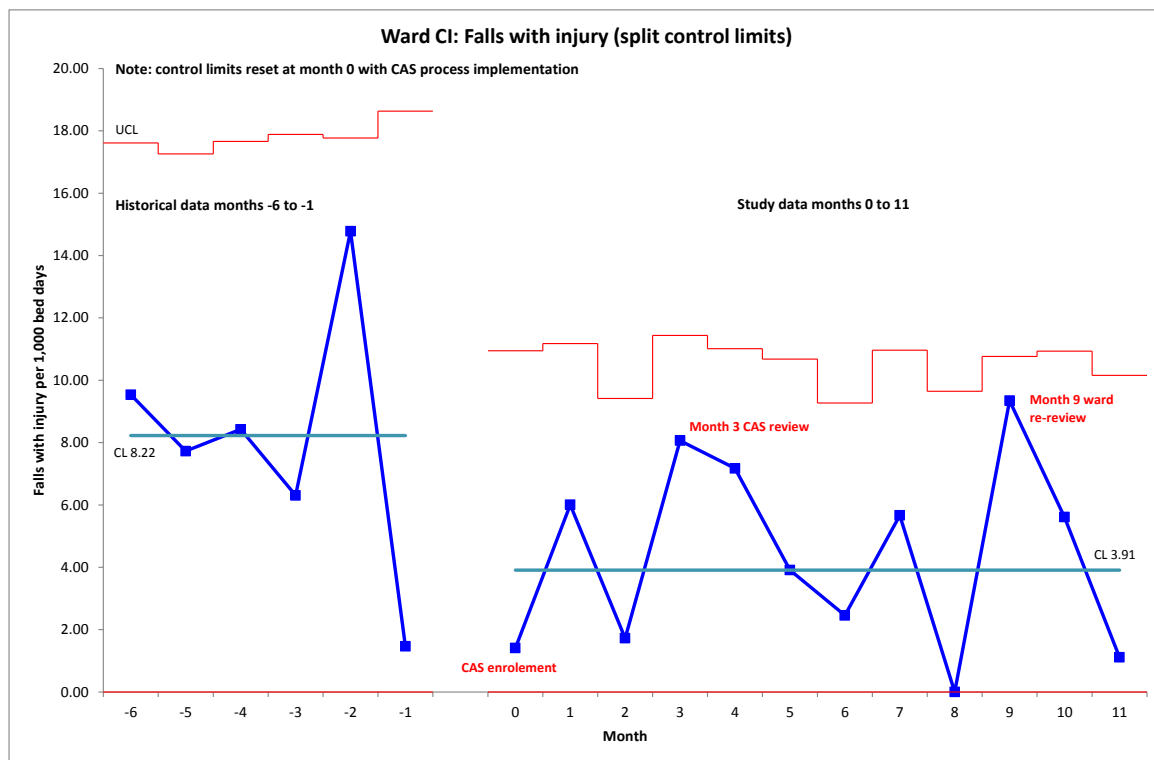


Ward CI

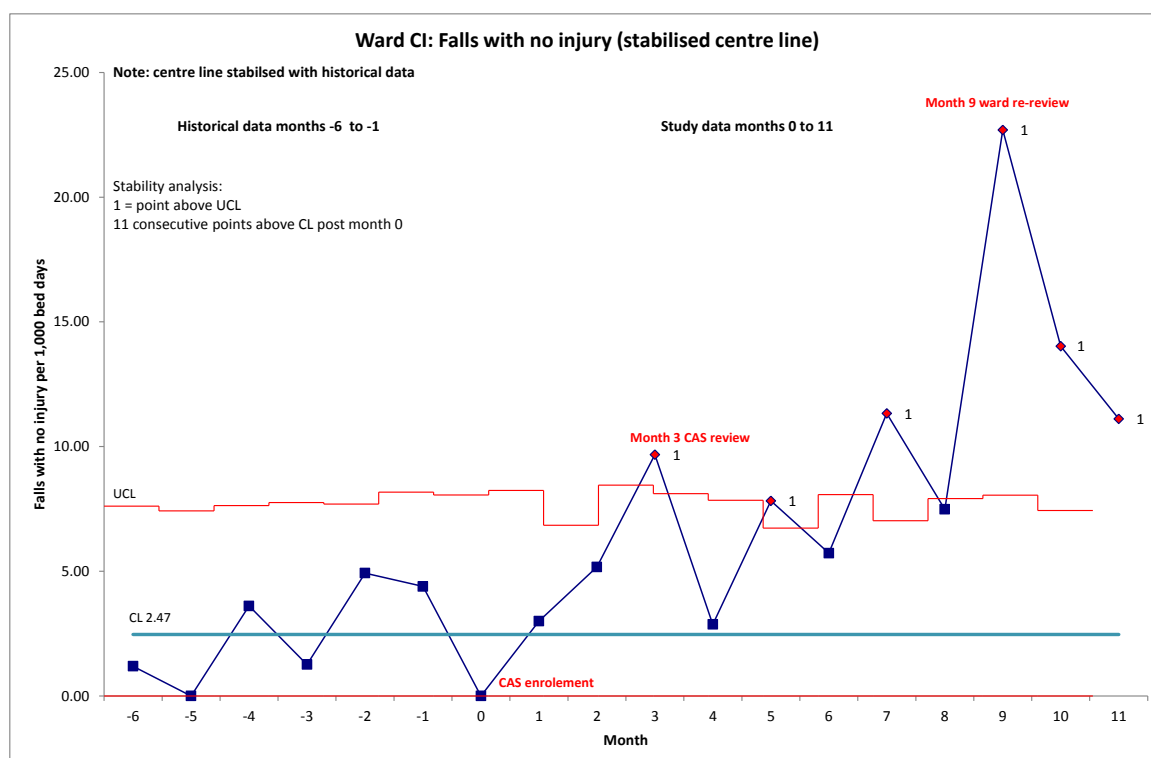
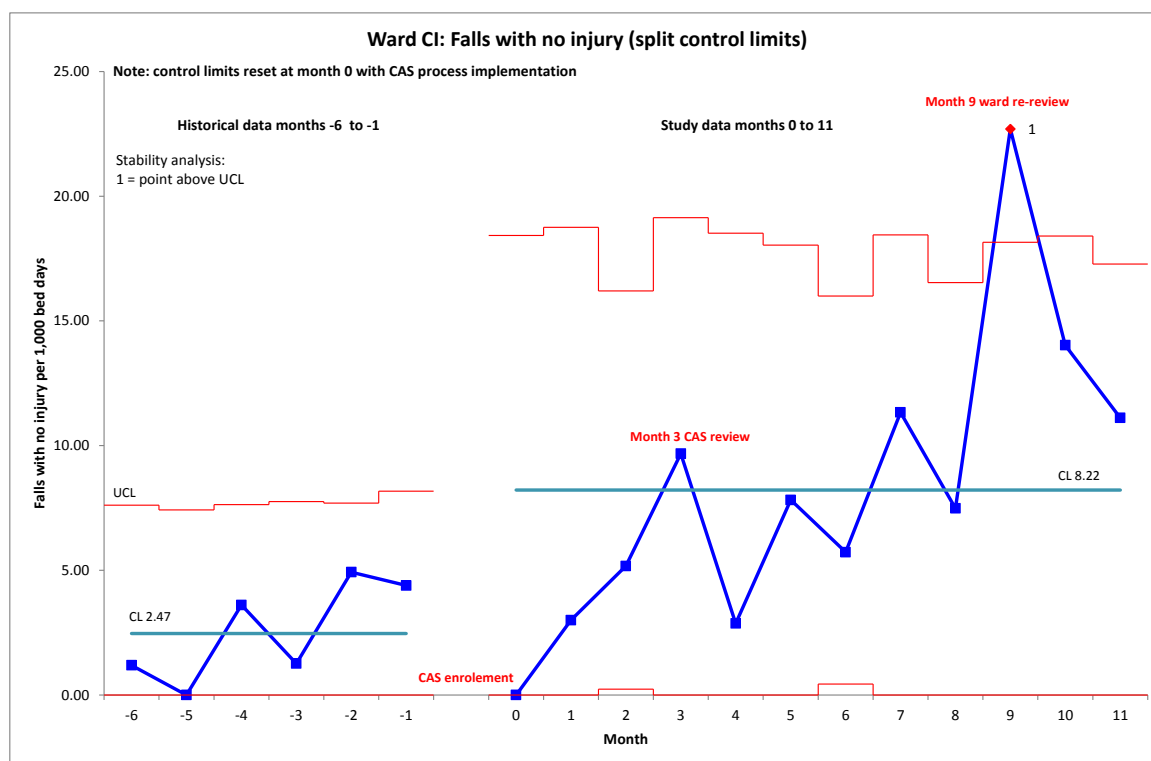
Ward CI: Number of falls (rate per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	839	906	831	793	812	683
Fall severity						
No injury	1 (1.19)		3 (3.61)	1 (1.26)	4 (4.93)	3 (4.39)
Low injury	7 (8.34)	7 (7.73)	7 (8.42)	5 (6.31)	12 (14.78)	1 (1.46)
Moderate	1 (1.19)					
Severe						
Total	9 (10.73)	7 (7.73)	10 (12.03)	6 (7.57)	16 (19.70)	4 (5.86)
Ward CI: Number of falls (rate per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	710	666	1160	620	697	767
Fall severity						
No injury		2 (3.00)	6 (5.17)	6 (9.68)	2 (2.87)	6 (7.82)
Low injury	1 (1.41)	4 (6.00)	2 (1.72)	5 (8.06)	4 (5.74)	2 (2.61)
Moderate						
Severe						1 (1.30)
Catastrophic/death					1 (1.43)	
Total	1 (1.41)	6 (9.00)	8 (6.90)	11 (17.74)	7 (10.04)	9 (11.73)
Month	6	7	8	9	10	11
Occupied bed days	1222	706	1069	749	713	900
Fall severity						
No injury	7 (5.73)	8 (11.33)	8 (7.48)	17 (22.70)	10 (14.03)	10 (11.11)
Low injury	3 (2.45)	4 (5.67)		6 (8.01)	4 (5.61)	1 (1.11)
Moderate				1 (1.34)		
Severe						
Total	10 (8.18)	12 (17.00)	8 (7.48)	24 (32.04)	14 (19.64)	11 (12.22)

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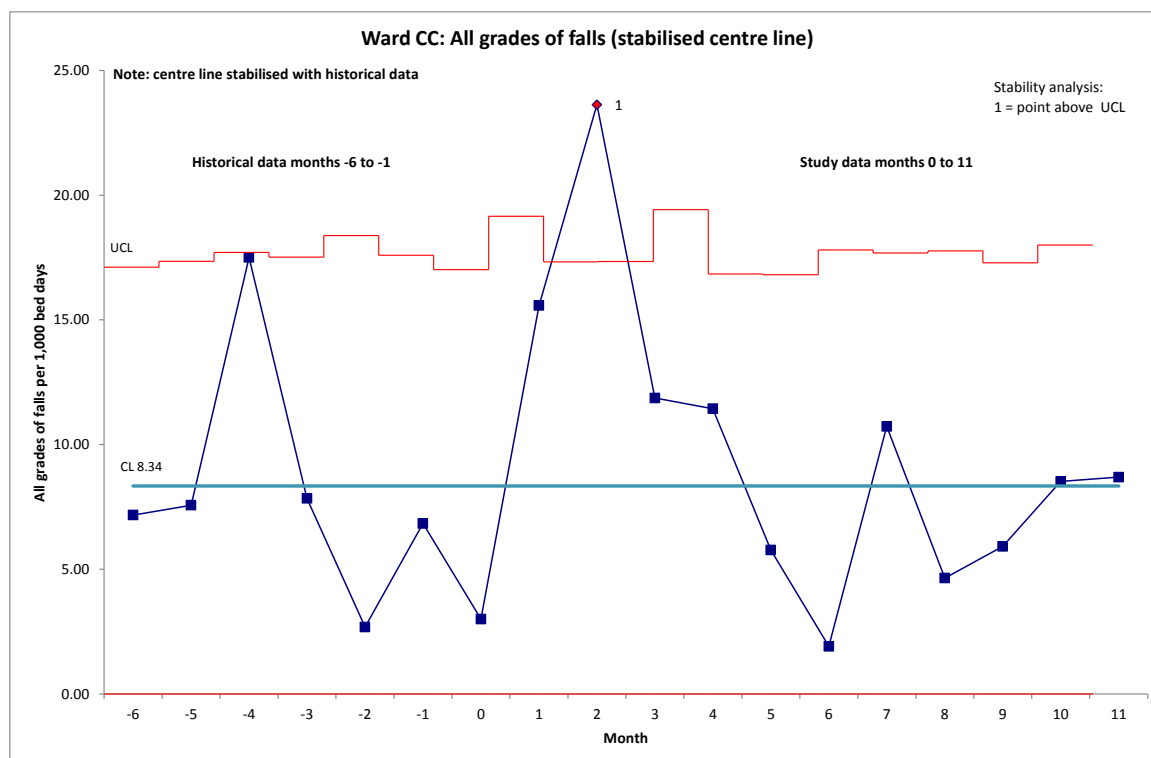
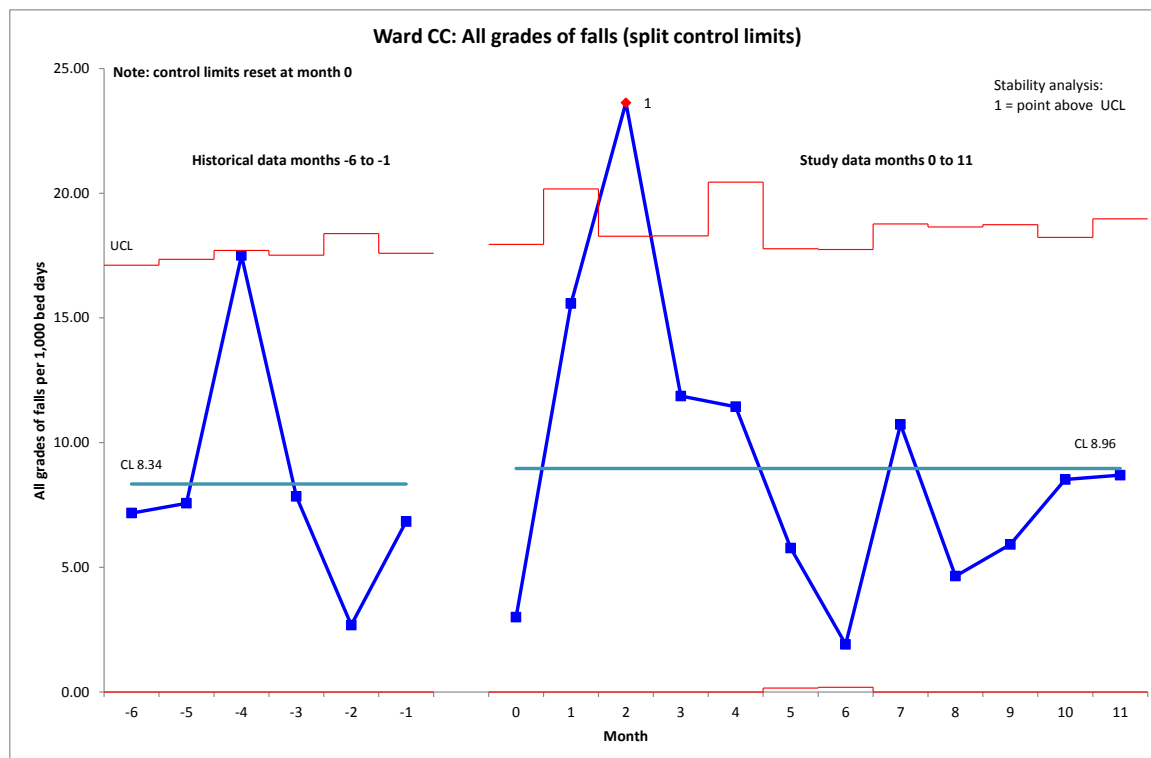
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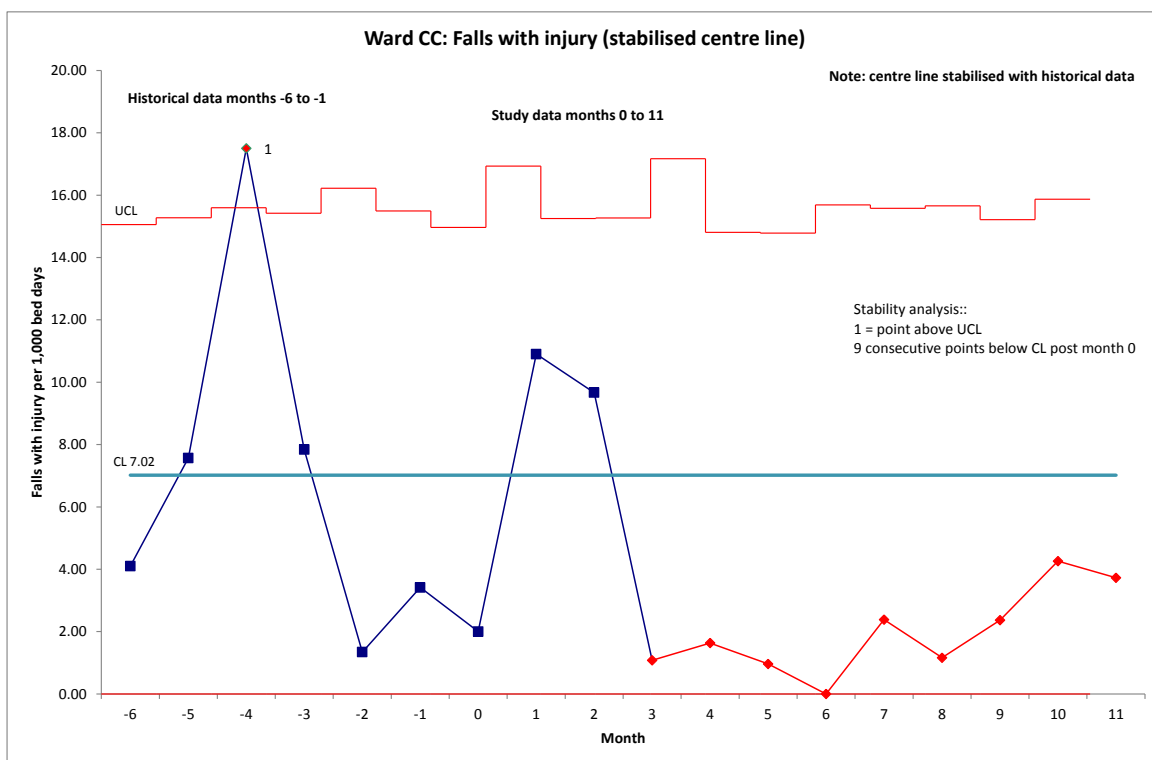
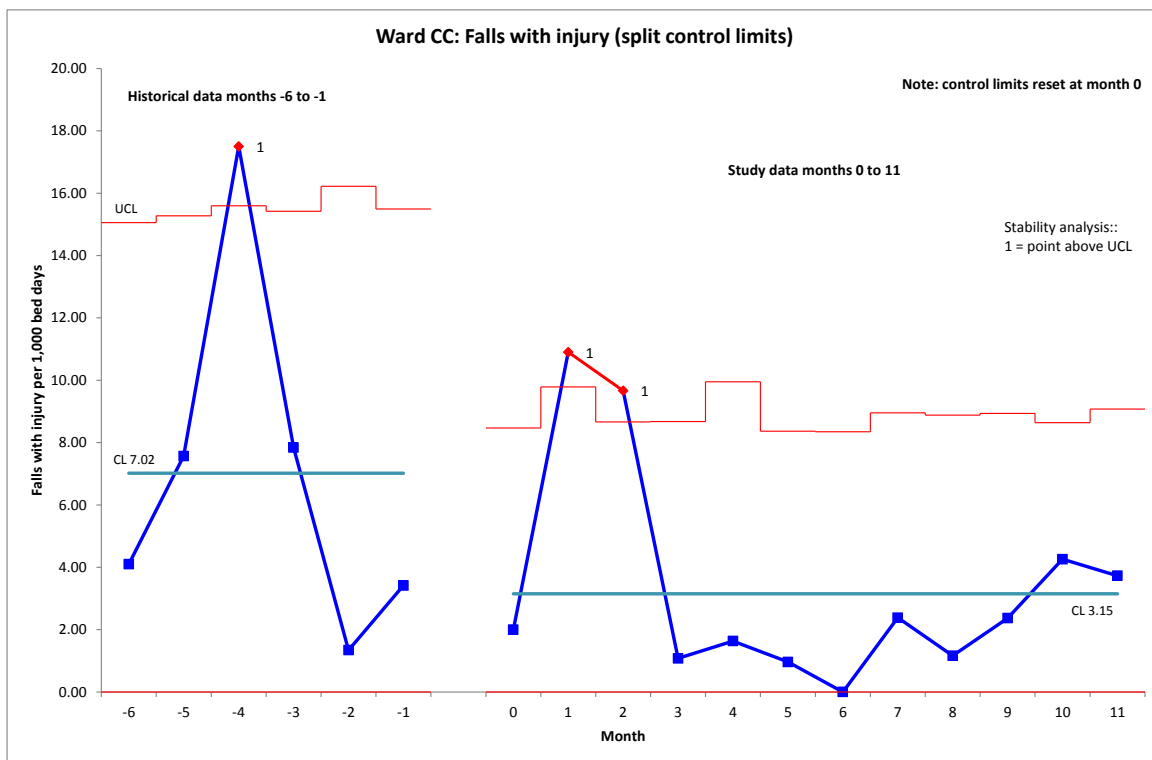


Ward CC

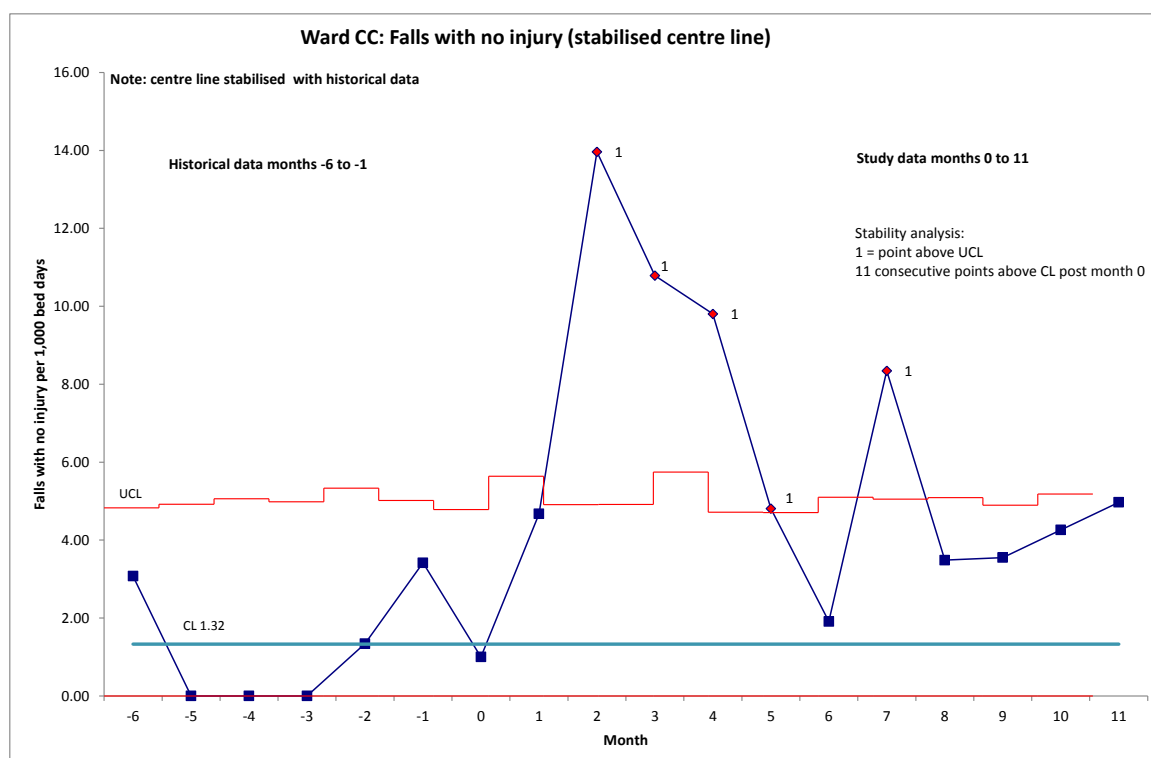
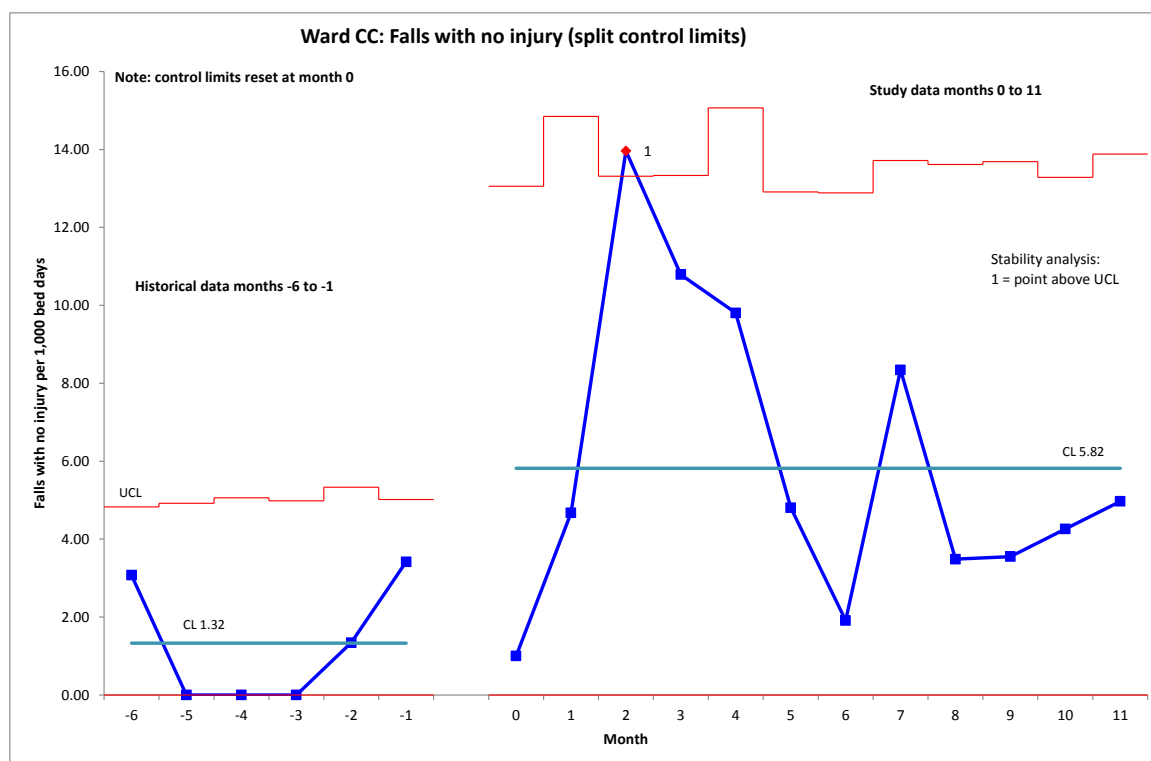
Ward CC: Number of falls (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	976	925	857	893	745	878
Fall severity						
No injury	3 (3.07)				1 (1.34)	3 (3.42)
Low injury	4 (4.10)	7 (7.57)	15 (17.50)	7 (7.84)	1 (1.34)	3 (3.42)
Moderate						
Severe						
Total	7 (7.17)	7 (7.57)	15 (17.50)	7 (7.84)	2 (2.68)	6 (6.84)
Ward CC: Number of falls (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	999	642	931	927	612	1040
Fall severity						
No injury	1 (1.00)	3 (4.67)	13 (13.96)	10 (10.79)	6 (9.80)	5 (4.81)
Low injury	2 (2.00)	7 (10.90)	8 (8.59)	1 (1.08)	1 (1.63)	1 (0.96)
Moderate			1 (1.07)			
Severe						
Total	3 (3.00)	10 (15.58)	22 (23.63)	11 (11.87)	7 (11.44)	6 (5.77)
Month	6	7	8	9	10	11
Occupied bed days	1047	839	861	845	939	805
Fall severity						
No injury	2 (1.91)	7 (8.34)	3 (3.48)	3 (3.55)	4 (4.26)	4 (4.97)
Low injury		1 (1.19)	1 (1.16)	2 (2.37)	3 (8.19)	3 (3.73)
Moderate						
Severe		1 (1.19)			1 (1.06)	
Total	2 (1.91)	9 (10.73)	4 (4.65)	5 (5.92)	8 (8.52)	7 (8.70)

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Intervention wards

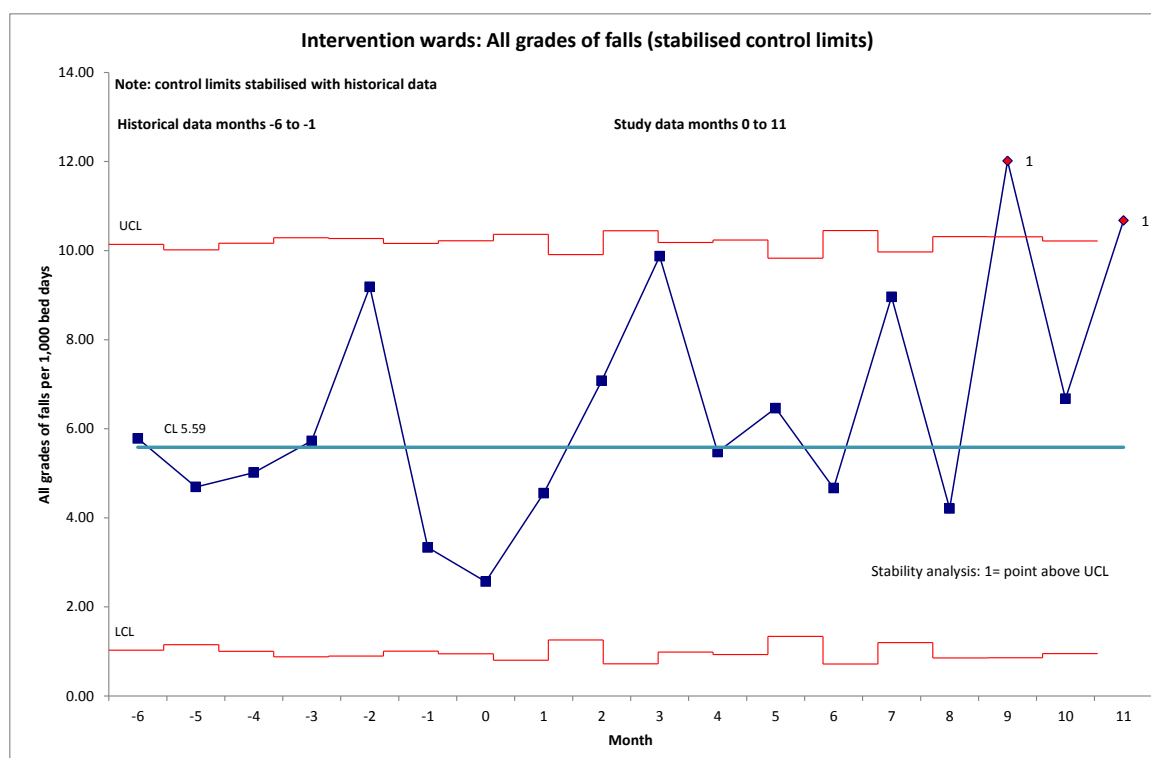
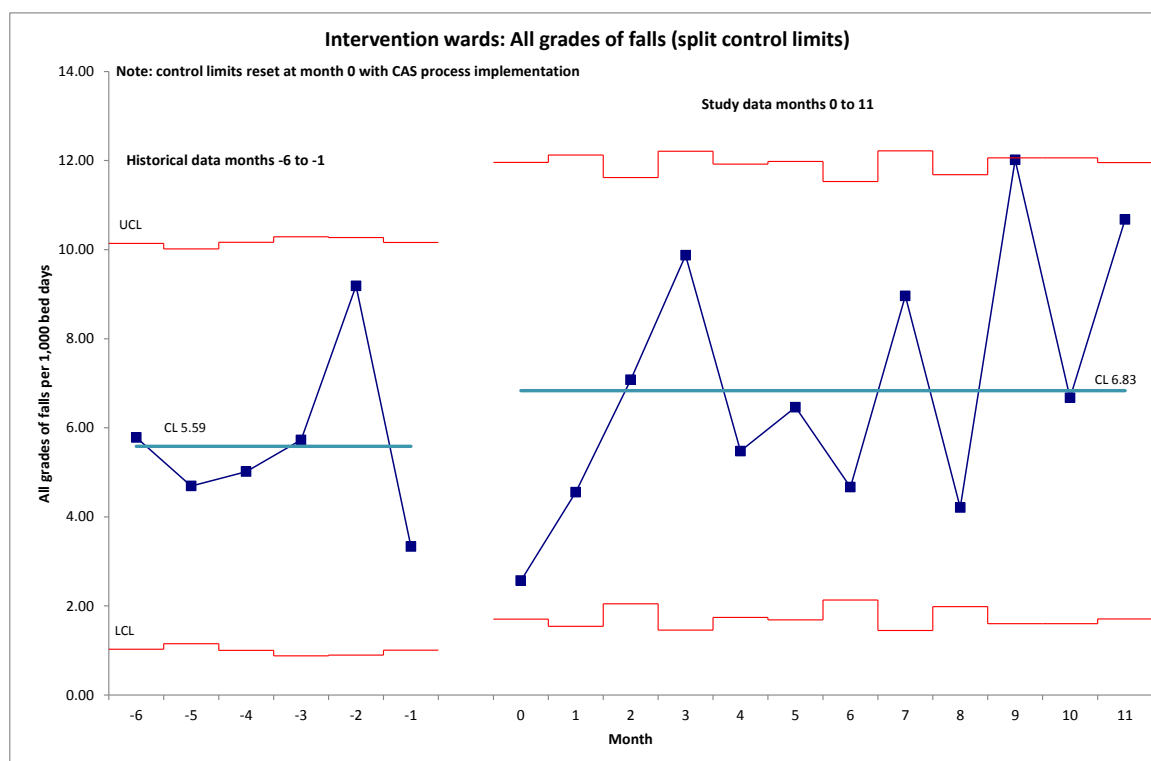
Intervention wards: Number of falls (rate per 1,000 bed days) per month (historical data)

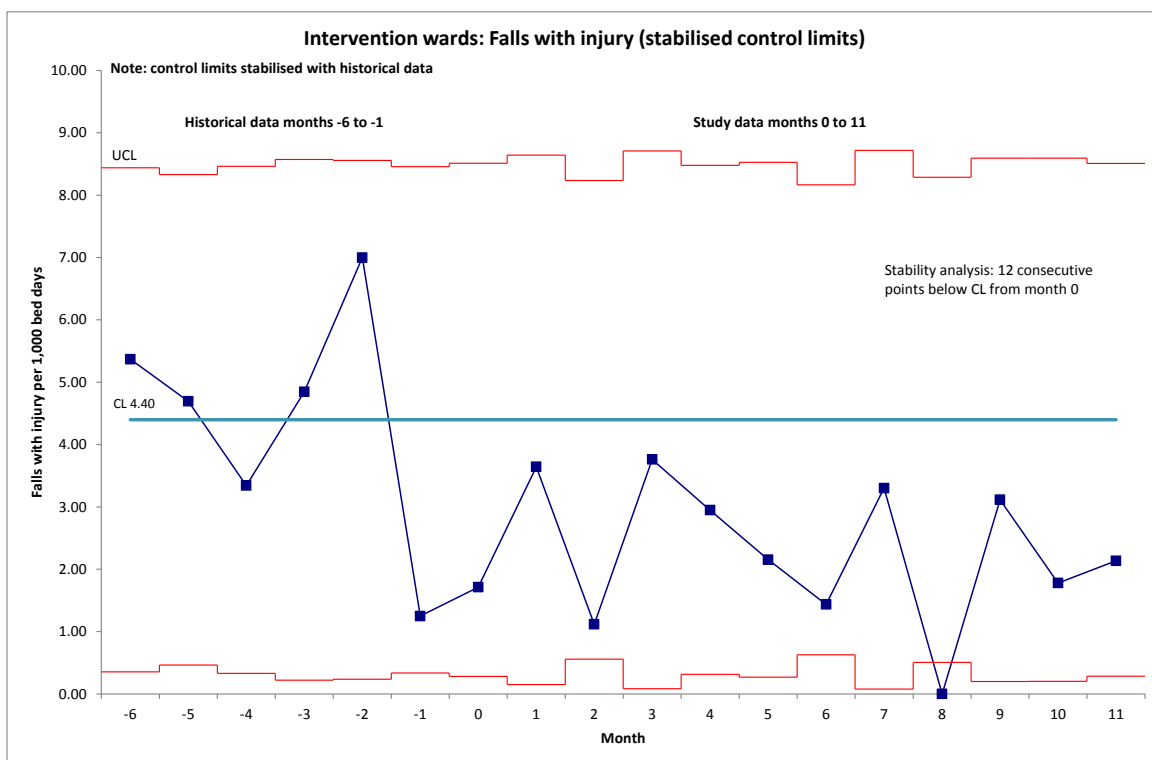
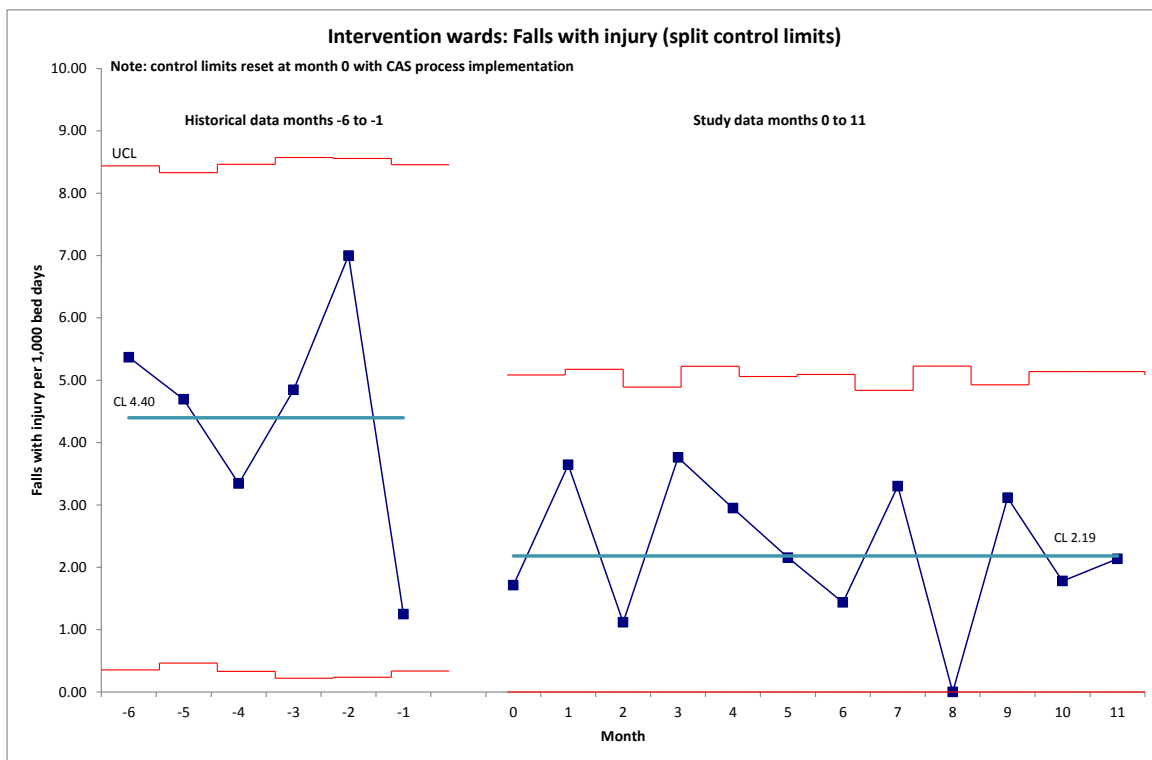
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	2,421	2,557	2,393	2,270	2,286	2,400
Fall severity						
No injury	1 (0.41)		4 (1.67)	2 (0.88)	5 (2.19)	5 (2.08)
Low injury	11 (4.54)	12 (4.69)	7 (2.93)	10 (4.41)	15 (6.56)	3 (1.25)
Moderate	2 (0.83)		1 (0.42)	1 (0.44)	1 (0.44)	
Severe						
Total	14 (5.78)	12 (4.69)	12 (4.69)	13 (5.73)	21 (9.19)	8 (3.33)

Intervention wards: Number of falls (rate per 1,000 bed days) per month (study data)

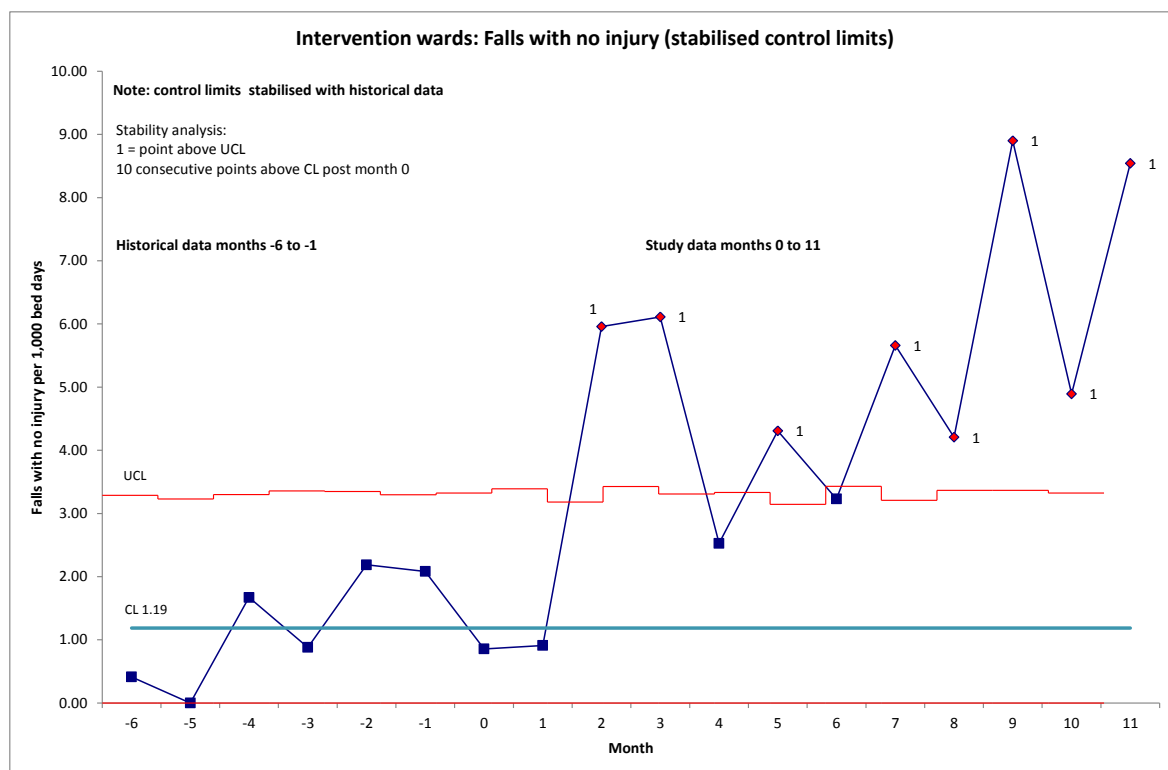
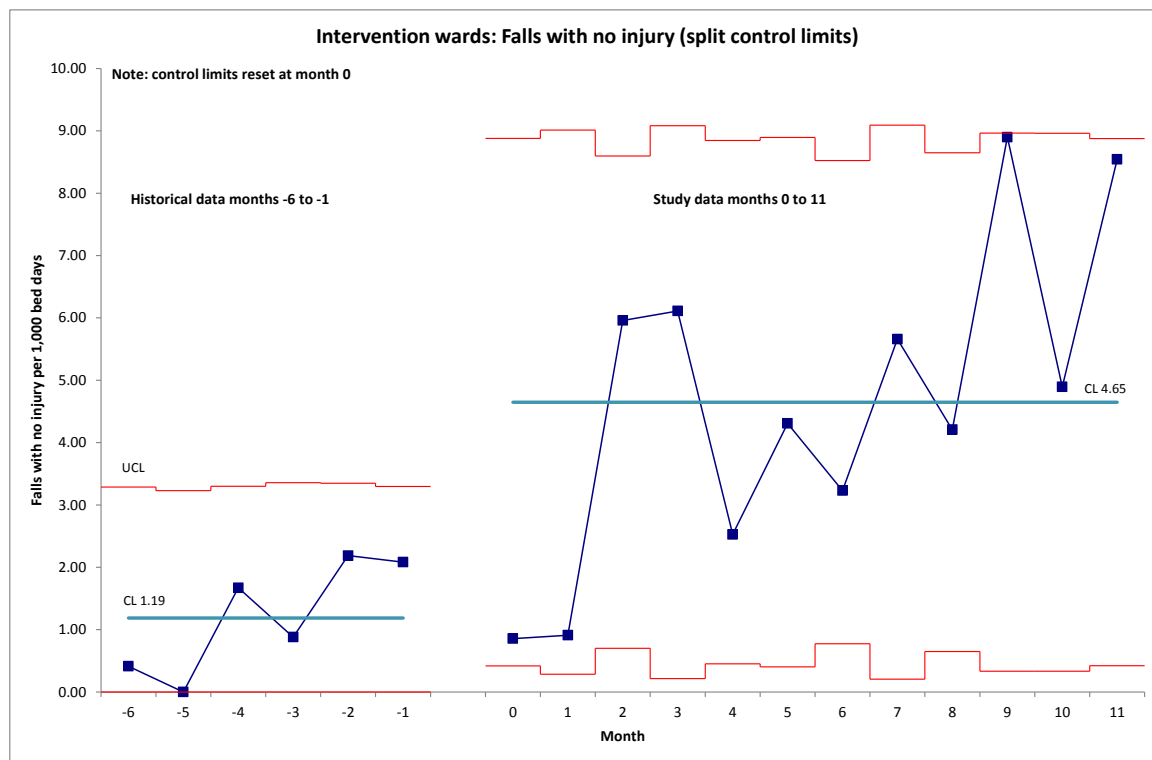
Month	0	1	2	3	4	5
Occupied bed days	2,337	2,196	2,685	2,127	2,374	2,321
Fall severity						
No injury	2 (0.86)	2 (0.91)	16 (5.96)	13 (6.11)	6 (2.53)	10 (4.31)
Low injury	4 (1.71)	8 (3.64)	3 (1.12)	7 (3.29)	6 (2.53)	4 (1.72)
Moderate						
Severe				1 (0.47)		1 (0.43)
Catastrophic/death					1 (0.42)	
Total	6 (2.57)	10 (4.55)	19 (7.08)	21 (9.87)	13 (5.48)	15 (6.46)
Month	6	7	8	9	10	11
Occupied bed days	2,786	2,120	2,614	2,247	2,247	2,341
Fall severity						
No injury	9 (3.23)	12 (5.67)	11 (4.21)	20 (8.90)	11 (4.90)	20 (8.54)
Low injury	4 (1.44)	6 (2.83)		6 (2.67)	4 (1.78)	4 (1.71)
Moderate				1 (0.45)		1 (0.43)
Severe		1 (0.47)				
Total	13 (4.67)	19 (8.96)	11 (4.21)	27 (12.02)	15 (6.68)	25 (10.68)

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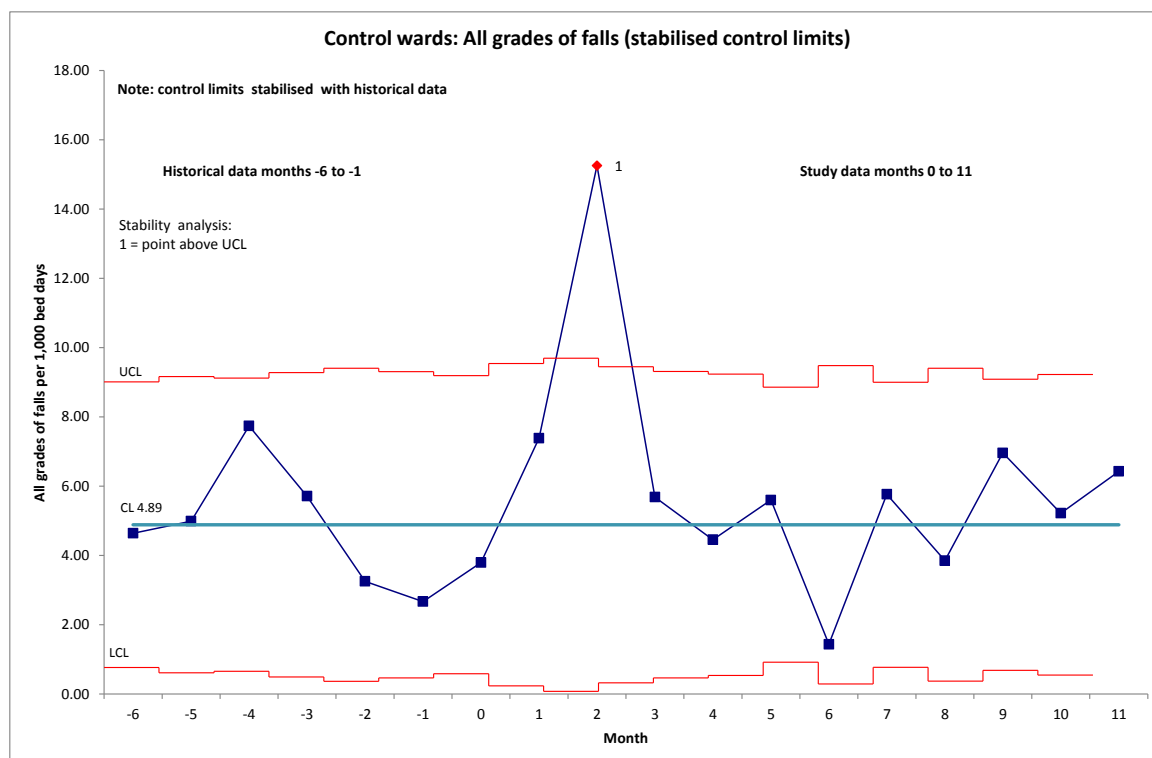
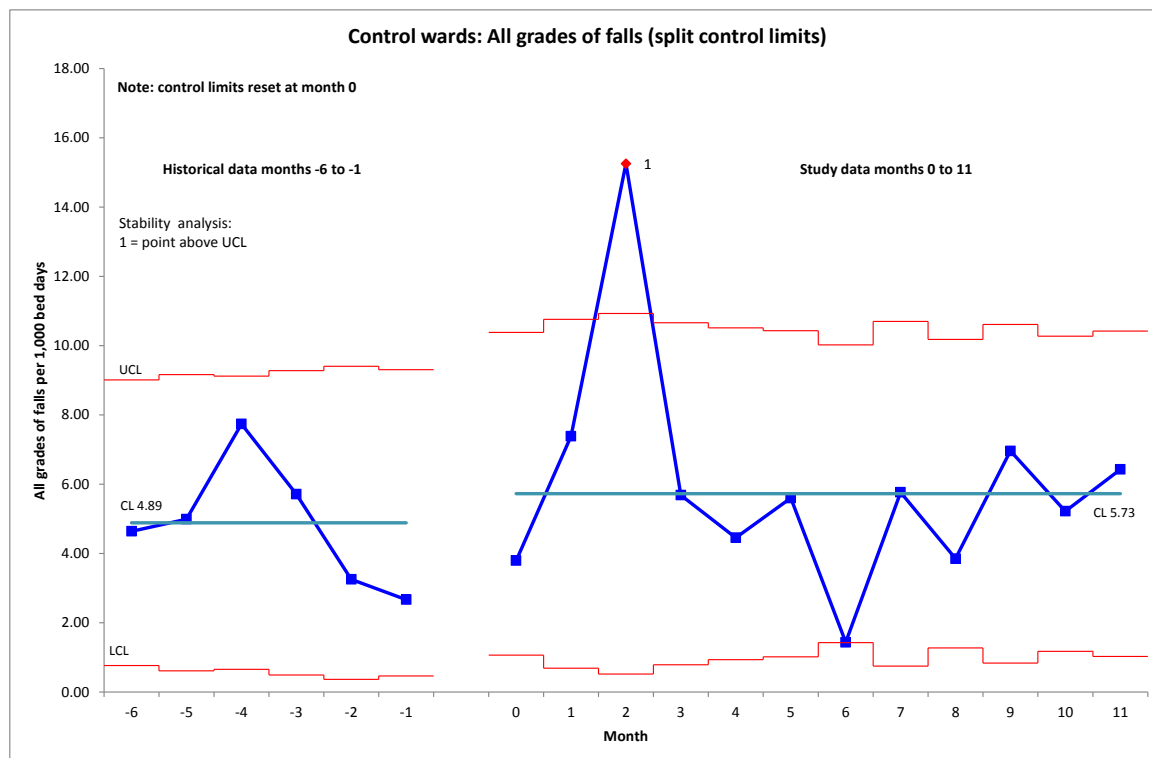
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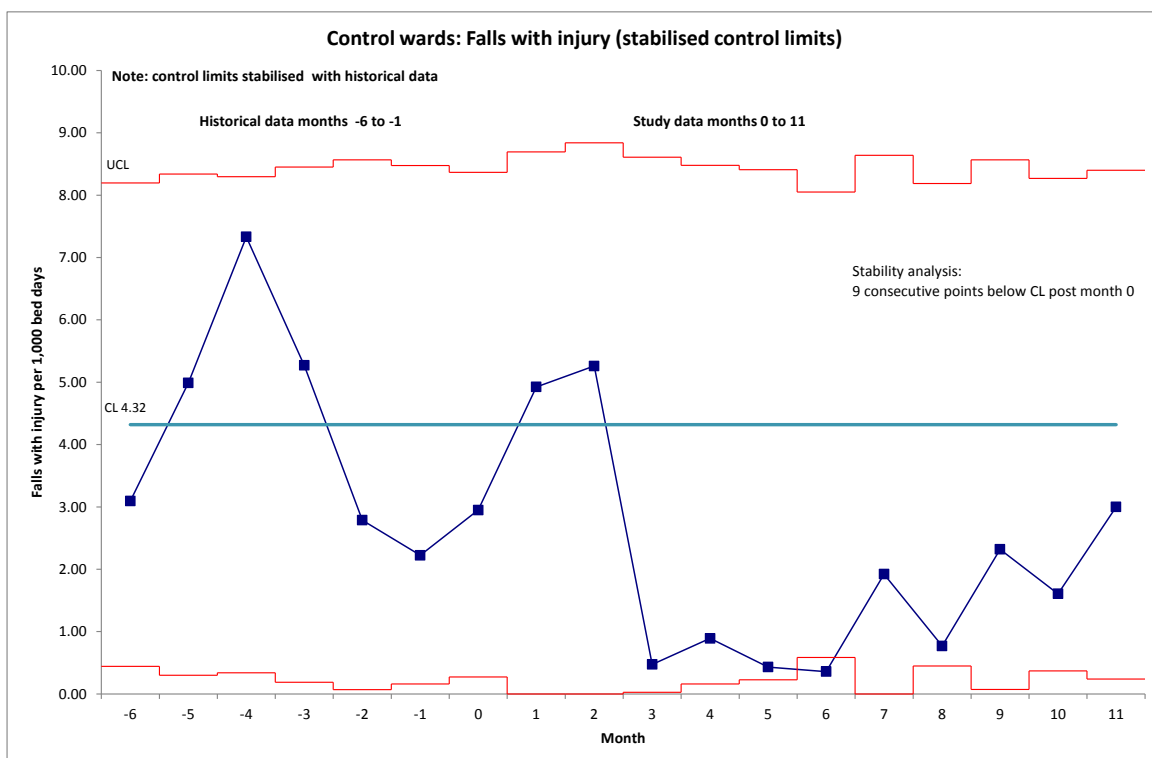
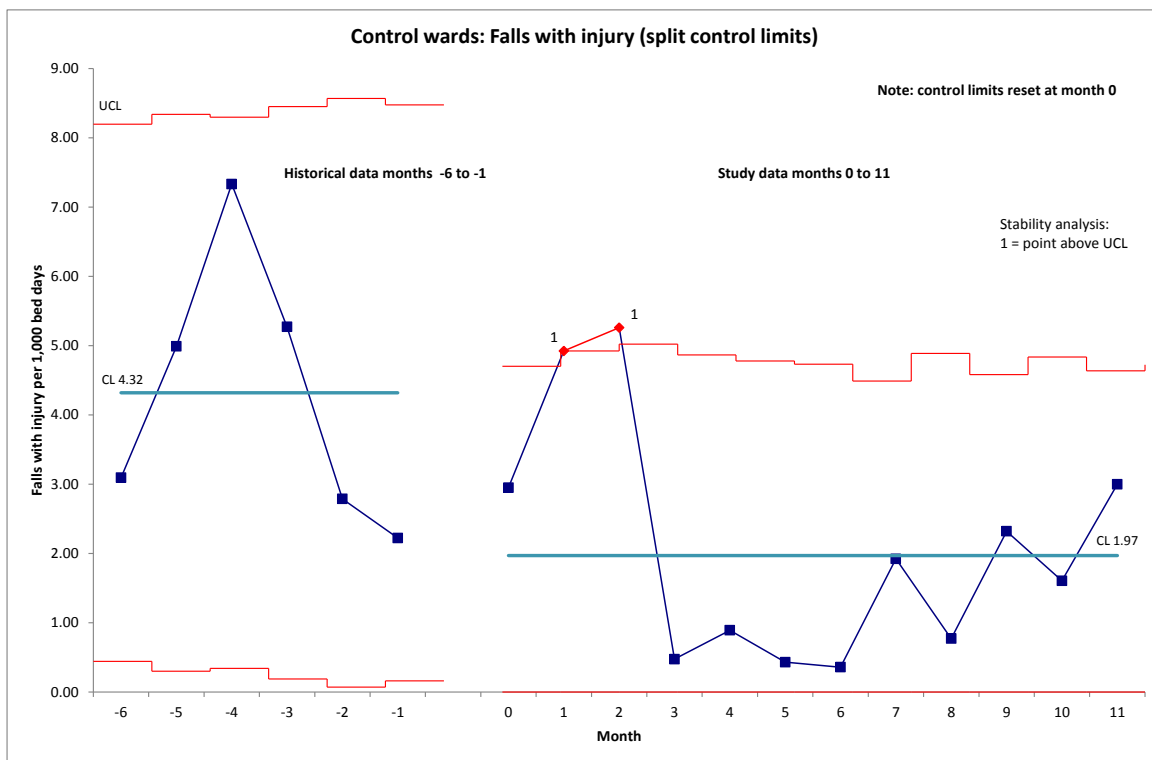


Control wards

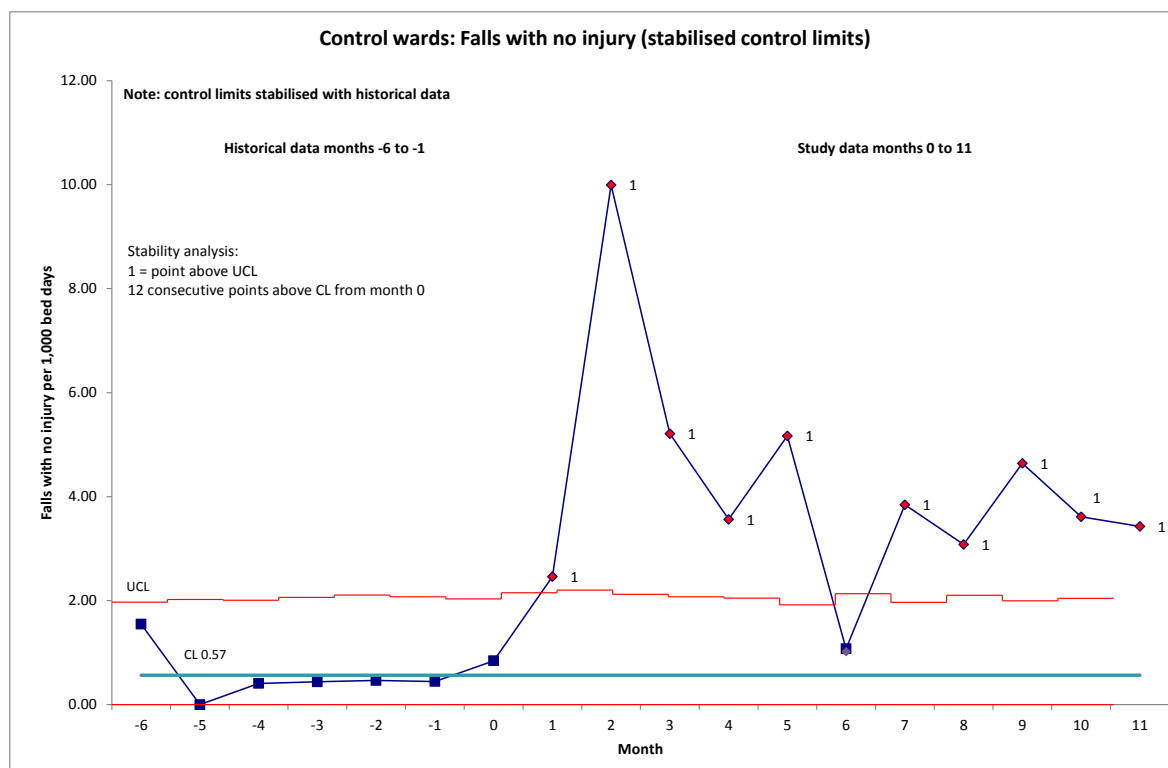
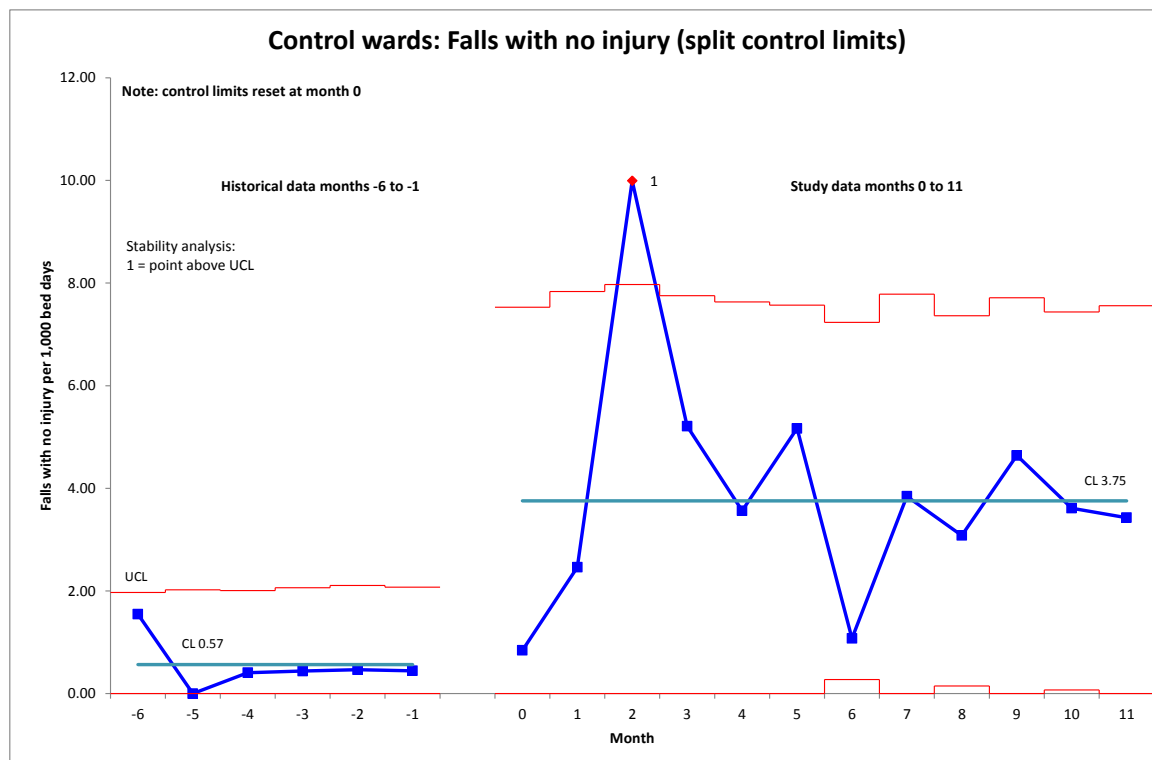
Control wards: Number of falls (rate per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	2,558	2,405	2,455	2,277	2,153	2,249
Fall severity						
No injury	4 (1.56)		1 (0.41)	1 (0.44)	1 (0.46)	1 (0.45)
Low injury	8 (3.13)	11 (4.57)	16 (6.52)	12 (5.27)	4 (1.86)	4 (1.78)
Moderate		1 (0.42)	2 (0.81)		2 (0.93)	1 (0.45)
Severe						
Total	12 (4.69)	12 (4.99)	19 (7.74)	13 (5.71)	7 (3.25)	6 (2.67)
Control wards: Number of falls (rate per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	2,373	2,031	2,552	2,131	2,246	2,322
Fall severity						
No injury	2 (0.84)	5 (2.46)	19 (7.45)	11 (5.16)	8 (3.56)	12 (5.17)
Low injury	4 (1.69)	9 (4.43)	9 (3.53)	1 (0.47)	2 (0.89)	1 (0.43)
Moderate	1 (0.42)	1 (0.49)	1 (0.39)			
Severe	2 (0.84)					
Total	9 (3.79)	15 (7.39)	29 (11.36)	12 (5.63)	10 (4.45)	13 (5.60)
Month	6	7	8	9	10	11
Occupied bed days	2,790	2,081	2,597	2,155	2,491	2,334
Fall severity						
No injury	3 (1.08)	8 (3.84)	8 (3.08)	10 (4.64)	9 (3.61)	8 (3.43)
Low injury	1 (0.36)	3 (1.44)	2 (0.77)	5 (2.32)	3 (1.20)	7 (3.00)
Moderate						
Severe		1 (0.48)			1 (0.40)	
Total	4 (1.43)	12 (5.77)	10 (3.85)	15 (6.96)	13 (5.22)	15 (6.43)

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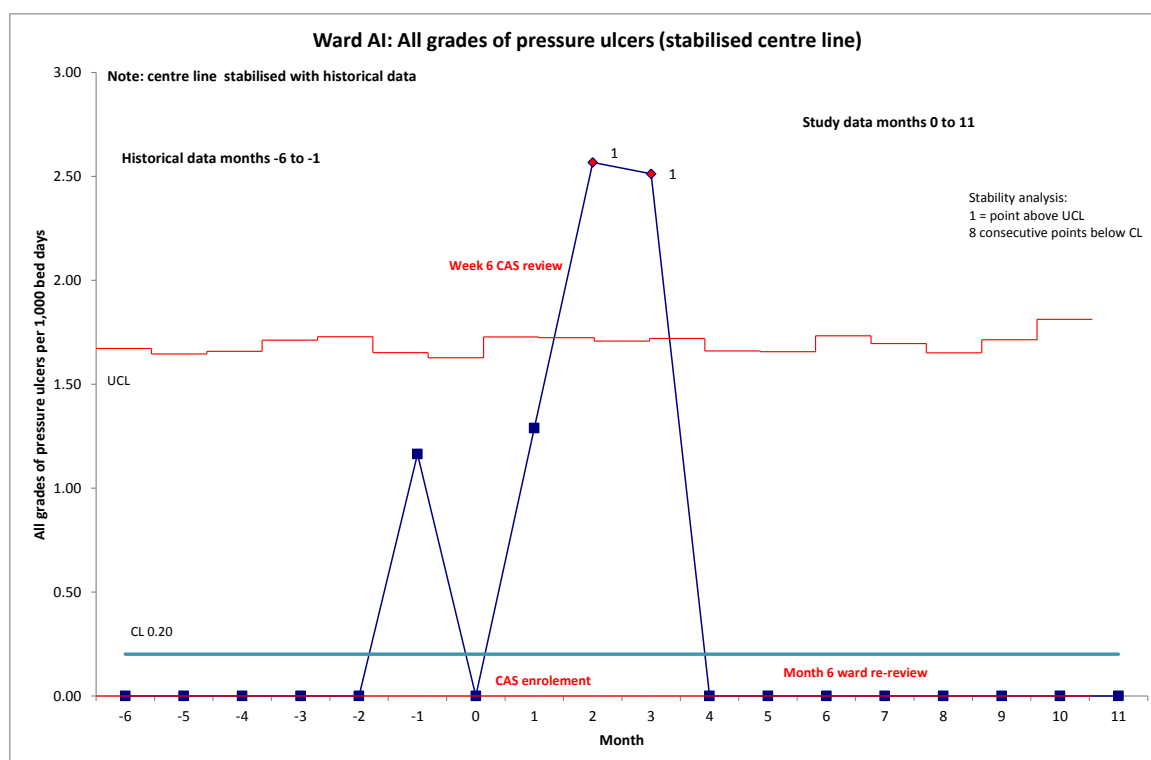
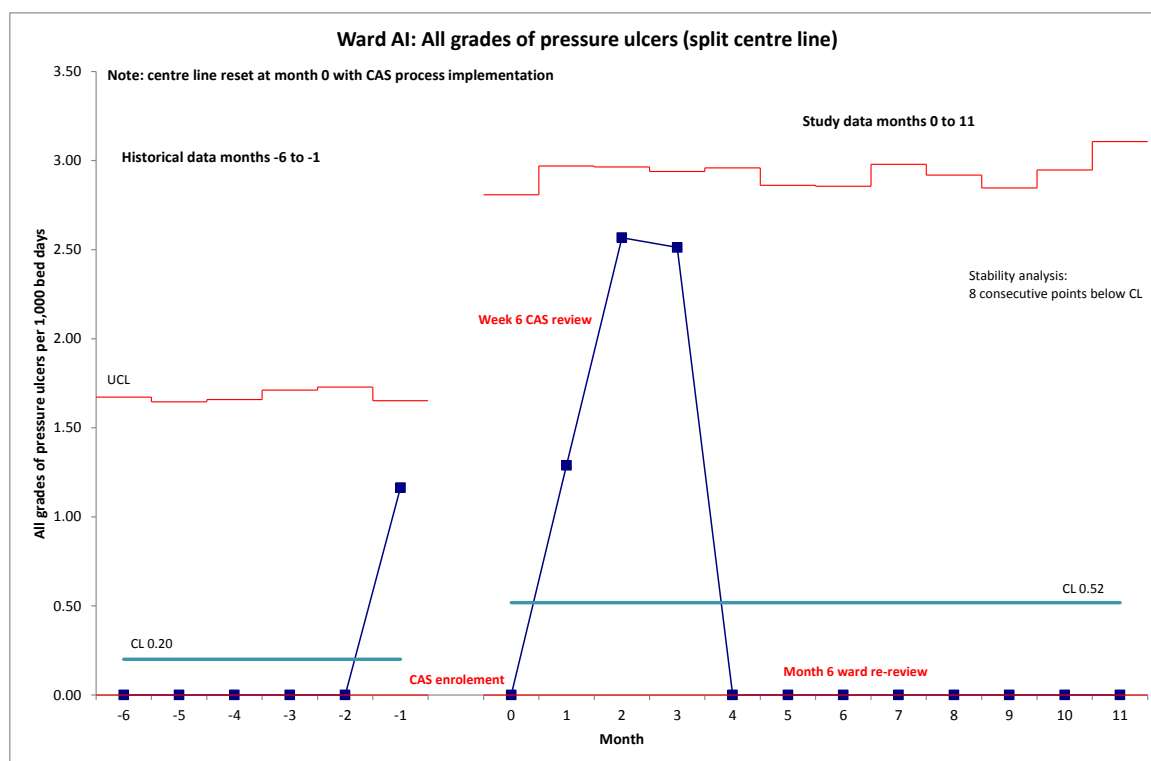
Appendix 36 – SPC charts for rates of pressure ulcers

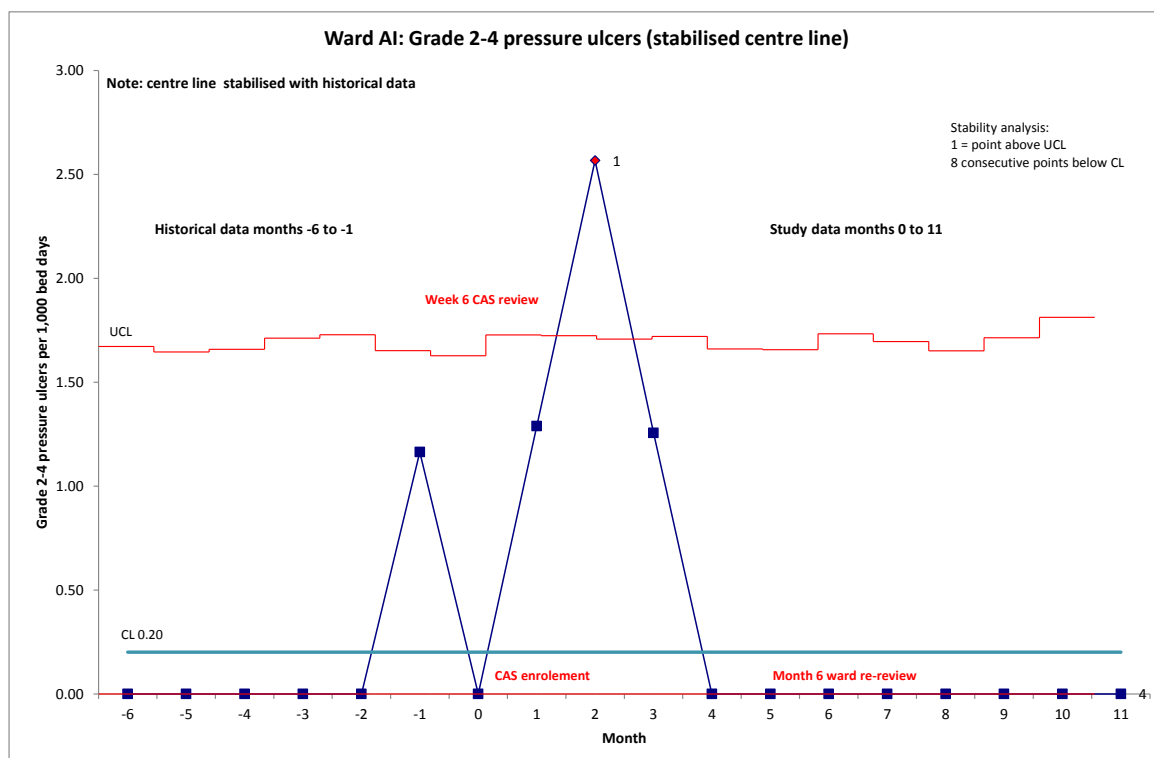
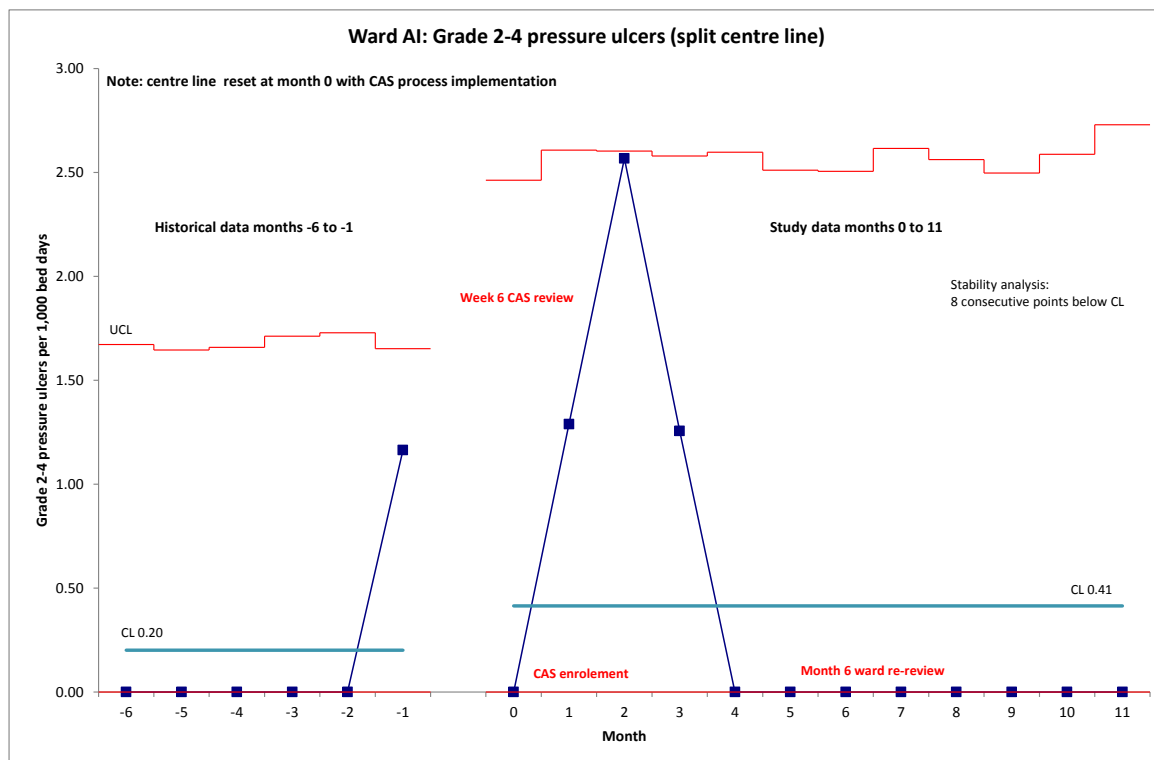
Ward A1: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	835	863	851	792	775	859
Grade						
1						
2						1 (1.16)
3						
4						
Total	0	0	0	0	0	1 (1.16)

Ward A1: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	889	776	779	796	783	849
Grade						
1				1 (1.26)		
2		1 (1.29)	1 (1.28)			
3				1 (1.26)		
4			1 (1.28)			
Total	0	1 (1.29)	2 (2.57)	2 (2.51)	0	0

Month	6	7	8	9	10	11
Occupied bed days	853	770	809	860	790	696
Grade						
1						
2						
3						
4						
Total	0	0	0	0	0	0

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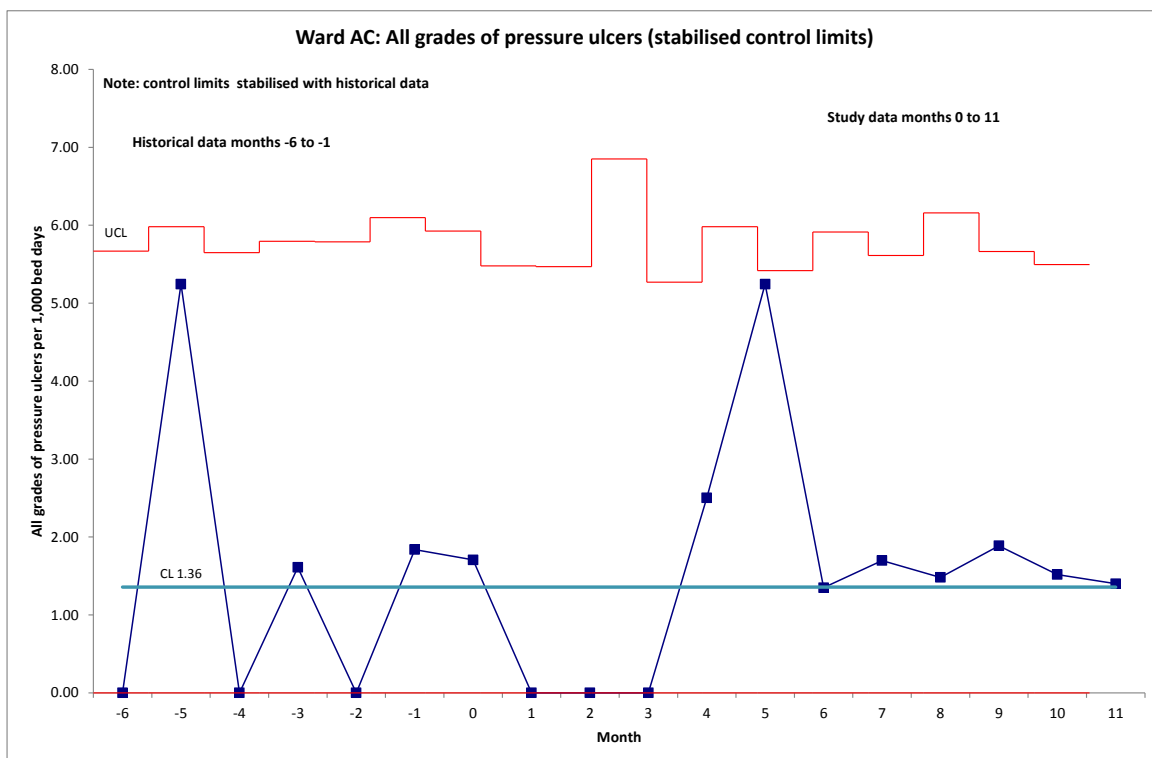
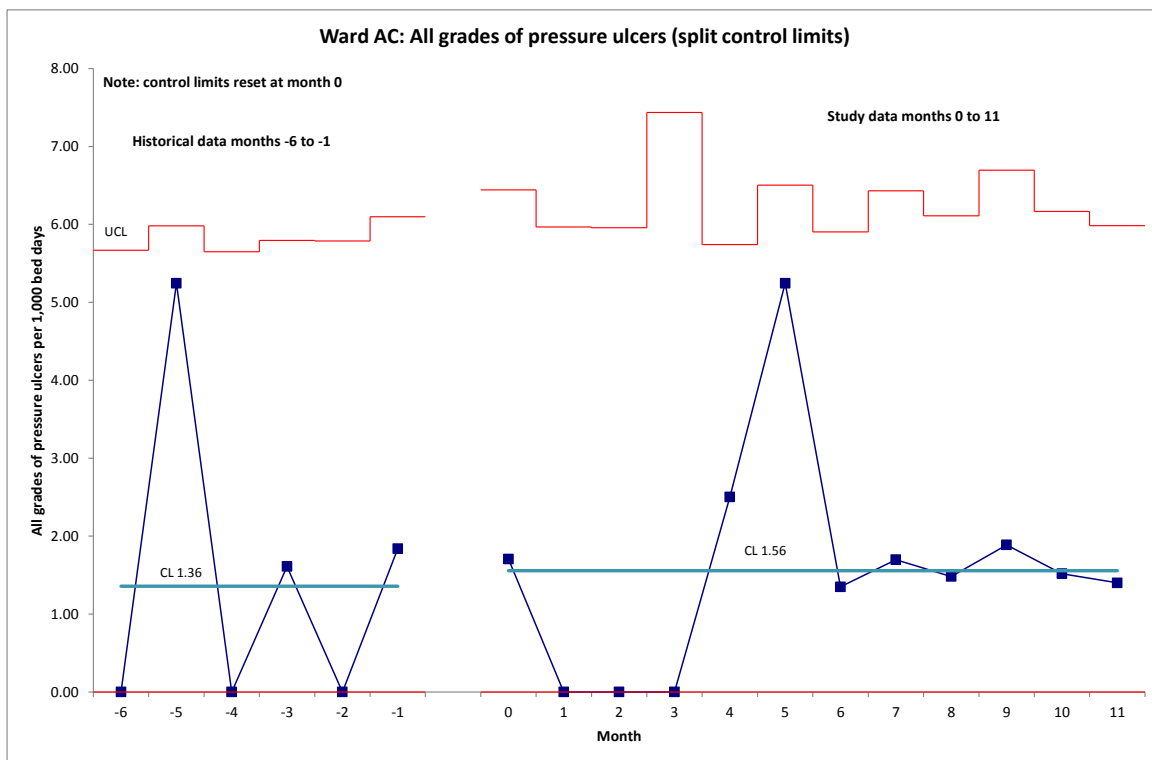
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Ward AC

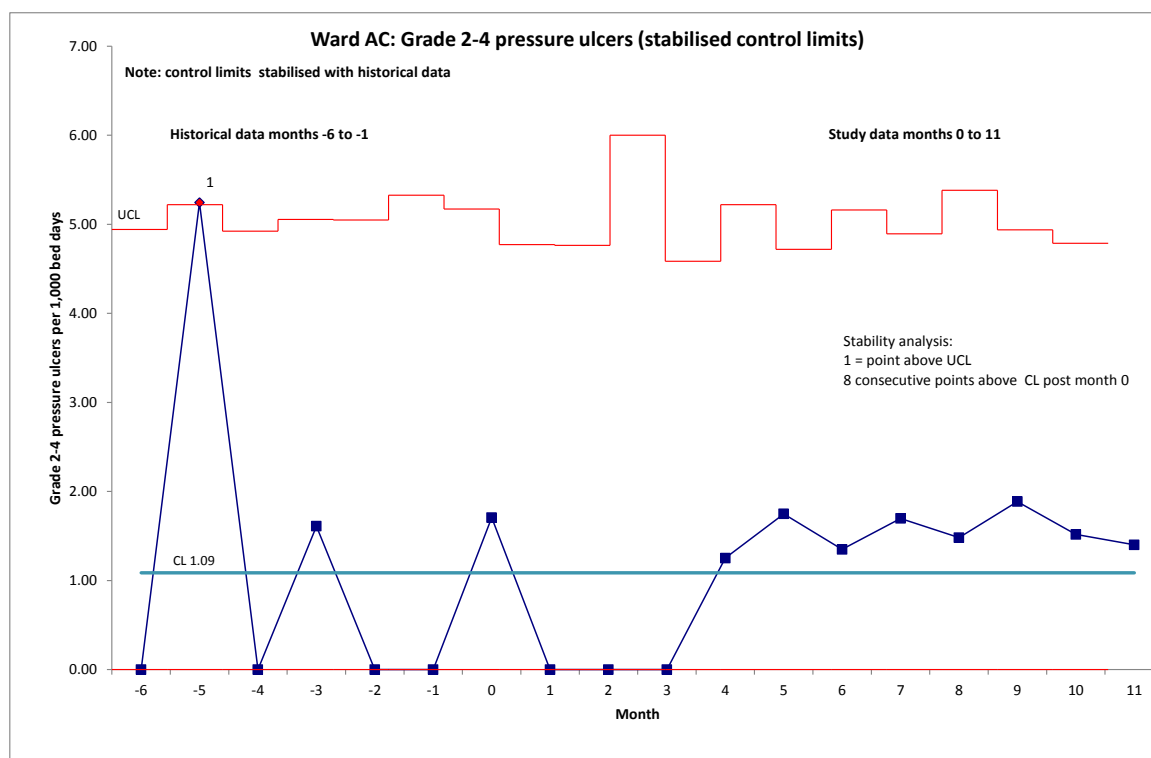
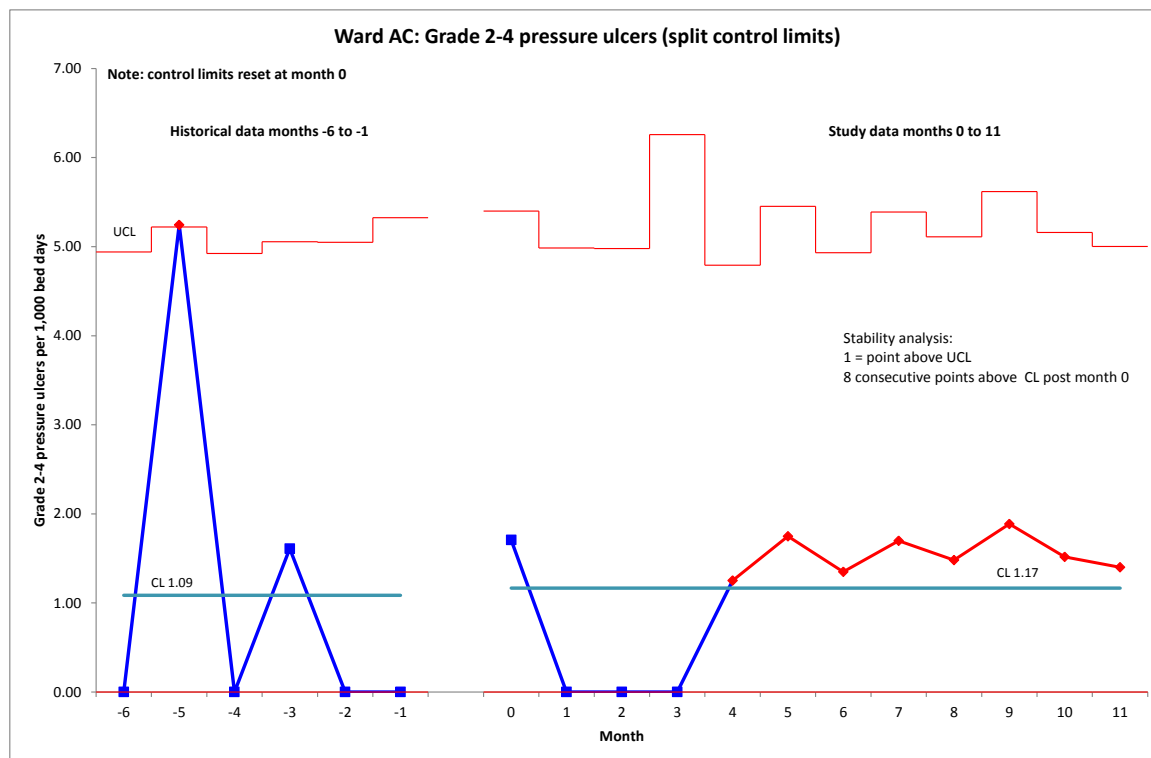
Ward AC: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	658	572	664	621	623	544
Grade						
1						1 (1.84)
2		1 (1.75)				
3		1 (1.75)		1 (1.61)		
4		1 (1.75)				
Total	0	3 (5.25)	0	1 (1.61)	0	1 (1.84)

Ward AC: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	586	720	723	405	799	572
Grade						
1					1 (1.25)	2 (3.50)
2					1 (1.25)	
3	1 (1.71)					1 (1.75)
4						
Total	1 (1.71)	0	0	0	2 (2.50)	3 (5.24)

Month	6	7	8	9	10	11
Occupied bed days	741	589	675	530	659	714
Grade						
1						
2			1 (1.48)			
3		1 (1.70)		1 (1.89)	1 (1.52)	1 (1.40)
4	1 (1.35)					
Total	1 (1.35)	1 (1.70)	1 (1.48)	1 (1.89)	1 (1.52)	1 (1.40)



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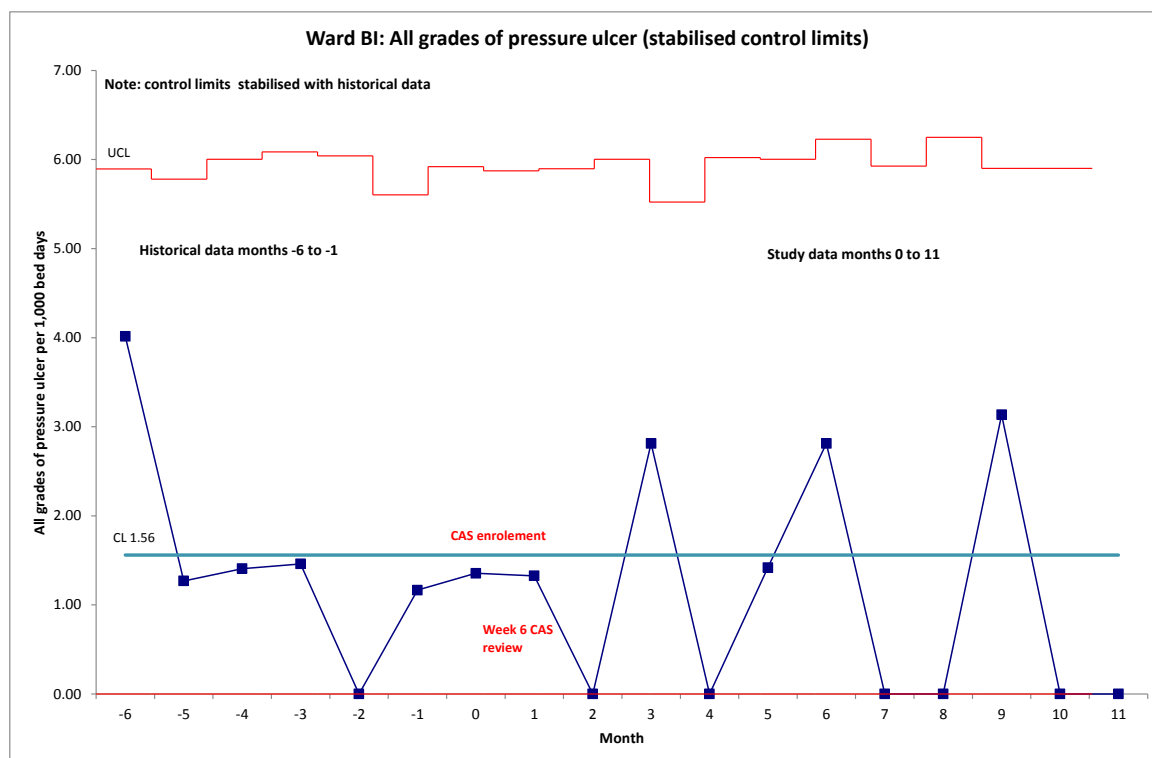
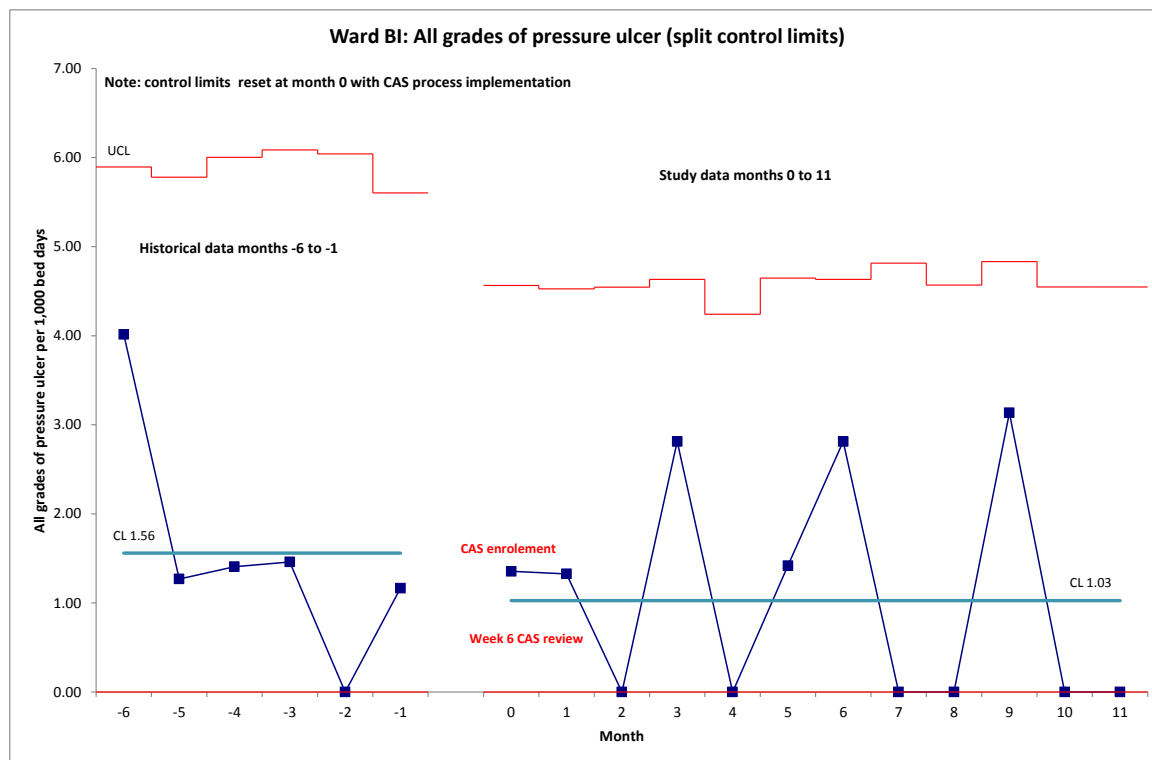
Ward BI

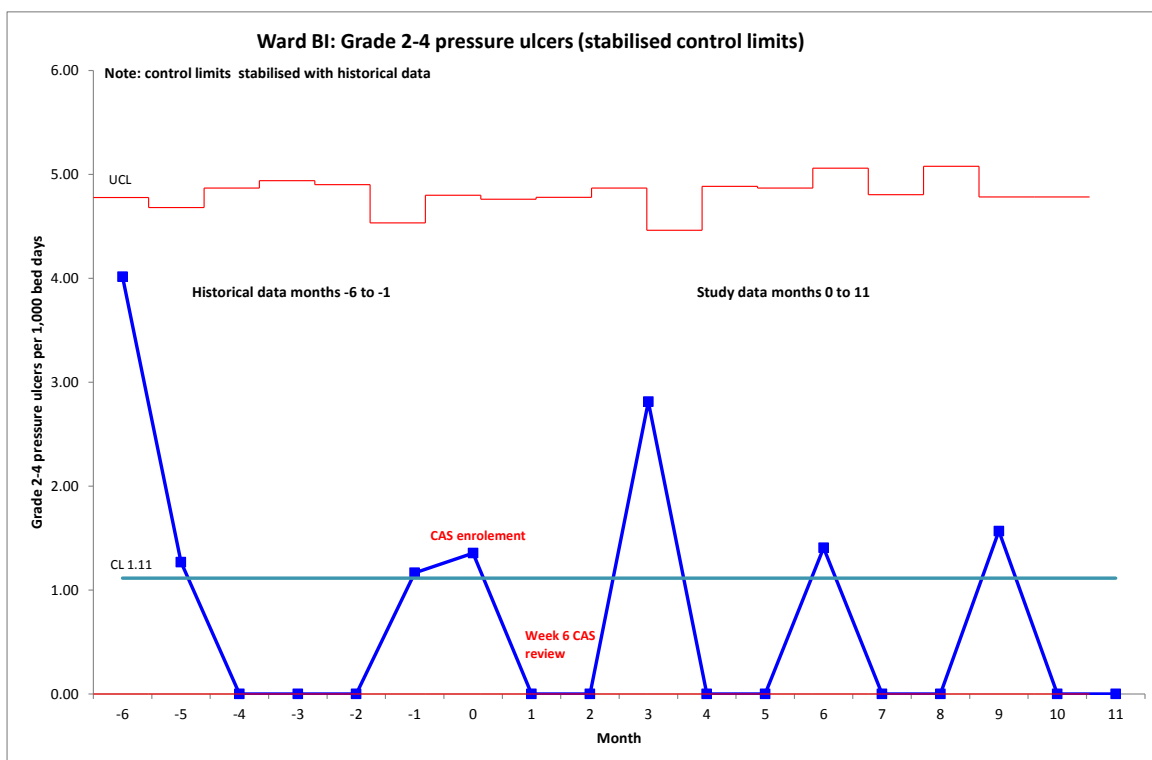
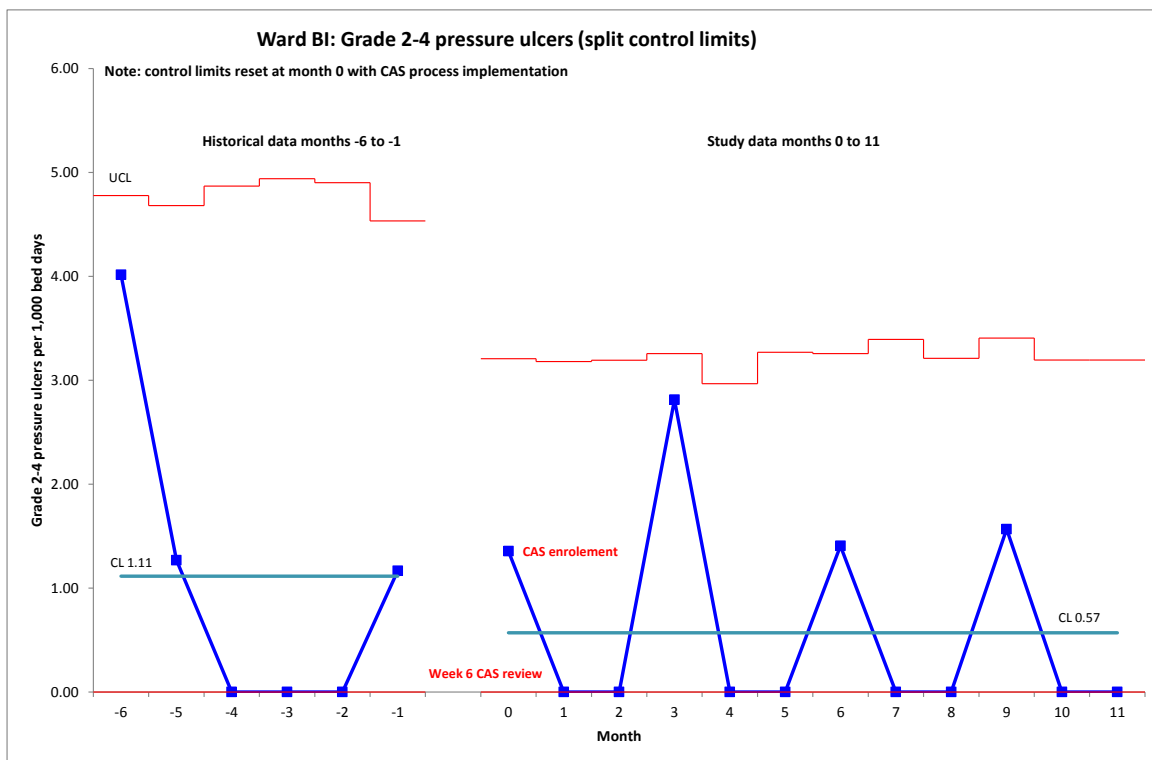
Ward BI: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	747	788	711	685	699	858
Grade						
1			1 (1.41)	1 (1.46)		
2	3 (4.02)	1 (1.27)				1 (1.17)
3						
4						
Total	3 (4.02)	1 (1.27)	1 (1.41)	1 (1.46)	0	1 (1.17)

Ward BI: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	738	754	746	711	894	705
Grade						
1		1 (1.33)				1 (1.42)
2	1 (1.36)			2 (2.81)		
3						
4						
Total	1 (1.36)	1 (1.33)	0	2 (2.81)	0	1 (1.42)

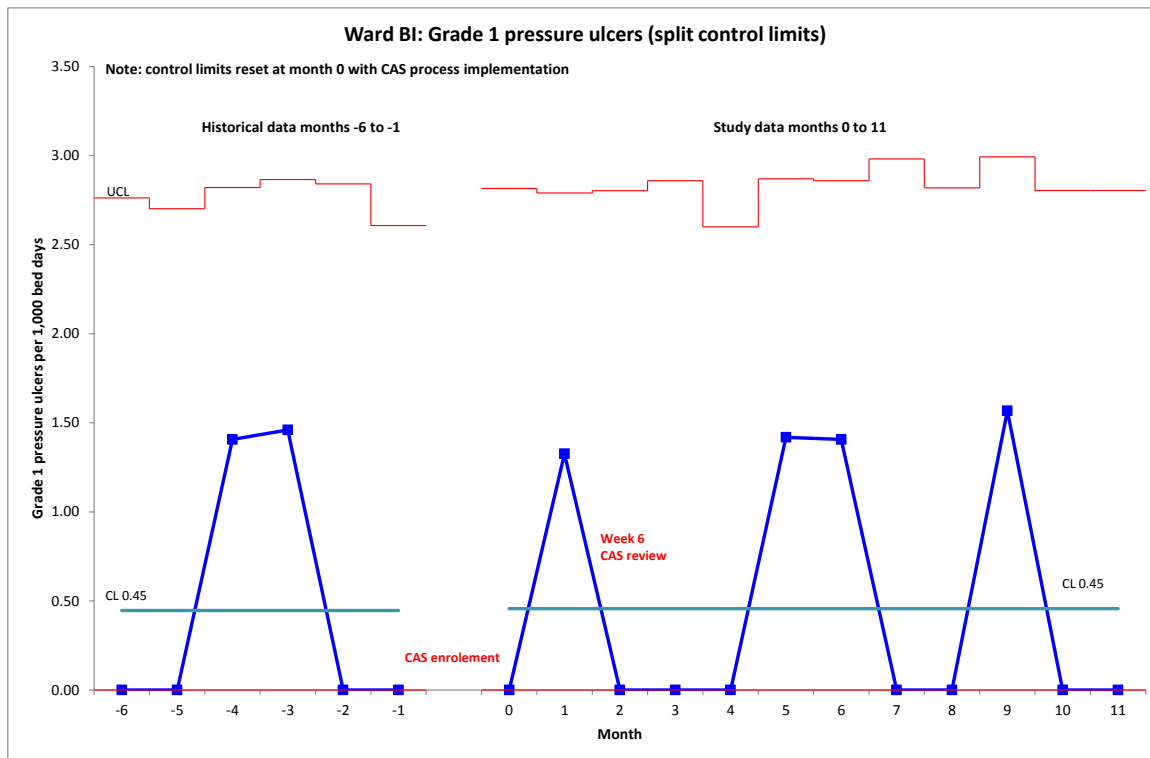
Month	6	7	8	9	10	11
Occupied bed days	711	644	736	638	745	745
Grade						
1	1 (1.41)			1 (1.57)		
2	1 (1.41)			1 (1.57)		
3						
4						
Total	2 (2.82)	0	0	2 (3.13)	0	0

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Note: split control limits unchanged before/after resetting therefore control chart with stabilised control limits not produced

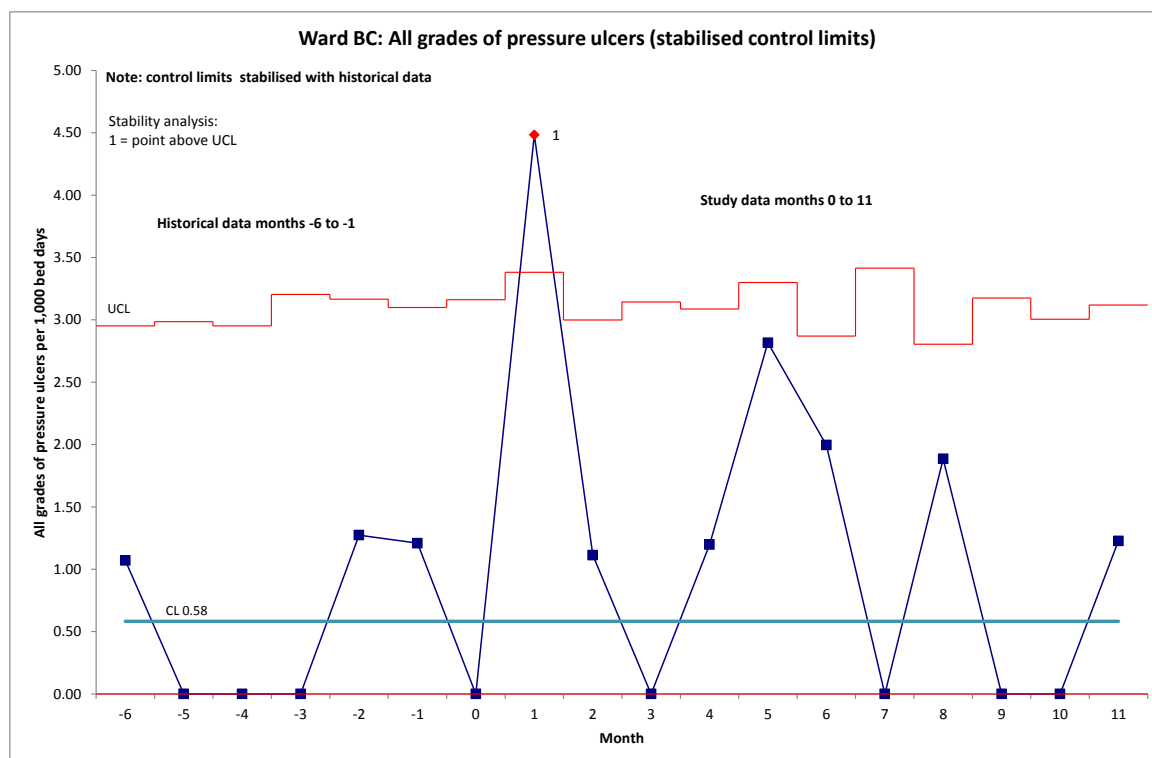
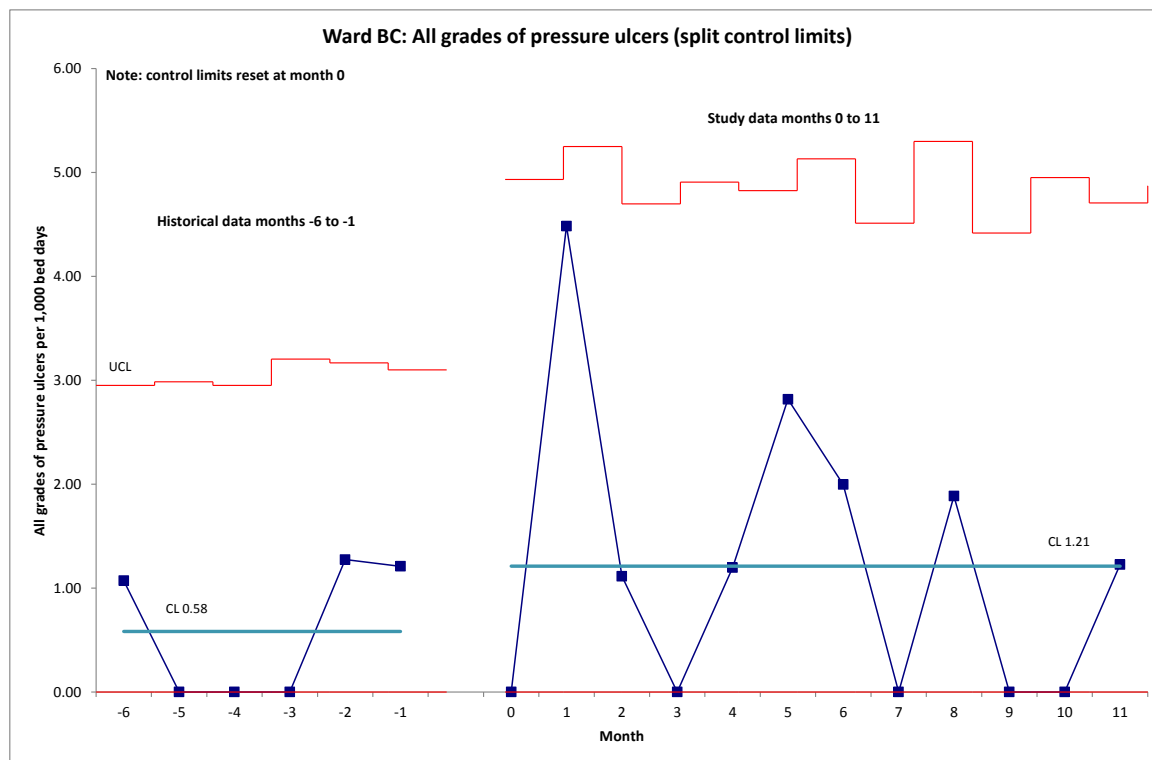
Ward BC

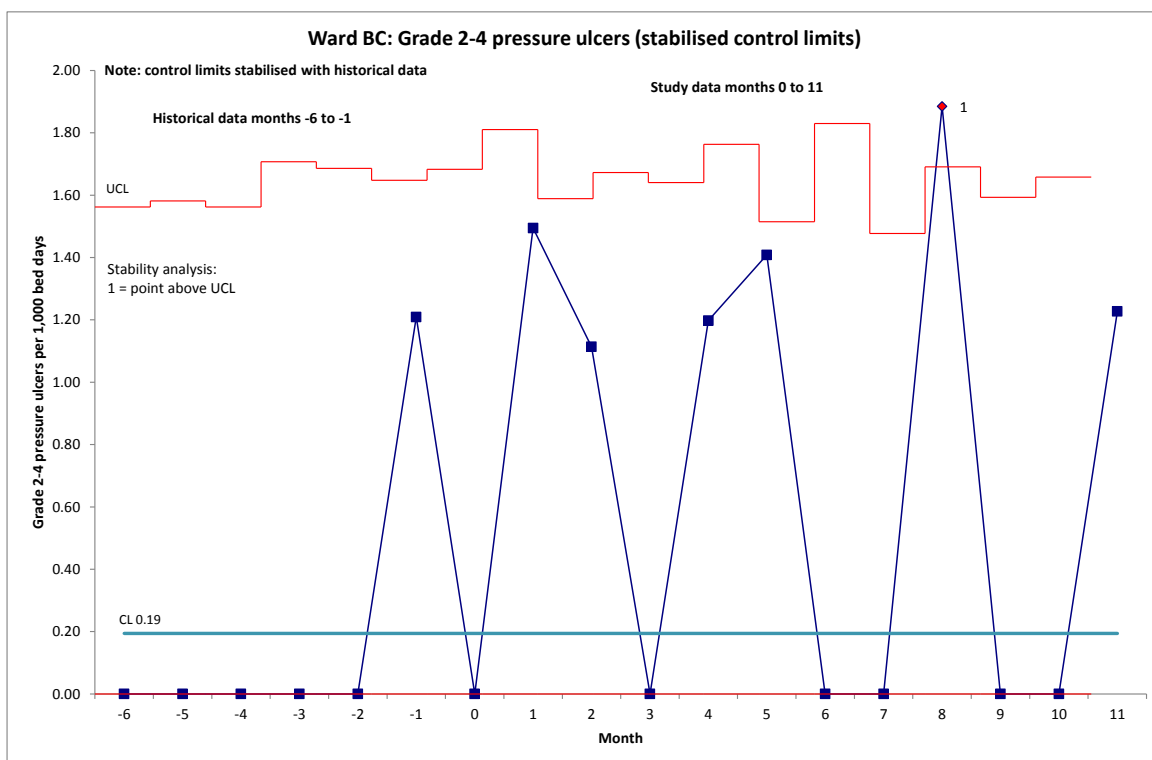
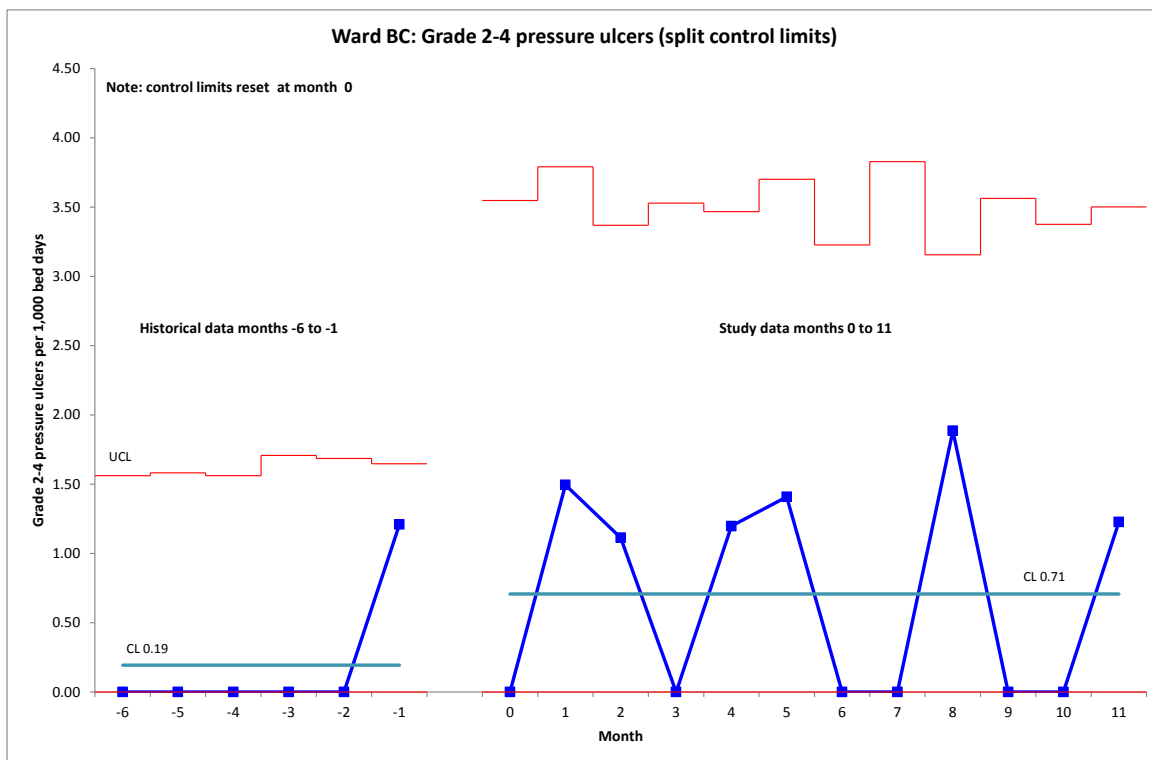
Ward BC: Number of pressure ulcers (rates per 1,00 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	934	908	934	763	785	827
Grade						
1	1 (1.07)				1 (1.27)	
2						1 (1.21)
3						
4						
Total	1 (1.07)	0	0	0	1 (1.27)	1 (1.21)

Ward BC: : Number of pressure ulcers (rates per 1,00 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	788	669	898	779	835	710
Grade						
1		2 (2.99)				1 (1.41)
2		1 (1.49)	1 (1.11)		1 (1.20)	1 (1.41)
3						
4						
Total	0	3 (4.48)	1 (1.11)	0	1 (1.20)	2 (2.82)

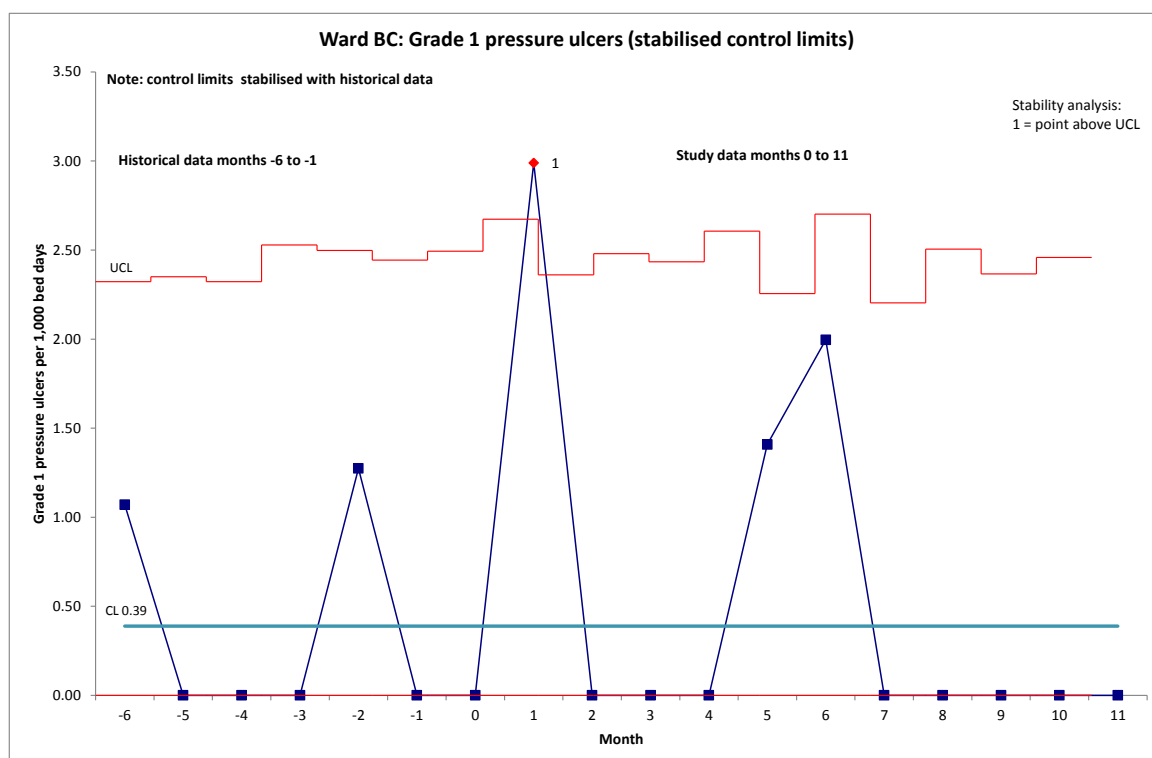
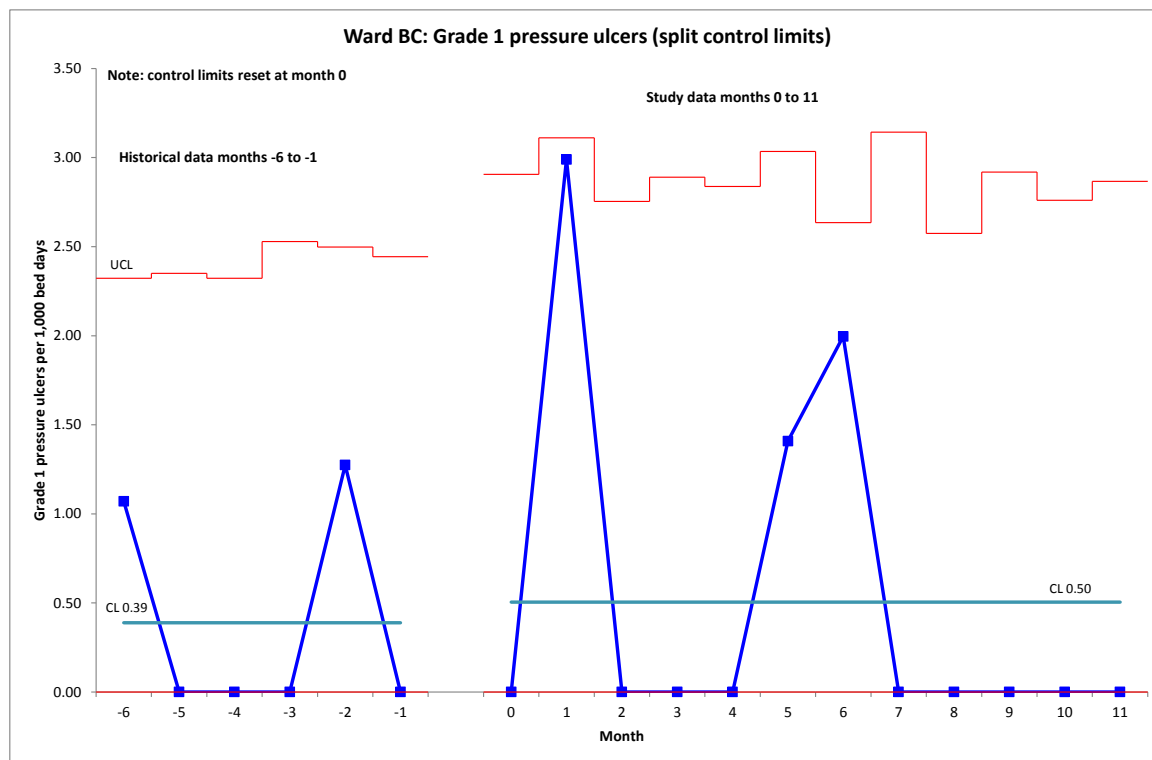
Month	6	7	8	9	10	11
Occupied bed days	1002	653	1061	780	893	815
Grade						
1	2 (2.00)					
2			1 (0.94)			1 (1.23)
3			1 (0.94)			
4						
Total	2 (2.00)	0	2 (1.89)	0	0	1 (1.23)

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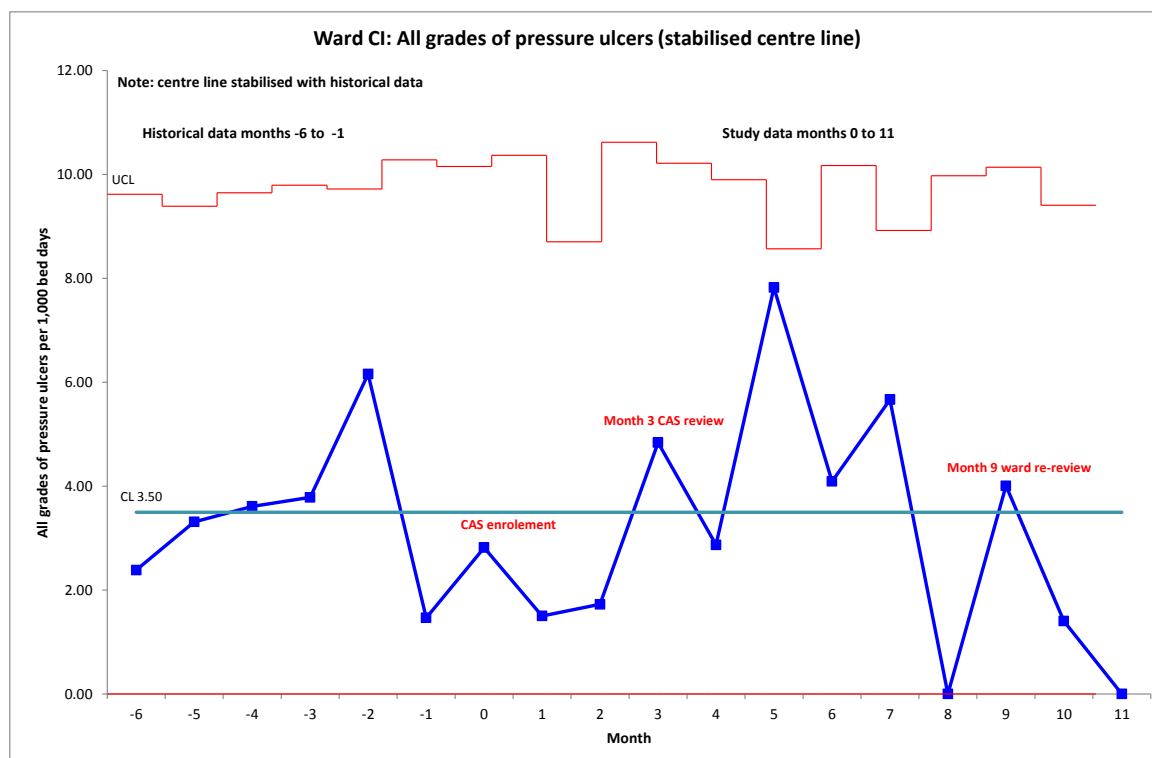
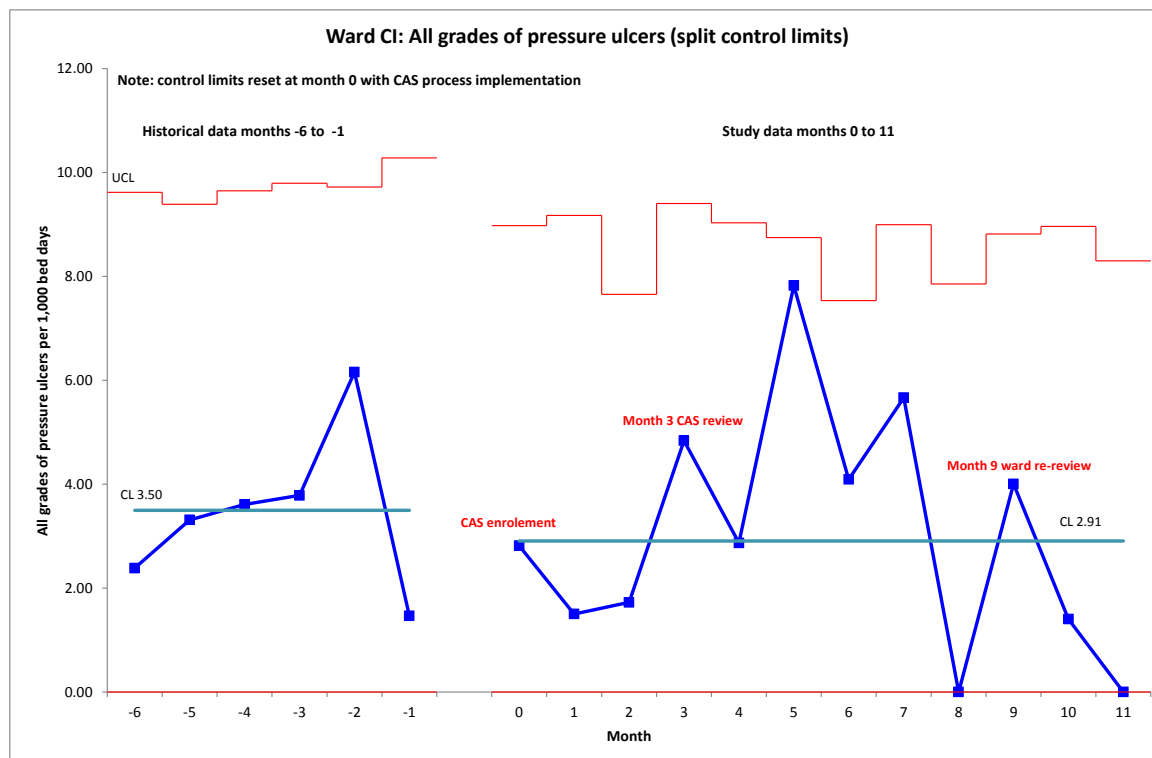
Ward CI

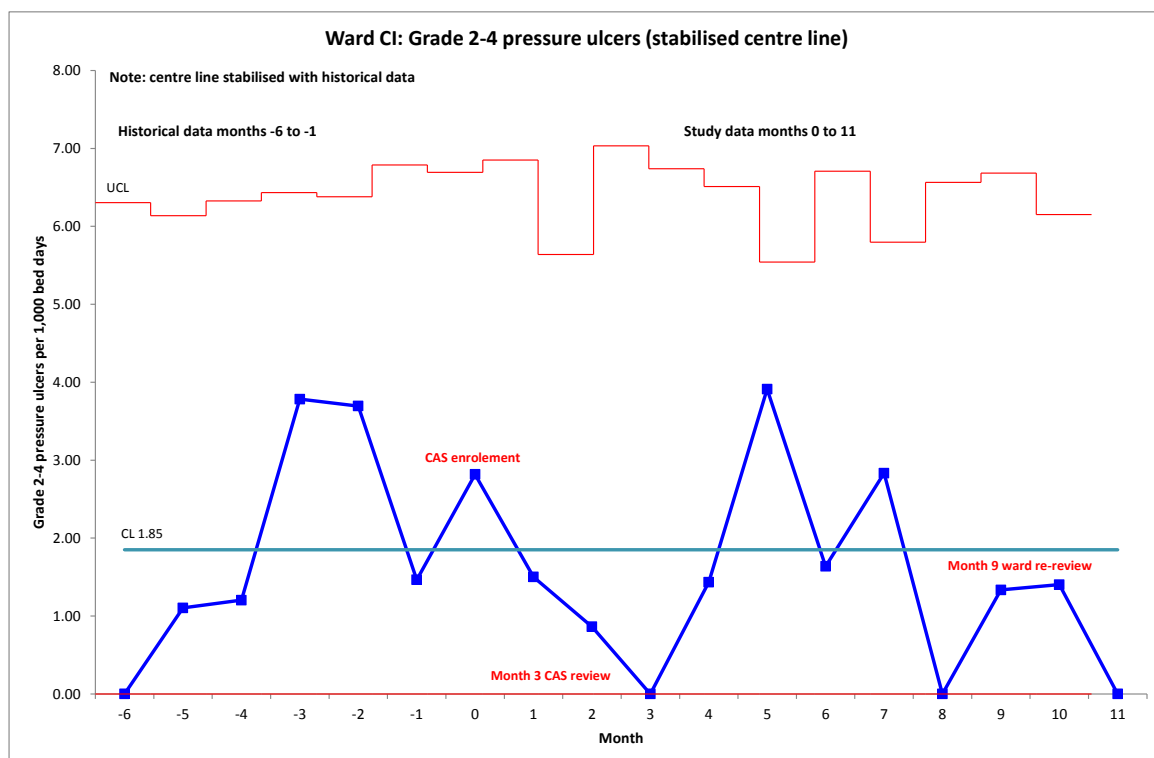
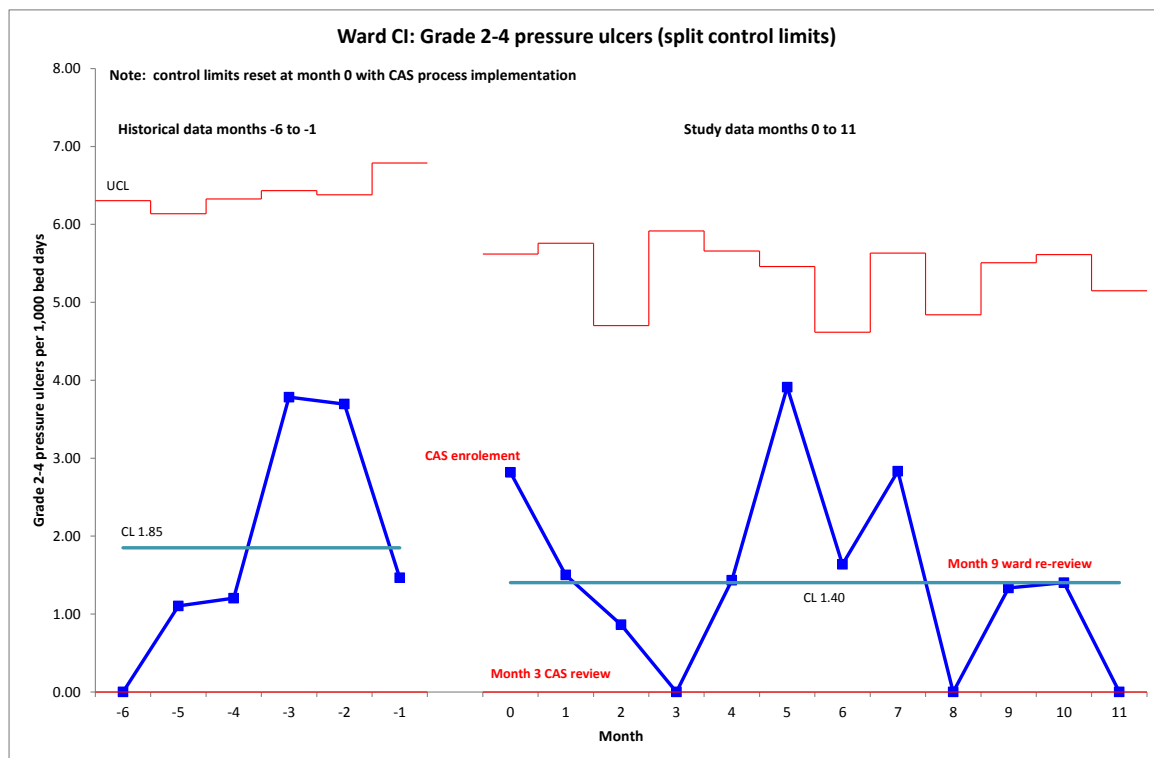
Ward CI: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	839	906	831	793	812	683
Grade						
1	2 (2.38)	2 (2.21)	2 (2.41)		2 (2.46)	
2		1 (1.10)	1 (1.20)	2 (2.52)	3 (3.69)	
3						
4				1 (1.26)		1 (1.46)
Total	2 (2.38)	3 (3.31)	3 (3.61)	3 (3.78)	5 (6.16)	1 (1.46)

Ward CI: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	710	666	1160	620	697	767
Grade						
1			1 (0.86)	3 (4.84)	1 (1.43)	3 (3.91)
2	1 (1.41)		1 (0.86)		1 (1.43)	2 (2.60)
3	1 (1.41)					1 (1.30)
4		1 (1.50)				
Total	2 (2.82)	1 (1.50)	2 (1.72)	3 (4.84)	2 (2.85)	6 (7.81)

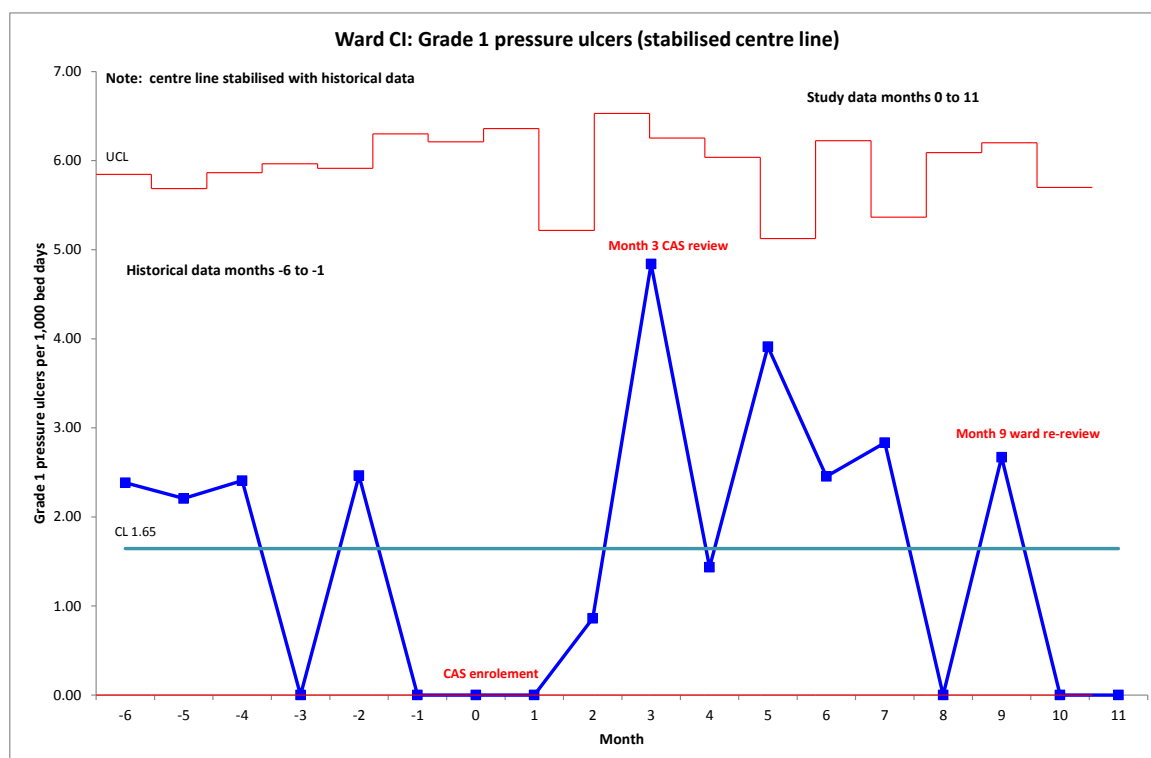
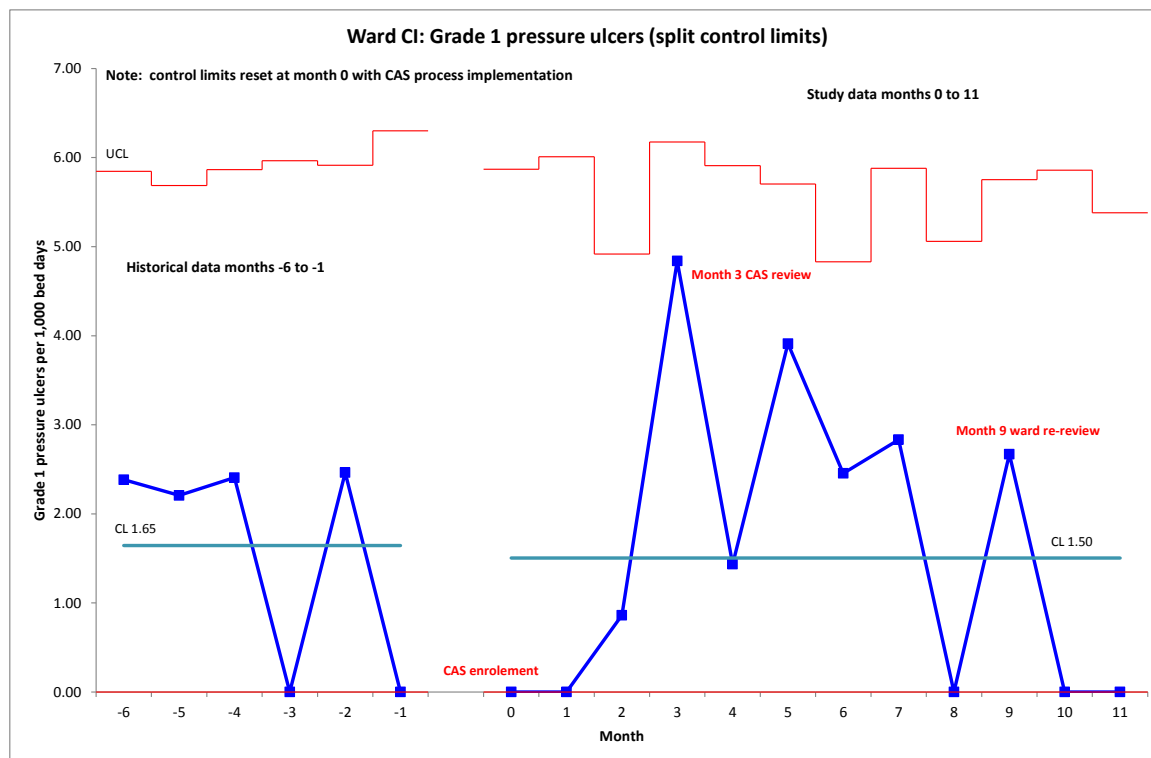
	6	7	8	9	10	11
	1222	706	1069	749	713	900
	3 (2.45)	2 (2.83)		2 (2.67)		
	2 (1.64)	2 (2.83)		1 (1.34)	1 (1.40)	
	5 (4.09)	4 (5.67)	0	3 (4.01)	1 (1.40)	0

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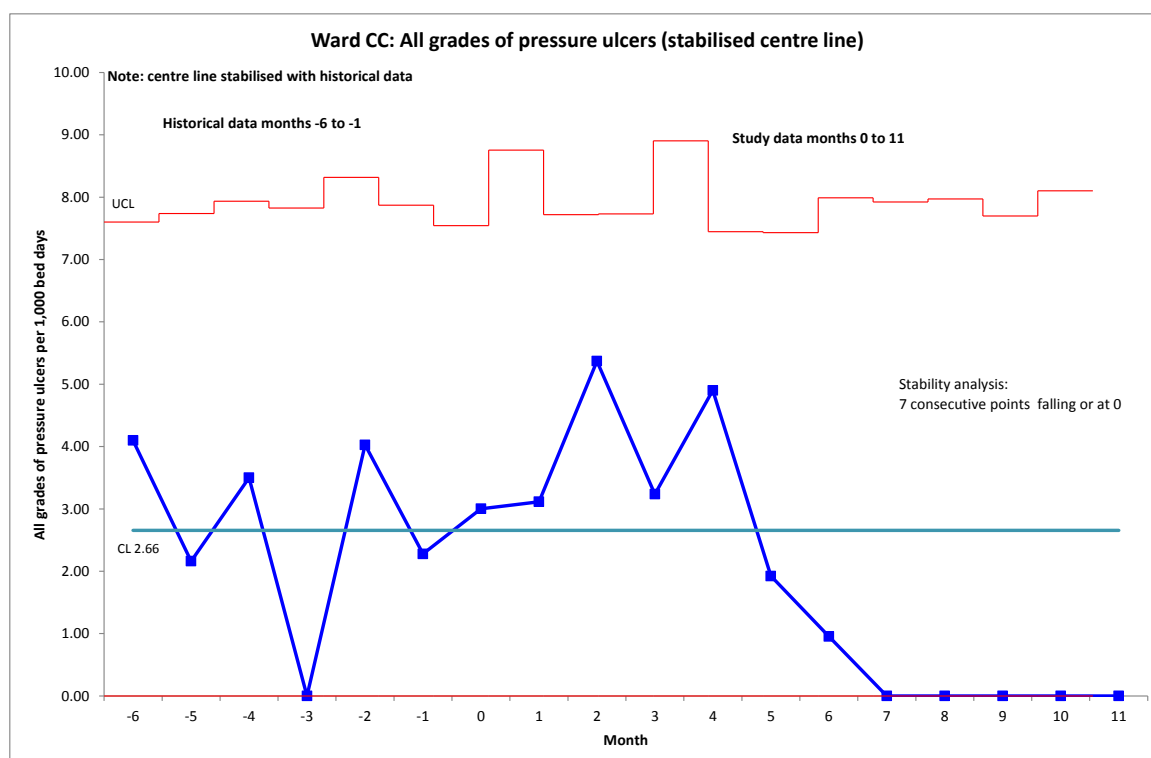
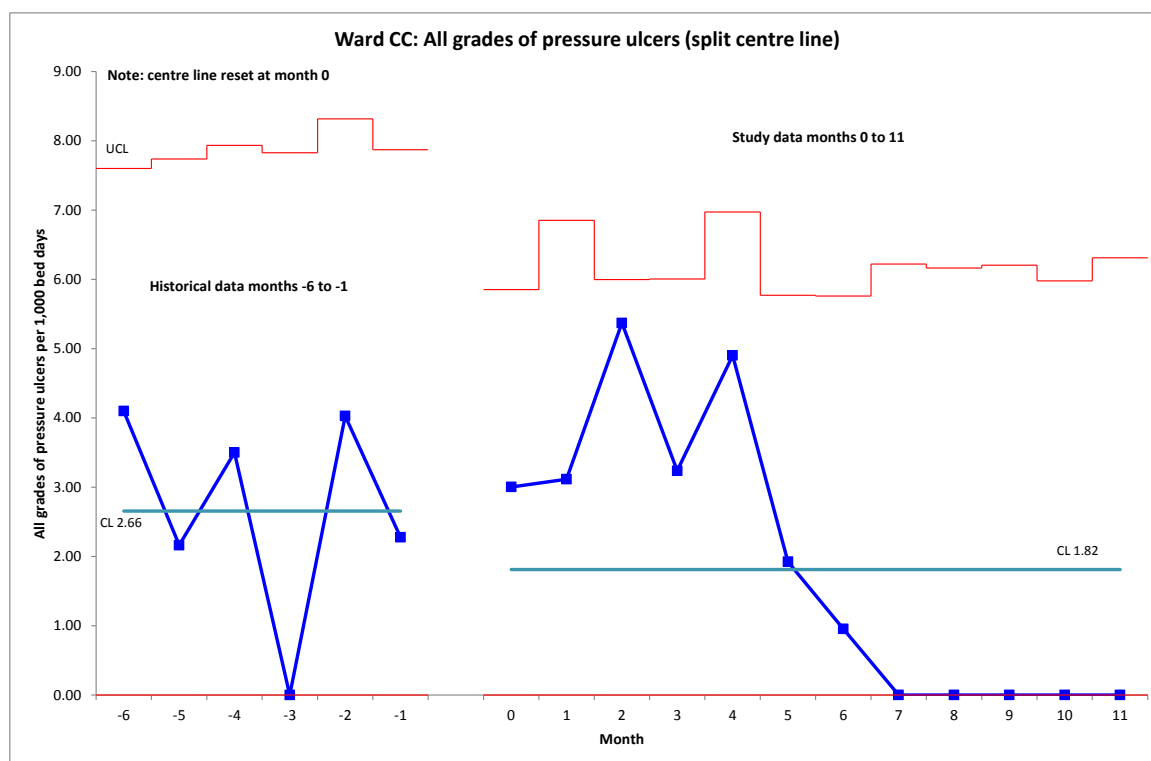
Ward CC

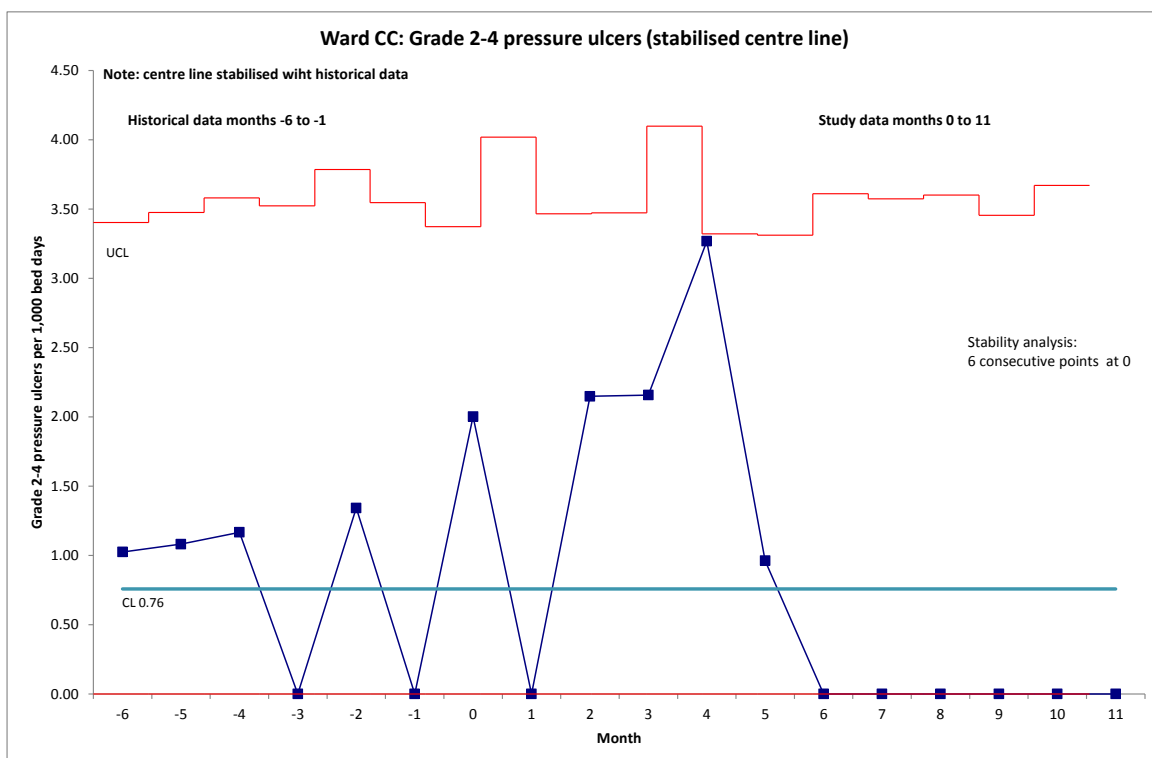
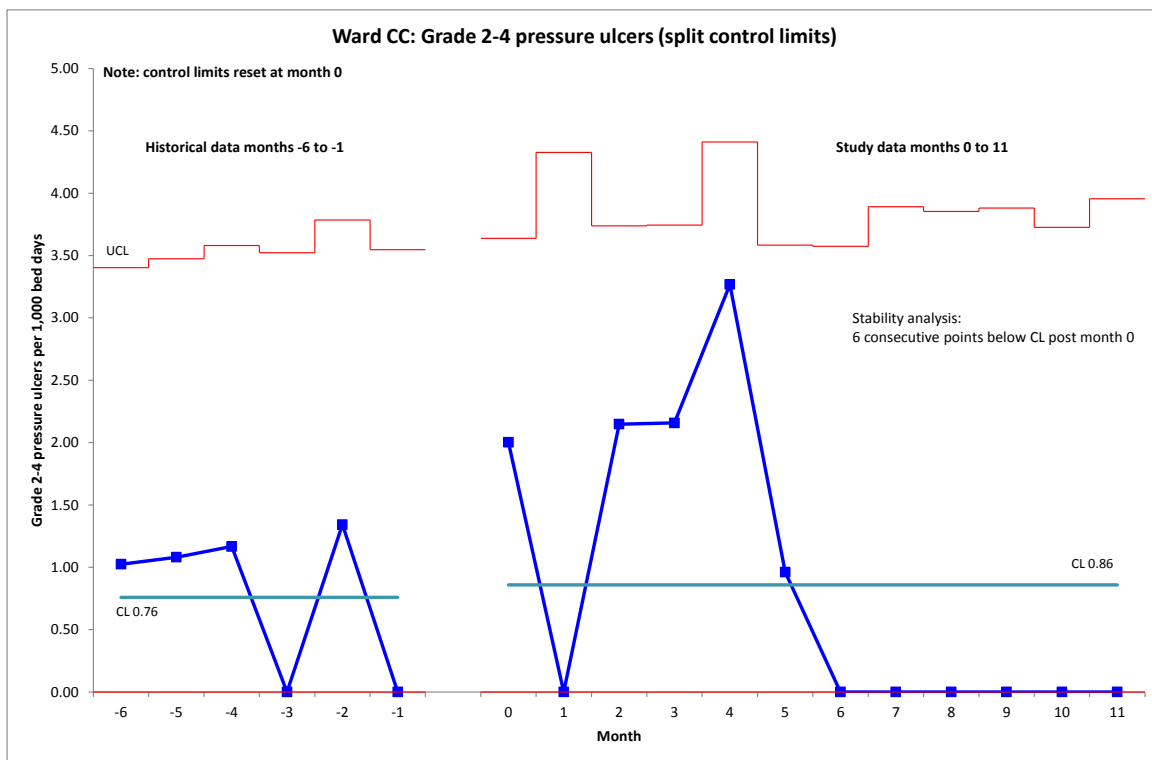
Ward CC: Number of pressure ulcers (rate per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	976	925	857	893	745	878
Grade						
1	3 (3.07)	1 (1.08)	2 (2.33)		2 (2.68)	2 (2.28)
2		1 (1.08)	1 (1.17)		1 (1.34)	
3	1 (1.02)					
4						
Total	4 (4.10)	2 (2.16)	3 (3.50)	0	3 (4.03)	2 (2.28)

Ward CC: Number of pressure ulcers (rate per 1,000 bed days) per month (historical data)						
Month	0	1	2	3	4	5
Occupied bed days	999	642	931	927	612	1040
Grade						
1	1 (1.00)	2 (3.12)	3 (3.22)	1 (1.08)	1 (1.63)	1 (0.96)
2	1 (1.00)		2 (2.15)	1 (1.08)	1 (1.63)	1 (0.96)
3	1 (1.00)			1 (1.08)		
4					1 (1.63)	
Total	3 (3.00)	2 (3.12)	5 (5.37)	3 (3.24)	3 (4.90)	2 (1.91)

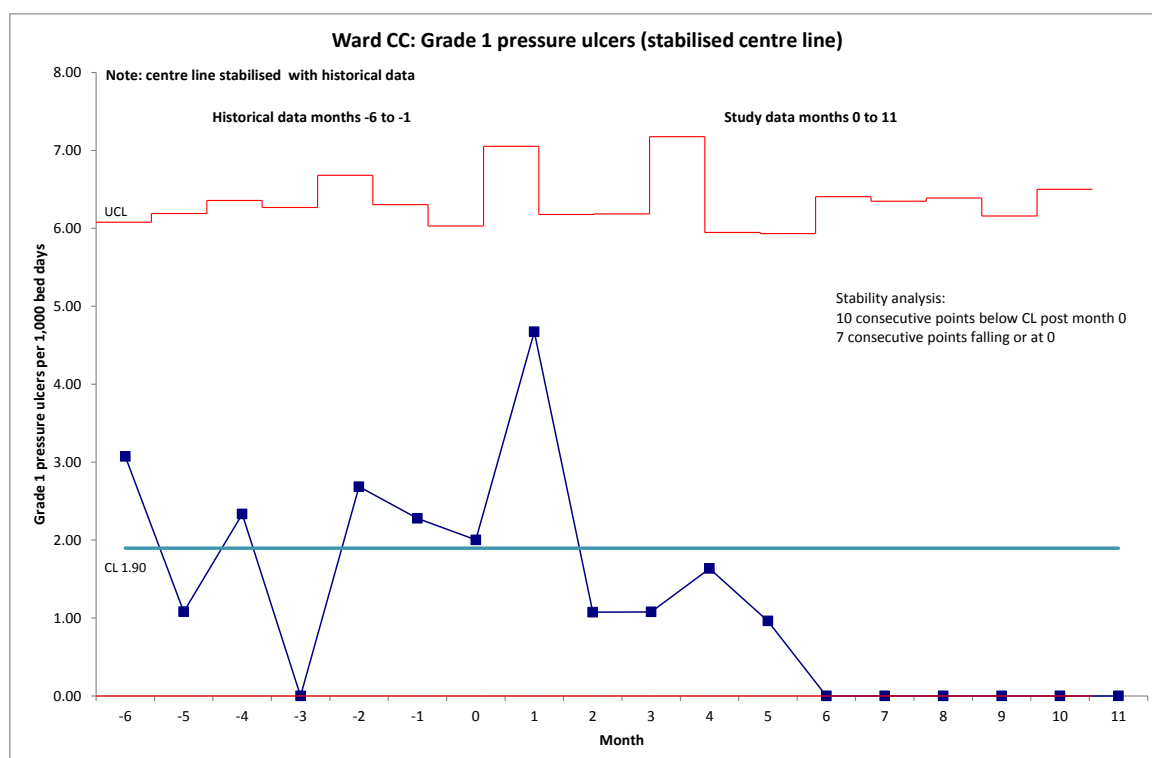
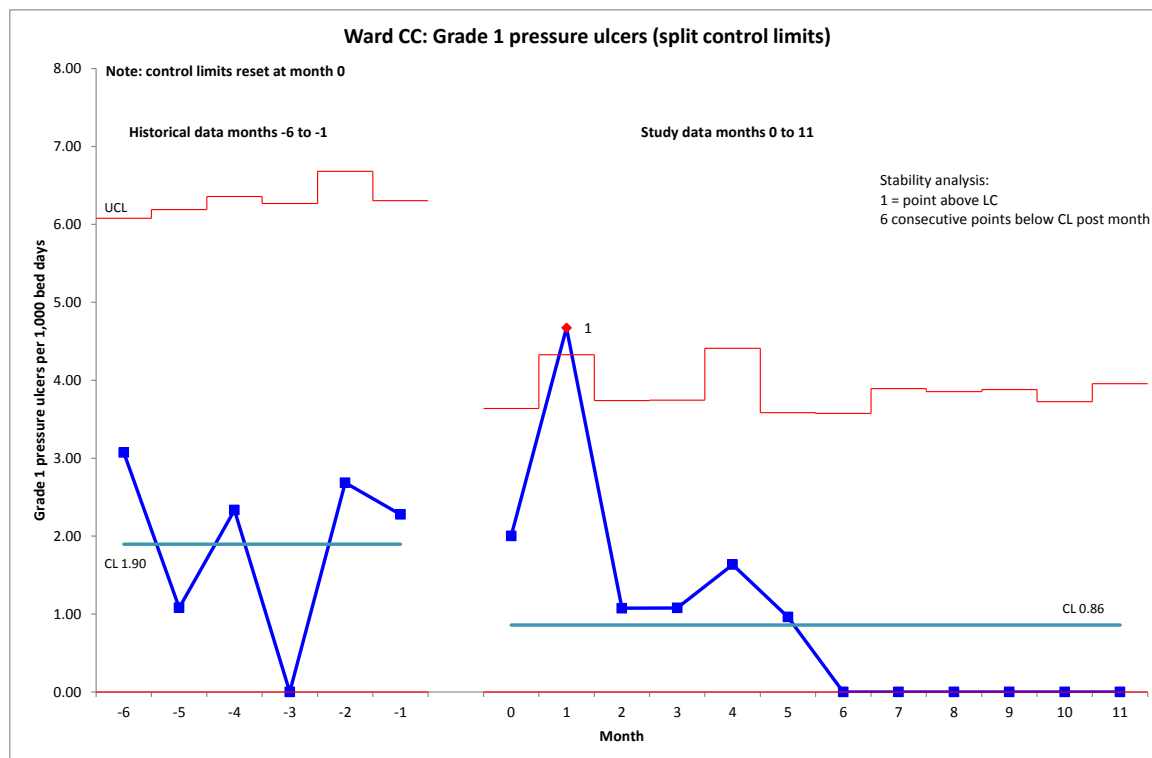
Month	6	7	8	9	10	11
Occupied bed days	1047	839	861	845	939	805
Grade						
1	1 (0.95)					
2						
3						
4						
Total	1 (0.95)	0	0	0	0	0

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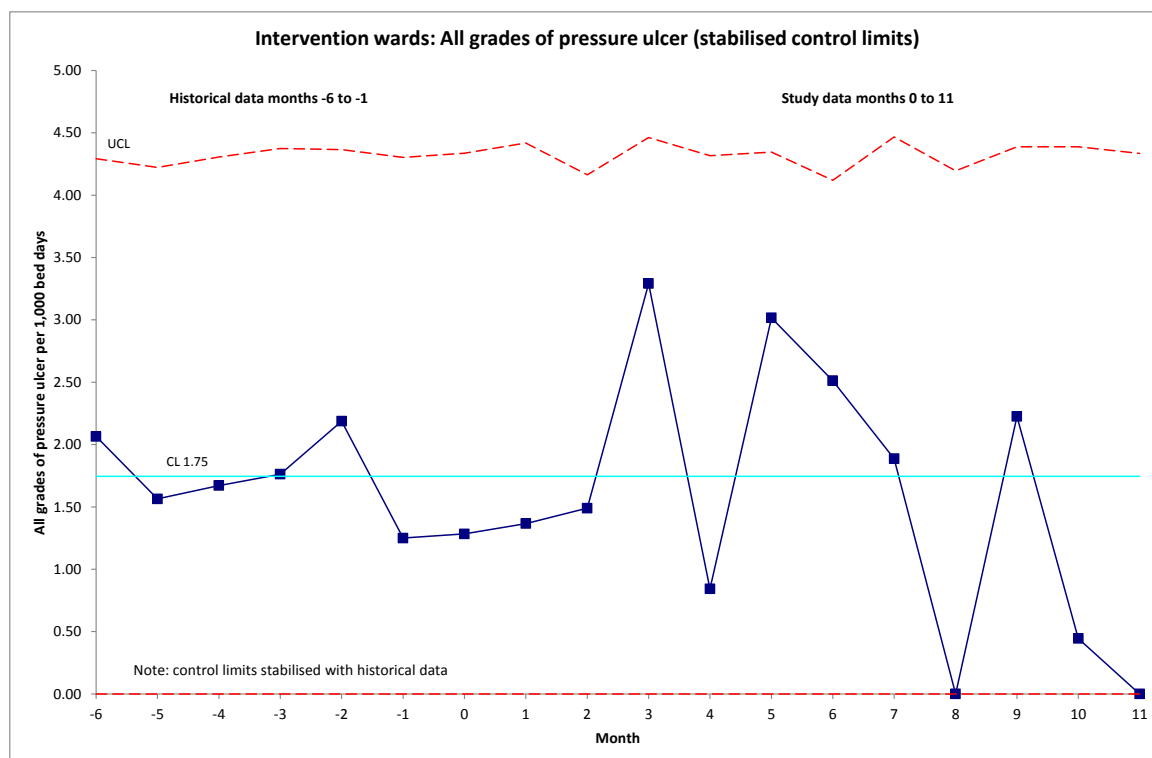
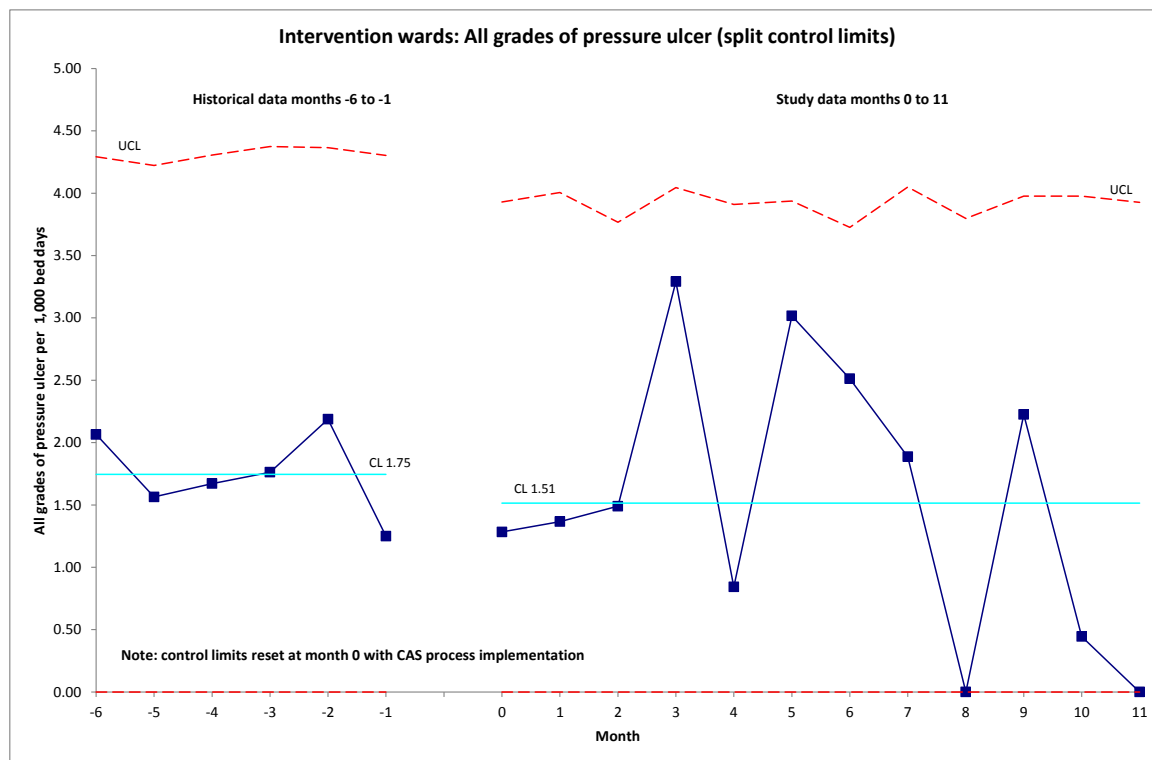
Intervention wards

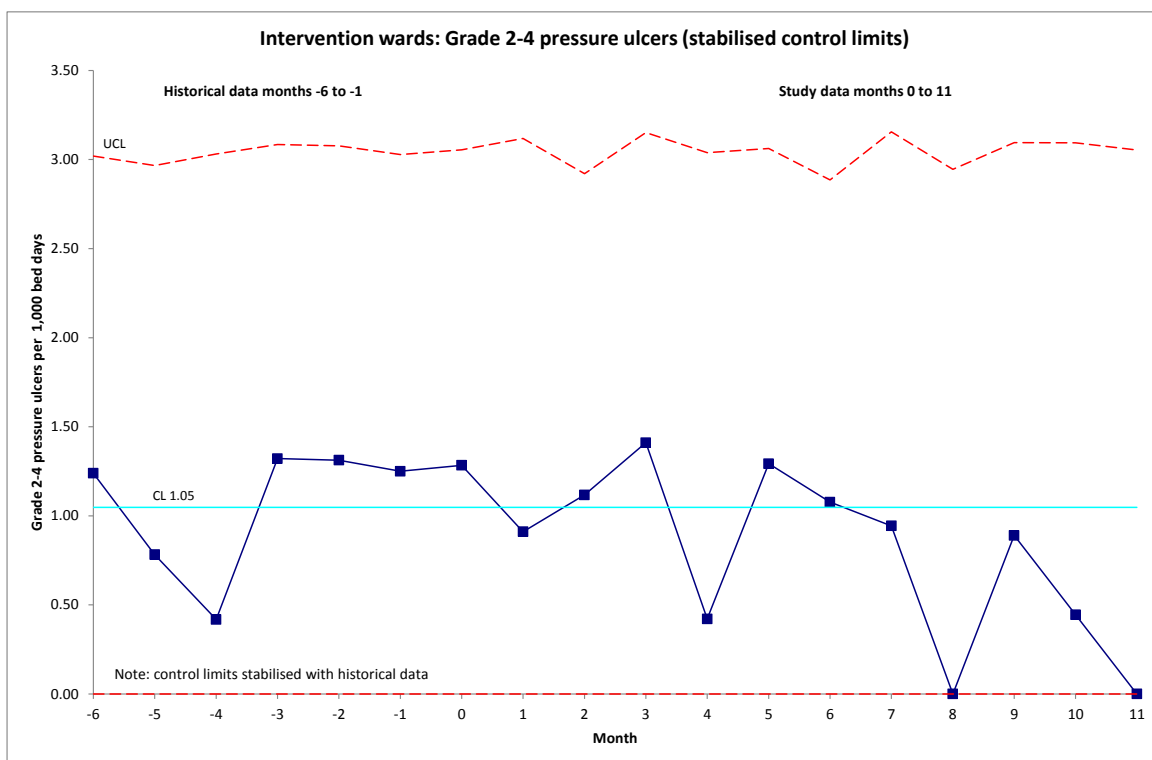
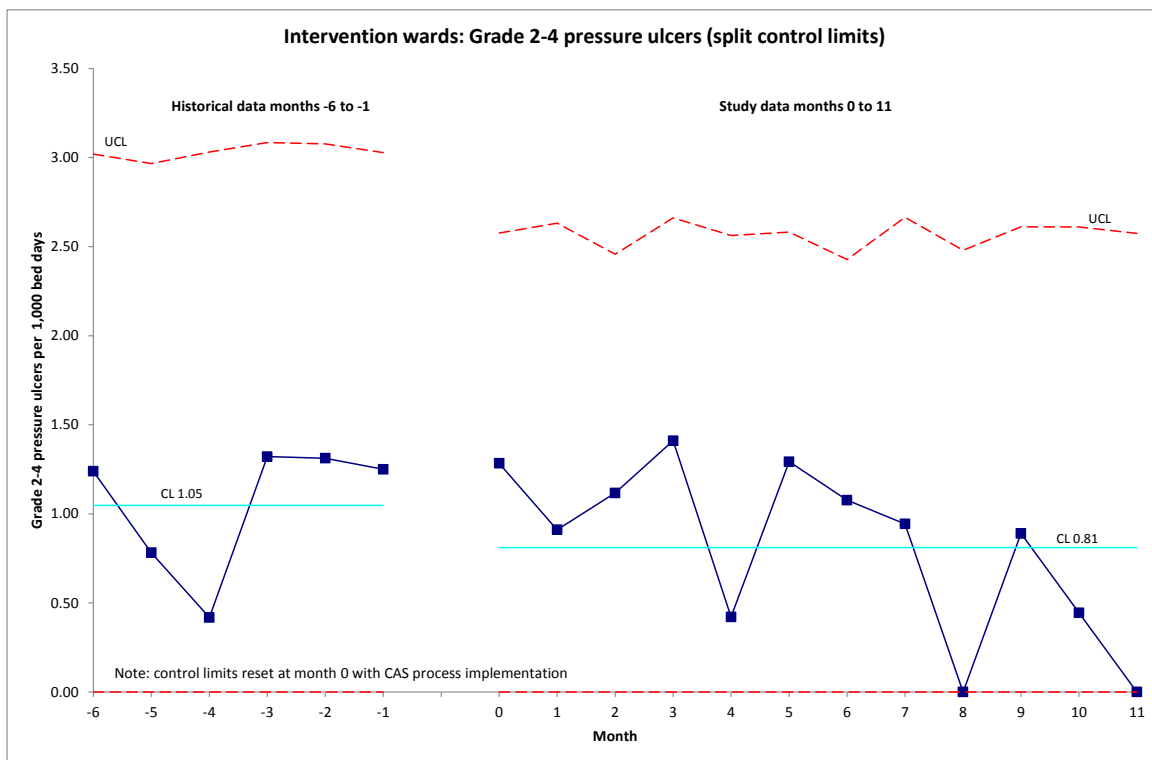
Intervention wards: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	2,421	2,557	2,393	2,270	2,286	2,400
Grade						
1	2 (0.83)	2 (0.78)	3 (1.25)	1 (0.44)	2 (0.87)	
2	3 (1.24)	2 (0.78)	1 (0.04)	2 (0.88)	3 (1.31)	2 (0.83)
3						
4				1 (0.44)		1 (0.42)
Total	5 (2.07)	4 (1.56)	4 (1.67)	4 (1.76)	5 (2.19)	3 (1.25)

Intervention wards: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	2,337	2,196	2,685	2,127	2,374	2,321
Grade						
1		1 (0.46)	1 (0.37)	4 (1.88)	1 (0.42)	4 (1.72)
2	2 (0.86)	1 (0.46)	2 (0.74)	2 (0.94)	1 (0.42)	2 (0.86)
3	1 (0.43)			1 (0.47)		1 (0.43)
4		1 (0.46)	1 (0.37)			
Total	3 (1.28)	3 (1.37)	4 (1.49)	7 (3.29)	2 (0.84)	7 (3.02)

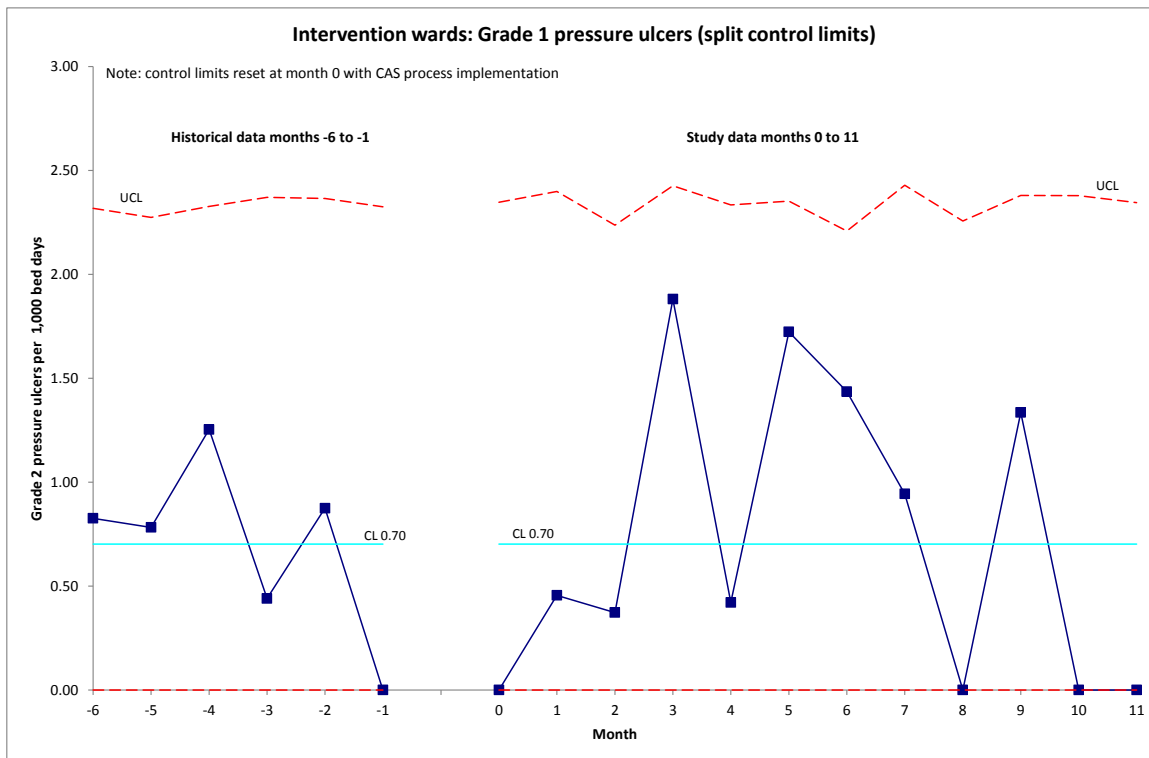
Month	6	7	8	9	10	11
Occupied bed days	2,786	2,120	2,614	2,247	2,248	2,341
Grade						
1	4 (1.44)	2 (0.94)		3 (1.34)		
2	3 (1.08)	2 (0.94)		2 (0.89)	1 (0.44)	
3						
4						
Total	7 (2.51)	4 (1.89)		5 (2.23)	1 (0.44)	

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Note: centre line unchanged with process implementation therefore chart with stabilised centre line not produced

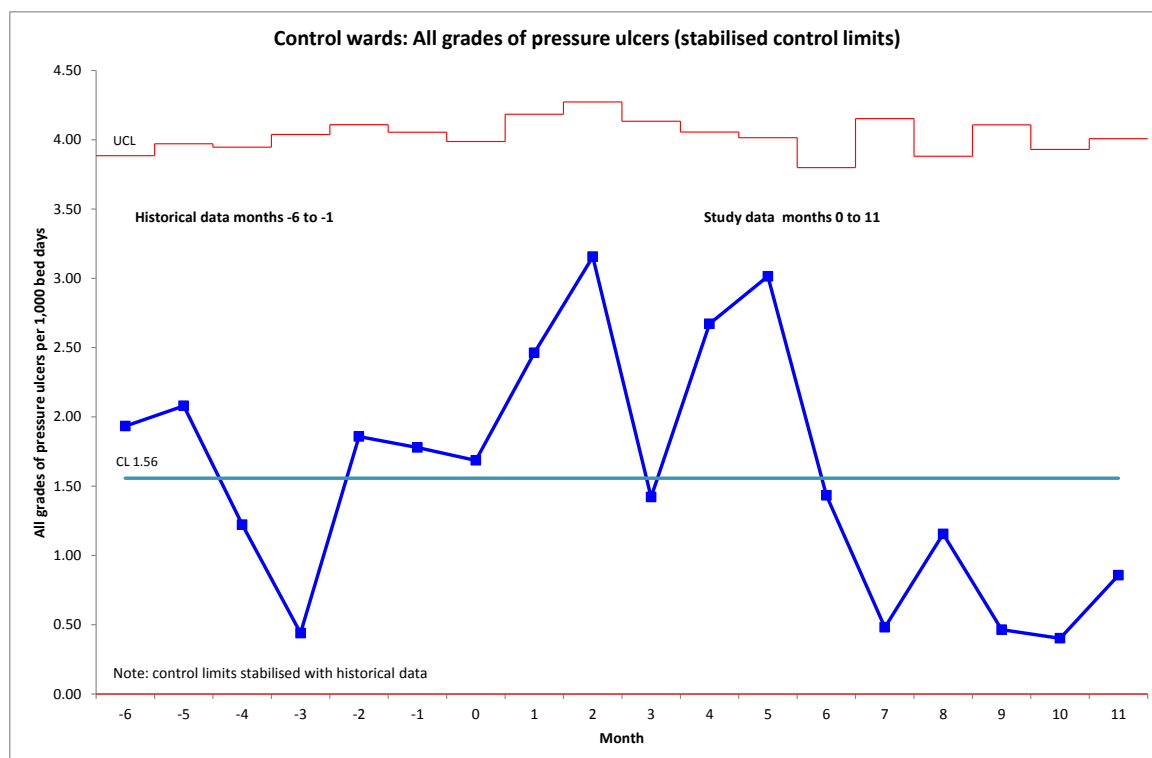
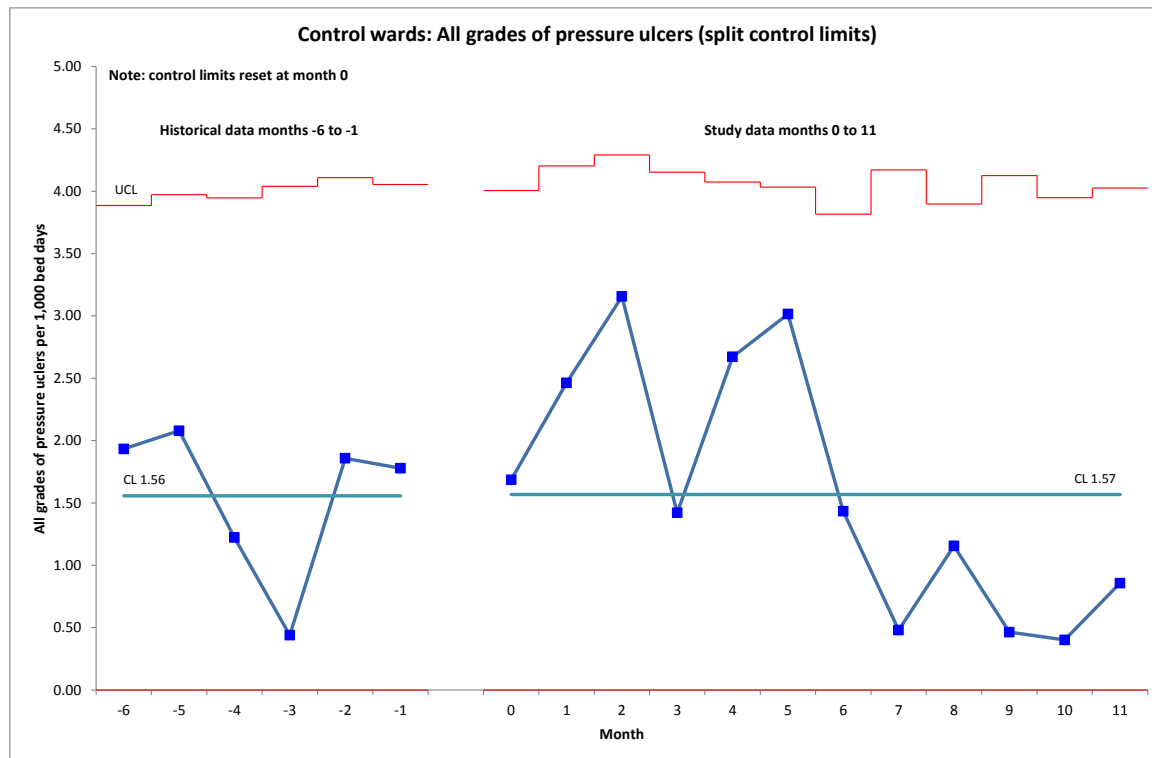
Control wards

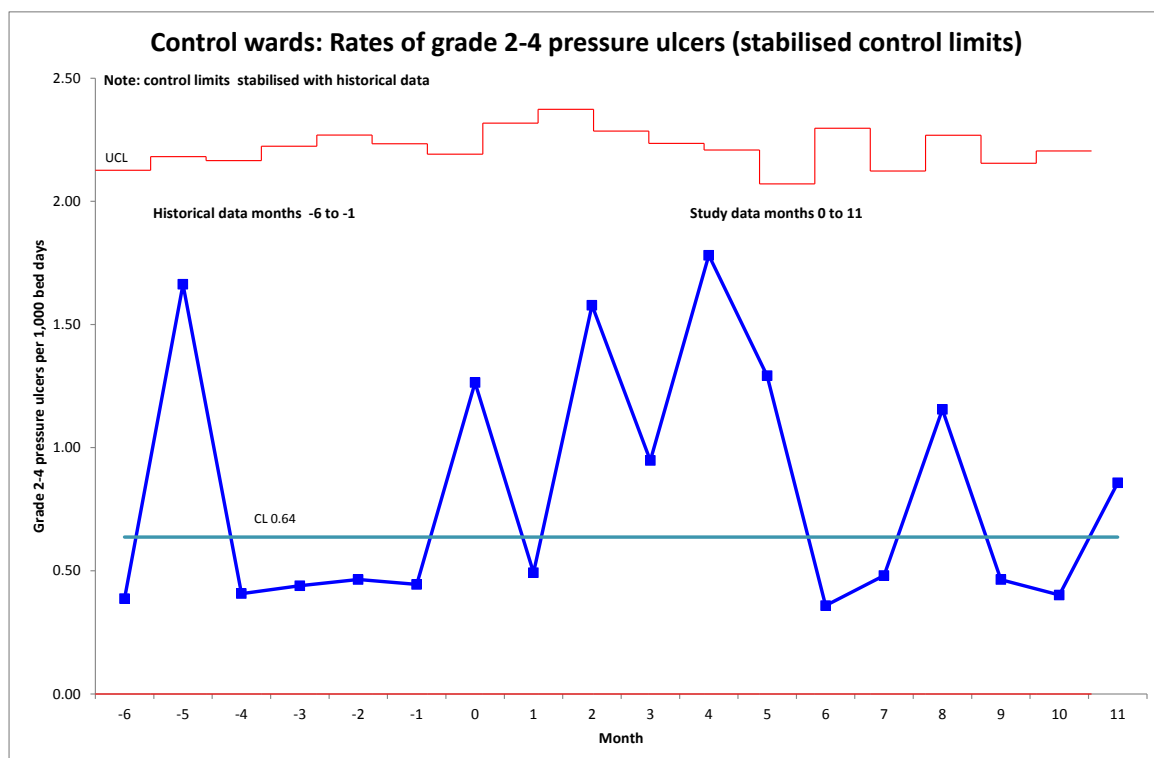
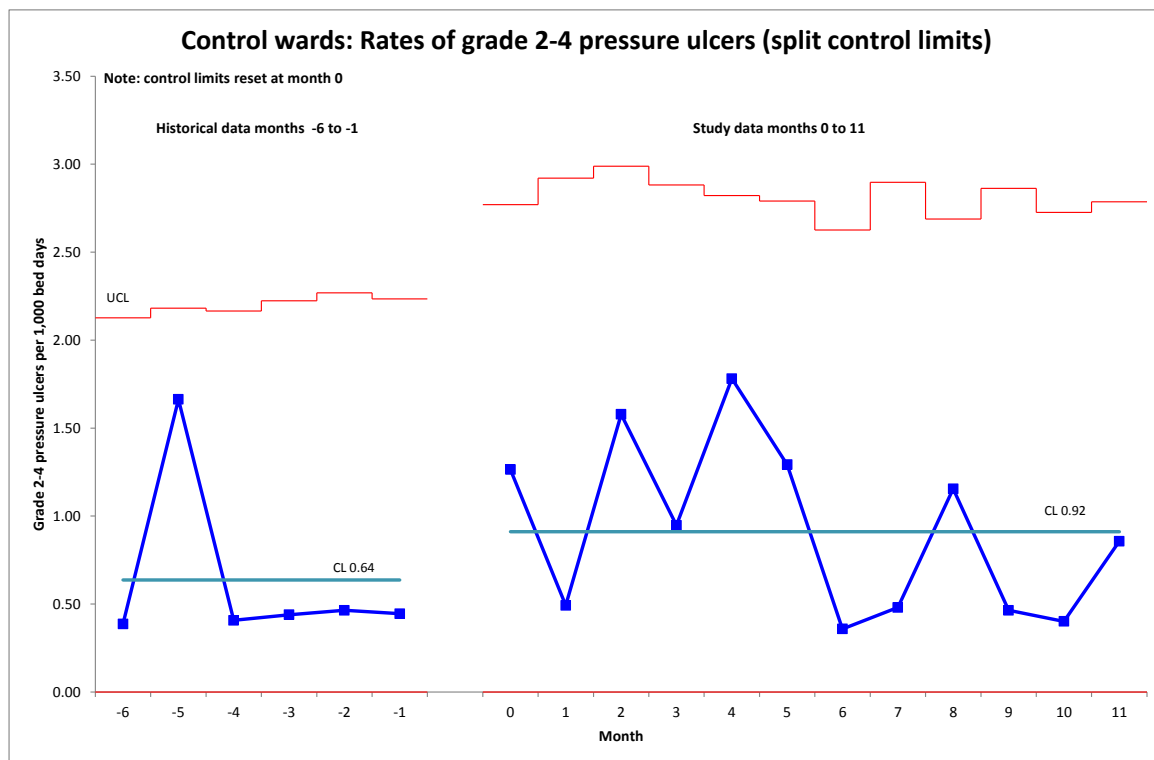
Control wards: Number of pressure ulcers (rates per 1,000 bed days) per month (historical data)						
Month	-6	-5	-4	-3	-2	-1
Occupied bed days	2,568	2,405	2,455	2,277	2,153	2,249
Grade						
1	4 (1.56)	1 (0.42)	2 (0.81)		3 (1.39)	3 (1.33)
2		2 (0.83)	1 (0.41)		1 (0.46)	1 (0.45)
3	1 (0.39)	1 (0.42)		1 (0.44)		
4		1 (0.42)				
Total	5 (1.95)	5 (2.08)	3 (1.22)	1 (0.44)	4 (1.86)	4 (1.78)

Control wards: Number of pressure ulcers (rates per 1,000 bed days) per month (study data)						
Month	0	1	2	3	4	5
Occupied bed days	2,373	2,031	1,901	2,111	2,246	2,322
Grade						
1	1 (0.42)	4 (1.97)	3 (1.58)	1 (0.47)	2 (0.89)	4 (1.72)
2	1 (0.42)	1 (0.49)	3 (1.58)	1 (0.47)	3 (1.34)	2 (0.86)
3	2 (0.84)			1 (0.47)		1 (0.43)
4					1 (0.45)	
Total	4 (1.69)	5 (2.46)	6 (3.16)	3 (1.42)	6 (2.67)	7 (3.01)

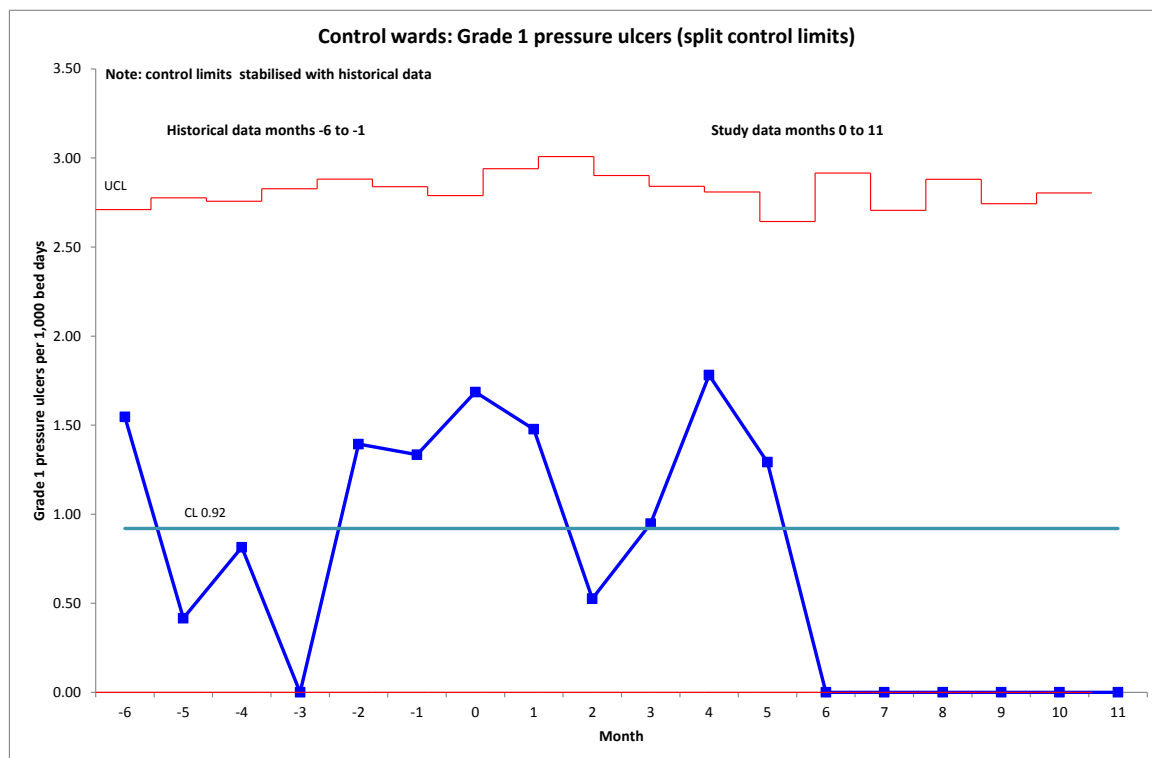
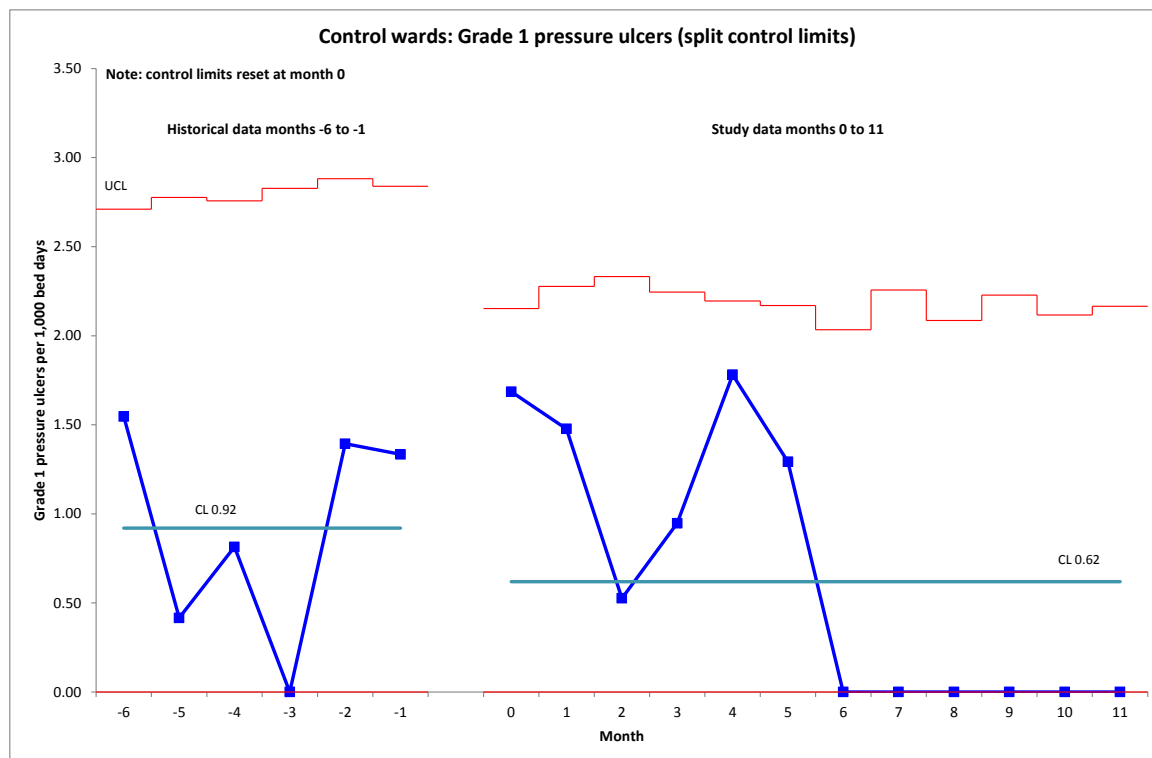
Month	6	7	8	9	10	11
Occupied bed days	2,790	2,081	2,597	2,155	2,491	2,334
Grade						
1	3 (1.08)					
2			2 (0.77)			1 (0.43)
3		1 (0.48)	1 (0.39)	1 (0.46)	1 (0.40)	1 (0.43)
4	1 (0.36)					
Total	4 (1.43)	1 (0.48)	3 (1.16)	1 (0.46)	1 (0.40)	2 (0.86)

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Appendix 37 – SPC charts for patient experience questions

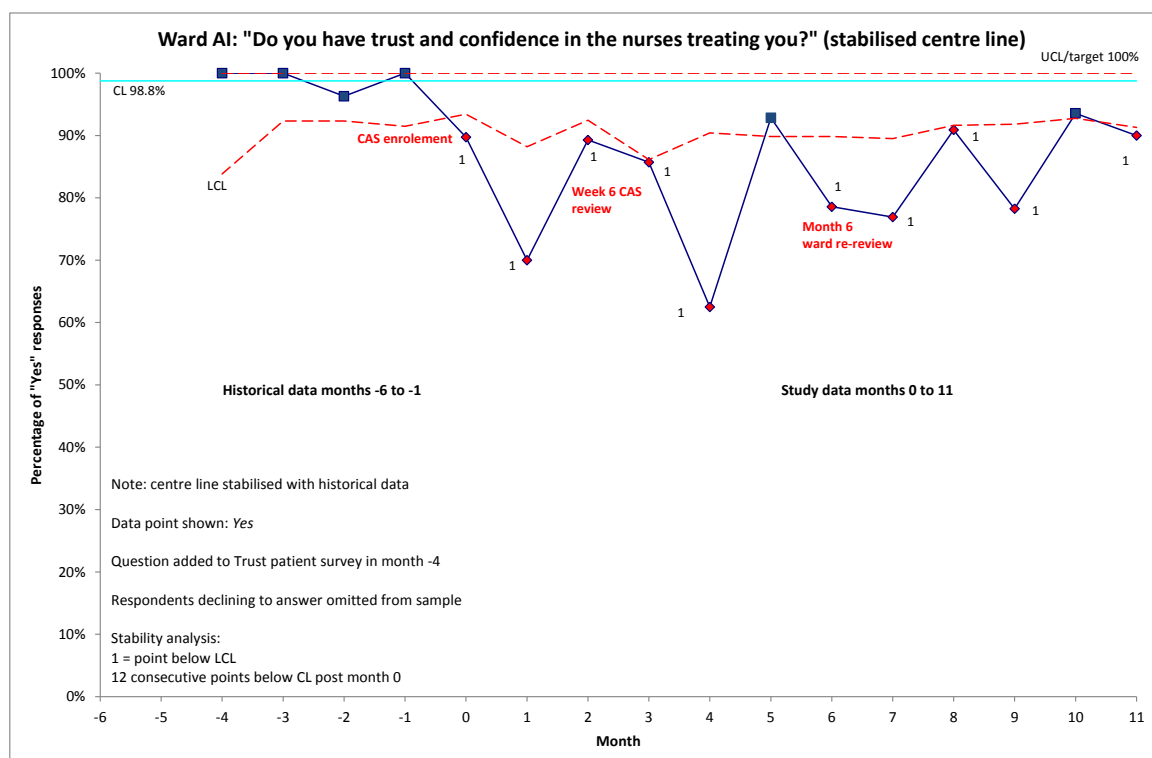
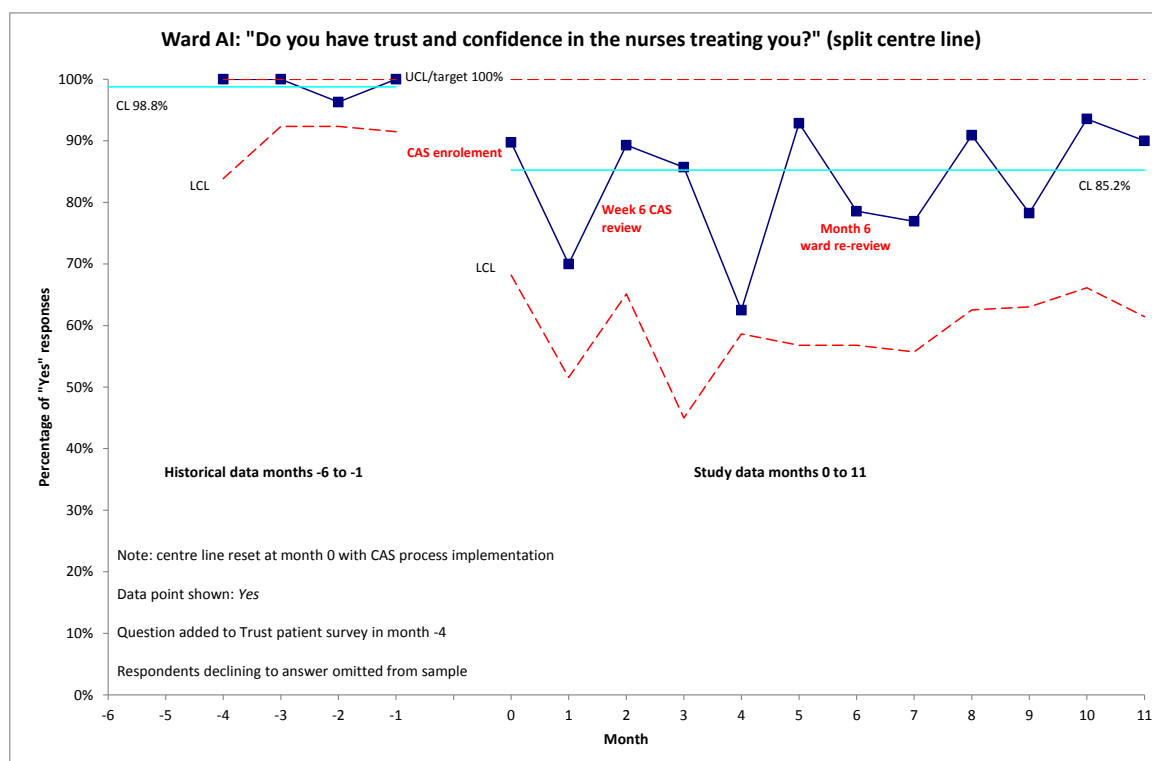
Ward AI question: *“Do you have trust and confidence in the nurses treating you?”*⁶⁰

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	5 (100.0%)	0	0	0	5
-3	27 (100.0%)	0	0	0	27
-2	26 (96.3%)	1 (3.7%)		0	27
-1	21 (100.0%)	0	0	0	21
Total	79 (98.8%)	1 (1.2%)	0	0	80

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	35 (89.7%)	4 (10.3%)	0	0	39
1	7 (70.0%)	3 (30.0%)	0	0	10
2	25 (89.3%)	3 (10.7%)	0	0	28
3	6 (85.7%)	1 (14.3%)	0	0	7
4	10 (62.5%)	3 (18.8%)	3 (18.8%)	0	16
5	13 (92.9%)	1 (7.1%)	0	0	14
6	11 (78.6%)	3 (21.4%)	0	0	14
7	10 (76.9%)	3 (23.1%)	0	0	13
8	20 (90.9%)	2 (9.1%)	0	0	22
9	18 (78.3%)	5 (21.7%)	0	0	23
10	29 (90.7%)	2 (6.3%)	0	1 (3.1%)	32
11	18 (90.0%)	2 (10.0%)	0	0	20
Total	202 (84.5%)	32 (13.5%)	3 (1.3%)	1 (0.4%)	238

⁶⁰ Question added to Trust patient survey in month -4

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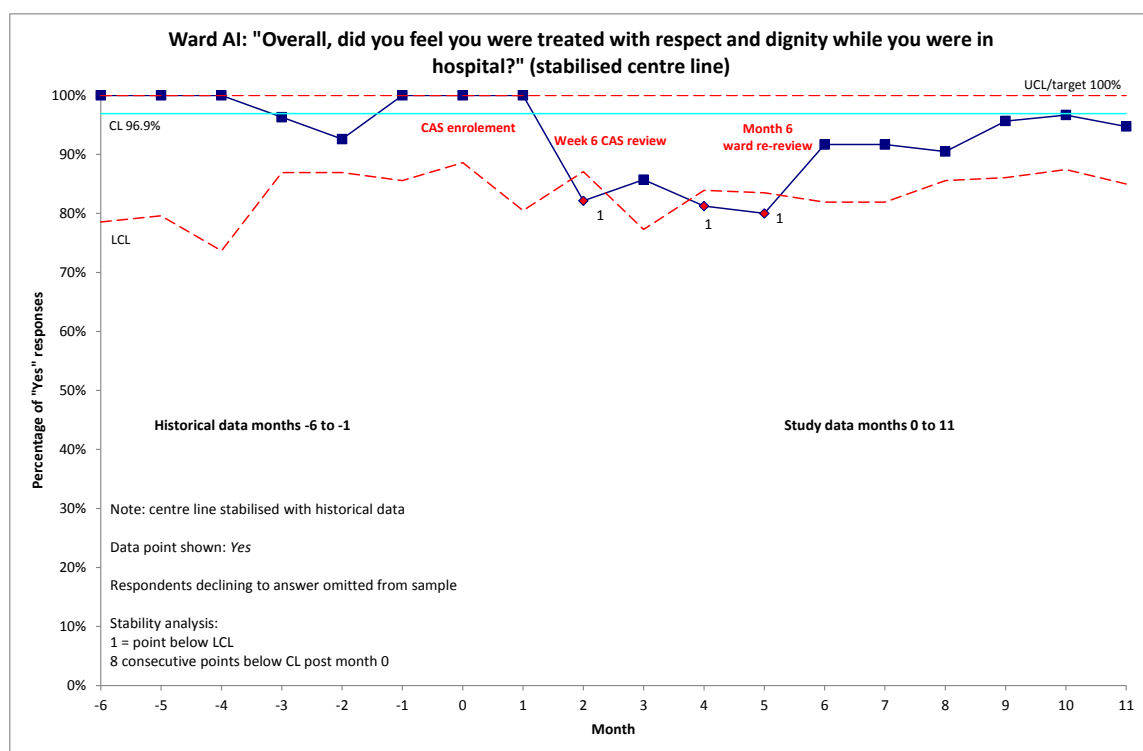
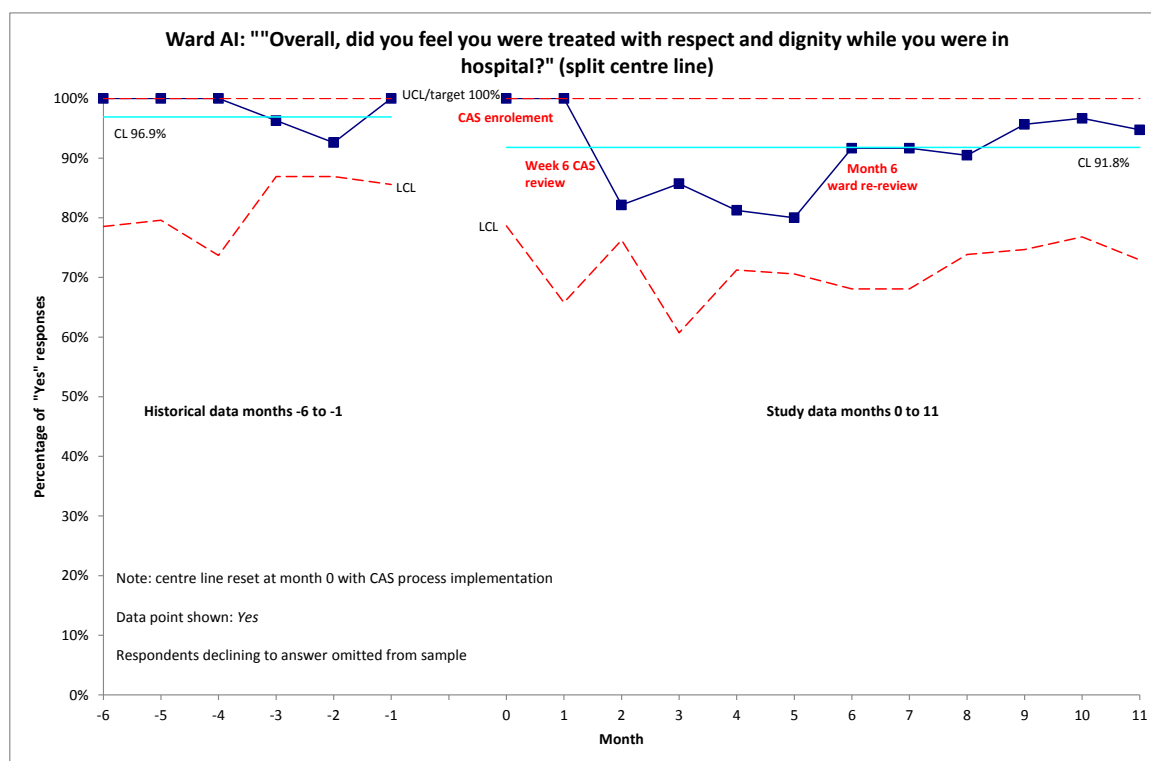


Ward AI question: “Overall, did you feel you were treated with respect and dignity while you were in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	8 (100.0%)	0	0	0	8
-5	11 (91.7%)	0	0	1 (8.3%)	12
-4	5 (100.0%)	0	0	0	5
-3	26 (96.3%)	1 (3.7%)	0	0	27
-2	25 (92.6%)	2 (7.4%)	0	0	27
-1	21 (100.0%)	0	0	0	21
Total	96 (96.0%)	3 (3.0%)	0	1 (1.0%)	100

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	39 (97.5%)	0	0	1 (2.5%)	40
1	10 (100.0%)	0	0	0	10
2	23 (82.1%)	3 (10.7%)	2 (7.1%)	0	28
3	6 (85.7%)	1 (14.3%)	0	0	7
4	13 (81.3%)	2 (12.5%)	1 (6.3%)	0	16
5	12 (80.0%)	3 (20.0%)	0	0	15
6	11 (91.7%)	1 (8.3%)	0	0	12
7	11 (91.7%)	1 (8.3%)	0	0	12
8	19 (90.5%)	2 (9.5%)	0	0	21
9	22 (95.7%)	1 (4.3%)	0	0	23
10	29 (93.6%)	1 (3.2%)	0	1 (3.2%)	31
11	18 (94.7%)	1 (5.3%)	0	0	19
Total	213 (91.0%)	16 (6.8%)	3 (1.3%)	2 (0.9%)	234

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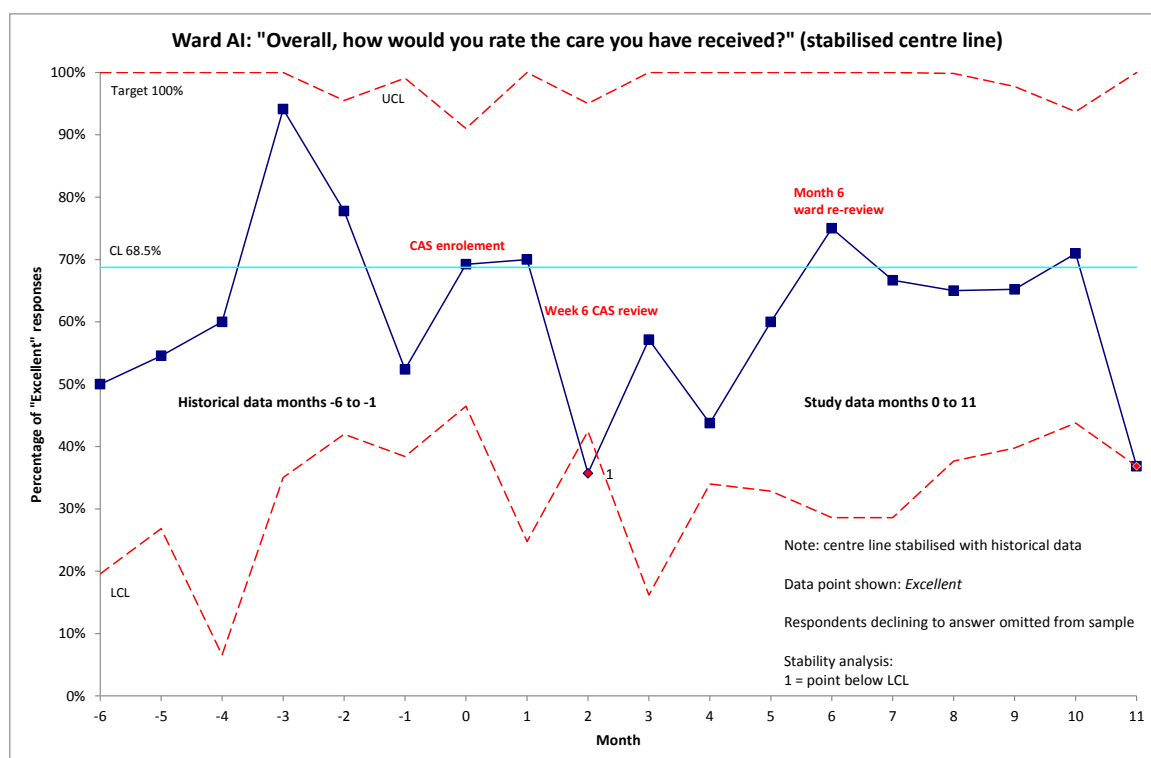
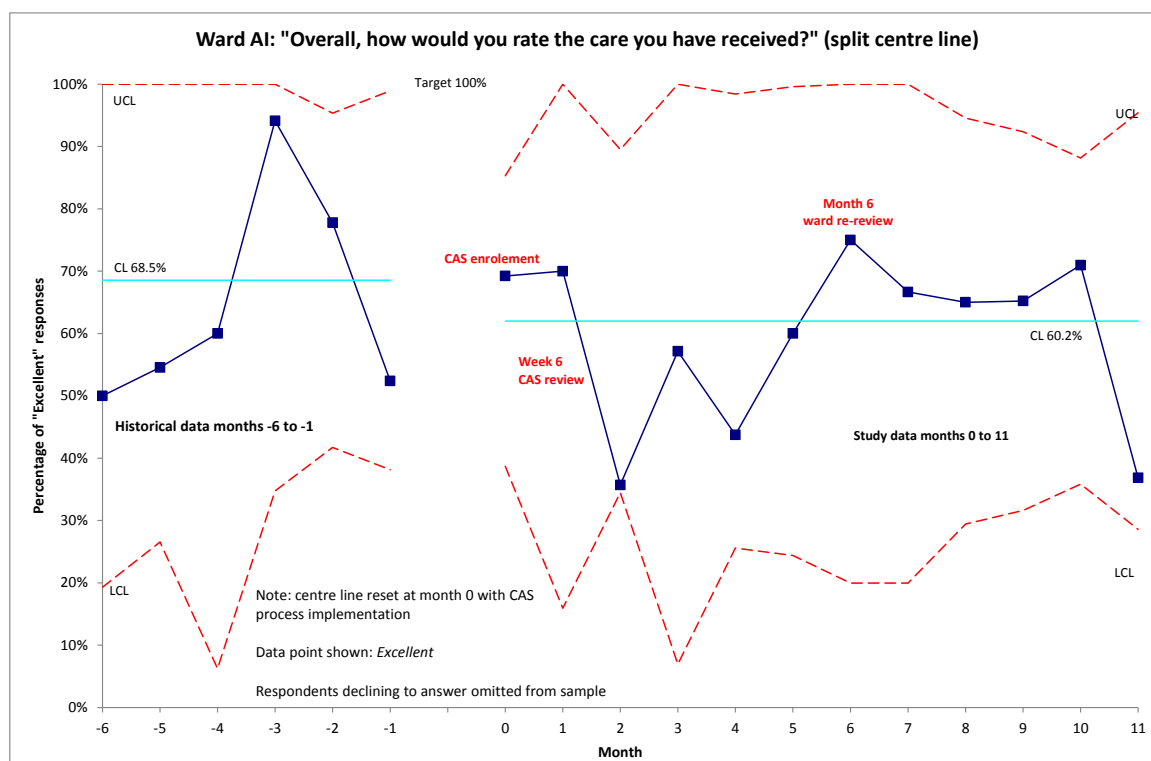


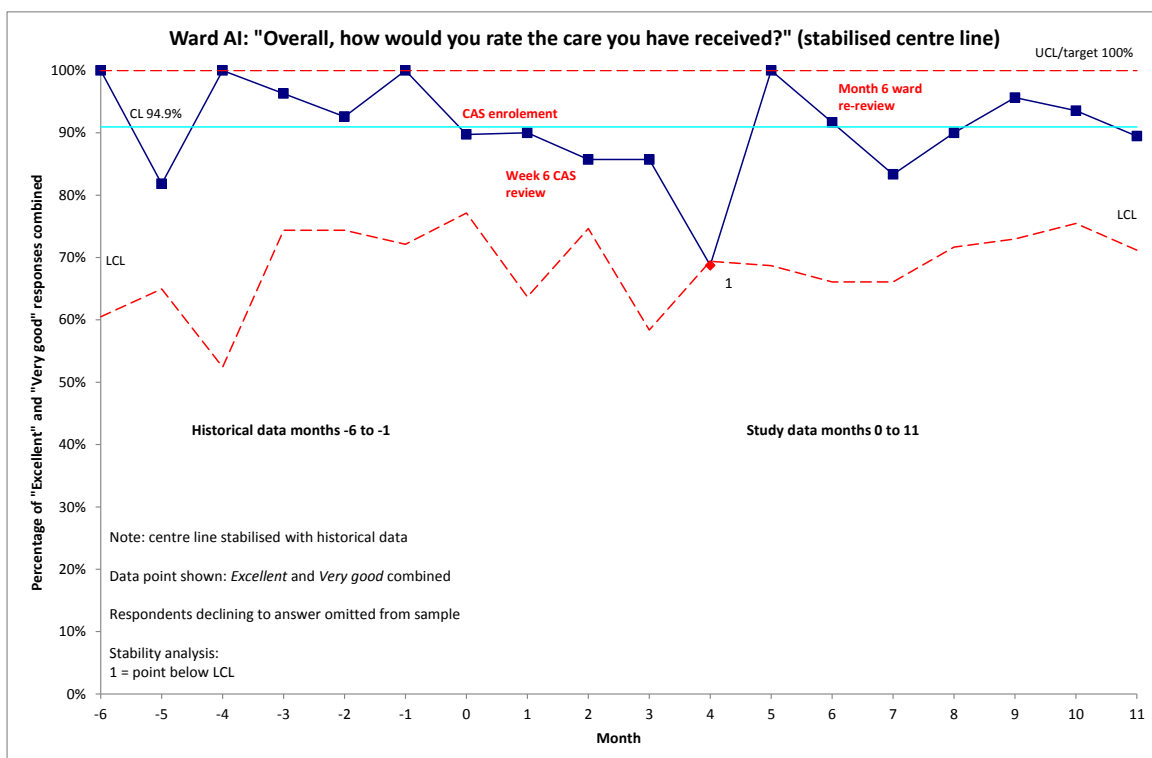
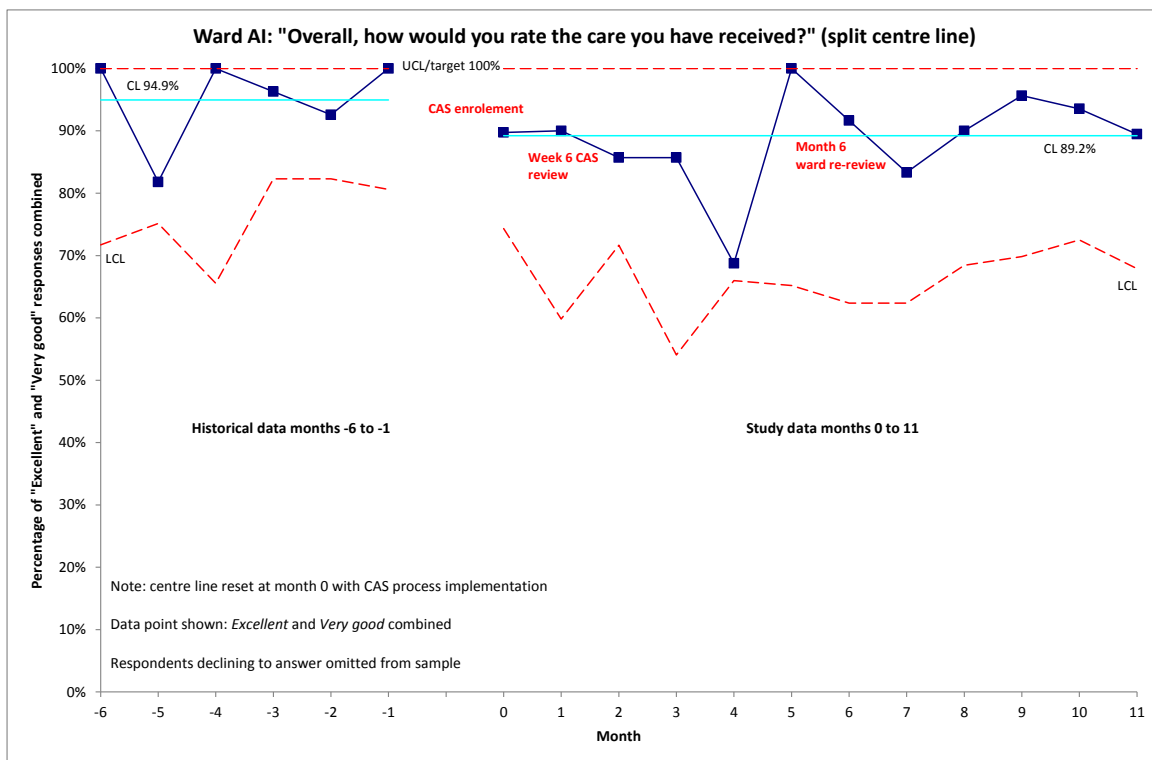
Ward AI question: *“Overall, how would you rate the care you have received?”*

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	4 (50.0%)	4 (50.0%)	0	0	0	0	8
-5	6 (50.0%)	3 (25.0%)	1 (8.3%)	1 (8.3%)	0	1 (8.3%)	12
-4	3 (60.0%)	2 (40.0%)	0	0	0	0	5
-3	16 (59.3%)	10 (37.0%)	1 (3.7%)	0	0	0	27
-2	12 (44.4%)	13 (48.1%)	2 (7.4%)	0	0	0	27
-1	11 (52.4%)	10 (47.6%)	0	0	0	0	21
Total	52 (52.0%)	42 (42.0%)	4 (4.0%)	1 (1.0%)	0	1 (1.0%)	100

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	27 (69.2%)	8 (20.5%)	4 (10.3%)	0	0	0	39
1	7 (63.6%)	2 (18.2%)	1 (9.1%)	0	0	1 (9.9%)	11
2	10 (35.7%)	14 (50.0%)	2 (7.1%)	1 (3.57%)	1 (3.6%)	0	28
3	4 (57.1%)	2 (28.6%)	1 (14.3%)	0	0	0	7
4	7 (43.8%)	4 (25.0%)	0	2 (12.5%)	3 (18.8%)	0	16
5	9 (60.0%)	6 (40.0%)	0	0	0	0	15
6	9 (75.0%)	2 (16.7%)	0	1 (8.3%)	0	0	12
7	8 (66.7%)	2 (16.7%)	2 (16.67%)	0	0	0	12
8	13 (65.0%)	5 (25.0%)	2 (10.00%)	0	0	0	20
9	15 (65.2%)	7 (30.4%)	1 (4.35%)	0	0	0	23
10	22 (71.0%)	7 (22.6%)	2 (6.45%)	0	0	0	31
11	7 (36.8%)	10 (52.6%)	1 (5.26%)	1 (5.3%)	0	0	19
Total	138 (59.2%)	69 (29.6%)	16 (6.87%)	5 (2.2%)	4 (1.7%)	1 (0.4%)	233

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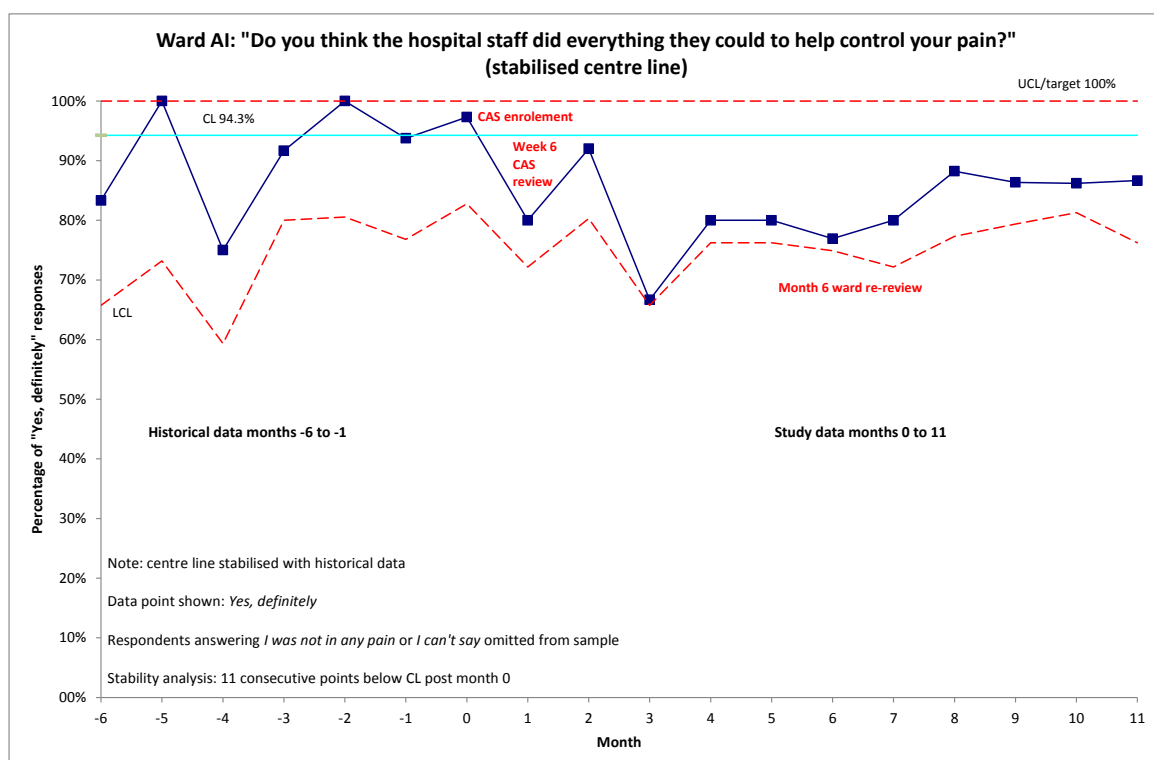
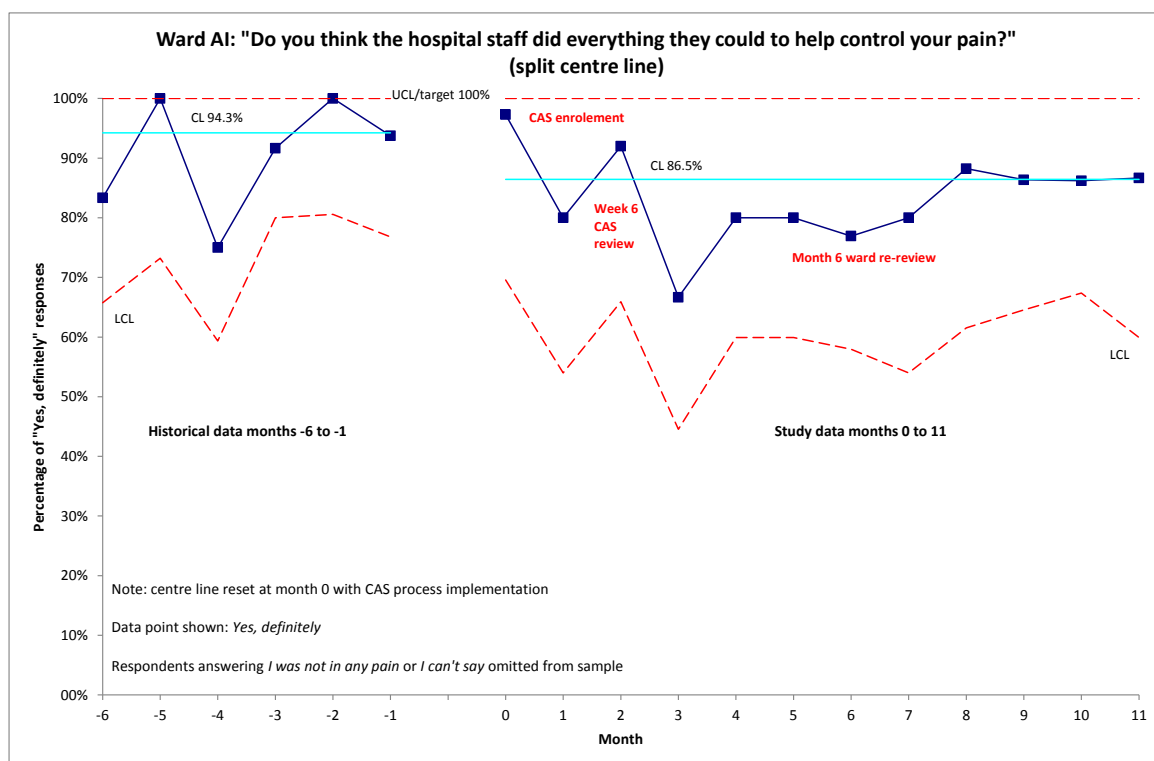
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Ward AI question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	4 (57.1%)	1 (14.3%)	0	2 (28.6%)	7
-5	11 (100.0%)	0	0	0	11
-4	3 (42.9%)	0	1 (14.2%)	3 (42.9%)	7
-3	22 (81.5%)	1 (3.7%)	1 (3.7%)	3 (11.1%)	27
-2	26 (96.3%)	0	0	1 (3.7%)	27
-1	15 (71.4%)	0	1 (4.8%)	5 (23.8%)	21
Total	81 (81.0%)	2 (2.0%)	3 (3.0%)	14 (14.0%)	100

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁶¹	Subgroup size
0	34 (87.2%)	2 (5.1%)	1 (2.5%)	2 (5.1%)	-	39
1	8 (72.7%)	2 (18.2%)	0	1 (9.1%)	-	11
2	23 (82.1%)	2 (7.1%)	0	3 (10.7%)	-	28
3	4 (57.1%)	2 (28.6%)	0	0	1 (14.3%)	7
4	12 (70.6%)	1 (5.9%)	2 (11.8%)	0	2 (11.8%)	17
5	12 (70.6%)	2 (11.8%)	1 (5.9%)	0	2 (11.8%)	17
6	10 (76.9%)	3 (23.1%)	0	0	0	13
7	8 (66.7%)	2 (16.7%)	0	0	2 (16.7%)	12
8	15 (71.4%)	2 (9.5%)	0	0	4 (19.1%)	21
9	19 (82.6%)	2 (8.7%)	1 (4.4%)	0	1 (4.4%)	23
10	25 (80.7%)	3 (9.7%)	1 (3.2%)	0	2 (6.5%)	31
11	13 (68.42%)	2 (10.5%)	0	0	4 (21.1%)	19
Total	183 (76.9%)	25 (10.5%)	6 (2.5%)	0	24 (10.1%)	238

⁶¹ Response added to Picker survey question in study month 3



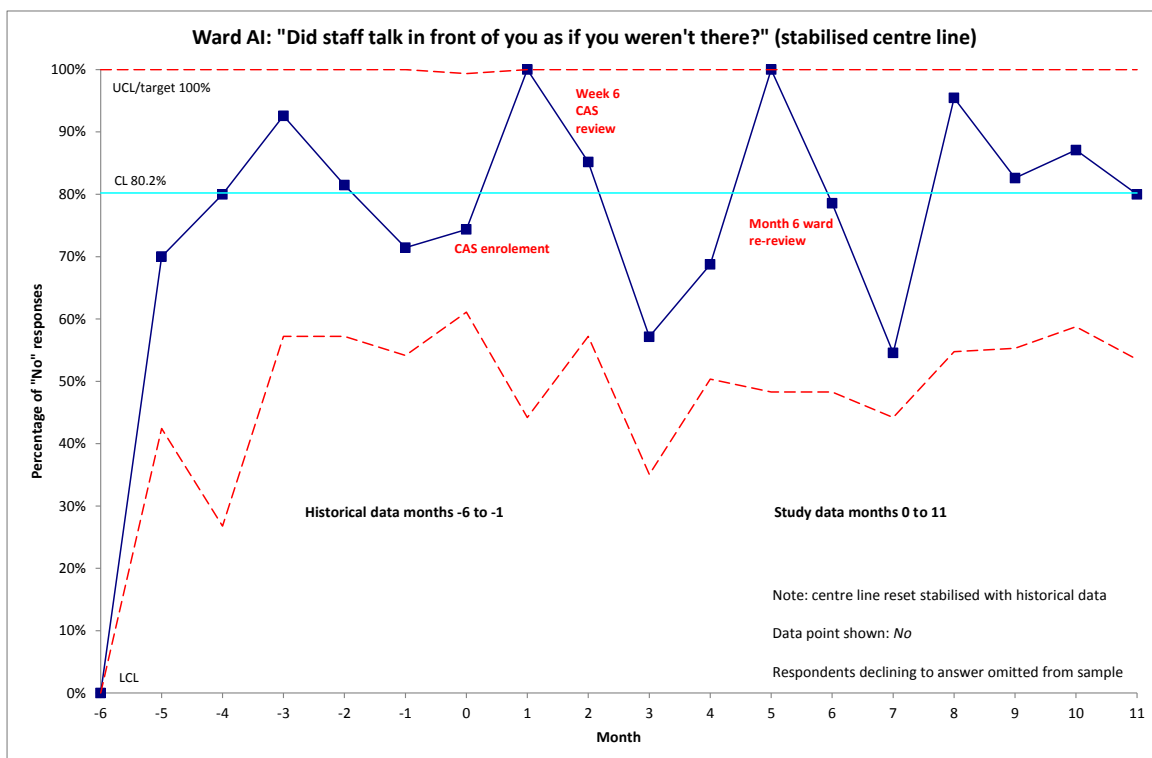
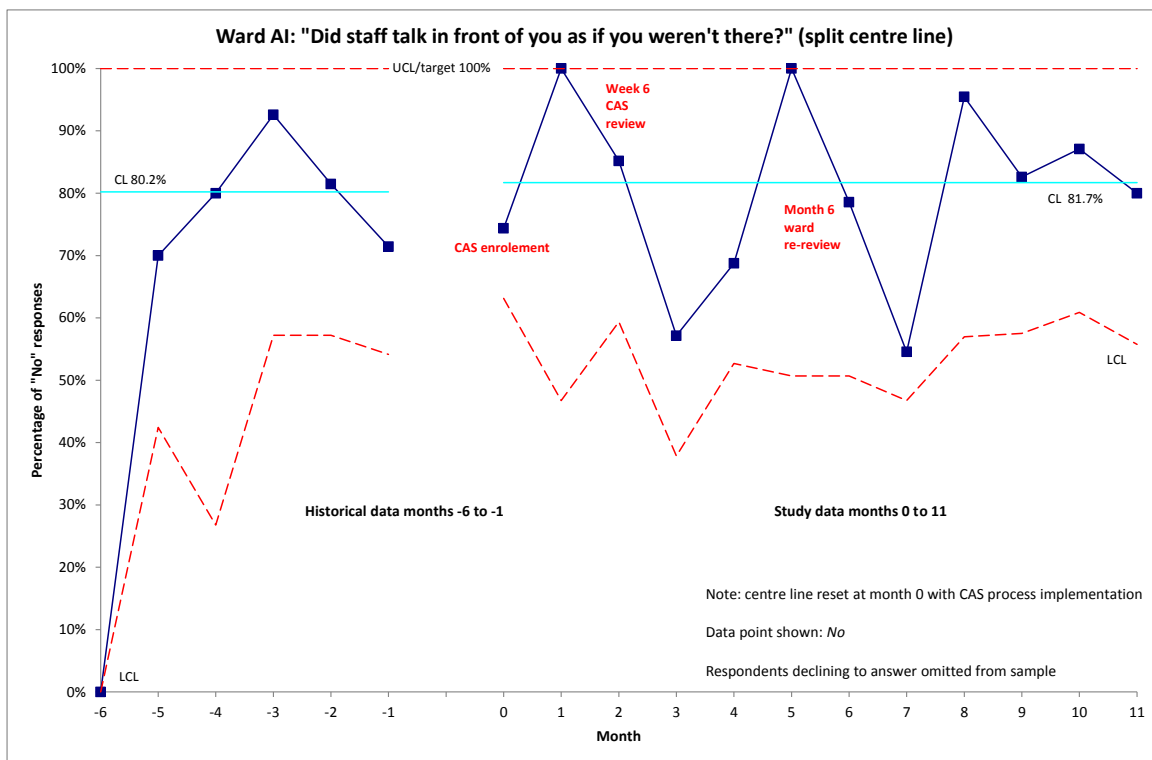
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Ward AI question: “Did staff talk in front of you as if you weren’t there?”

Response rates <i>n</i> = (%) per month (study data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	1 (100.0%)	0	0	1
-5	3 (25.0%)	7 (58.3%)	2 (16.7%)	12
-4	1 (20.0%)	4 (80.0%)	0	5
-3	2 (7.4%)	25 (92.6%)	0	27
-2	5 (18.5%)	22 (81.5%)	0	27
-1	6 (28.5%)	15 (71.4%)	0	21
Total	18 (19.4%)	73 (78.5%)	2 (2.1%)	93

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁶²	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	10 (25.6%)	-	29 (75.4%)	0	39
1	0	-	11 (100.0%)	0	11
2	4 (14.3%)	-	23 (82.1%)	1 (3.8%)	28
3	0	3 (42.9%)	4 (57.1%)	0	7
4	1 (5.9%)	4 (23.5%)	11 (64.7%)	1 (5.9%)	17
5	0	0	14 (93.3%)	1 (6.7%)	15
6	2 (14.3%)	1 (7.1%)	11 (78.6%)	0	14
7	1 (9.1%)	4 (36.4%)	6 (54.6%)	0	11
8	1 (4.6%)	0	21 (95.5%)	0	22
9	1 (4.4%)	3 (13.0%)	19 (82.6%)	0	23
10	2 (6.3%)	2 (6.3%)	27 (84.4%)	1 (3.1%)	32
11	1 (5.0%)	3 (15.0%)	16 (80.0%)	0	20
Total	23 (9.6%)	20 (8.4%)	192 (80.3%)	4 (1.7%)	239

⁶² Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

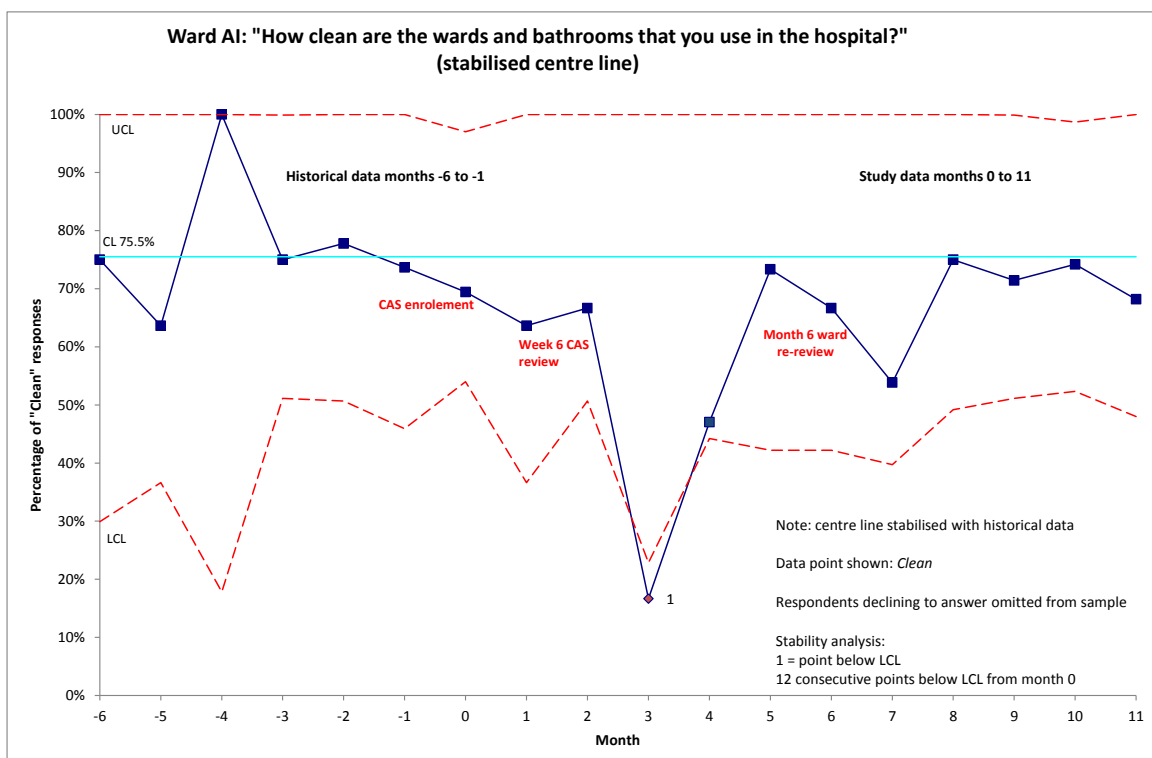
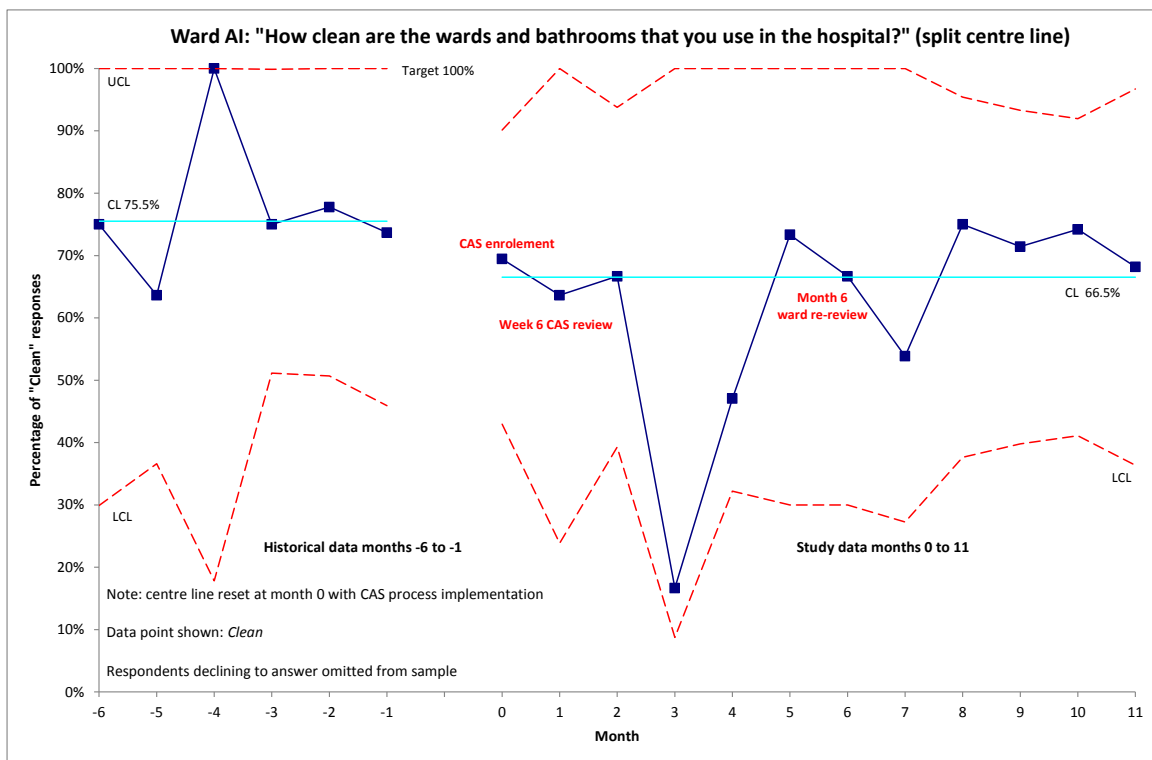


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Ward AI question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	6 (75.0%)	2 (25.0%)	0	0	0	8
-5	7 (58.4%)	3 (25.0%)	0	1 (8.3%)	1 (8.3%)	12
-4	5 (100.0%)	0	0	0	0	5
-3	21 (75.0%)	7 (25.0%)	0	0	0	28
-2	21 (77.8%)	5 (18.5%)	1 (3.7%)	0	0	27
-1	14 (66.7%)	5 (23.8%)	0	0	2 (9.5%)	21
Total	74 (73.3%)	22 (21.8%)	1 (1.0%)	1 (1.0%)	3 (2.9%)	101

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	25 (69.4%)	11 (30.6%)	0	0	0	36
1	7 (63.6%)	4 (36.4%)	0	0	0	11
2	18 (64.3%)	5 (17.9%)	4 (14.4%)	0	1 (3.6%)	28
3	1 (16.7%)	5 (83.3%)	0	0	0	6
4	8 (47.1%)	7 (41.2%)	1 (5.9%)	1 (5.9%)	0	17
5	11 (73.3%)	4 (26.7%)	0	0	0	15
6	10 (66.7%)	4 (26.7%)	1 (6.7%)	0	0	15
7	7 (53.9%)	6 (46.2%)	0	0	0	13
8	18 (75.0%)	6 (25.0%)	0	0	0	24
9	20 (71.4%)	7 (25.0%)	1 (3.6%)	0	0	28
10	23 (71.9%)	7 (21.9%)	0	1 (3.1%)	1 (3.1%)	32
11	15 (68.2%)	5 (22.7%)	1 (4.6%)	1 (4.6%)	0	22
Total	163 (66.0%)	71 (28.7%)	8 (3.2%)	3 (1.2%)	2 (0.8%)	247



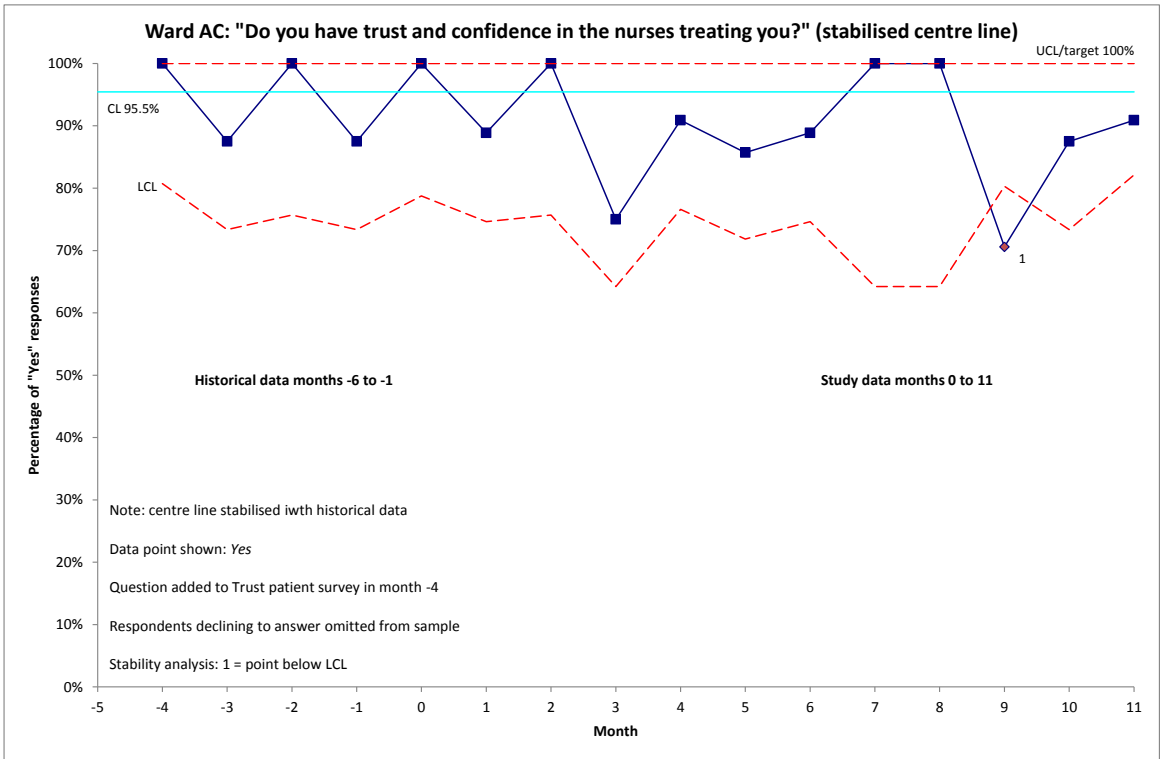
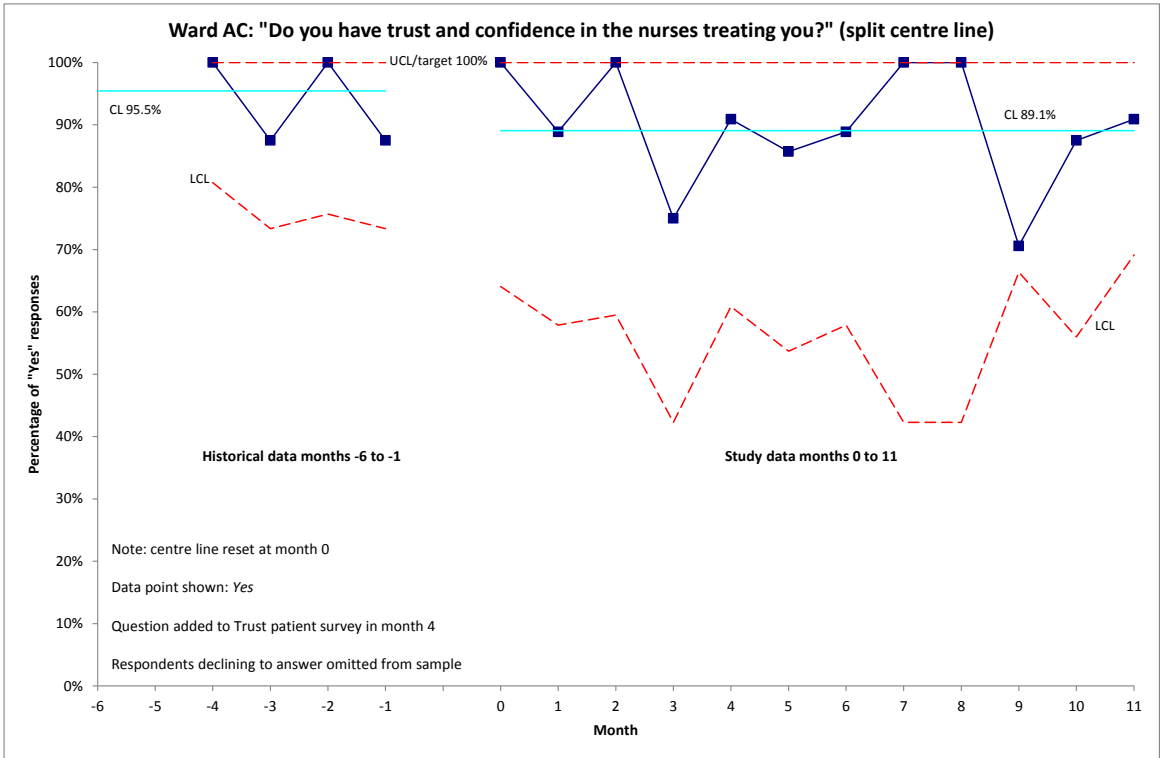
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Ward AC question: *“Do you have trust and confidence in the nurses treating you?”*⁶³

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	18 (100.0%)	0	0	0	18
-3	7 (87.5%)	0	0	1 (12.5%)	8
-2	10 (100.0%)	0	0	0	10
-1	7 (87.5%)	1 (12.5%)	0	0	8
Total	42 (95.4%)	1 (2.3%)	0	1 (2.3%)	44

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Always	Sometimes	No	Declined	Subgroup size
0	14 (100.0%)	0	0	0	14
1	8 (88.9%)	1 (11.1%)	0	0	9
2	10 (100.0%)	0	0	0	10
3	3 (75.0%)	1 (25.0%)	0	0	4
4	10 (90.9%)	1 (9.1%)	0	0	11
5	6 (85.7%)	1 (14.3%)	0	0	7
6	8 (88.9%)	1 (11.1%)	0	0	9
7	4 (100.0%)	0	0	0	4
8	4 (100.0%)	0	0	0	4
9	12 (70.6%)	5 (29.4%)	0	0	17
10	7 (87.5%)	1 (12.5%)	0	0	8
11	20 (90.9%)	2 (9.1%)	0	0	22
Total	106 (89.1%)	13 (10.9%)	0	0	119

⁶³ Question added to Trust patient survey in month -4

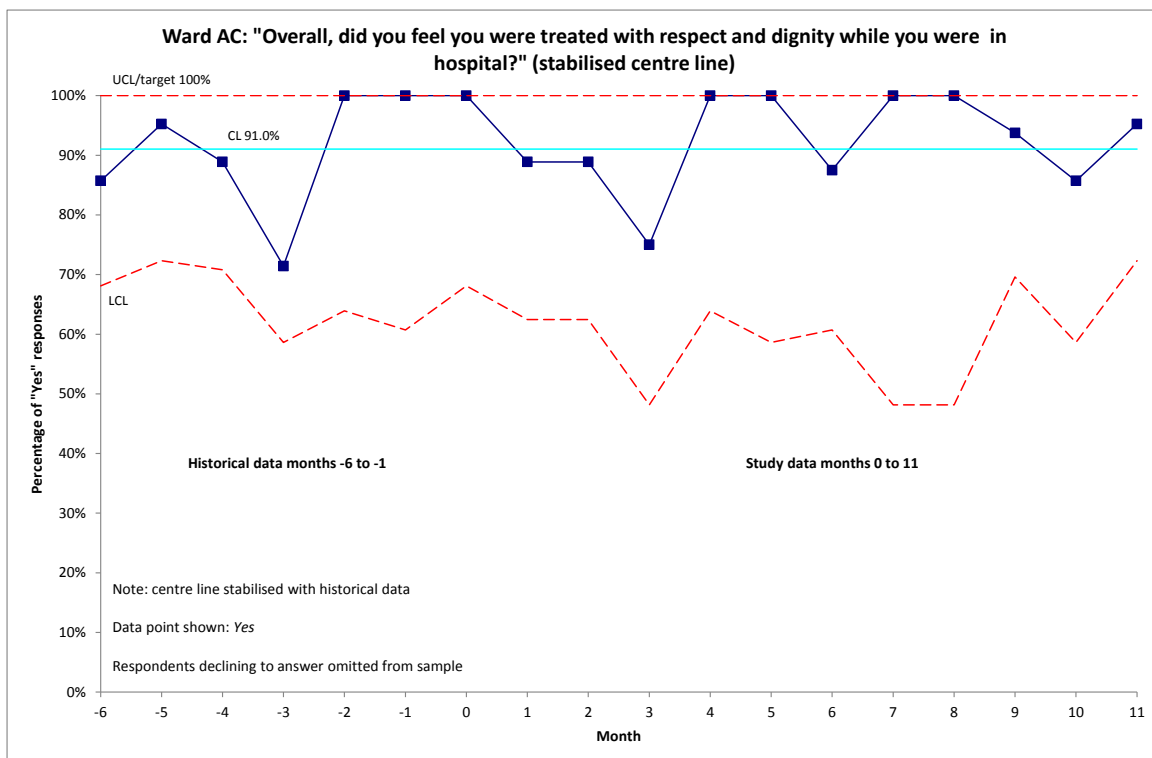
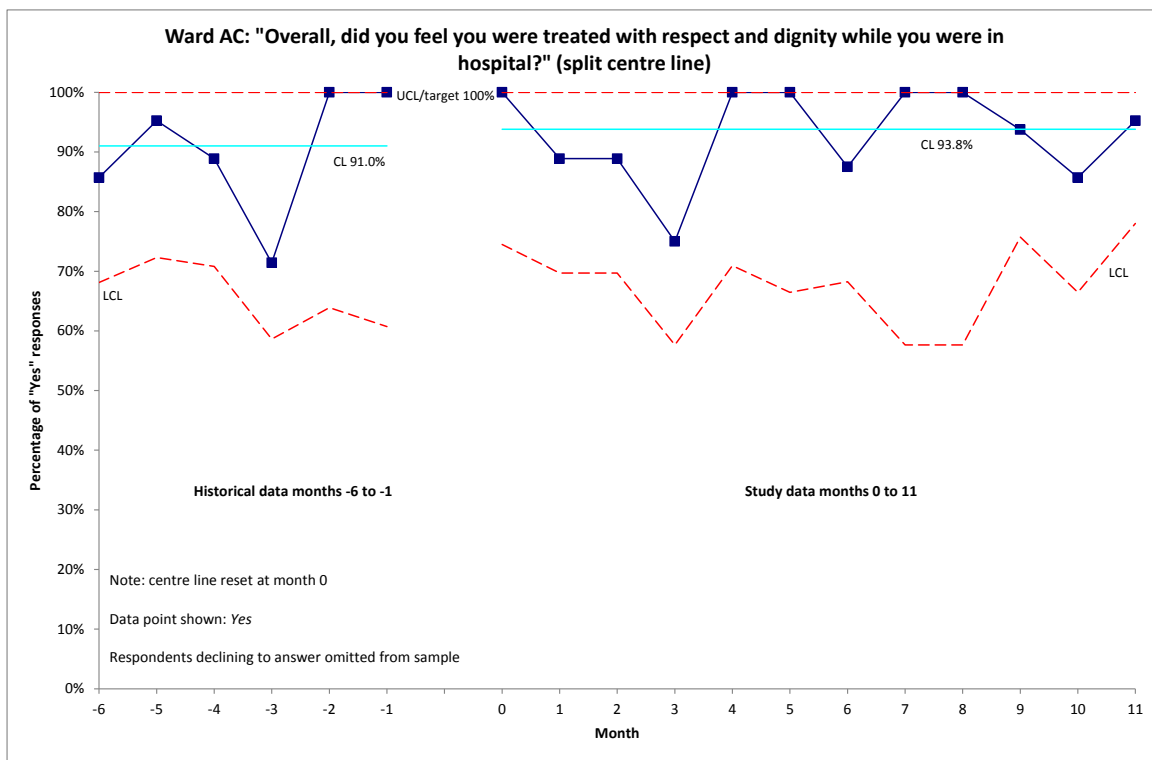


10. Appendices

Ward AC question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	12 (85.7%)	0	2 (14.3%)	0	14
-5	20 (95.2%)	1 (4.8%)	0	0	21
-4	16 (88.9%)	2 (11.1%)	0	0	18
-3	5 (62.5%)	1 (12.5%)	1 (12.5%)	1 (12.5%)	8
-2	10 (100.0%)	0	0	0	10
-1	8 (100.0%)	0	0	0	8
Total	71 (89.8%)	4 (5.1%)	3 (3.8%)	1 (1.3%)	79

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	14 (100.0%)	0	0	0	14
1	8 (88.9%)	1 (11.1%)	0	0	9
2	8 (80.0%)	0	1 (10.0%)	1 (10.0%)	10
3	3 (75.0%)	1 (25.0%)	0	0	4
4	10 (100.0%)	0	0	0	10
5	7 (100.0%)	0	0	0	7
6	7 (87.5%)	1 (12.5%)	0	0	8
7	4 (100.0%)	0	0	0	4
8	4 (100.0%)	0	0	0	4
9	15 (93.8%)	1 (6.2%)	0	0	16
10	6 (85.7%)	1 (14.3%)	0	0	7
11	20 (95.2%)	1 (4.8%)	0	0	21
Total	106 (93.0%)	6 (5.2%)	1 (0.9%)	1 (0.9%)	114

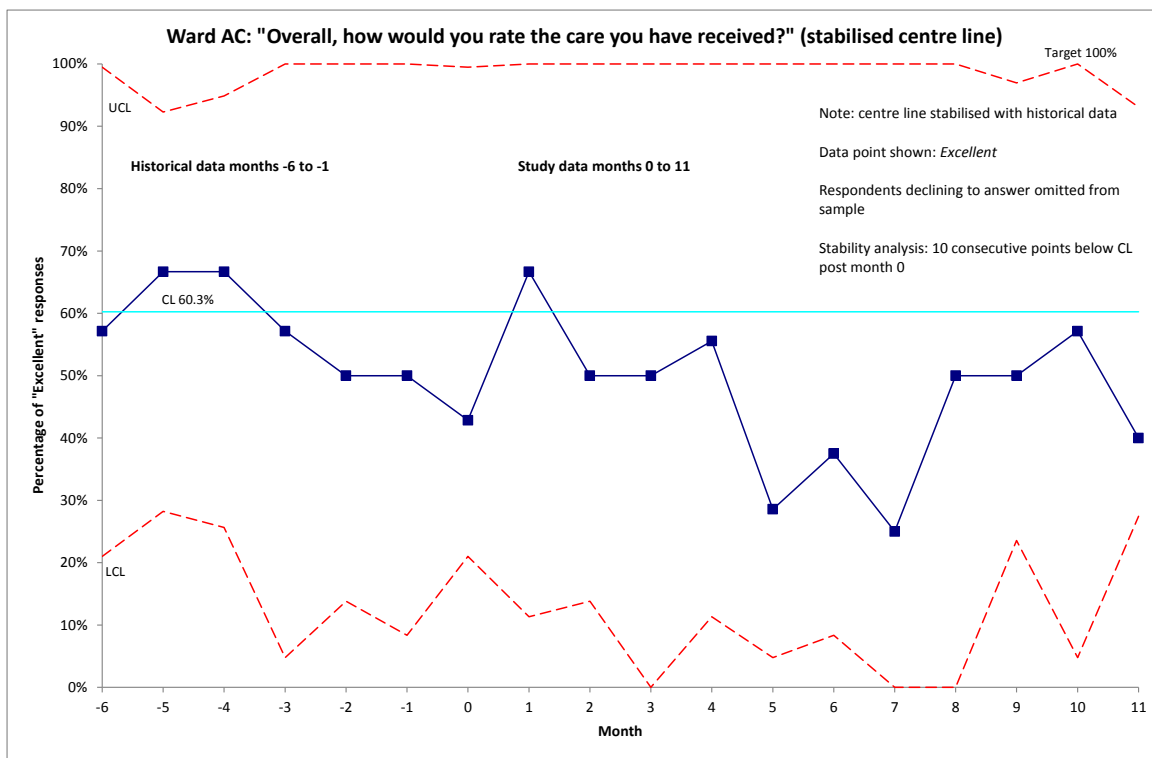
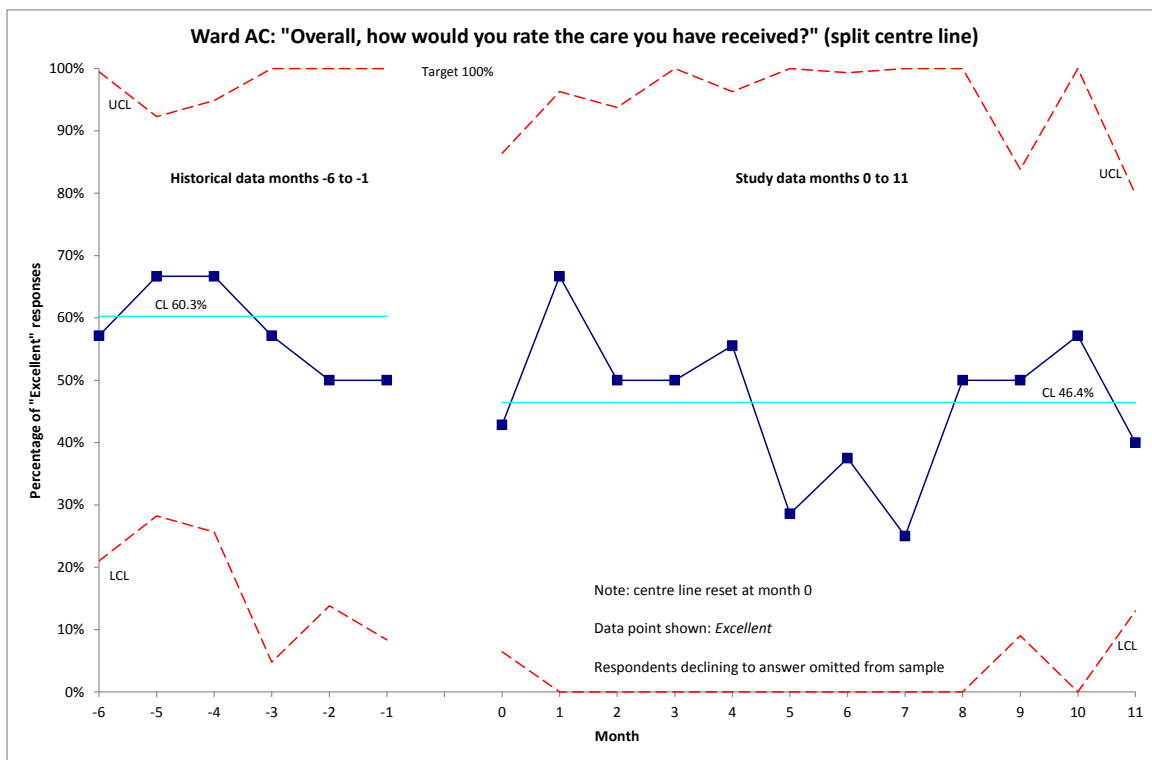


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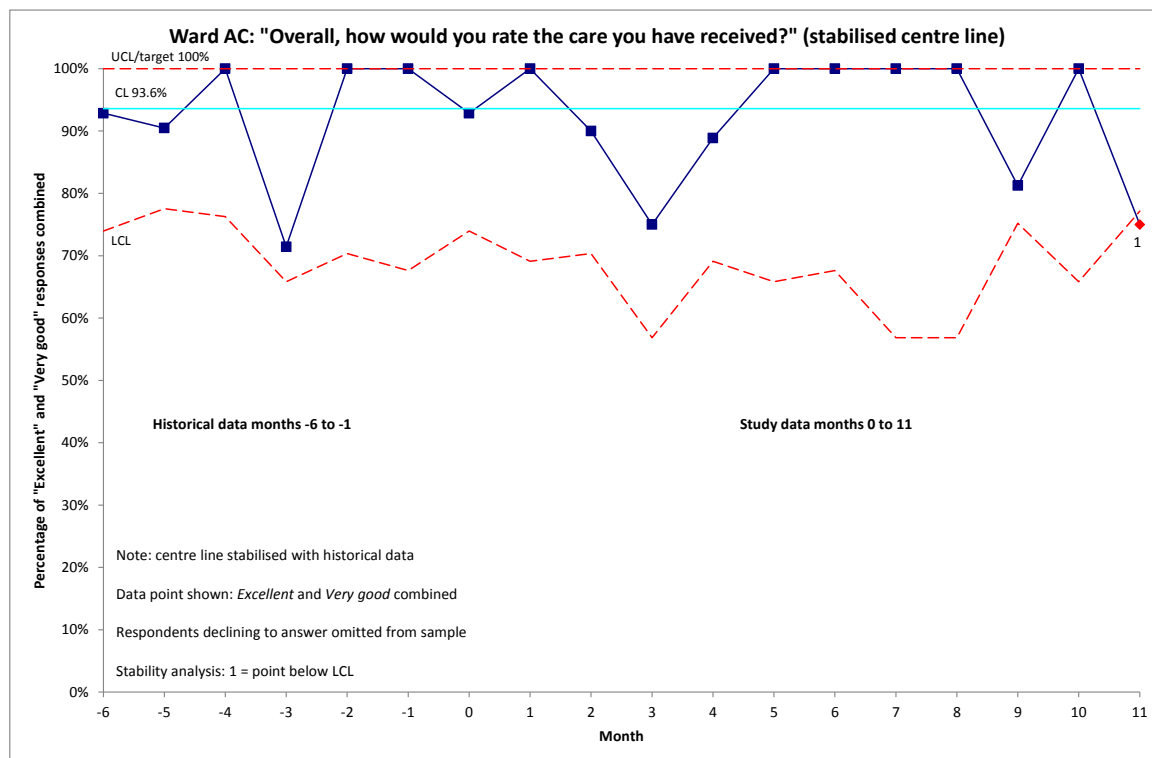
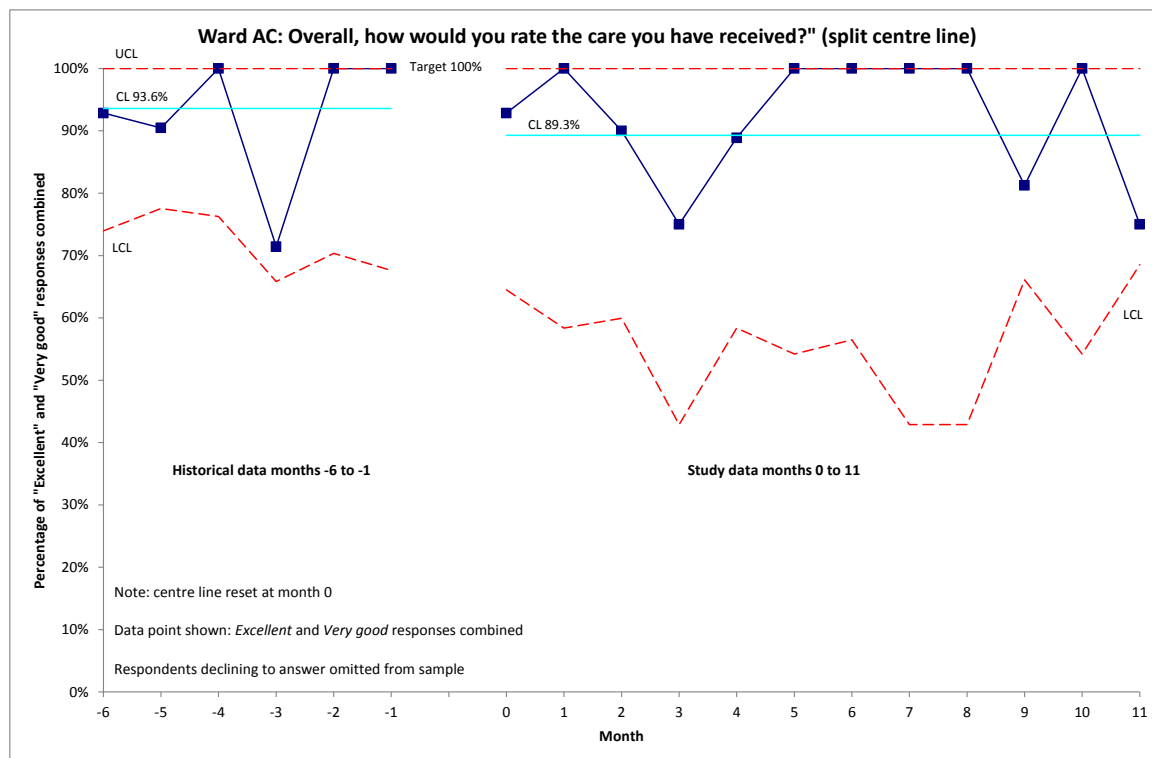
Ward AC question: “Overall, how would you rate the care you have received?”

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	8 (57.1%)	5 (35.7%)	1 (7.1%)	0	0	0	14
-5	14 (66.7%)	5 (23.8%)	1 (4.8%)	1 (4.8%)	0	0	21
-4	12 (66.7%)	6 (33.3%)	0	0	0	0	18
-3	4 (57.1%)	1 (14.3%)	2 (28.6%)	0	0	0	7
-2	5 (50.0%)	5 (50.0%)	0	0	0	0	10
-1	4 (50.0%)	4 (50.0%)	0	0	0	0	8
Total	47 (60.3%)	26 (33.3%)	4 (5.1%)	1 (1.3%)	0	0	78

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	6 (42.9%)	7 (50.0%)	1 (7.1%)	0	0	0	14
1	6 (66.7%)	3 (33.3%)	0	0	0	0	9
2	5 (50.0%)	4 (40.0%)	1 (10.0%)	0	0	0	10
3	2 (50.0%)	1 (25.0%)	1 (25.0%)	0	0	0	4
4	5 (55.6%)	3 (33.3%)	1 (11.1%)	0	0	0	9
5	2 (28.6%)	5 (71.4%)	0	0	0	0	7
6	3 (37.5%)	5 (62.5%)	0	0	0	0	8
7	1 (25.0%)	3 (75.0%)	0	0	0	0	4
8	2 (50.0%)	2 (50.0%)	0	0	0	0	4
9	8 (50.0%)	5 (31.3%)	2 (12.5%)	1 (6.3%)	0	0	16
10	4 (57.1%)	3 (42.9%)	0	0	0	0	7
11	8 (40.0%)	7 (35.0%)	5 (25.0%)	0	0	0	20
Total	52 (46.4%)	48 (42.9%)	11 (9.8%)	1 (0.9%)	0	0	112



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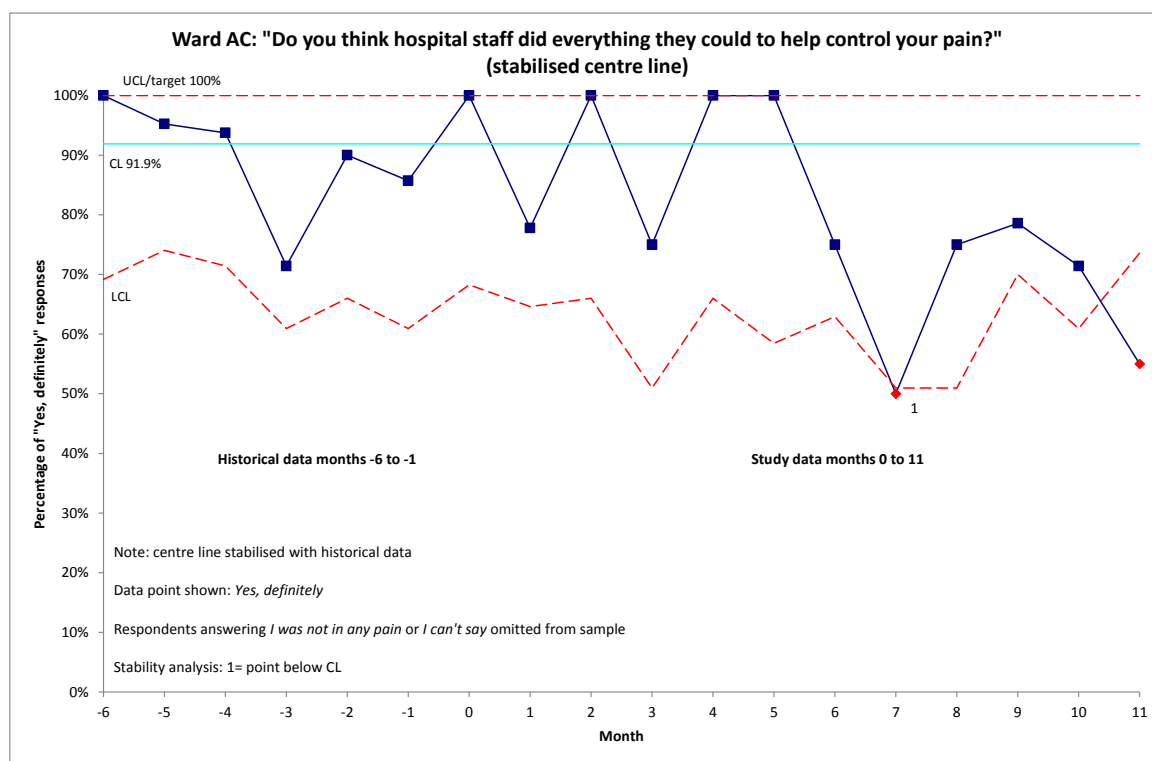
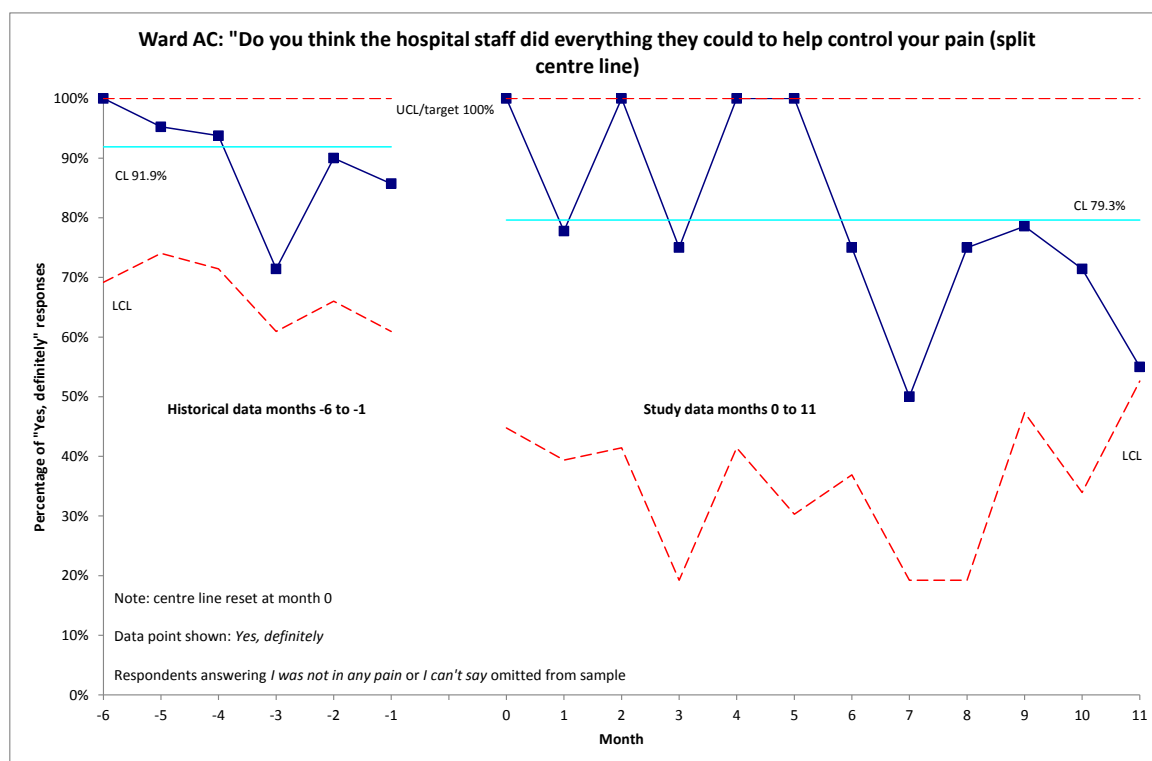
Ward AC question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	13 (92.9%)	0	0	1 (7.1%)	14
-5	20 (87.0%)	1 (4.3%)	0	2 (8.7%)	23
-4	15 (83.3%)	1 (5.6%)	0	2 (11.1%)	18
-3	5 (62.5%)	2 (25.0%)	0	1 (12.5%)	8
-2	9 (90.0%)	1 (10.0%)	0	0	10
-1	6 (66.7%)	1 (11.1%)	0	2 (22.2%)	9
Total	68 (82.9%)	6 (7.3%)	0	8 (9.8%)	82

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁶⁴	Subgroup size
0	12 (85.7%)	0	0	2 (14.3%)	-	14
1	7 (77.8%)	0	2 (22.2%)	0	-	9
2	10 (100.0%)	0	0	0	-	10
3	3 (75.0%)	1 (25.0%)	0	0	0	4
4	10 (90.9%)	0	0	0	1 (9.1%)	11
5	6 (100.0%)	0	0	0	0	6
6	6 (75.0%)	2 (25.0%)	0	0	0	8
7	2 (50.0%)	2 (50.0%)	0	0	0	4
8	3 (75.0%)	1 (25.0%)	0	0	0	4
9	11 (73.3%)	1 (6.7%)	0	2 (13.3%)	1 (6.7%)	15
10	5 (62.5%)	2 (25.0%)	0	0	1 (12.5%)	8
11	11 (52.4%)	6 (28.6%)	3 (14.3%)	0	1 (4.8%)	21
Total	86 (75.4%)	15 (13.1%)	5 (4.4%)	2 (1.8%)	6 (5.3%)	114

⁶⁴ Response added to Picker survey question in study month 3

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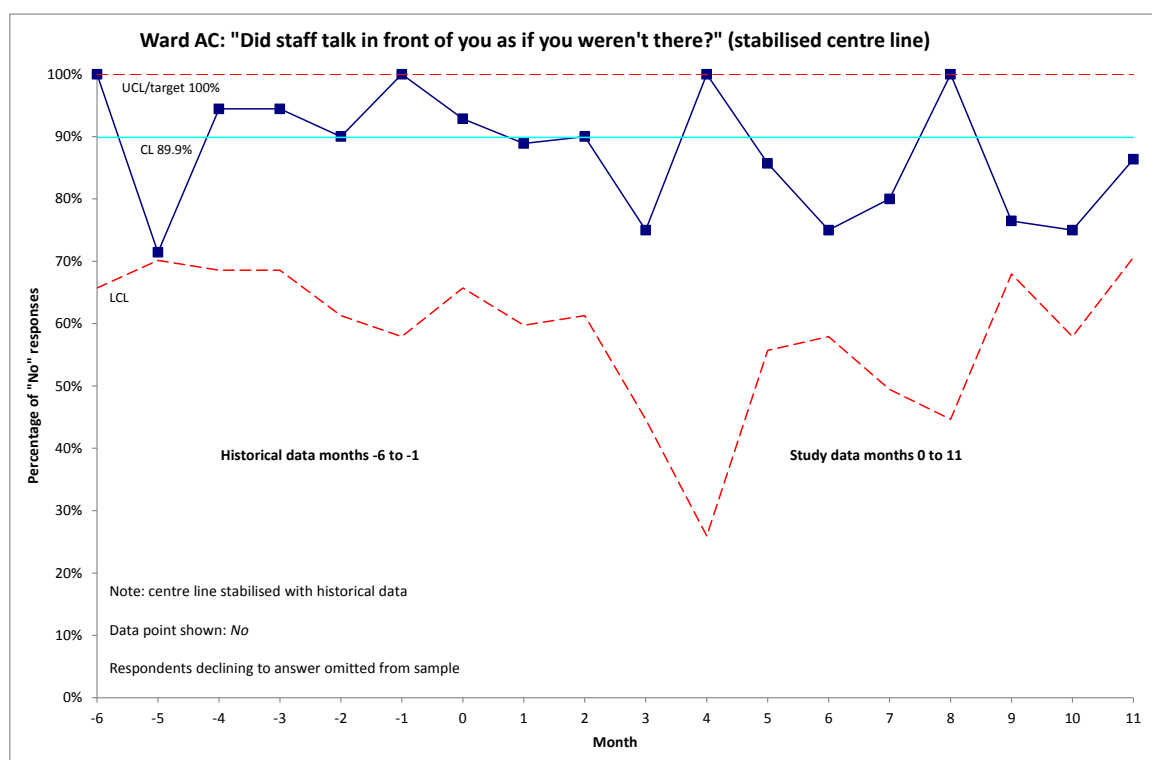
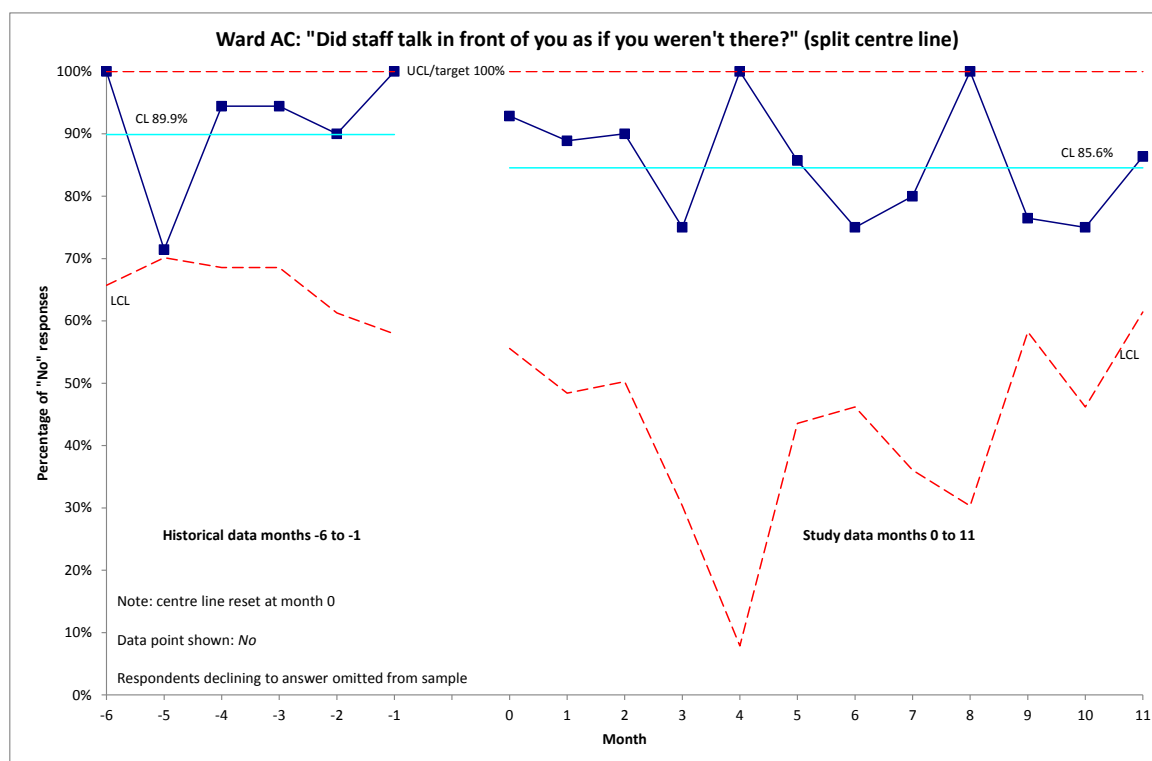
Ward AC question: “Did staff talk in front of you as if you weren’t there?”

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	0	14 (100.0%)	0	14
-5	7 (33.3%)	14 (66.7%)	0	21
-4	1 (7.7%)	12 (92.3%)	0	13
-3	1 (11.1%)	7 (77.8%)	1 (11.1%)	9
-2	1 (10.0%)	9 (90.0%)	0	10
-1	0	8 (100.0%)	0	8
Total	10 (13.3%)	64 (85.4%)	1 (1.3%)	75

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁶⁵	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	1 (7.1%)	-	13 (92.9%)	0	14
1	1 (11.1%)	-	8 (88.9%)	0	9
2	1 (10.0%)	-	9 (90.0%)	0	10
3	0	1 (25.0%)	3 (75.0%)	0	4
4	0	0	2 (100.0%)	0	2
5	0	1 (14.3%)	6 (85.7%)	0	7
6	0	2 (22.2%)	6 (66.7%)	1 (11.1%)	9
7	0	1 (20.0%)	4 (80.0%)	0	5
8	0	0	4 (100.0%)	0	4
9	2 (11.8%)	2 (11.8%)	13 (76.5%)	0	17
10	0	2 (25.0%)	6 (75.0%)	0	8
11	1 (4.4%)	2 (8.7%)	19 (82.6%)	1 (4.4%)	23
Total	6 (5.4%)	11 (9.8%)	93 (83.0%)	2 (1.8%)	112

⁶⁵ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

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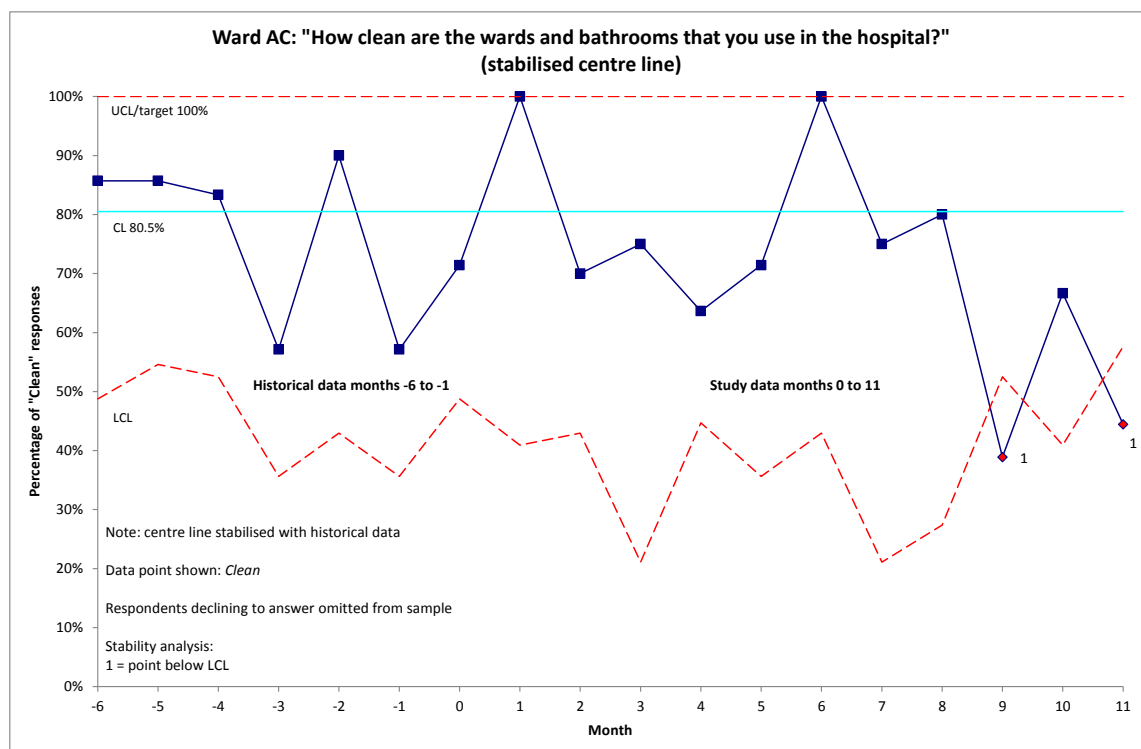
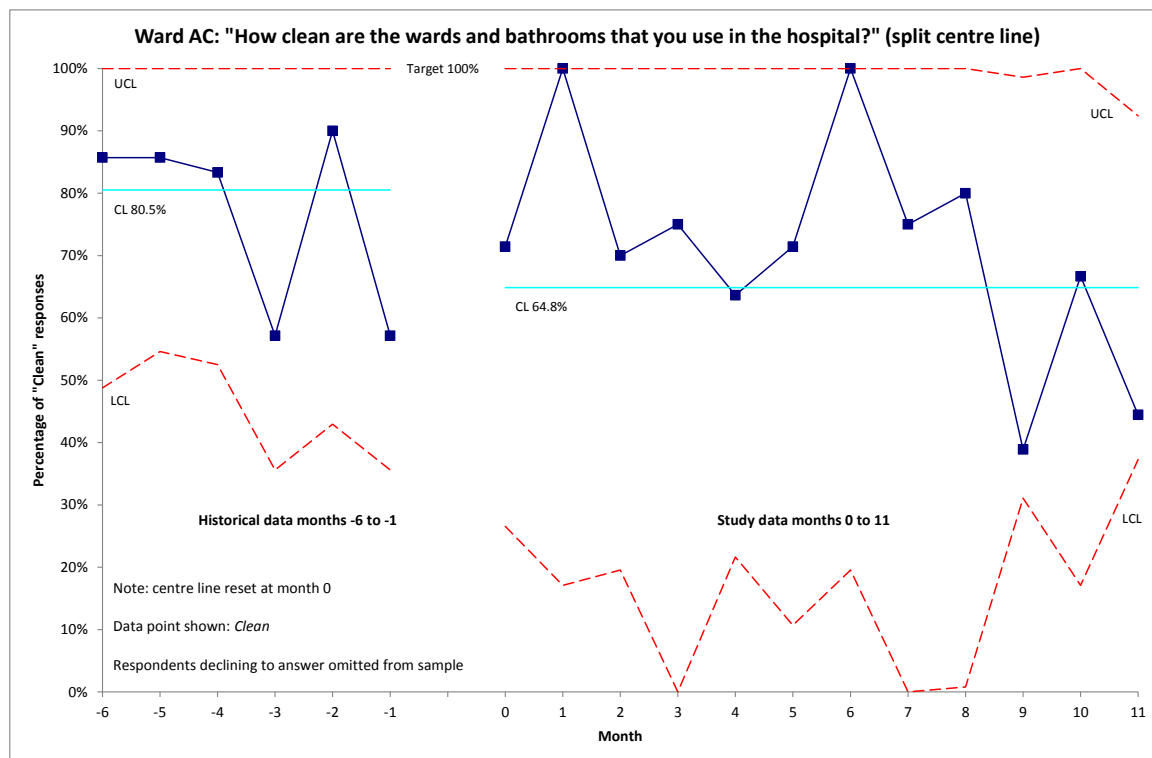


Ward AC question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	12 (85.8%)	1 (7.1%)	1 (7.1%)	0	0	14
-5	18 (85.7%)	2 (9.5%)	1 (4.8%)	0	0	21
-4	15 (83.3%)	2 (11.1%)	0	1 (5.6%)	0	18
-3	4 (44.4%)	2 (22.2%)	1 (11.1%)	1 (11.1%)	1 (11.1%)	9
-2	9 (90.0%)	1 (10.0%)	0	0	0	10
-1	4 (50.0%)	3 (37.5%)	0	0	1 (12.5%)	8
Total	62 (77.4%)	11 (13.8%)	3 (3.8%)	2 (2.5%)	2 (2.5%)	80

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	10 (71.4%)	3 (21.4%)	1 (7.1%)	0	0	14
1	9 (100.0%)	0	0	0	0	9
2	7 (70.0%)	3 (30.0%)	0	0	0	10
3	3 (75.0%)	0	1 (25.0%)	0	0	4
4	7 (63.6%)	4 (36.4%)	0	0	0	11
5	5 (71.4%)	2 (28.6%)	0	0	0	7
6	10 (100.0%)	0	0	0	0	10
7	3 (75.0%)	1 (25.0%)	0	0	0	4
8	4 (80.0%)	1 (20.0%)	0	0	0	5
9	7 (38.9%)	9 (50.0%)	2 (11.1%)	0	0	18
10	6 (66.7%)	3 (33.3%)	0	0	0	9
11	12 (44.4%)	15 (55.6%)	0	0	0	27
Total	83 (64.8%)	41 (32.0%)	4 (3.1%)	0	0	128

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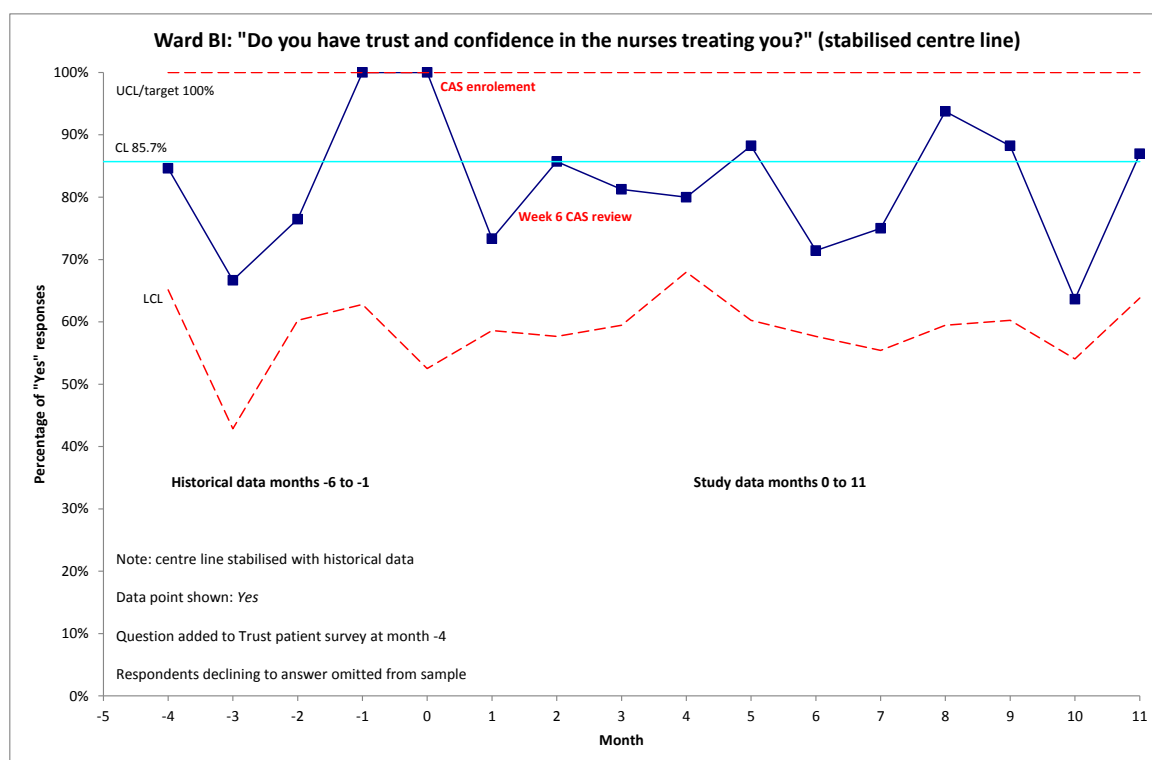
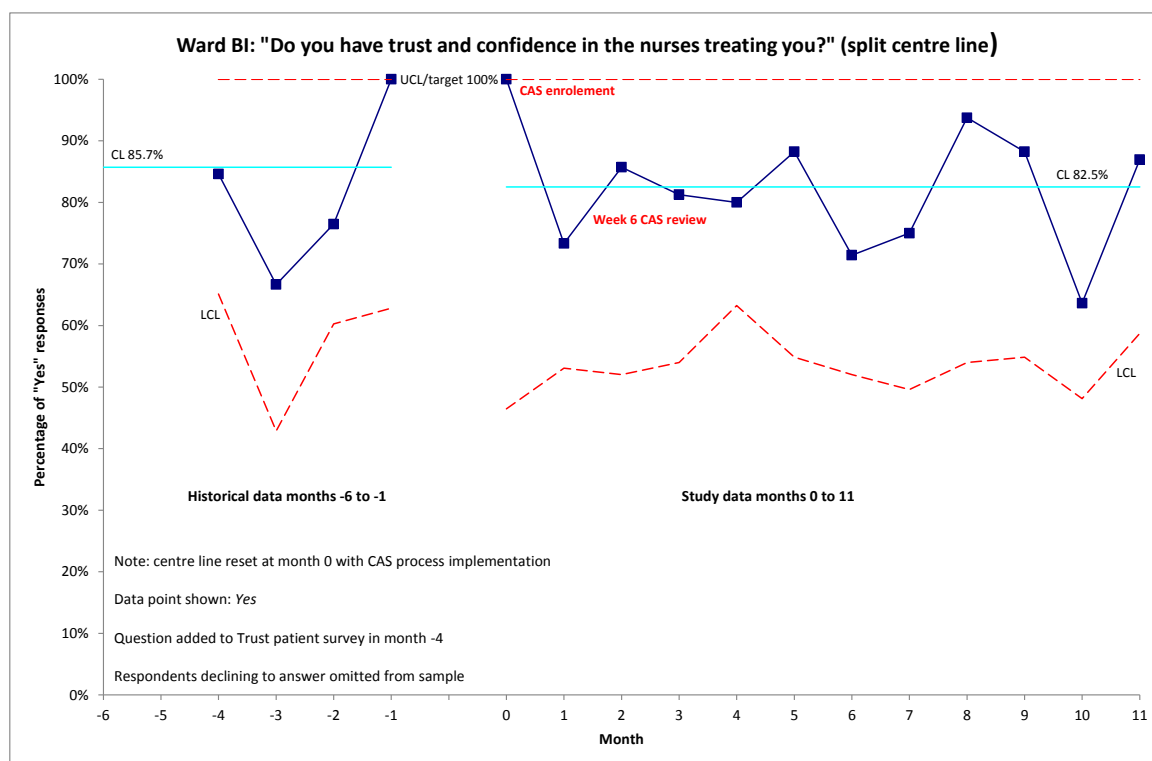
Ward BI question: *“Do you have trust and confidence in the nurses treating you?”*⁶⁶

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	22 (78.5%)	4 (14.3%)	1 (3.6%)	1 (3.6%)	28
-3	4 (66.7%)	1 (16.7%)	1 (16.7%)	0	6
-2	13 (72.2%)	4 (22.2%)	1 (5.6%)	0	18
-1	21 (100.0%)	0	0	0	21
Total	60 (82.2%)	9 (12.3%)	3 (4.1%)	1 (1.4%)	73

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	10 (100.0%)	0	0	0	10
1	11 (73.3%)	4 (26.7%)	0	0	15
2	12 (85.7%)	2 (14.3%)	0	0	14
3	13 (81.3%)	3 (18.8%)	0	0	16
4	28 (80.0%)	7 (20.0%)	0	0	35
5	15 (88.2%)	2 (11.8%)	0	0	17
6	10 (66.7%)	3 (20.0%)	1 (6.7%)	1 (6.7%)	15
7	9 (69.2%)	2 (15.4%)	1 (7.7%)	1 (7.7%)	13
8	15 (88.2%)	1 (5.9%)	0	1 (5.9%)	17
9	15 (88.2%)	1 (5.9%)	1 (5.9%)	0	17
10	7 (63.6%)	4 (36.4%)	0	0	11
11	20 (87.0%)	3 (13.0%)	0	0	23
Total	165 (81.3%)	32 (15.8%)	3 (1.5%)	3 (1.5%)	203

⁶⁶ Question added to Trust patient survey in month -4

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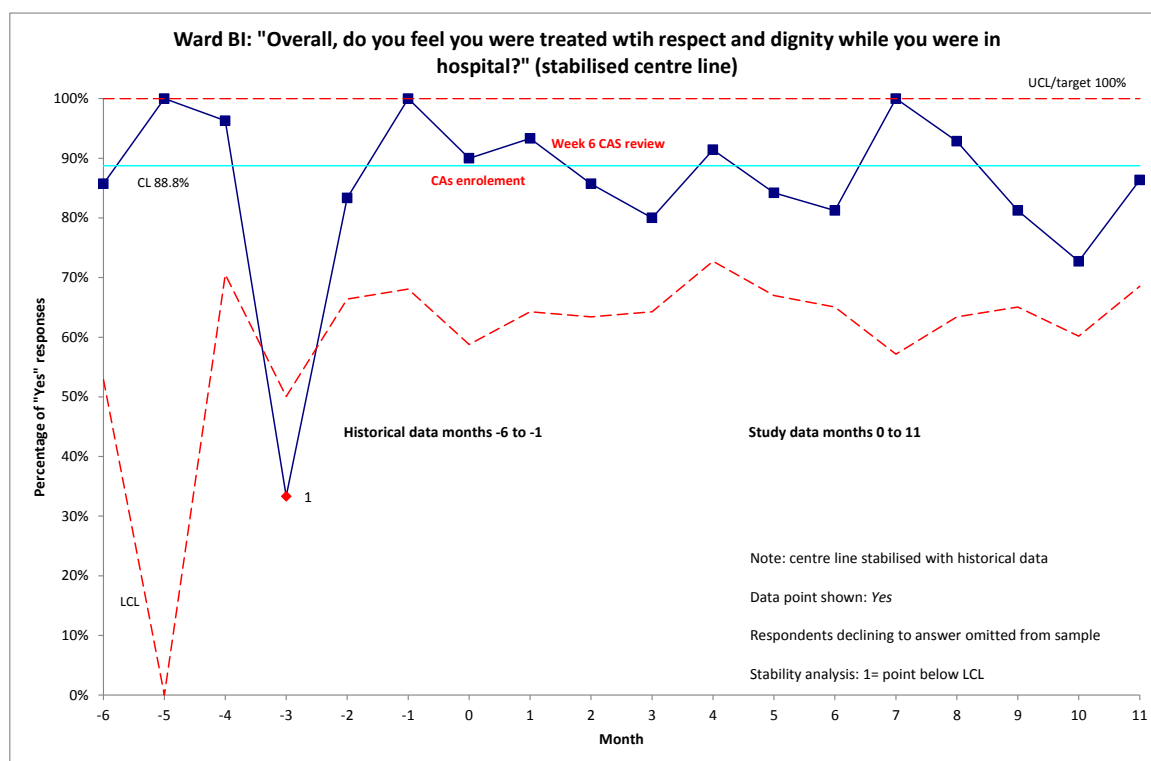
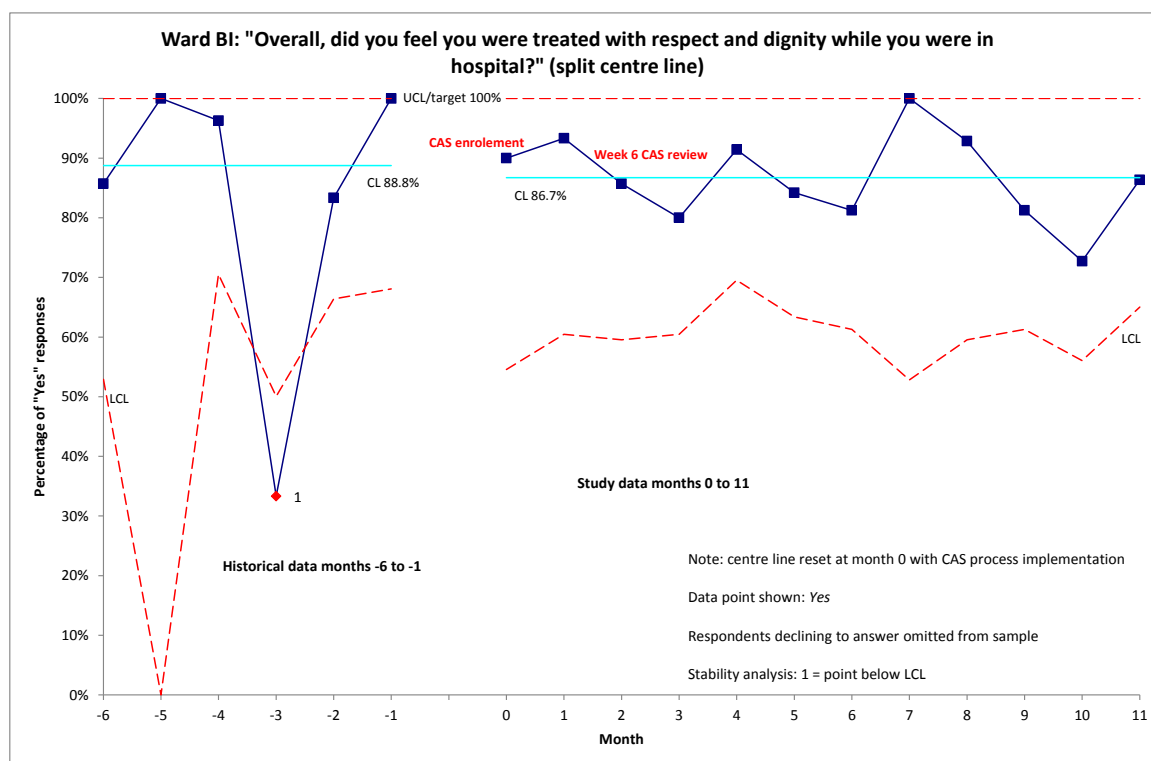


Ward BI question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	6 (85.7%)	1 (14.3%)	0	0	7
-5	1 (100.0%)	0	0	0	1
-4	26 (96.3%)	1 (3.7%)	0	0	27
-3	2 (33.3%)	3 (50.0%)	1 (22.2%)	0	6
-2	15 (83.3%)	3 (16.7%)	0	0	18
-1	21 (100.0%)	0	0	0	21
Total	71 (88.8%)	8 (10.0%)	1 (1.2%)	0	80

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	9 (90.0%)	1 (10.0%)	0	0	10
1	14 (93.3%)	1 (6.7%)	0	0	15
2	12 (85.7%)	2 (14.3%)	0	0	14
3	12 (80.0%)	3 (20.0%)	0	0	15
4	32 (91.4%)	2 (5.7%)	1 (2.9%)	0	35
5	16 (84.2%)	3 (15.8%)	0	0	19
6	13 (81.3%)	3 (18.8%)	0	0	16
7	9 (90.0%)	0	0	1 (10.0%)	10
8	13 (86.7%)	0	1 (6.7%)	1 (6.7%)	15
9	13 (81.3%)	2 (12.5%)	1 (6.3%)	0	16
10	8 (72.7%)	3 (27.3%)	0	0	11
11	19 (86.4%)	3 (13.6%)	0	0	22
Total	170 (85.9%)	23 (11.6%)	3 (1.5%)	2 (1.0%)	198

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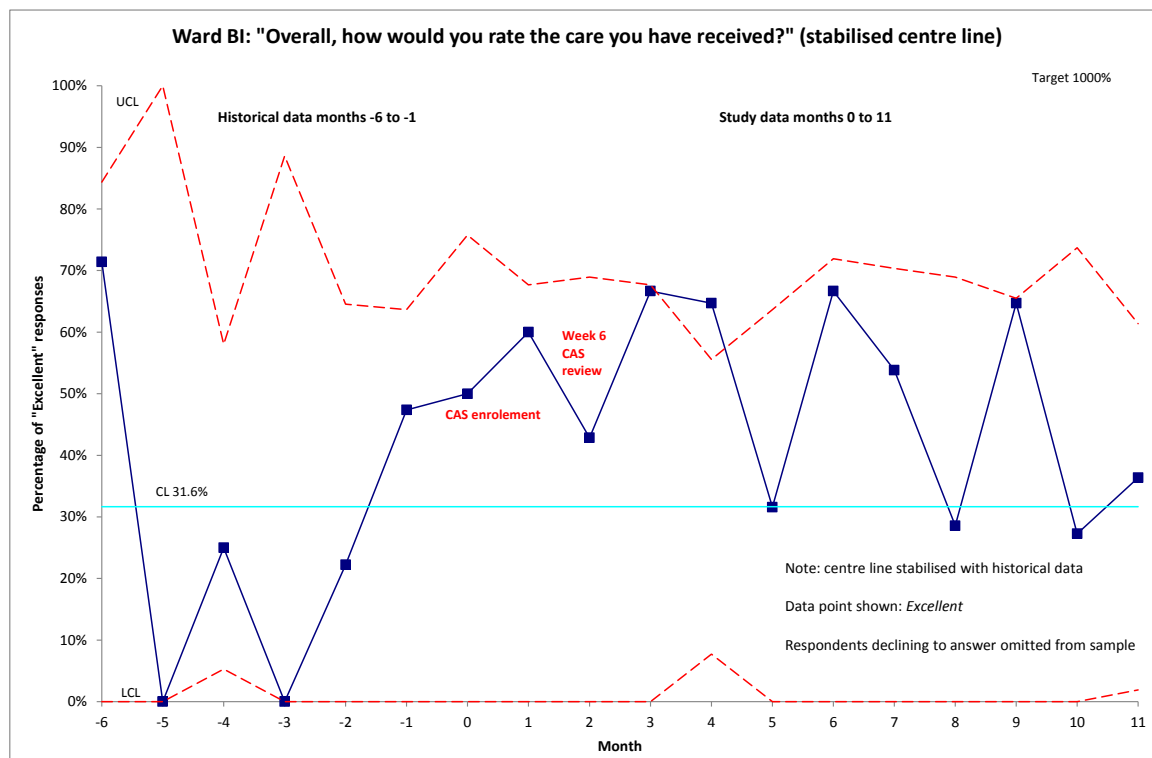
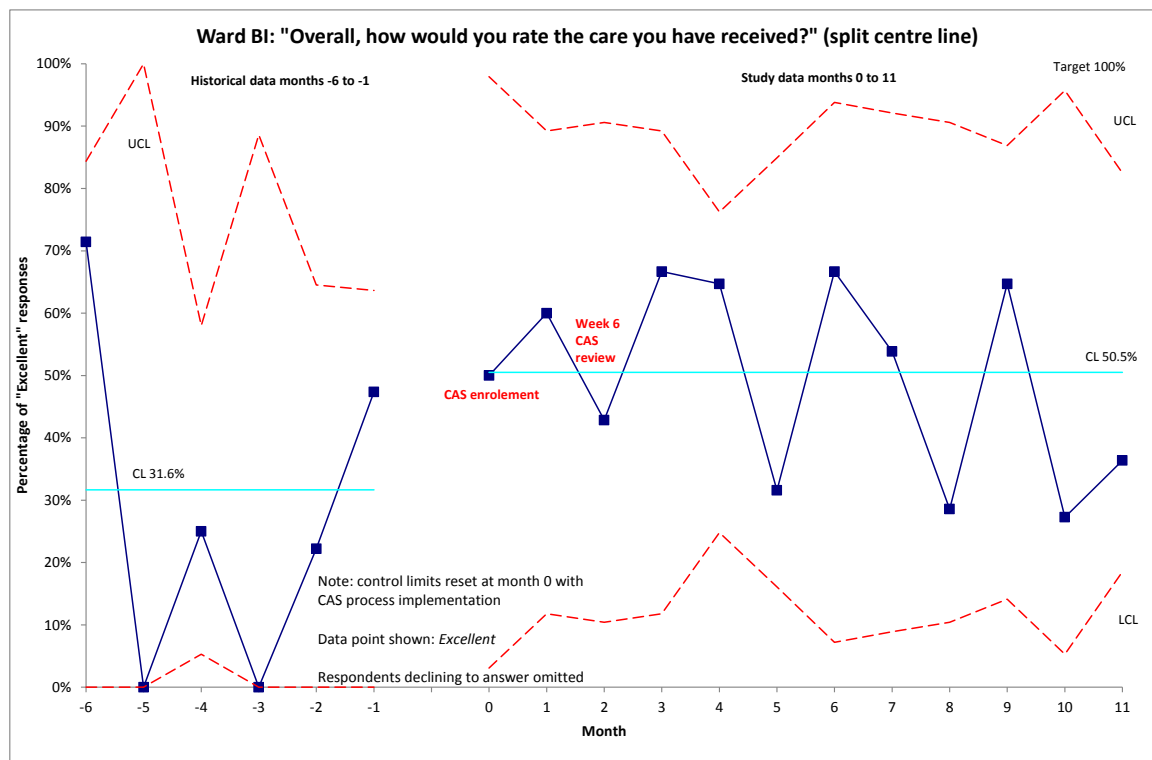


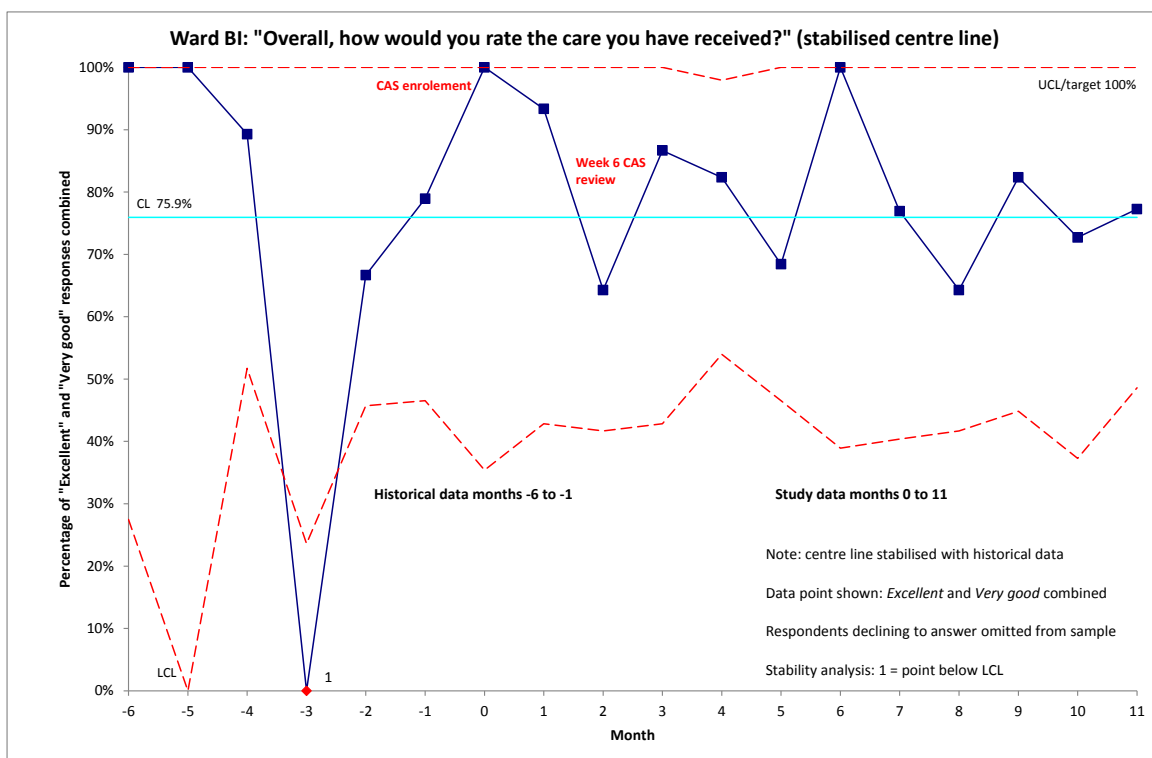
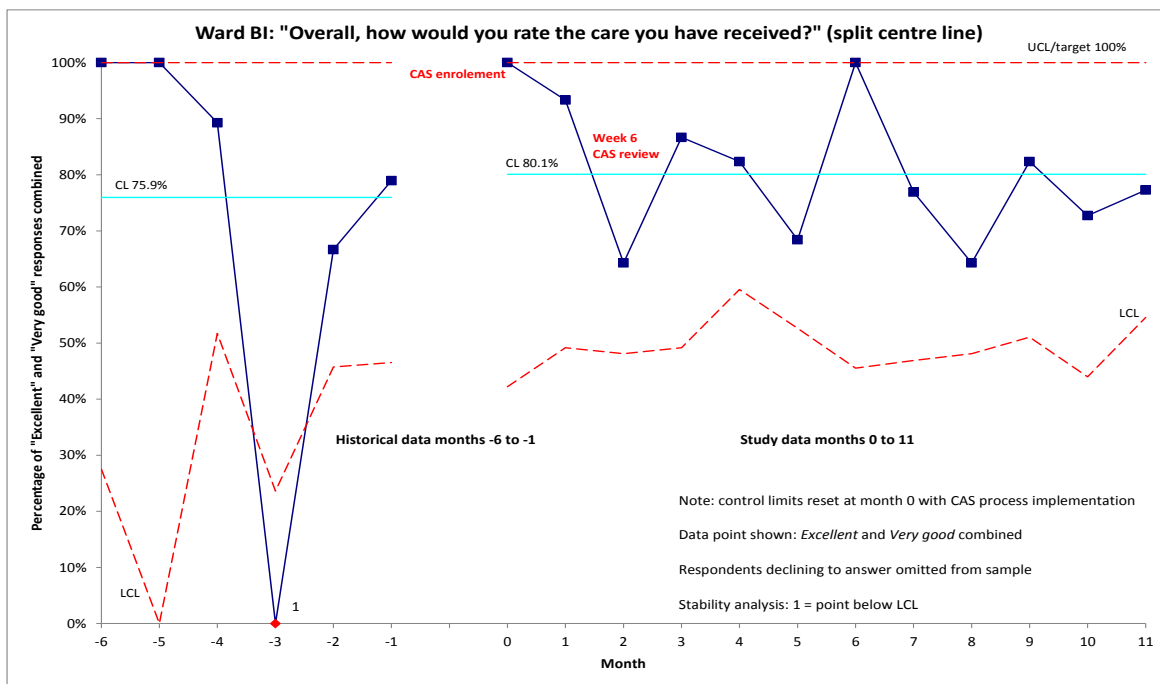
Ward BI question: *“Overall, how would you rate the care you have received?”*

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	5 (71.4%)	2 (28.6%)	0	0	0	0	7
-5	0	1 (100.0%)	0	0	0	0	1
-4	7 (25.0%)	18 (64.3%)	2 (7.1%)	1 (3.6%)	0	0	28
-3	0	0	3 (50.0%)	3 (50.0%)	0	0	6
-2	4 (22.2%)	8 (44.4%)	4 (22.2%)	2 (11.1%)	0	0	18
-1	11 (52.4%)	7 (33.3%)	2 (9.5%)	1 (4.8%)	0	0	21
Total	27 (33.3%)	36 (44.4%)	11 (13.6%)	7 (8.7%)	0	0	81

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	5 (50.0%)	5 (50.0%)	0	0	0	0	10
1	9 (60.0%)	5 (33.3%)	1 (6.7%)	0	0	0	15
2	6 (42.9%)	3 (21.4%)	4 (28.6%)	1 (7.1%)	0	0	14
3	10 (66.7%)	3 (20.0%)	1 (6.7%)	1 (6.7%)	0	0	15
4	22 (64.7%)	6 (17.6%)	5 (14.7%)	1 (3.0%)	0	0	34
5	6 (31.6%)	7 (36.8%)	6 (31.6%)	0	0	0	19
6	8 (61.5%)	4 (30.8%)	0	0	0	1 (7.7%)	13
7	7 (53.9%)	3 (23.1%)	0	2 (15.4%)	1 (7.7%)	0	13
8	4 (26.7%)	5 (33.3%)	3 (20.0%)	1 (6.7%)	1 (6.6%)	1 (6.7%)	15
9	11 (64.7%)	3 (17.7%)	2 (11.8%)	0	1 (5.9%)	0	17
10	3 (27.3%)	5 (45.5%)	3 (27.3%)	0	0	0	11
11	8 (36.4%)	9 (40.9%)	5 (22.7%)	0	0	0	22
Total	99 (50.0%)	58 (29.3%)	30 (15.2%)	6 (3.0%)	3 (1.5%)	2 (1.0%)	198

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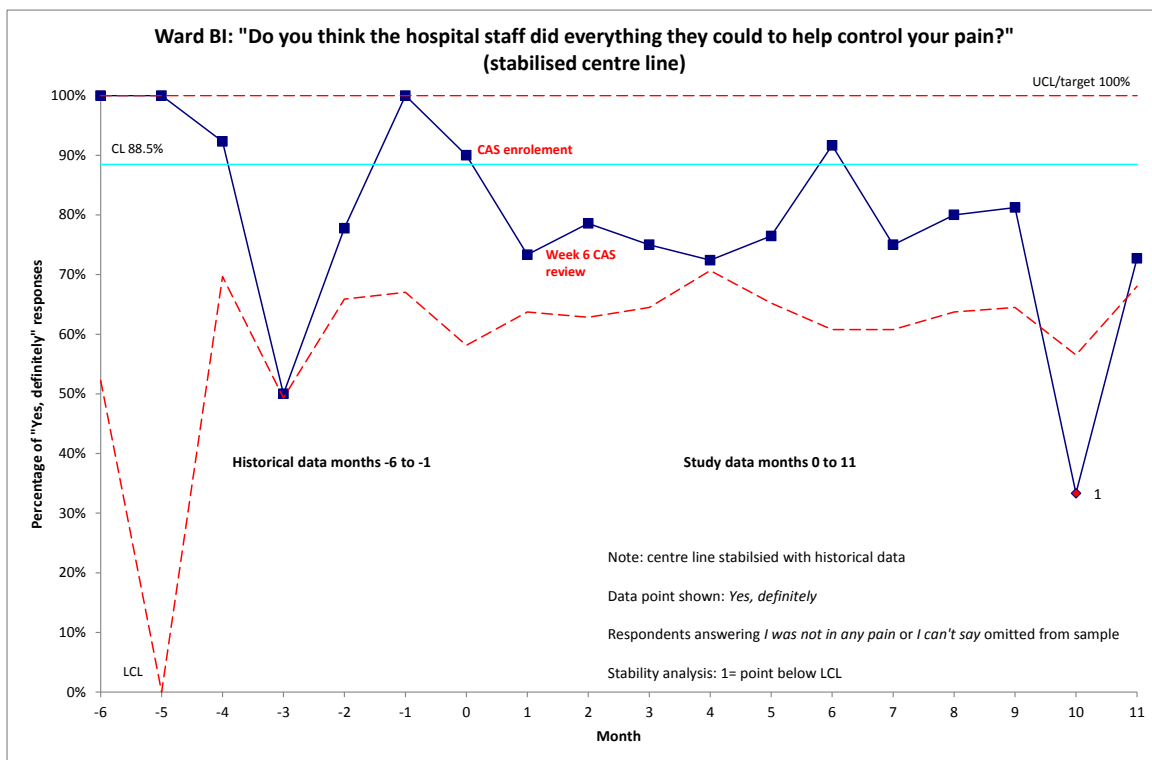
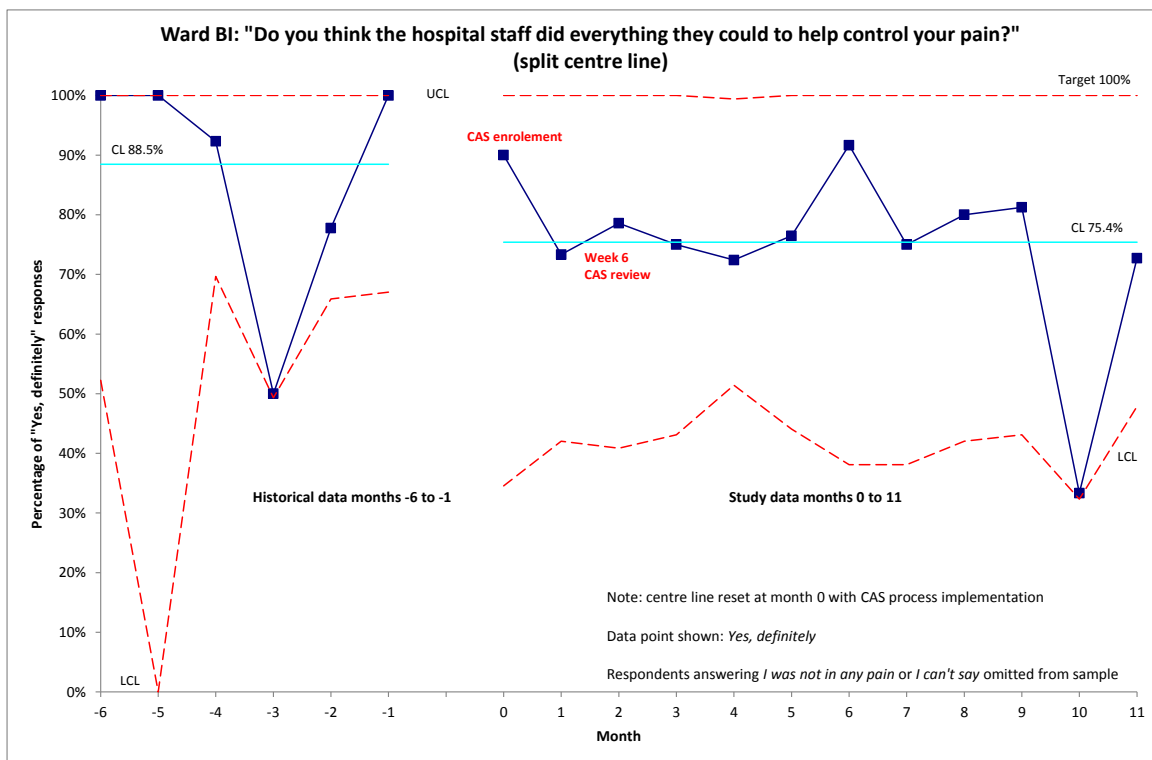
10. Appendices

Ward BI question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	7 (100.0%)	0	0	0	7
-5	1 (100.0%)	0	0	0	1
-4	24 (88.9%)	2 (7.4%)	0	1 (3.7%)	27
-3	3 (50.0%)	3 (50.0%)	0	0	6
-2	14 (77.7%)	3 (16.7%)	1 (5.6%)	0	18
-1	20 (95.2%)	0	0	1 (4.8%)	21
Total	69 (86.2%)	8 (10.0%)	1 (1.3%)	2 (2.5%)	80

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁶⁷	Subgroup size
0	9 (90.0%)	1 (10.0%)	0	0	-	10
1	11 (73.3%)	1 (6.7%)	3 (20.0%)	0	-	15
2	11 (78.6%)	3 (21.4%)	0	0	-	14
3	12 (75.0%)	3 (18.8%)	1 (6.3%)	0	0	16
4	21 (72.4%)	7 (24.1%)	1 (3.5%)	0	0	29
5	13 (76.5%)	4 (23.5%)	0	0	0	17
6	11 (84.6%)	1 (7.7%)	0	0	1 (7.7%)	13
7	9 (69.2%)	0	3 (23.1%)	0	1 (7.7%)	13
8	12 (80.0%)	0	3 (20.0%)	0	0	15
9	13 (76.5%)	2 (11.8%)	1 (5.9%)	0	1 (5.9%)	17
10	3 (27.3%)	6 (54.6%)	0	0	2 (18.2%)	11
11	16 (72.8%)	6 (27.3%)	0	0	0	22
Total	141 (73.4%)	34 (17.7%)	12 (6.3%)	0	5 (2.6%)	192

⁶⁷ Response added to Picker survey question in study month 3



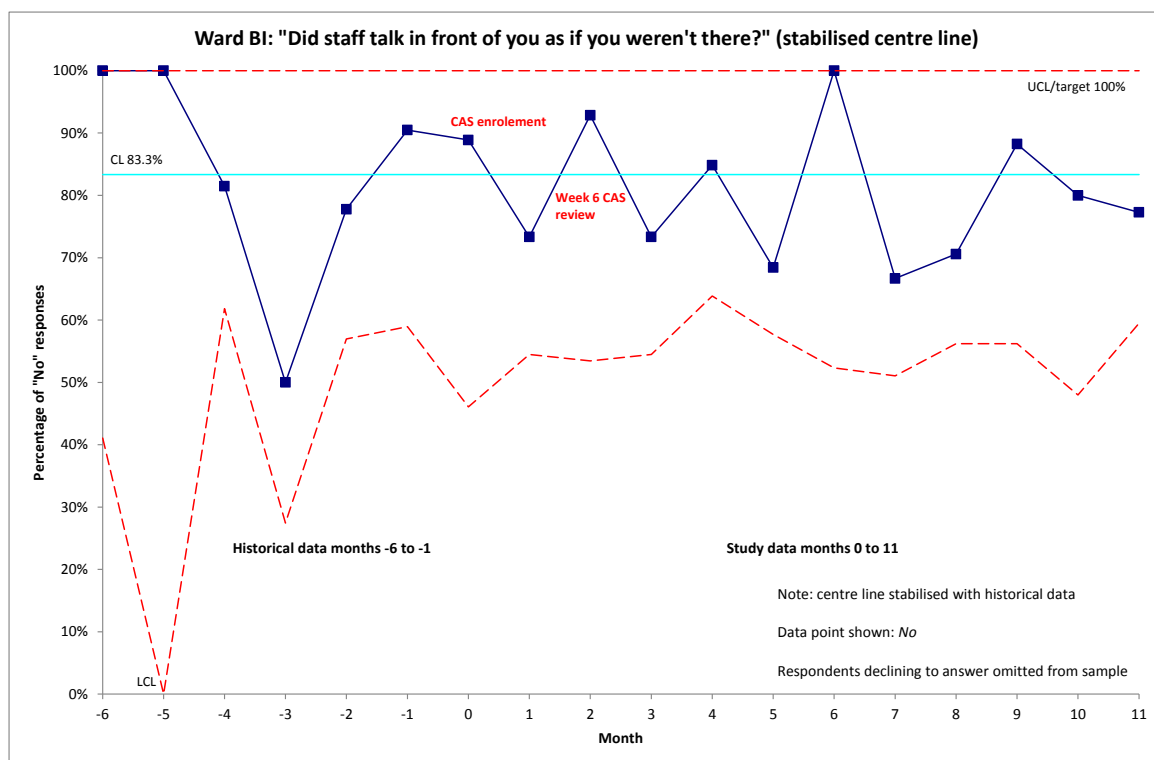
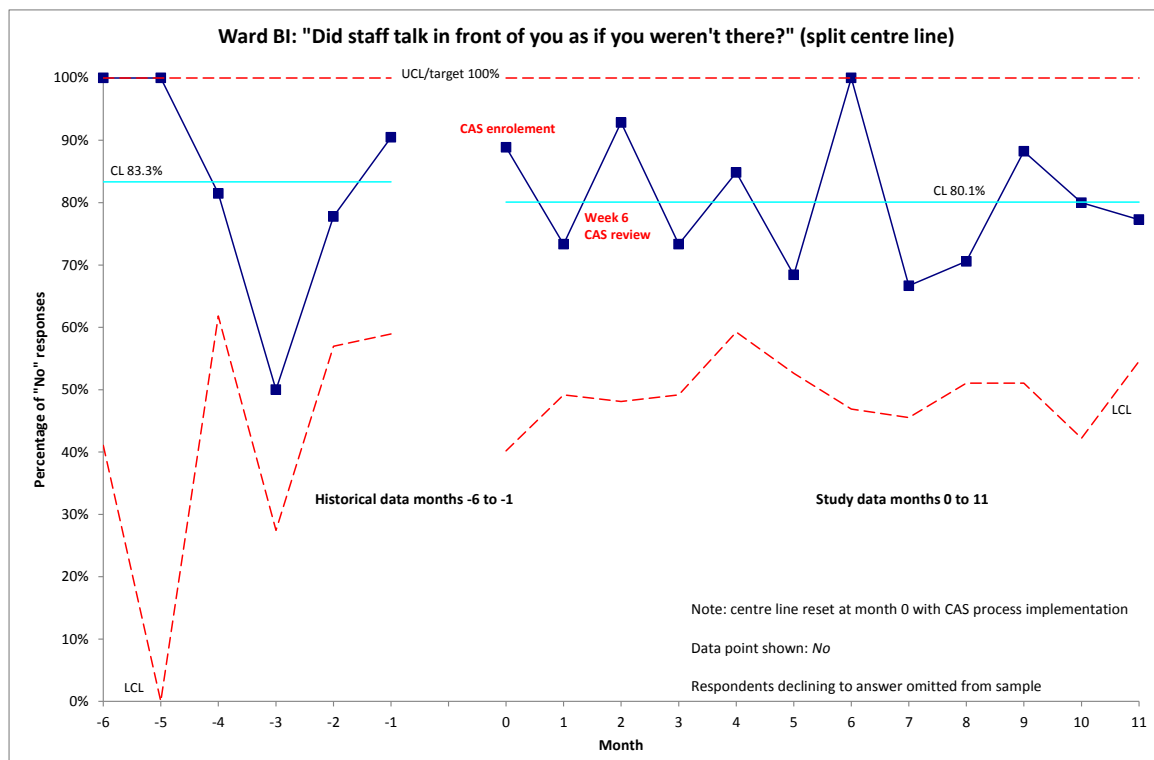
10. Appendices

Ward BI question: *“Did staff talk in front of you as if you weren’t there?”*

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	0	7 (100.0%)	0	7
-5	0	1 (100.0)	0	1
-4	5 (18.5%)	22 (81.5)	0	27
-3	2 (50.0%)	2 (50.0%)	0	4
-2	4 (22.2%)	14 (77.8%)	0	18
-1	2 (9.1%)	19 (90.4%)	1 (4.5%)	22
Total	13 (16.5%)	65 (82.3%)	1 (1.2%)	79

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁶⁸	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	1 (10.0%)	-	8 (80.0%)	1 (10.0%)	10
1	4 (26.7%)	-	11 (73.3%)	0	15
2	1 (7.1%)	-	13 (92.9%)	0	14
3	1 (6.3%)	3 (18.8%)	11 (68.8%)	1 (6.3%)	16
4	0	5 (14.7%)	28 (82.4%)	1 (2.9%)	34
5	1 (5.3%)	5 (26.3%)	13 (68.4%)	0	19
6	0	0	13 (100.0%)	0	13
7	2 (15.4%)	2 (15.4%)	8 (61.5%)	1 (7.7%)	13
8	0	5 (29.4%)	12 (70.6%)	0	17
9	0	2 (11.7%)	15 (88.2%)	0	17
10	1 (9.1%)	1 (9.1%)	8 (72.7%)	1 (9.1%)	11
11	1 (4.4%)	4 (17.4%)	17 (73.9%)	1 (4.4%)	23
Total	12 (6.0%)	27 (13.4%)	157 (77.7%)	6 (3.0%)	202

⁶⁸ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

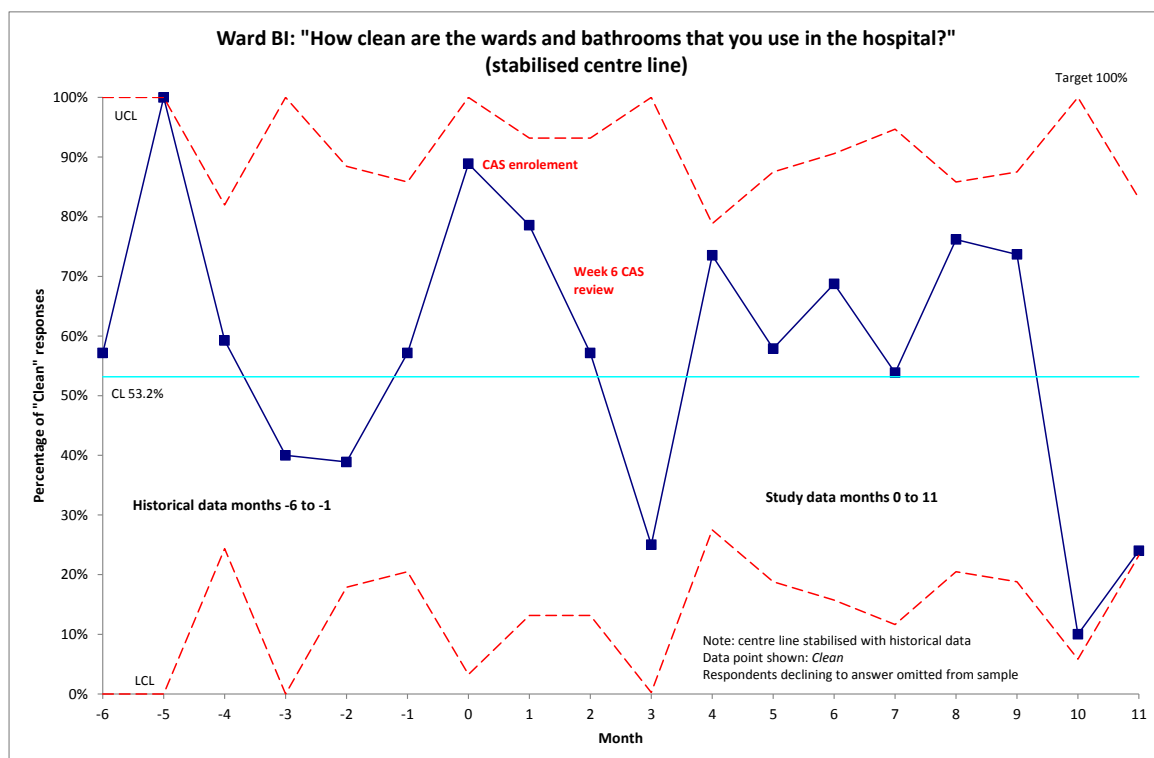
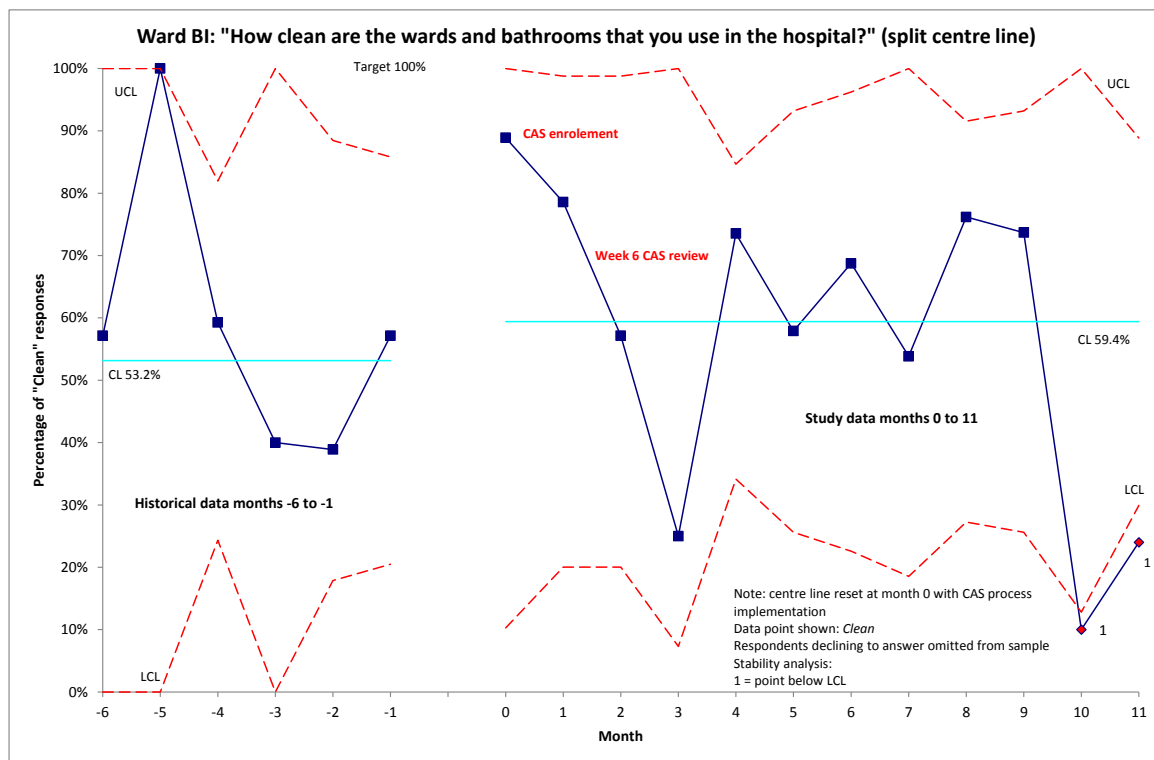


10. Appendices

Ward BI question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	4 (57.1%)	3 (42.9%)	0	0	0	7
-5	1 (100.0%)	0	0	0	0	1
-4	16 (59.3%)	10 (37.0%)	0	1 (3.7%)	0	27
-3	2 (33.2%)	1 (16.7%)	1 (16.7%)	1 (16.7%)	1 (16.7%)	6
-2	7 (38.9%)	10 (55.6%)	1 (5.6%)	0	0	18
-1	12 (57.1%)	9 (42.9%)	0	0	0	21
Total	42 (52.5%)	33 (41.3%)	2 (2.5%)	2 (2.5%)	1 (1.25%)	80

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	8 (88.9%)	1 (11.1%)	0	0	0	9
1	11 (78.6%)	2 (14.3%)	1 (7.1%)	0	0	14
2	8 (57.1%)	5 (35.7%)	1 (7.1%)	0	0	14
3	2 (25.0%)	6 (75.0%)	0	0	0	8
4	25 (73.5%)	5 (14.7%)	3 (8.8%)	1 (2.9%)	0	34
5	11 (57.9%)	6 (31.6%)	1 (5.3%)	1 (5.3%)	0	19
6	11 (68.8%)	5 (31.3%)	0	0	0	16
7	7 (53.9%)	4 (30.8%)	1 (7.7%)	1 (7.7%)	0	13
8	16 (76.2%)	3 (14.3%)	1 (4.8%)	1 (4.8%)	0	21
9	14 (73.7%)	5 (26.3%)	0	0	0	19
10	1 (7.7%)	8 (61.5%)	0	1 (7.7%)	3 (23.1%)	13
11	6 (23.1%)	17 (65.4%)	1 (3.9%)	1 (3.9%)	1 (3.9%)	26
Total	120 (58.3%)	67 (32.5%)	9 (4.4%)	6 (2.9%)	4 (1.9%)	206



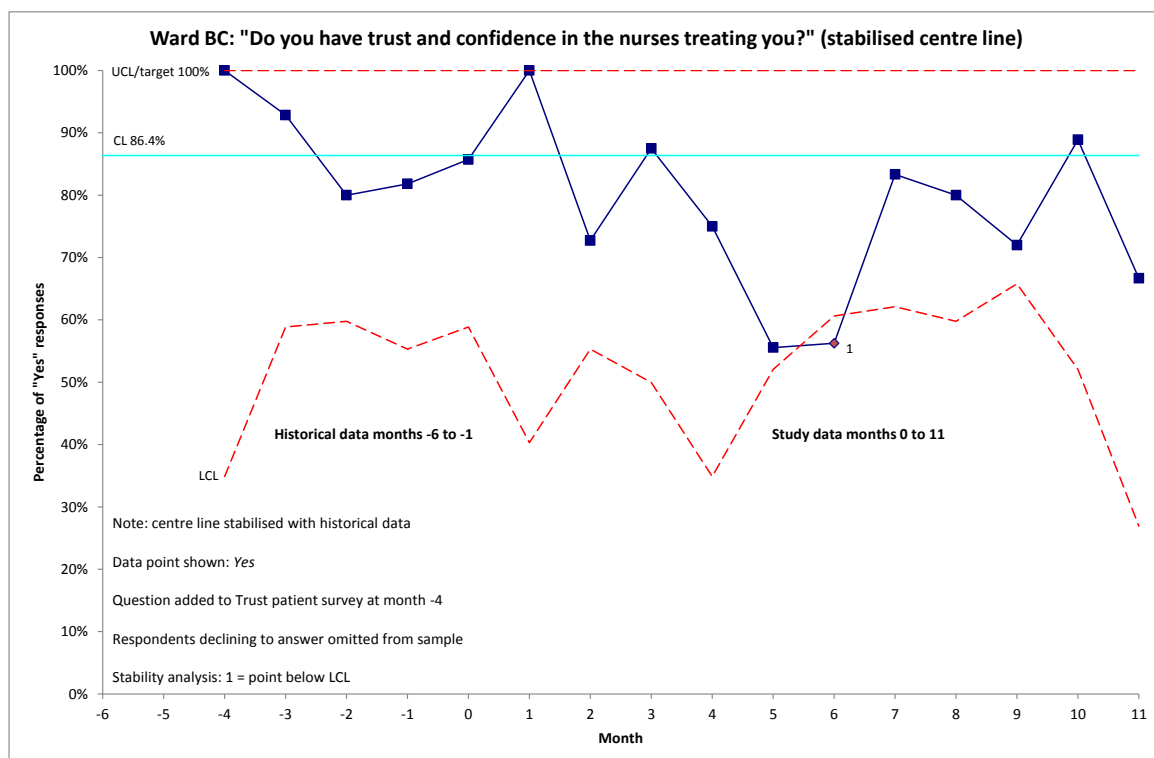
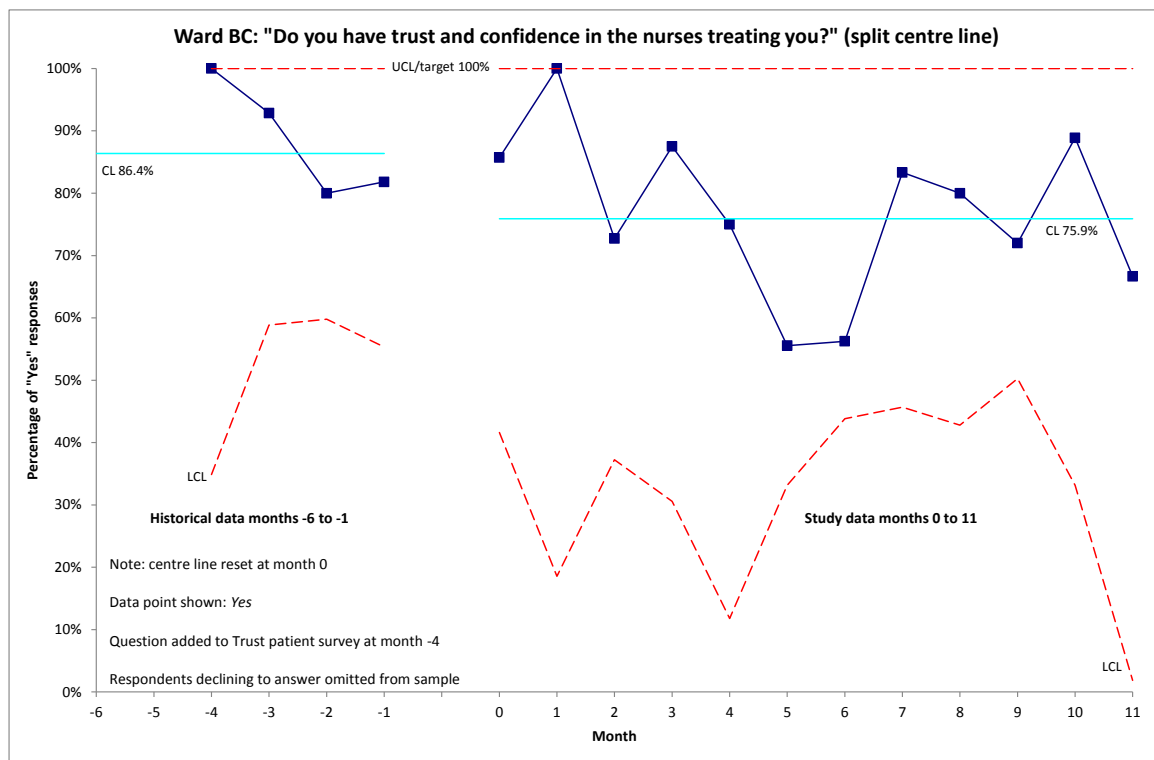
10. Appendices

Ward BC question: *“Do you have trust and confidence in the nurses treating you?”*⁶⁹

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	4 (100.0%)	0	0	0	4
-3	13 (92.9%)	1 (7.1%)	0	0	14
-2	12 (80.0%)	3 (20.0%)	0	0	15
-1	9 (81.8%)	2 (18.2%)	0	0	11
Total	38 (86.4%)	6 (13.6%)	0	0	44

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	12 (85.7%)	2 (14.3%)	0	0	14
1	5 (100.0%)	0	0	0	5
2	8 (72.7%)	3 (27.3%)	0	0	11
3	7 (87.5%)	1 (12.0%)	0	0	8
4	3 (75.0%)	1 (25.0%)	0	0	4
5	5 (55.6%)	4 (44.4%)	0	0	9
6	9 (56.3%)	6 (37.5%)	1 (6.3%)	0	16
7	15 (83.3%)	2 (11.1%)	1 (5.6%)	0	18
8	12 (80.0%)	2 (13.3%)	1 (6.7%)	0	15
9	18 (72.0%)	6 (24.0%)	1 (4.0%)	0	25
10	8 (88.9%)	1 (11.1%)	0	0	9
11	2 (66.7%)	1 (33.3%)	0	0	3
Total	104 (75.9%)	29 (21.2%)	4 (3.0%)	0	137

⁶⁹ Question added to Trust patient survey in month -4

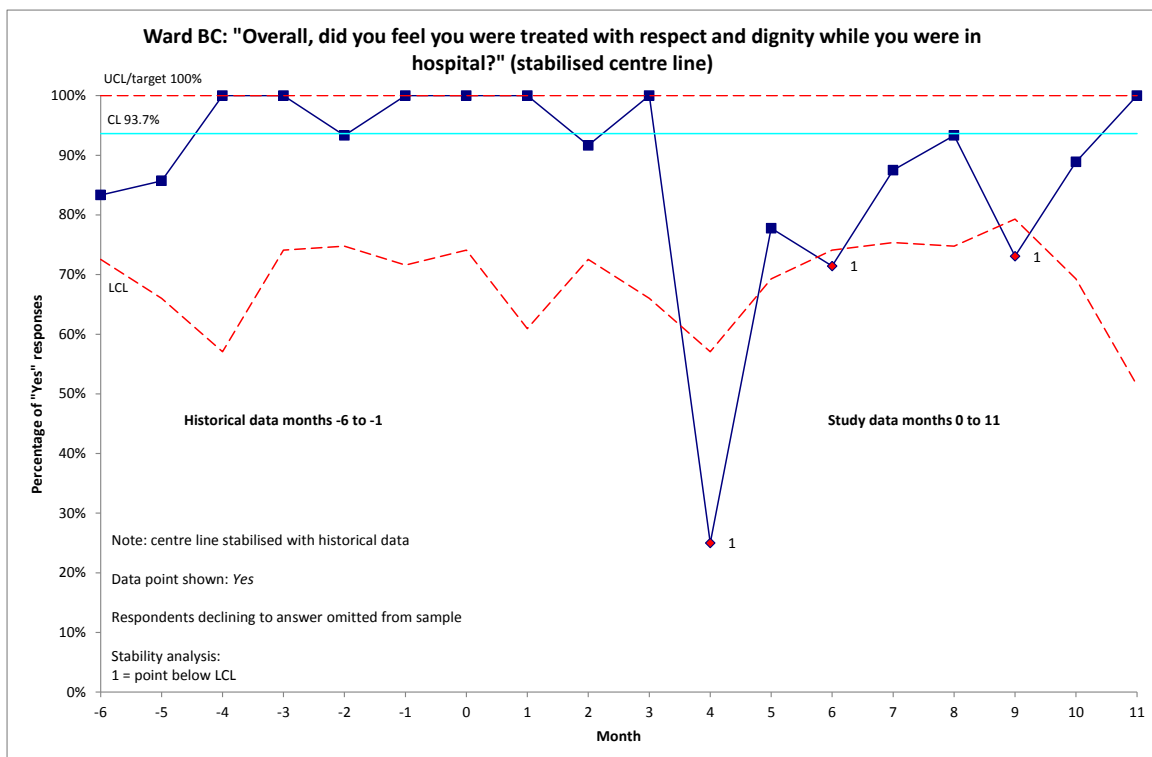
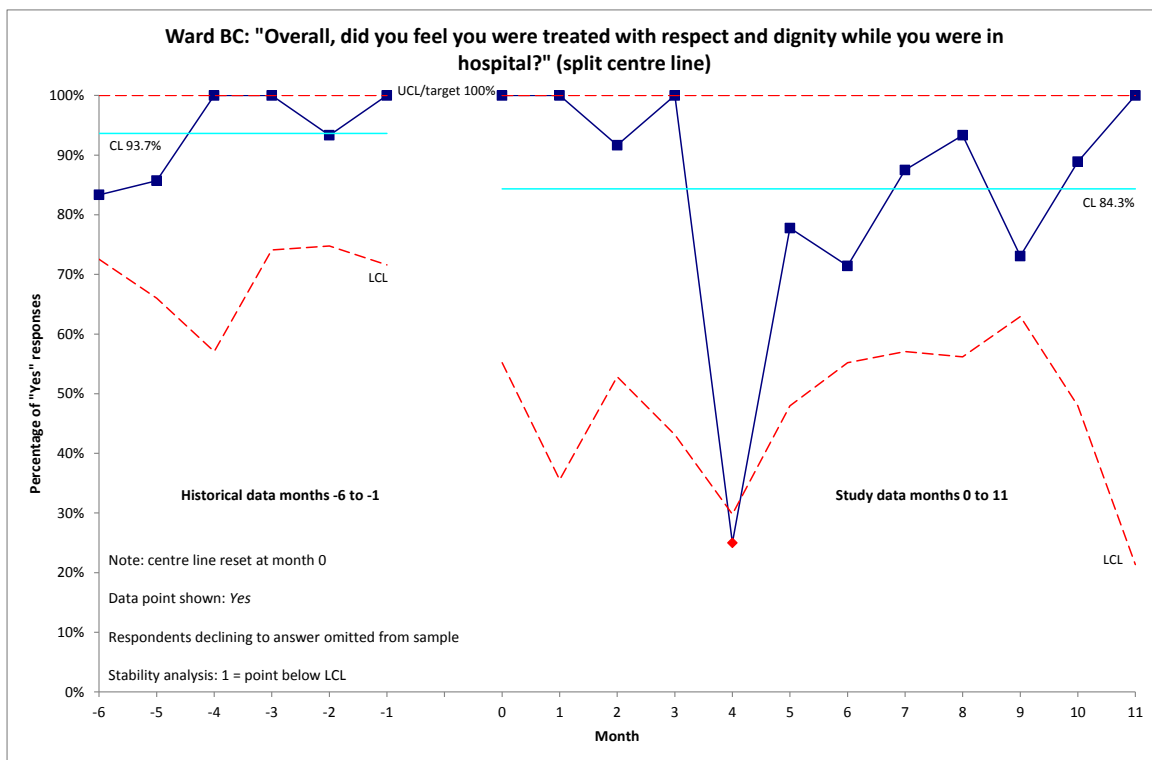


10. Appendices

Ward BC question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	10 (83.3%)	2 (16.7%)	0	0	12
-5	6 (75.0%)	1 (12.5%)	0	1 (12.5%)	8
-4	4 (100.0%)	0	0	0	4
-3	14 (100.0%)	0	0	0	14
-2	14 (93.3%)	0	1 (6.7%)	0	15
-1	11 (100.0%)	0	0	0	11
Total	59 (92.2%)	3 (4.6%)	1 (1.6%)	1 (1.6%)	64

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	14 (100.0%)	0	0	0	14
1	5 (100.0%)	0	0	0	5
2	11 (91.7%)	1 (8.3%)	0	0	12
3	7 (100.0%)	0	0	0	7
4	1 (25.0%)	1 (25.0%)	2 (50.0%)	0	4
5	7 (77.8%)	2 (22.2%)	0	0	9
6	10 (71.4%)	3 (21.4%)	1 (7.1%)	0	14
7	14 (87.4%)	1 (6.3%)	1 (6.3%)	0	16
8	14 (93.3%)	1 (6.7%)	0	0	15
9	19 (73.1%)	6 (23.1%)	1 (3.8%)	0	26
10	8 (88.9%)	1 (11.1%)	0	0	9
11	3 (100.0%)	0	0	0	3
Total	113 (84.3%)	16 (11.9%)	5 (3.8%)	0	134

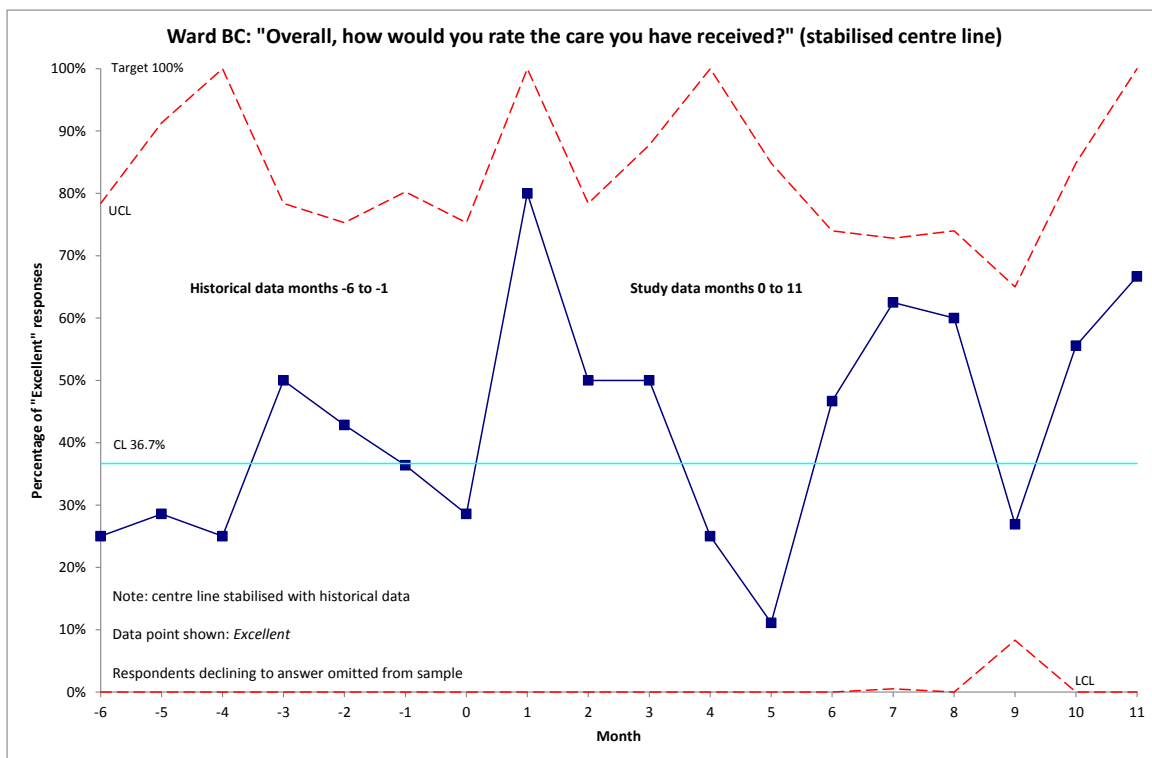
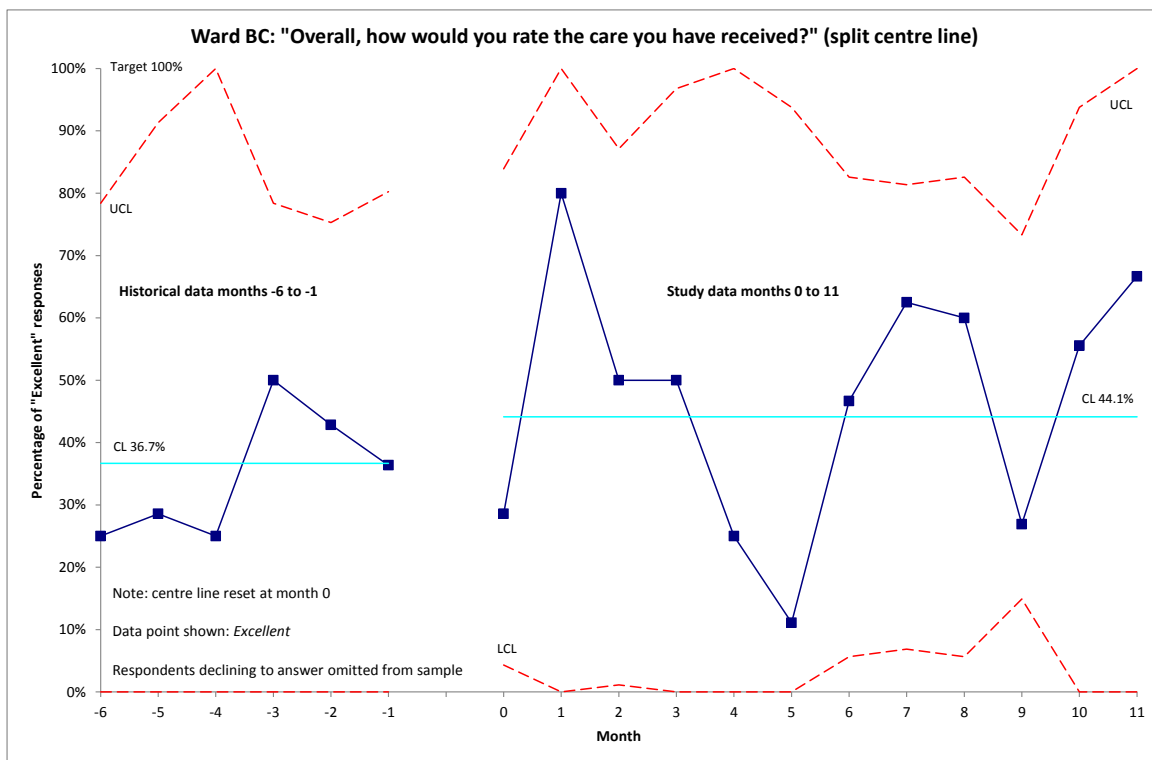


10. Appendices

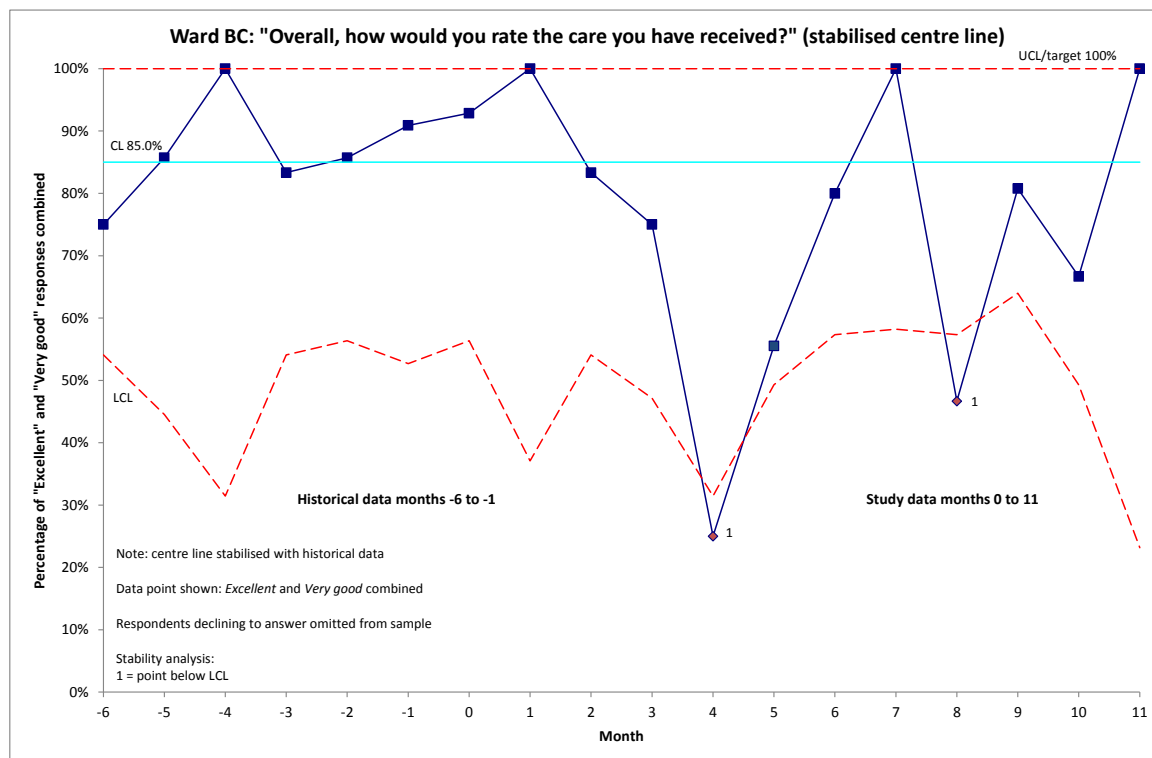
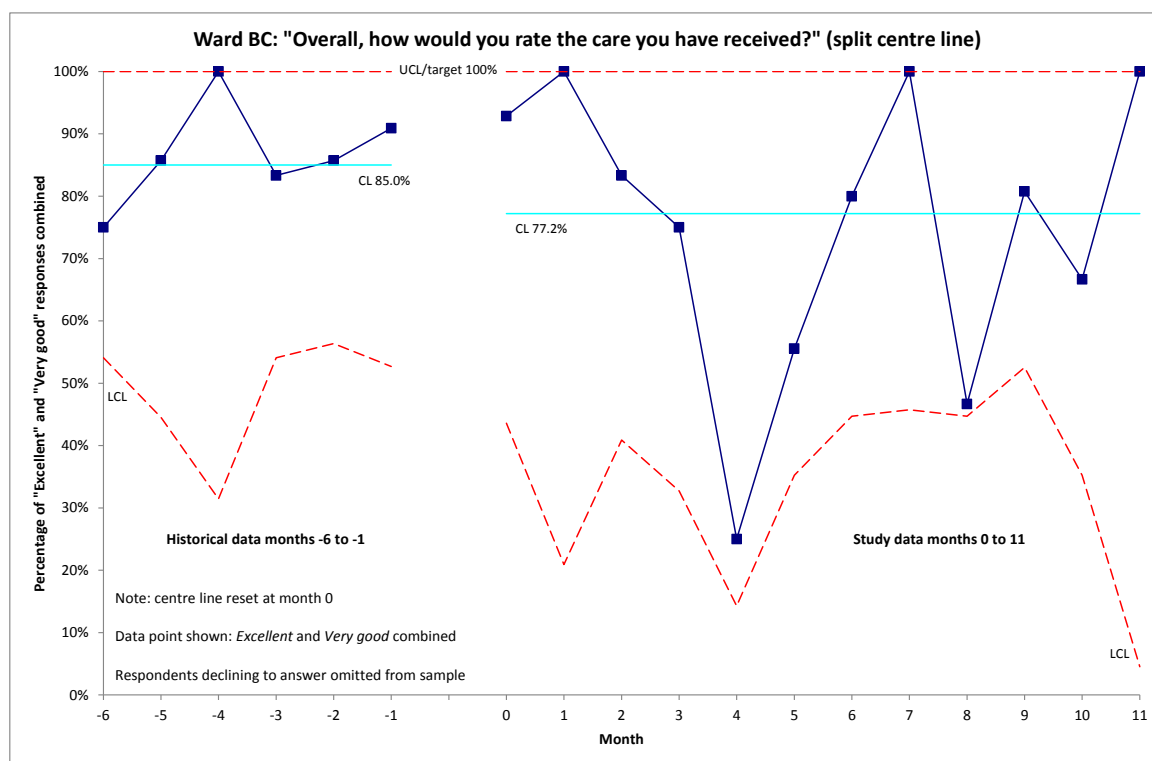
Ward BC question: *“Overall, how would you rate the care you have received?”*

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	3 (25.0%)	6 (50.0%)	3 (25.0%)	0	0	0	12
-5	2 (25.0%)	4 (50.0%)	1 (12.5%)	0	0	1 (12.5%)	8
-4	1 (25.0%)	3 (75.0%)	0	0	0	0	4
-3	6 (50.0%)	4 (33.3%)	1 (8.3%)	1 (8.3%)	0	0	12
-2	6 (42.9%)	6 (42.9%)	1 (7.1%)	1 (7.1%)	0	0	14
-1	4 (36.4%)	6 (54.5%)	1 (9.1%)	0	0	0	11
Total	22 (36.1%)	29 (47.5%)	7 (11.5%)	2 (3.3%)	0	1 (1.6%)	61

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	4 (28.6%)	9 (64.3%)	1 (7.1%)	0	0	0	14
1	4 (80.0%)	1 (20.0%)	0	0	0	0	5
2	6 (50.0%)	4 (33.3%)	2 (16.7%)	0	0	0	12
3	4 (50.0%)	2 (25.0%)	2 (25.0%)	0	0	0	8
4	1 (25.0%)	0	2 (50.0%)	1 (25.0%)	0	0	4
5	1 (11.1%)	4 (44.4%)	4 (44.4%)	0	0	0	9
6	7 (46.7%)	5 (33.3%)	2 (13.3%)	0	1 (6.7%)	0	15
7	10 (62.5%)	6 (37.5%)	0	0	0	0	16
8	9 (60.0%)	2 (13.3%)	2 (13.3%)	1 (6.7%)	1 (6.7%)	0	15
9	7 (26.9%)	14(53.9%)	3 (11.5%)	2 (7.7%)	0	0	26
10	5 (55.6%)	1 (11.1%)	3 (33.3%)	0	0	0	9
11	2 (66.7%)	1 (33.3%)	0	0	0	0	3
Total	60 (44.1%)	49 (36.0%)	21 (15.4%)	4 (3.0%)	2 (1.5%)	0	136



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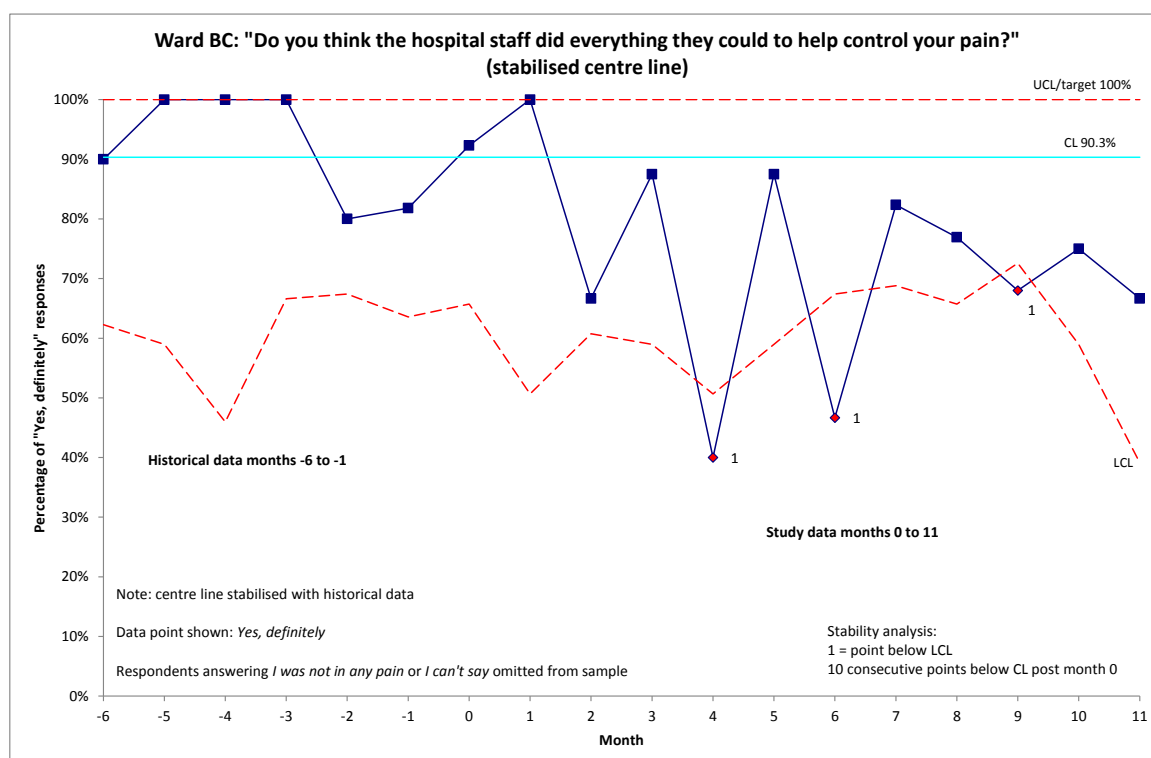
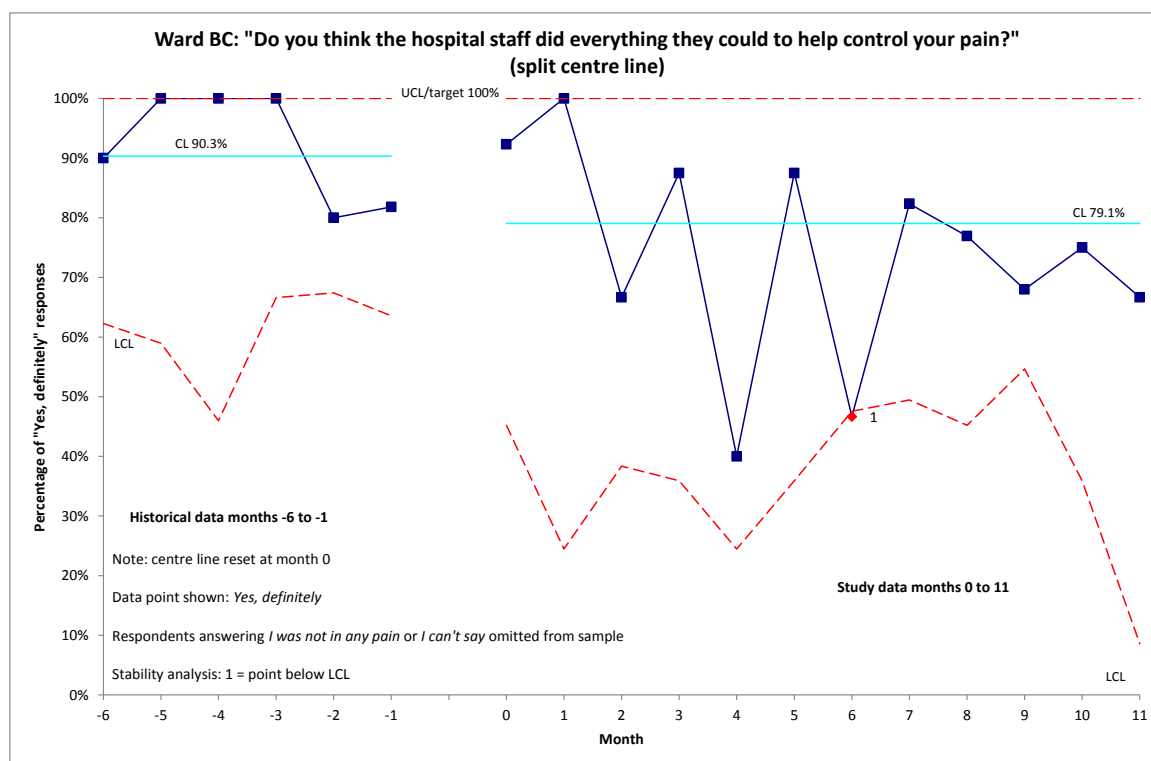
Ward BC question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	9 (81.8%)	1 (9.1%)	0	1 (9.1%)	11
-5	8 (100.0%)	0	0	0	8
-4	4 (100.00%)	0	0	0	4
-3	14 (100.00%)	0	0	0	14
-2	12 (80.0%)	3 (20.0%)	0	0	15
-1	9 (81.8%)	2 (18.2%)	0	0	11
Total	56 (88.9%)	6 (9.5%)	0	1 (1.6%)	63

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁷⁰	Subgroup size
0	12 (85.8%)	1 (7.1%)	0	1 (7.1%)	-	14
1	5 (100.00%)	0	0	0	-	5
2	6 (50.00%)	2 (16.67%)	1 (8.3%)	3(25.0%)	-	12
3	7 (87.5%)	0	1 (12.5%)	0	0	8
4	2 (40.0%)	1 (20.0%)	2 (40.0%)	0	0	5
5	7 (77.8%)	1 (11.1%)	0	0	1 (11.1%)	9
6	7 (46.7%)	7 (46.7%)	1 (6.7%)	0	0	15
7	14 (82.4%)	1 (5.8%)	2 (11.8%)	0	0	17
8	10 (71.4%)	2 (14.4%)	1 (7.1%)	0	1 (7.1%)	14
9	17 (68.0%)	6 (24.0%)	2 (8.0%)	0	0	25
10	6 (66.7%)	2 (22.2%)	0	0	1 (11.1%)	9
11	2 (66.7%)	0	1 (33.3%)	0	0	3
Total	95 (69.9%)	23 (16.9%)	11 (8.1%)	0	7 (5.1%)	136

⁷⁰ Response added to Picker survey question in study month 3

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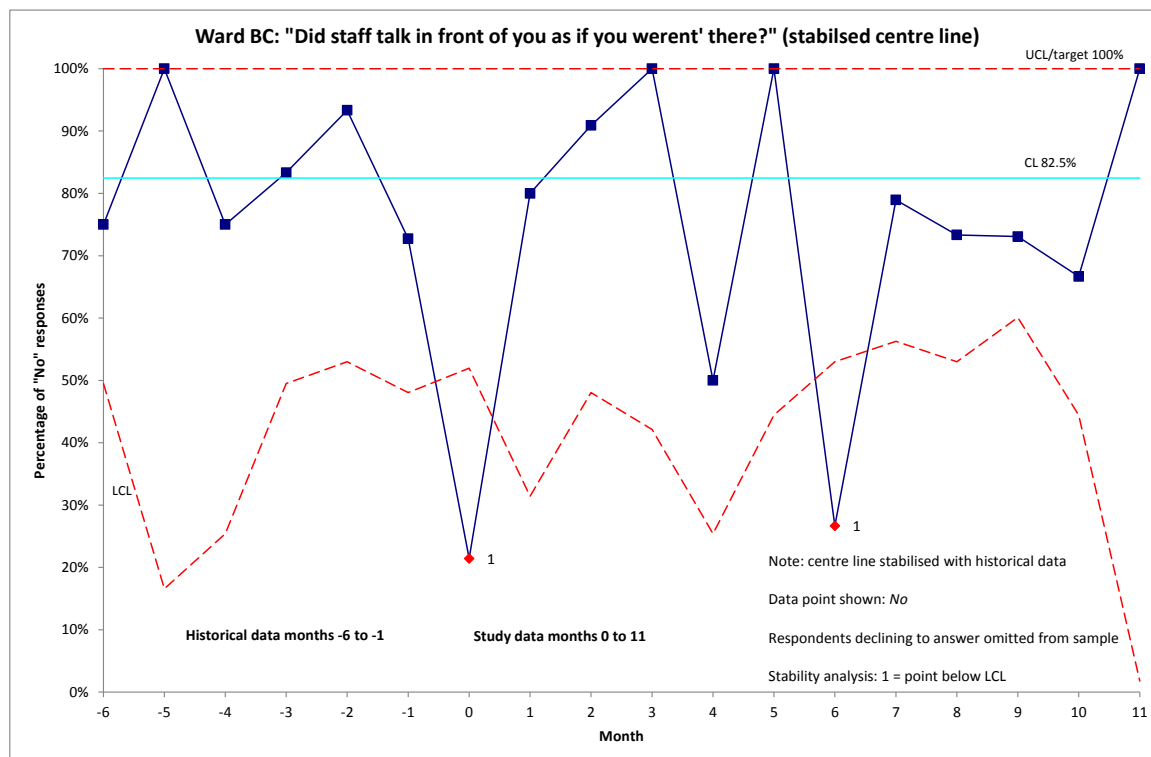
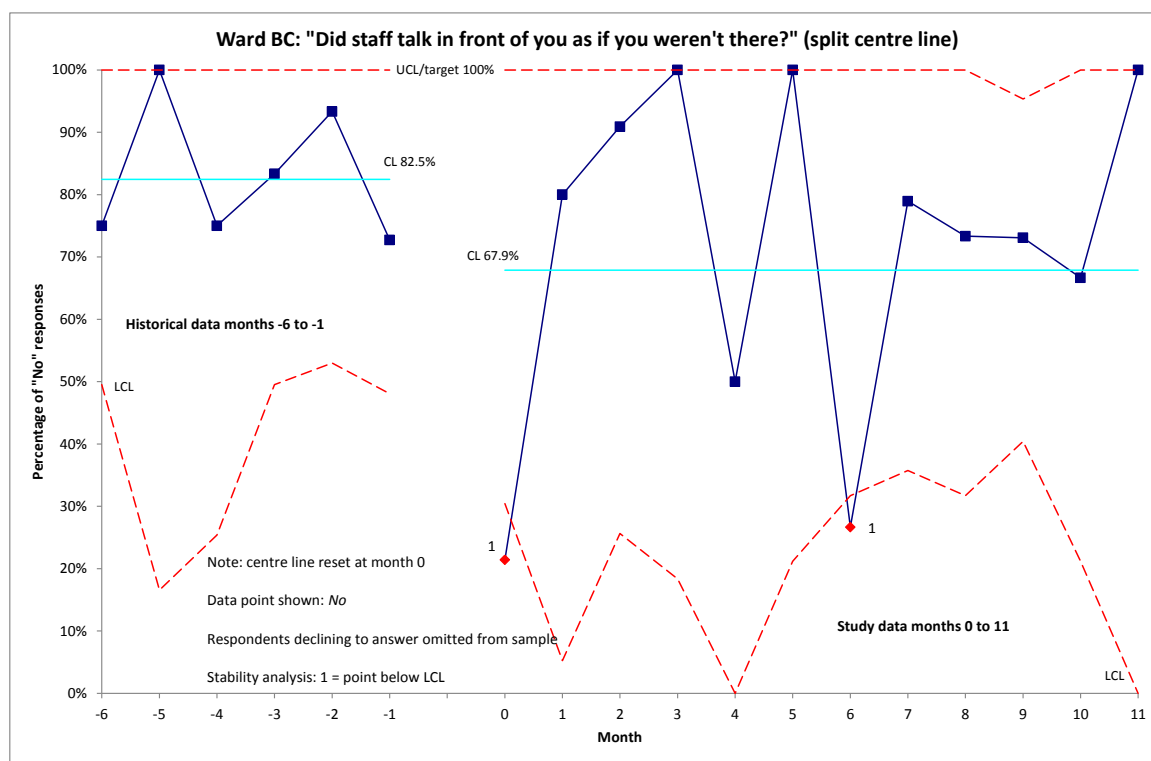
Ward BC question: “Did staff talk in front of you as if you weren’t there?”

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	3 (33.3%)	9 (66.7%)	0	12
-5	0	3 (37.5%)	5 (62.5%)	8
-4	1 (25.0%)	3 (75.0%)	0	4
-3	2 (16.7%)	10 (83.3%)	0	12
-2	1 (6.7%)	14 (93.3%)	0	15
-1	3 (27.3%)	8 (72.7%)	0	11
Total	10 (16.1%)	47 (75.8%)	5 (8.1%)	62

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁷¹	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	11 (78.6%)	-	3 (21.4%)	0	14
1	1 (20.0%)	-	4 (80.0%)	0	5
2	1 (8.3%)	-	10 (83.3%)	1 (8.3%)	12
3	0	0	8 (100.0%)	0	8
4	1 (25.0%)	1 (25.0%)	2 (50.0%)	0	4
5	0	0	9 (100.0%)	0	9
6	3 (20.0%)	8 (53.3%)	4 (26.7%)	0	15
7	2 (10.5%)	2 (10.5%)	15 (79.0%)	0	19
8	0	4 (26.7%)	11 (73.3%)	0	15
9	1 (3.8%)	6 (23.1%)	19 (73.1%)	0	26
10	1 (11.1%)	2 (22.2%)	6 (66.7%)	0	9
11	0	0	2 (100.0%)	0	2
Total	21 (15.2%)	23 (16.7%)	93 (67.4%)	1 (0.7%)	138

⁷¹ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

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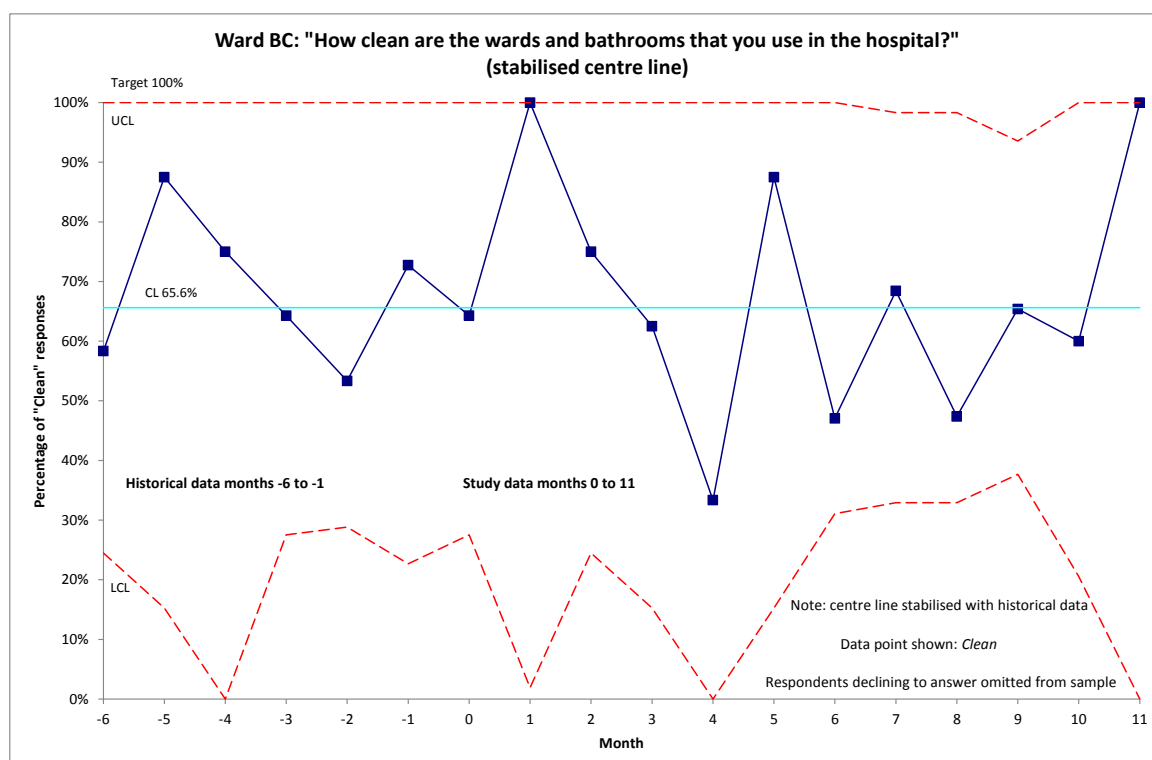
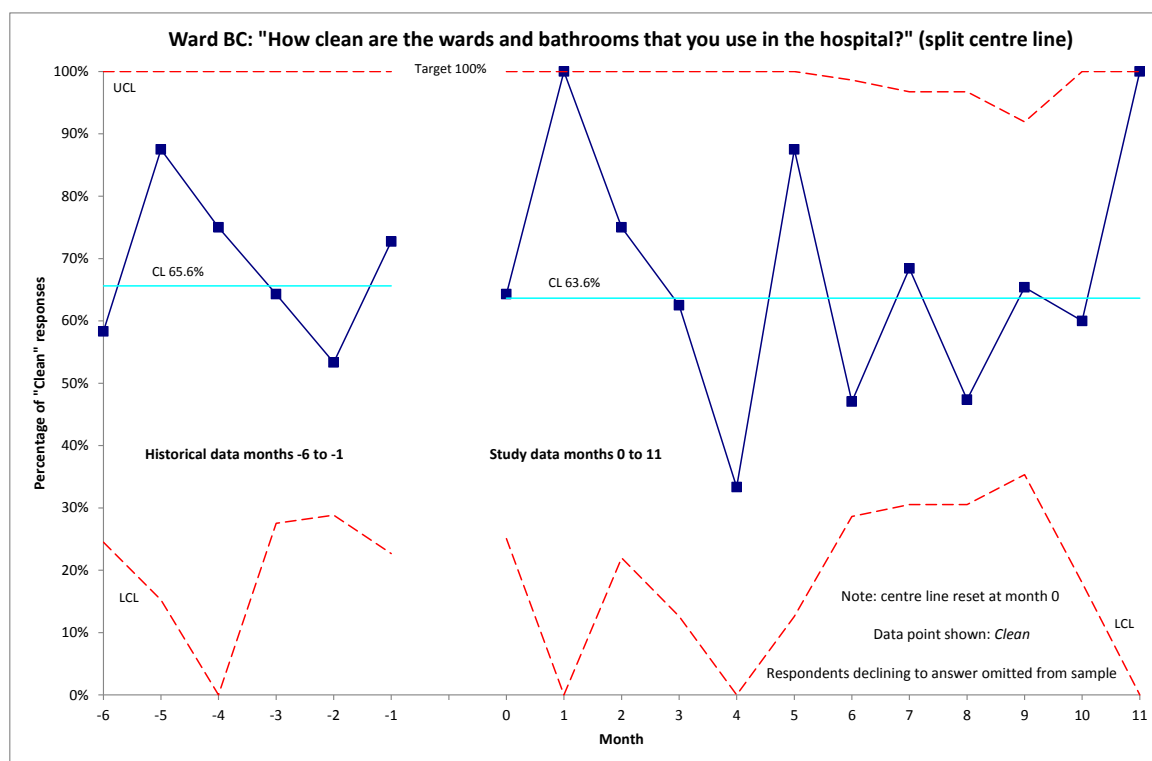


Ward BC question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	7 (58.3%)	5 (41.7%)	0	0	0	12
-5	7 (87.5%)	1 (12.5%)	0	0	0	8
-4	3 (75.0%)	1 (25.0%)	0	0	0	4
-3	9 (64.3%)	4 (28.6%)	1 (7.1%)	0	0	14
-2	8 (53.3%)	4 (26.7%)	0	3 (20.0%)	0	15
-1	8 (72.7%)	2 (18.2%)	1 (9.1%)	0	0	11
Total	42 (65.6%)	17 (26.6%)	2 (3.1%)	3 (4.7%)	0	64

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	9 (64.3%)	5 (35.7%)	0	0	0	14
1	5 (100.0%)	0	0	0	0	5
2	9 (75.0%)	2 (16.7%)	1 (8.3%)	0	0	12
3	5 (62.5%)	2 (25.0%)	1 (12.5%)	0	0	8
4	1 (33.3%)	2 (66.7%)	0	0	0	3
5	7 (77.8%)	1 (11.1%)	0	0	1 (11.1%)	9
6	8 (47.1%)	7 (41.2%)	2 (11.7%)	0	0	17
7	13 (65.0%)	6 (30.0%)	0	0	1 (5.0%)	20
8	9 (47.4%)	8 (42.1%)	2 (10.5%)	0	0	19
9	17 (65.4%)	9 (34.6%)	0	0	0	26
10	6 (60.0%)	4 (40.0%)	0	0	0	10
11	2 (100.0%)	0	0	0	0	2
Total	91 (62.8%)	46 (31.7%)	6 (4.1%)	0	2 (1.4%)	145

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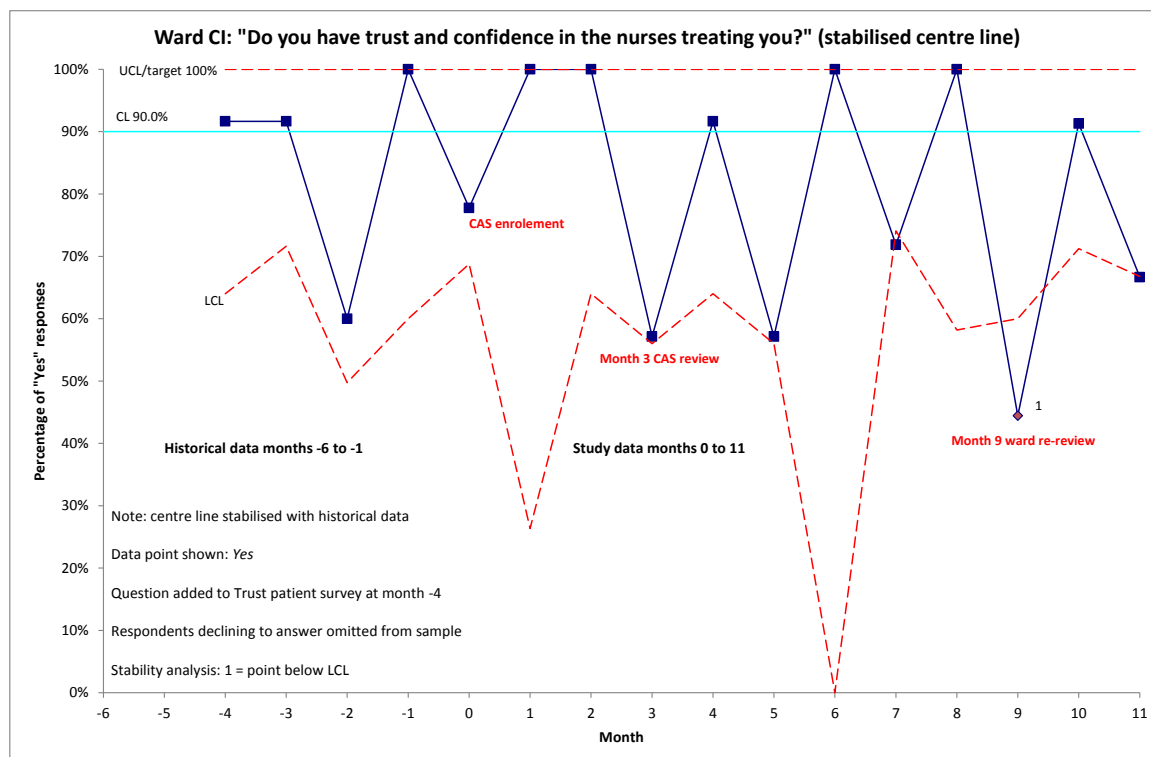
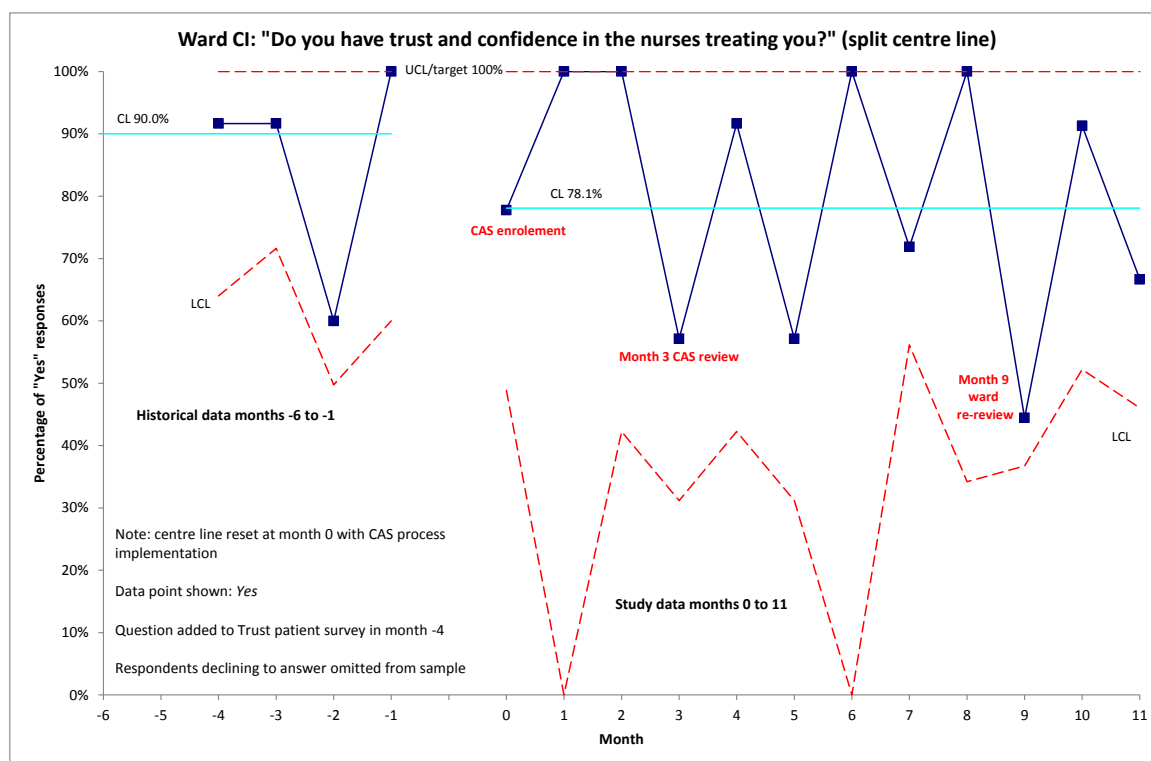
Ward CI question: *“Do you have trust and confidence in the nurses treating you?”*⁷²

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	11 (84.6%)	1 (7.7%)	0	1 (7.7%)	13
-3	22 (91.7%)	2 (8.3%)	0	0	24
-2	3 (60.0%)	2 (40.0%)	0	0	5
-1	9 (100.0%)	0	0	0	9
Total	45 (88.2%)	5 (9.8%)	0	1 (2.0%)	51

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	14 (77.8%)	3 (16.7%)	1 (5.6%)	0	18
1	2 (100.0%)	0	0	0	2
2	12 (100.0%)	0	0	0	12
3	4 (57.1%)	2 (28.6%)	1 (14.3%)	0	7
4	11 (91.7%)	1 (8.3%)	0	0	12
5	4 (57.1%)	3 (42.9%)	0	0	7
6	1 (100.0%)	0	0	0	1
7	23 (71.9%)	9 (28.1%)	0	0	32
8	8 (100.0%)	0	0	0	8
9	4 (44.4%)	5 (55.6%)	0	0	9
10	21 (91.3%)	2 (8.7%)	0	0	23
11	10 (66.7%)	5 (33.3%)	0	0	15
Total	114 (78.1%)	30 (20.6%)	2 (1.3%)	0	146

⁷² Question added to Trust patient survey at month -4

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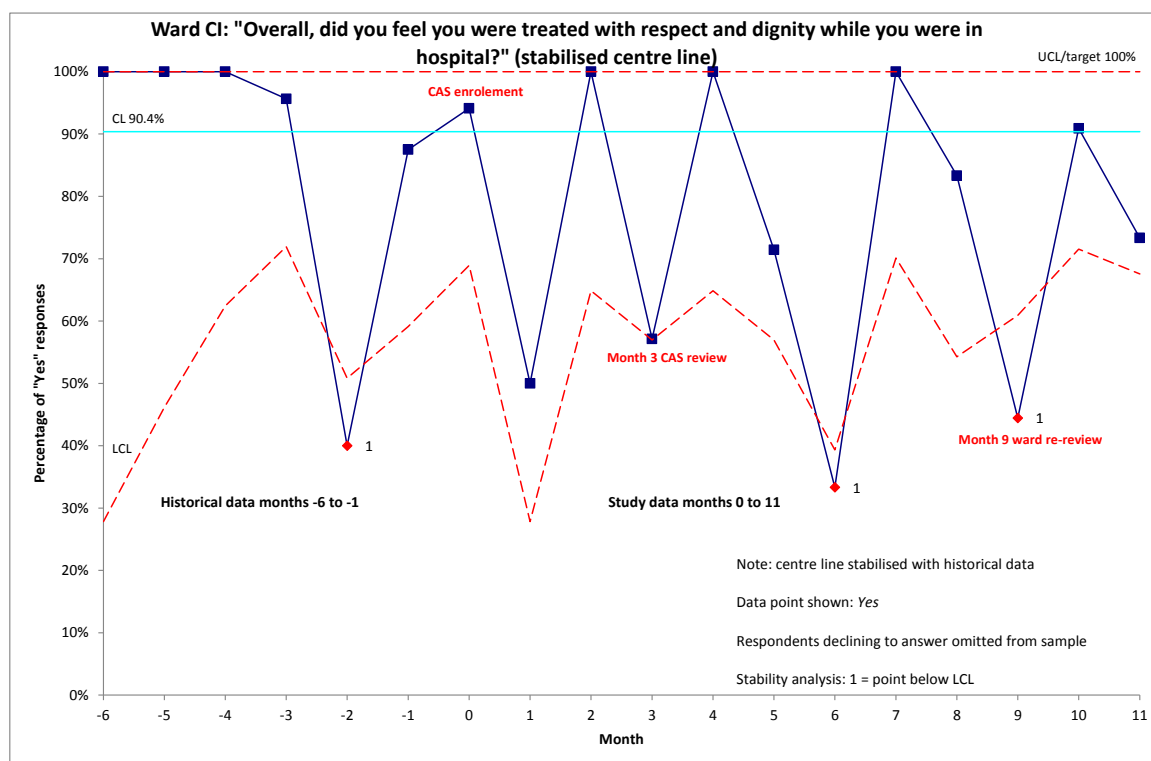
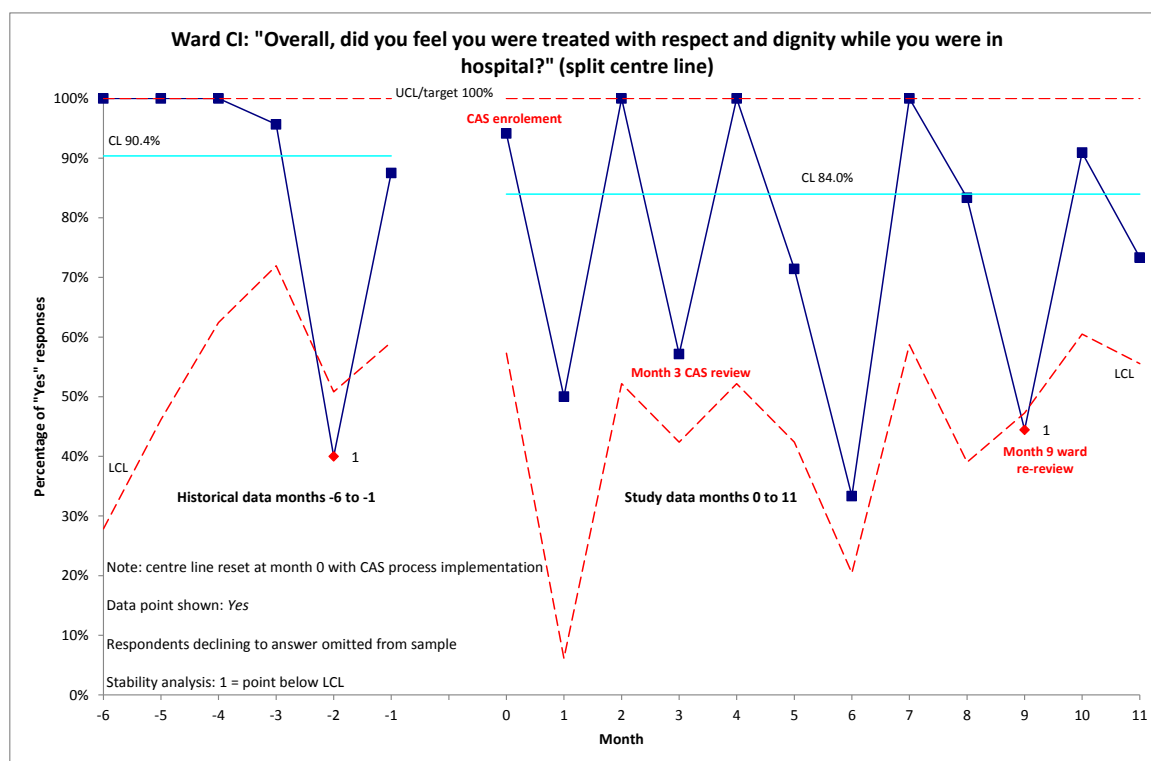


Ward CI question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	2 (100.0%)	0	0	0	2
-5	4 (100.0%)	0	0	0	4
-4	10 (100.0%)	0	0	0	10
-3	22 (95.7%)	1 (4.3%)	0	0	23
-2	2 (40.0%)	3 (60.0%)	0	0	5
-1	7 (87.5%)	1 (12.5%)	0	0	8
Total	47 (90.4%)	5 (9.6%)	0	0	52

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	16 (88.8%)	1 (5.6%)	0	1 (5.6%)	18
1	1 (50.0%)	1 (50.0%)	0	0	2
2	12 (100.0%)	0	0	0	12
3	4 (57.1%)	3 (42.9%)	0	0	7
4	12 (100.0%)	0	0	0	12
5	5 (71.4%)	2 (28.6%)	0	0	7
6	1 (33.3%)	2 (66.7%)	0	0	3
7	19 (100.0%)	0	0	0	19
8	5 (83.3%)	1 (16.7%)	0	0	6
9	4 (44.4%)	5 (55.6%)	0	0	9
10	20 (90.0%)	1 (4.6%)	1 (4.6%)	0	22
11	11 (73.3%)	4 (26.7%)	0	0	15
Total	110 (83.2%)	20 (15.2%)	1 (0.8%)	1 (0.8%)	132

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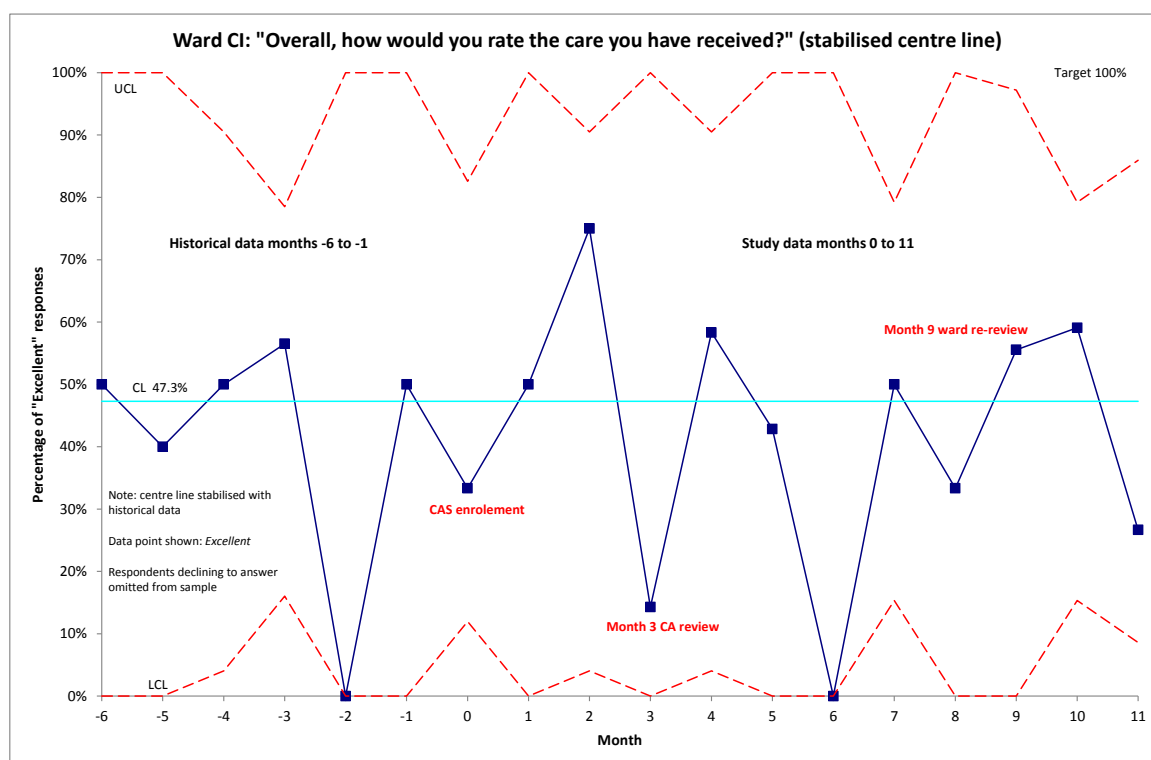
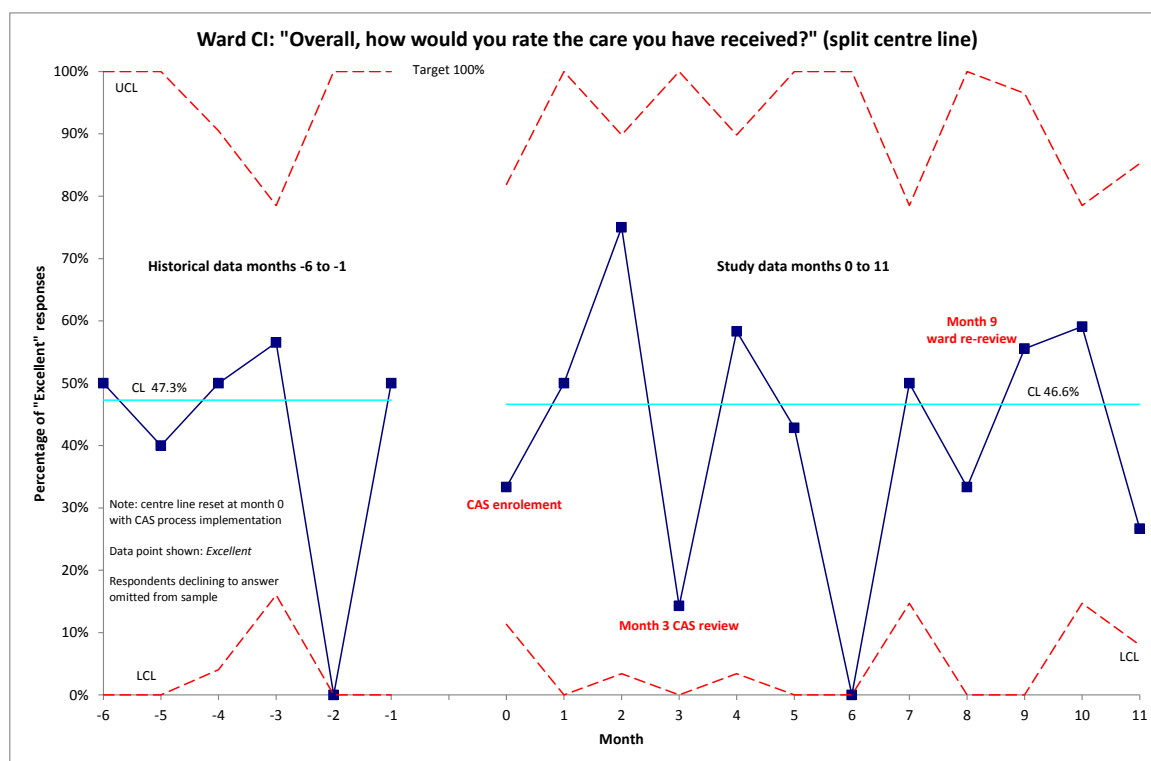


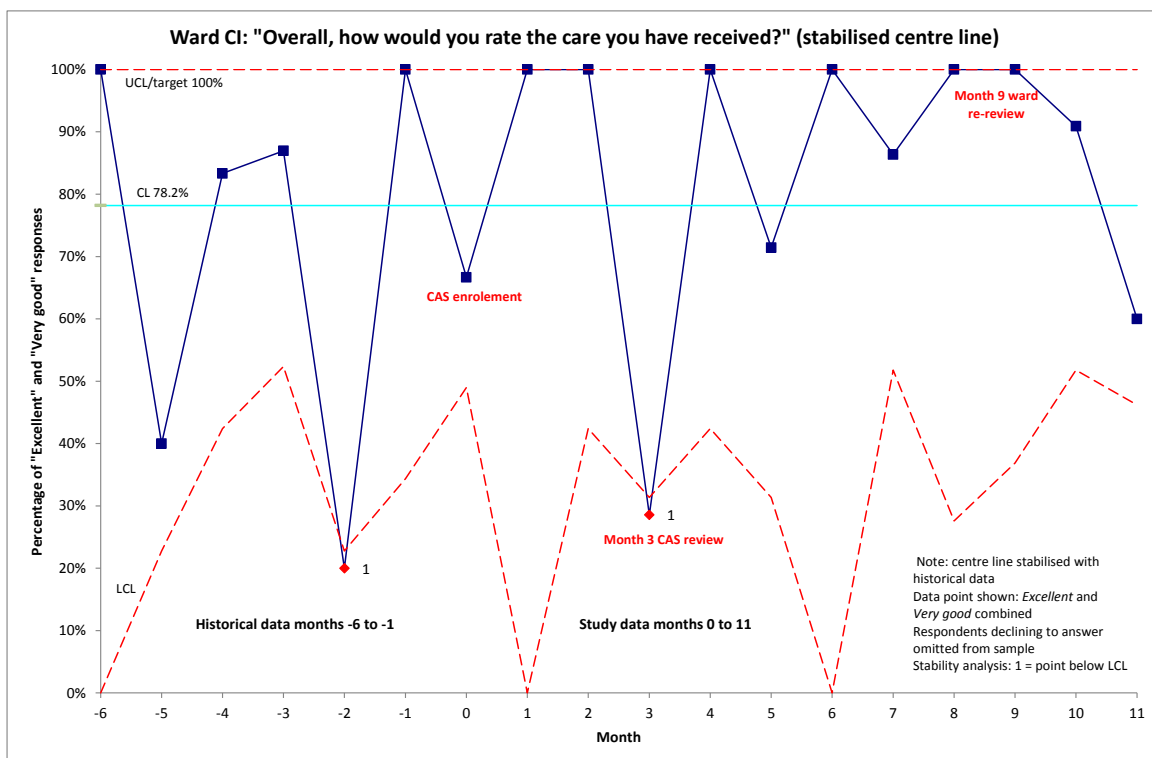
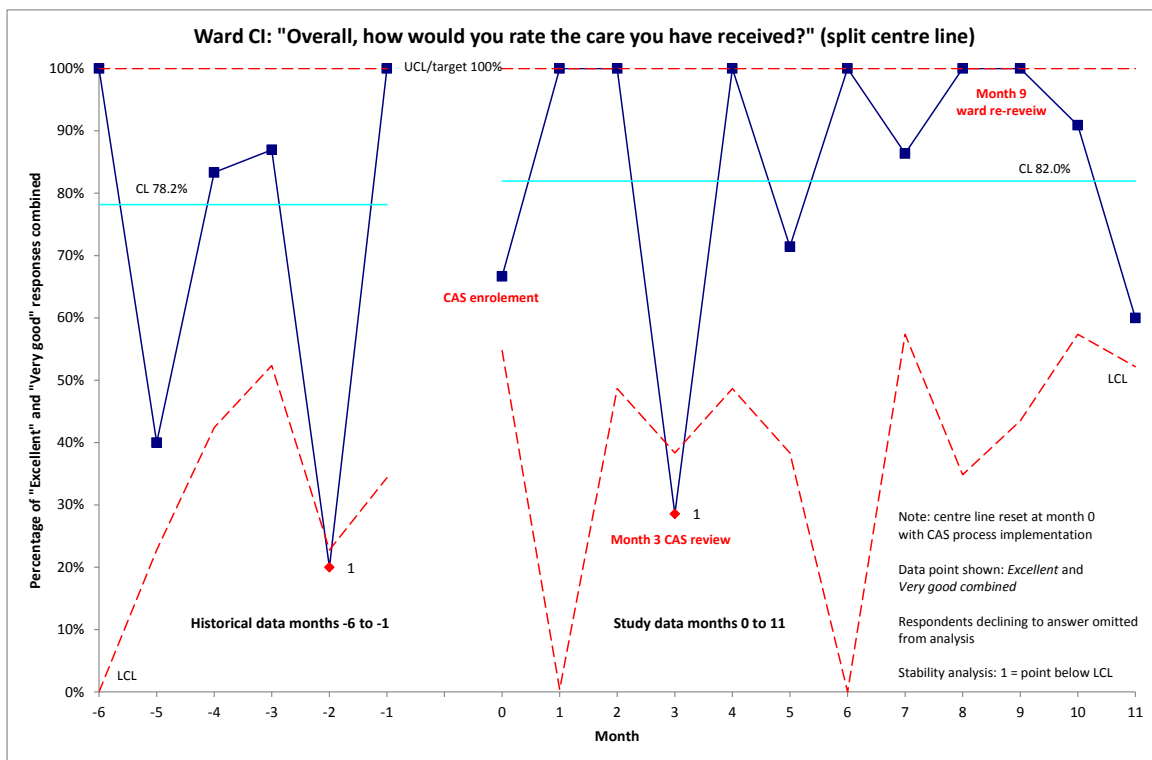
Ward CI question: *“Overall, how would you rate the care you have received?”*

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	1 (50.0%)	1 (50.0%)	0	0	0	0	2
-5	2 (40.0%)	0	3 (60.0%)	0	0	0	5
-4	6 (46.2%)	4 (30.8%)	2 (15.3%)	0	0	1 (7.7%)	13
-3	13 (56.5%)	7 (30.4%)	3 (13.1%)	0	0	0	23
-2	0	1 (20.0%)	3 (60.0%)	1 (10.0%)	0	0	5
-1	4 (50.0%)	4 (50.0%)	0	0	0	0	8
Total	26 (46.4%)	17 (30.4%)	11 (19.6%)	1 (1.8%)	0	1 (1.8%)	56

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	6 (33.3%)	8 (44.4%)	4 (22.2%)	0	0	0	18
1	1 (50.0%)	1 (50.0%)	0	0	0	0	2
2	9 (75.0%)	3 (25.0%)	0	0	0	0	12
3	1 (14.3%)	1 (14.3%)	3 (42.8%)	1 (14.3%)	1 (14.3%)	0	7
4	7 (58.3%)	5 (41.7%)	0	0	0	0	12
5	3 (42.8%)	2 (28.6%)	1 (14.3%)	1 (14.3%)	0	0	7
6	0	1 (100.0%)	0	0	0	0	1
7	11 (50.0%)	7 (31.8%)	3 (13.6%)	1 (4.5%)	0	0	22
8	2 (33.3%)	4 (66.7%)	0	0	0	0	6
9	5 (55.6%)	3 (33.3%)	1 (11.1%)	0	0	0	9
10	13 (59.1%)	7 (31.8%)	2 (9.1%)	0	0	0	22
11	4 (26.7%)	5 (33.3%)	6 (40.0%)	0	0	0	15
Total	63 (46.6%)	47 (35.3%)	20 (15.0%)	3 (2.3%)	1 (0.8%)	0	133

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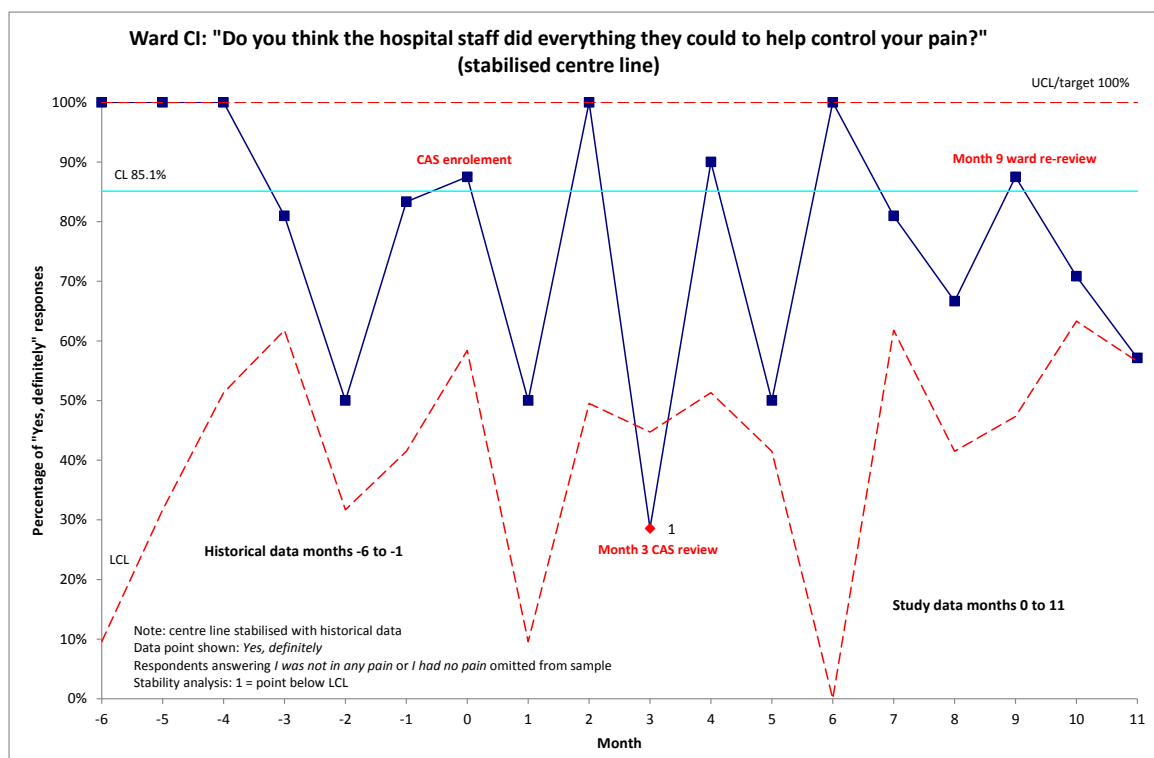
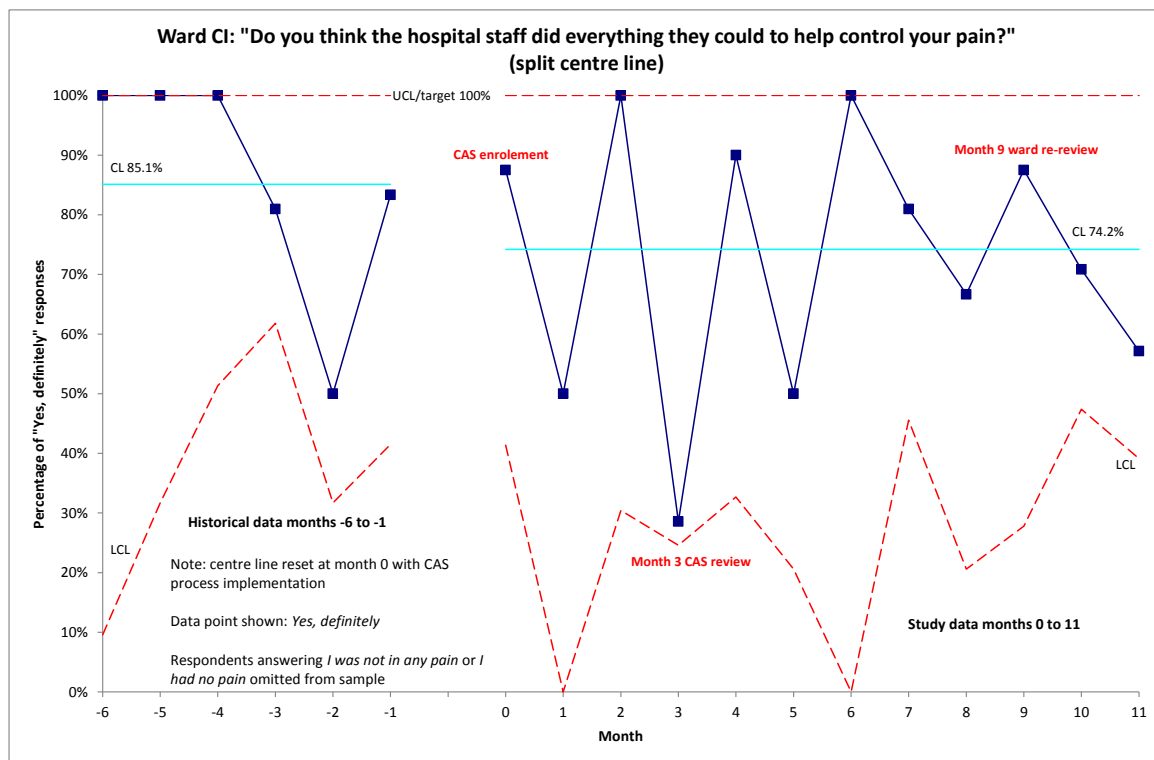
10. Appendices

Ward CI question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	2 (100.0%)	0	0	0	2
-5	4 (100.0%)	0	0	0	4
-4	10 (100.0%)	0	0	0	10
-3	17 (81.0%)	4 (19.0%)	0	0	21
-2	2 (50.0%)	1 (25.0%)	1 (25.0%)	0	4
-1	5 (83.3%)	1 (16.7%)	0	0	6
Total	40 (85.1%)	6 (12.8%)	1 (2.1%)	0	47

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁷³	Subgroup size
0	14 (77.8%)	2 (11.1%)	0	2 (11.1%)	-	18
1	1 (50.0%)	0	1 (50.0%)	0	-	2
2	9 (75.0%)	0	0	3 (25.0%)	-	12
3	2 (28.6%)	2 (28.6%)	3 (42.8%)	0	0	7
4	9 (90.0%)	1 (10.0%)	0	0	0	10
5	3 (50.0%)	2 (33.3%)	1 (16.7%)	0	0	6
6	1 (100.0%)	0	0	0	0	1
7	17 (68.0%)	1 (4.0%)	3 (12.0%)	0	4 (16.0%)	25
8	4 (66.6%)	1 (16.7%)	1 (16.7%)	0	0	6
9	7 (77.8%)	1 (11.1%)	0	0	1 (11.1%)	9
10	17 (68.0%)	7 (28.0%)	0	0	1 (4.0%)	25
11	8 (53.3%)	6 (40.0%)	0	0	1 (6.7%)	15
Total	92 (67.6%)	23 (16.9%)	9 (6.6%)	0	12 (8.8%)	136

⁷³ Response added to Picker survey question by Picker Institute in study month 3



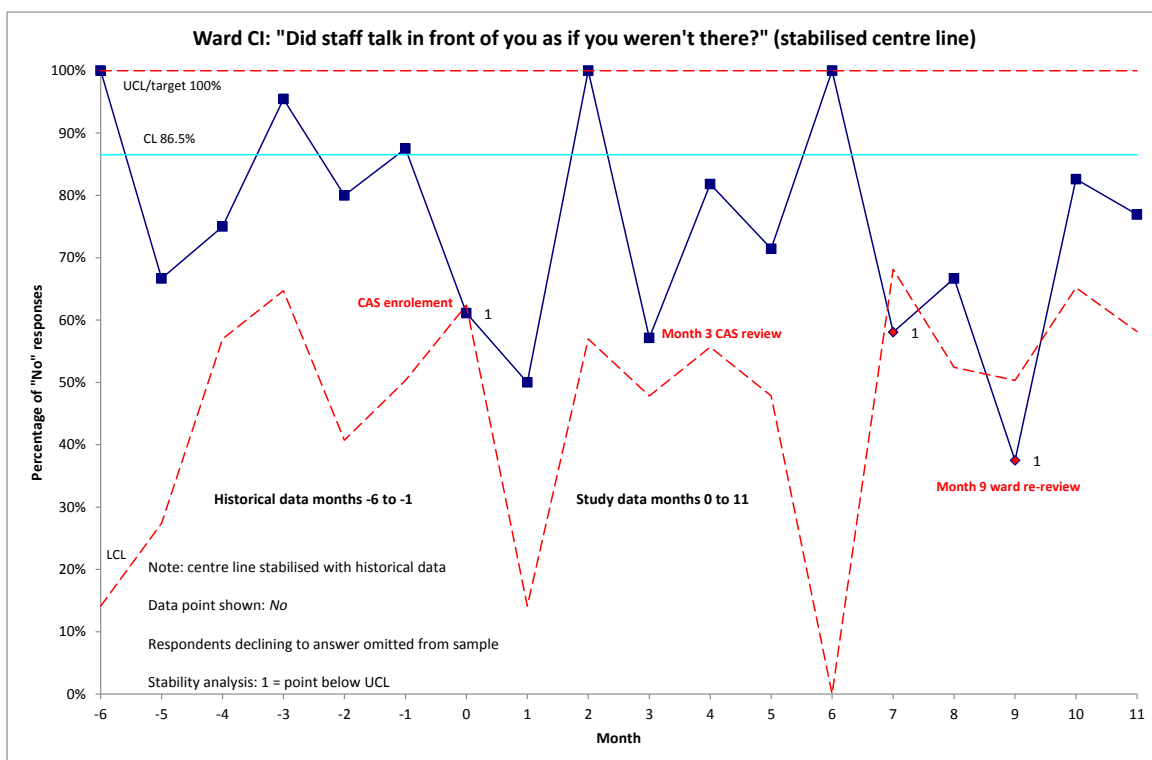
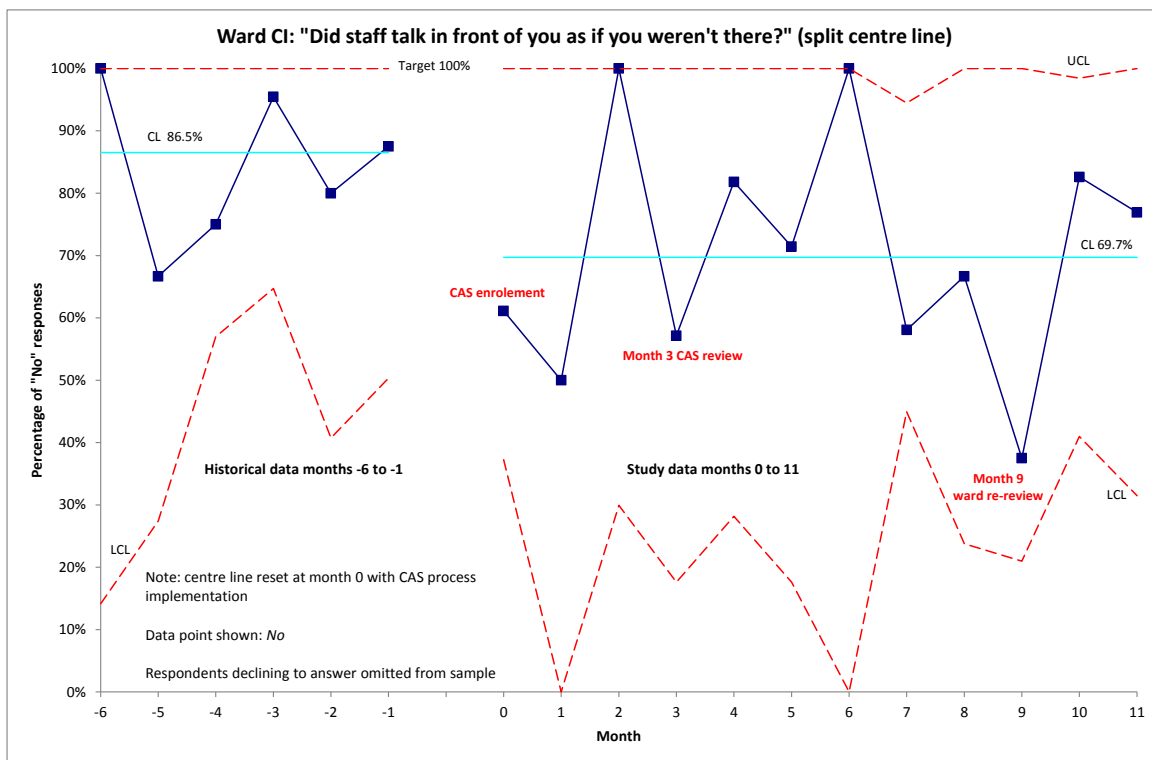
10. Appendices

Ward CI question: *“Did staff talk in front of you as if you weren’t there?”*

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	0	2 (100.0%)	0	2
-5	1 (33.3%)	2 (66.7%)	0	3
-4	3 (23.1%)	9 (69.2%)	1 (7.7%)	13
-3	1 (4.5%)	21 (95.5%)	0	22
-2	1 (20.0%)	4 (80.0%)	0	5
-1	1 (12.5%)	7 (87.5%)	0	8
Total	7 (13.2%)	45 (84.9%)	1 (1.9%)	53

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁷⁴	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	7 (38.9%)	-	11 (61.1%)	0	18
1	1 (50.0%)	-	1 (50.0%)	0	2
2	0	-	12 (100.0%)	0	12
3	1 (14.3%)	2 (28.6%)	4 (57.1%)	0	7
4	1 (9.9%)	1 (9.1%)	9 (81.8%)	0	11
5	0	2 (28.6%)	5 (71.4%)	0	7
6	0	0	1 (100.0%)	0	1
7	5 (16.1%)	8 (25.8%)	18 (58.1%)	0	31
8	1 (11.1%)	2 (22.2%)	6 (66.7%)	0	9
9	0	5 (55.6%)	3 (33.3%)	1 (11.1%)	9
10	0	4 (16.7%)	19 (79.2%)	1 (4.1%)	24
11	0	3 (20.0%)	10 (66.7%)	2 (13.3%)	15
Total	16 (11.0%)	27 (18.5%)	99 (67.8%)	4 (2.7%)	146

⁷⁴ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

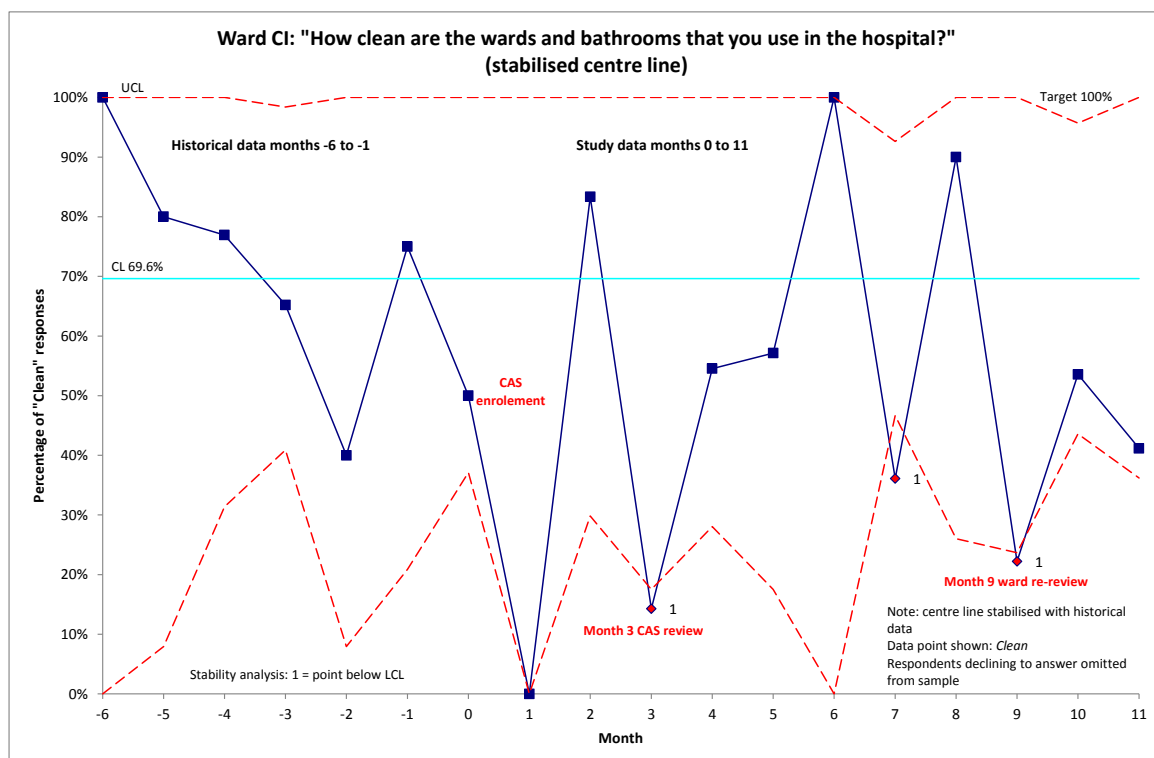
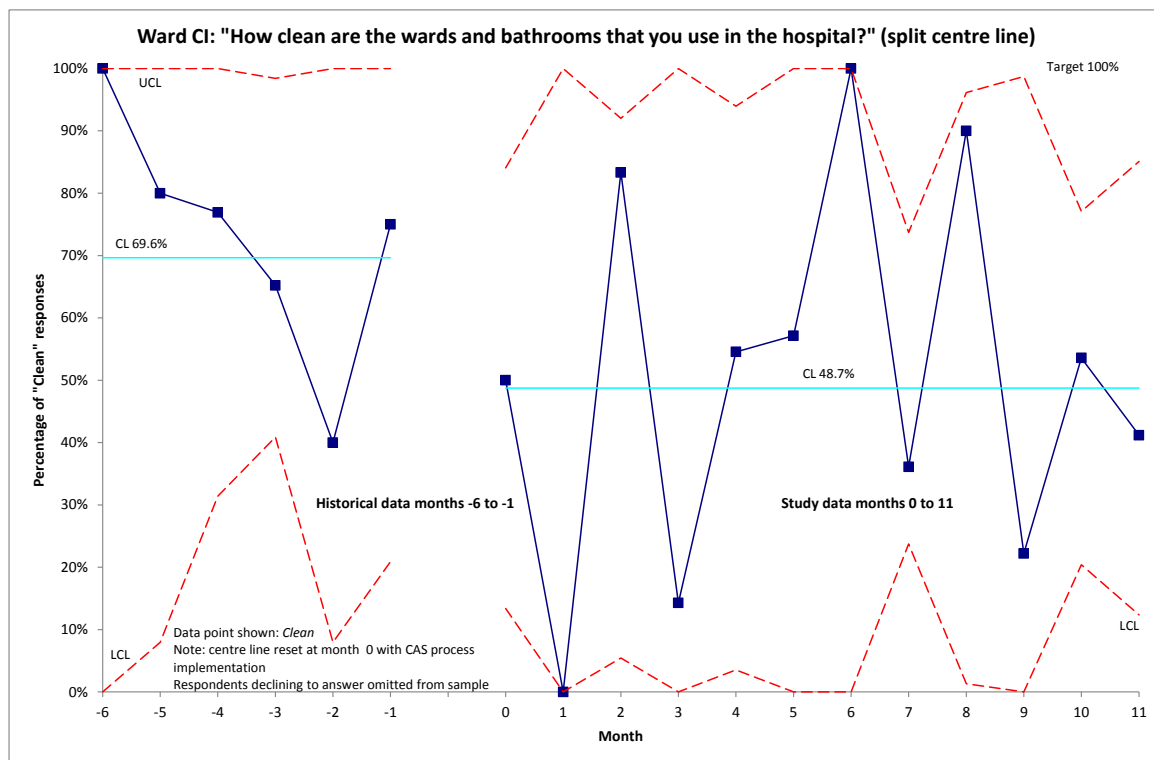


10. Appendices

Ward CI question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	2 (100.0%)	0	0	0	0	2
-5	4 (80.0%)	1 (10.0%)	0	0	0	5
-4	10 (76.9%)	3 (23.1%)	0	0	0	13
-3	15 (65.2%)	8 (34.8%)	0	0	0	23
-2	2 (40.0%)	2 (40.0%)	0	1 (20.0%)	0	5
-1	6 (75.0%)	1 (12.5%)	1 (12.5%)	0	0	8
Total	39 (69.6%)	15 (26.8%)	1 (1.8%)	1 (1.8%)	0	56

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	9 (50.0%)	9 (50.0%)	0	0	0	18
1	0	2 (100.0%)	0	0	0	2
2	10 (83.3%)	1 (8.3%)	1 (8.3%)	0	0	12
3	1 (14.3%)	4 (57.1%)	1 (14.3%)	1 (14.3%)	0	7
4	6 (50.0%)	5 (41.7%)	0	0	1 (8.3%)	12
5	4 (57.1%)	2 (28.6%)	1 (14.3%)	0	0	7
6	1 (100.0%)	0	0	0	0	1
7	13 (34.2%)	17 (44.7%)	6 (15.8%)	0	2 (5.3%)	38
8	9 (90.0%)	1 (10.0%)	0	0	0	10
9	2 (22.2%)	5 (55.6%)	2 (22.2%)	0	0	9
10	15 (51.7%)	13 (44.8%)	0	0	1 (3.5%)	29
11	7 (41.2%)	10 (58.8%)	0	0	0	17
Total	77 (47.5%)	69 (42.6%)	11 (6.8%)	1 (0.6%)	4 (2.5%)	162



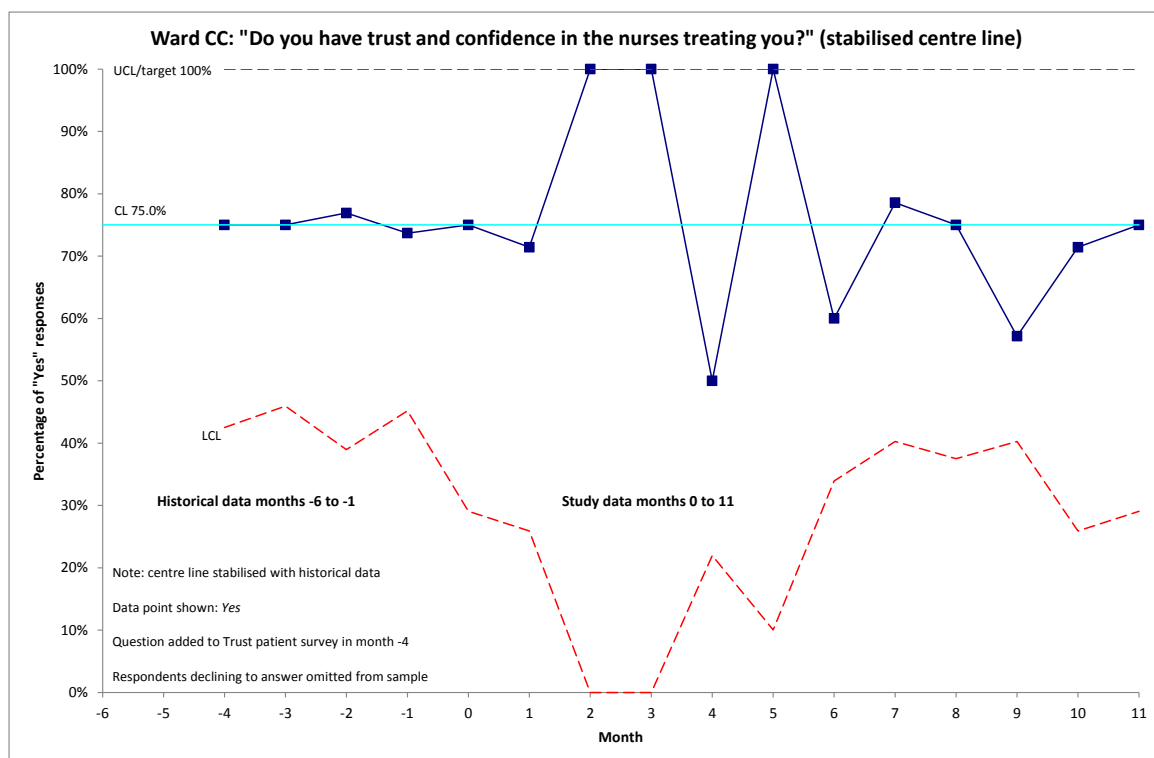
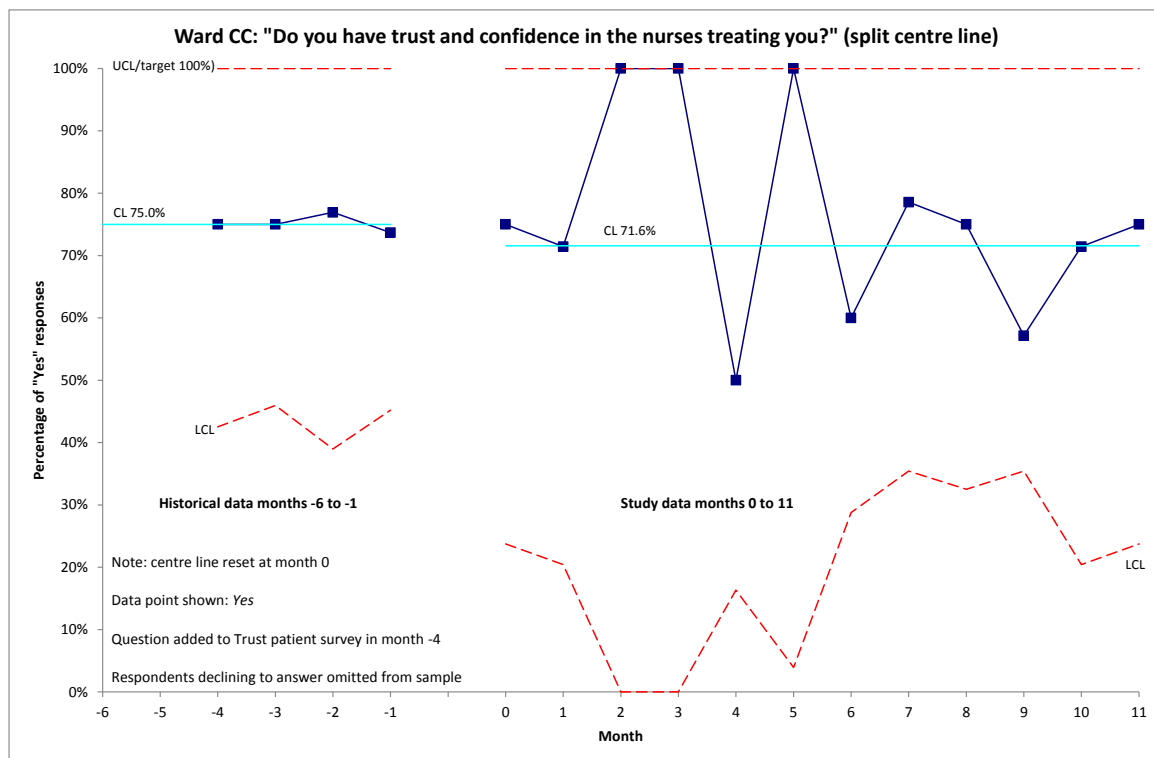
10. Appendices

Ward CC question: *“Do you have trust and confidence in the nurses treating you?”*⁷⁵

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	12 (75.0%)	2 (12.5%)	1 (6.3%)	1 (6.3%)	16
-3	15 (75.0%)	5 (25.0%)	0	0	20
-2	10 (77.0%)	3 (23.0%)	0	0	13
-1	14 (73.7%)	4 (21.0%)	0	1 (5.3%)	19
Total	51 (75.0%)	14 (20.5%)	1 (1.5%)	2 (3.0%)	68

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	6 (75.0%)	1 (12.5%)	1 (12.5%)	0	8
1	5 (71.4%)	1 (14.3%)	1 (14.3%)	0	7
2	3 (100.0%)	0	0	0	3
3	2 (100.0%)	0	0	0	2
4	3 (50.0%)	2 (33.3%)	1 (16.7%)	0	6
5	4 (100.0%)	0	0	0	4
6	6 (60.0%)	3 (30.0%)	1 (10.0%)	0	10
7	11 (78.6%)	2 (14.3%)	1 (7.1%)	0	14
8	9 (75.0%)	3 (25.0%)	0	0	12
9	8 (57.1%)	6 (42.9%)	0	0	14
10	5 (71.4%)	2 (28.6%)	0	0	7
11	6 (75.0%)	2 (25.0%)	0	0	8
Total	68 (71.5%)	22 (23.2%)	5 (5.3%)	0	95

⁷⁵ Question add to Trust patient survey in month -4

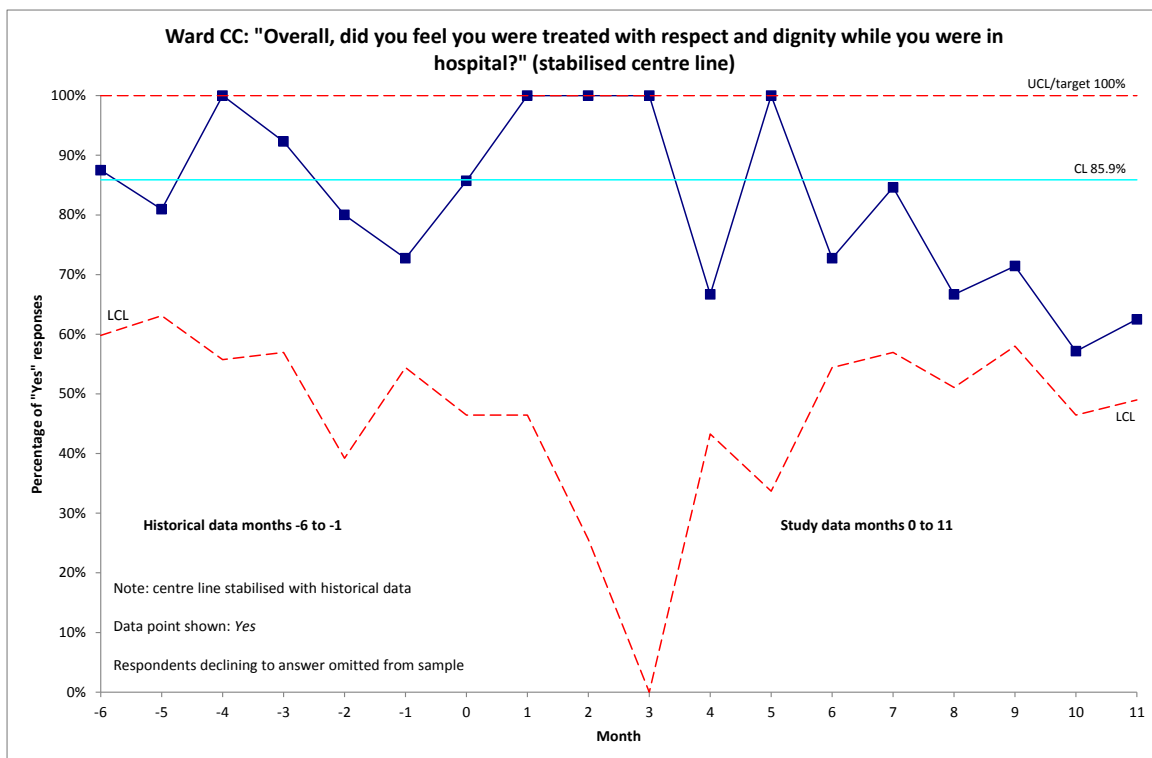
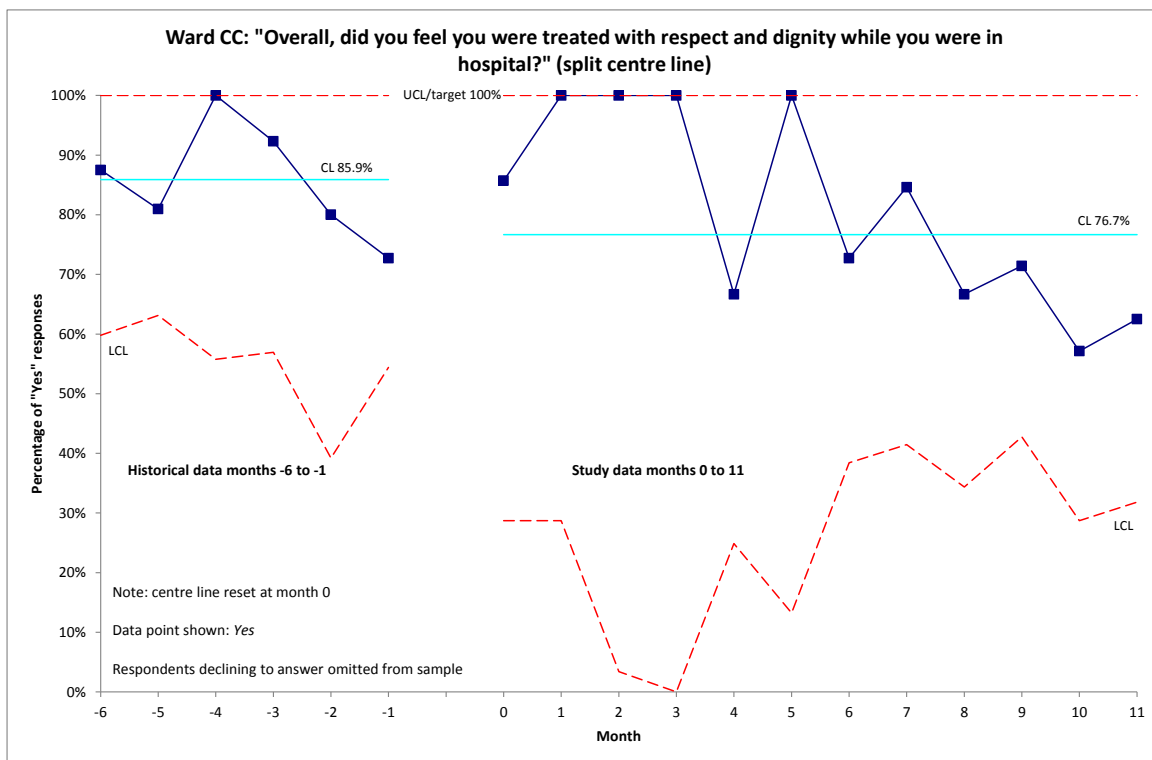


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Ward CC question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	14 (87.5%)	1 (6.25%)	1 (6.25%)	0	16
-5	17 (81.0%)	1 (4.8%)	3 (14.2%)	0	21
-4	12 (100.0%)	0	0	0	12
-3	12 (85.8%)	0	1 (7.1%)	1 (7.1%)	14
-2	4 (80.0%)	1 (20.0%)	0	0	5
-1	8 (72.7%)	3 (27.3%)	0	0	11
Total	67 (84.8%)	6 (7.6%)	5 (6.3%)	1 (1.3%)	79

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	6 (75.0%)	0	1 (12.5%)	1 (12.5%)	8
1	7 (100.0%)	0	0	0	7
2	3 (100.0%)	0	0	0	3
3	1 (100.0%)	0	0	0	1
4	4 (66.6%)	2 (33.3%)	0	0	6
5	4 (100.0%)	0	0	0	4
6	8 (72.7%)	3 (27.3%)	0	0	11
7	11 (84.6%)	2 (15.4%)	0	0	13
8	6 (66.7%)	2 (22.2%)	1 (11.1%)	0	9
9	10 (71.4%)	3 (21.4%)	1 (7.2%)	0	14
10	4 (57.1%)	2 (28.6%)	1 (14.3%)	0	7
11	5 (62.5%)	3 (37.5%)	0	0	8
Total	69 (75.8%)	17 (18.7%)	4 (4.4%)	1 (1.1%)	91

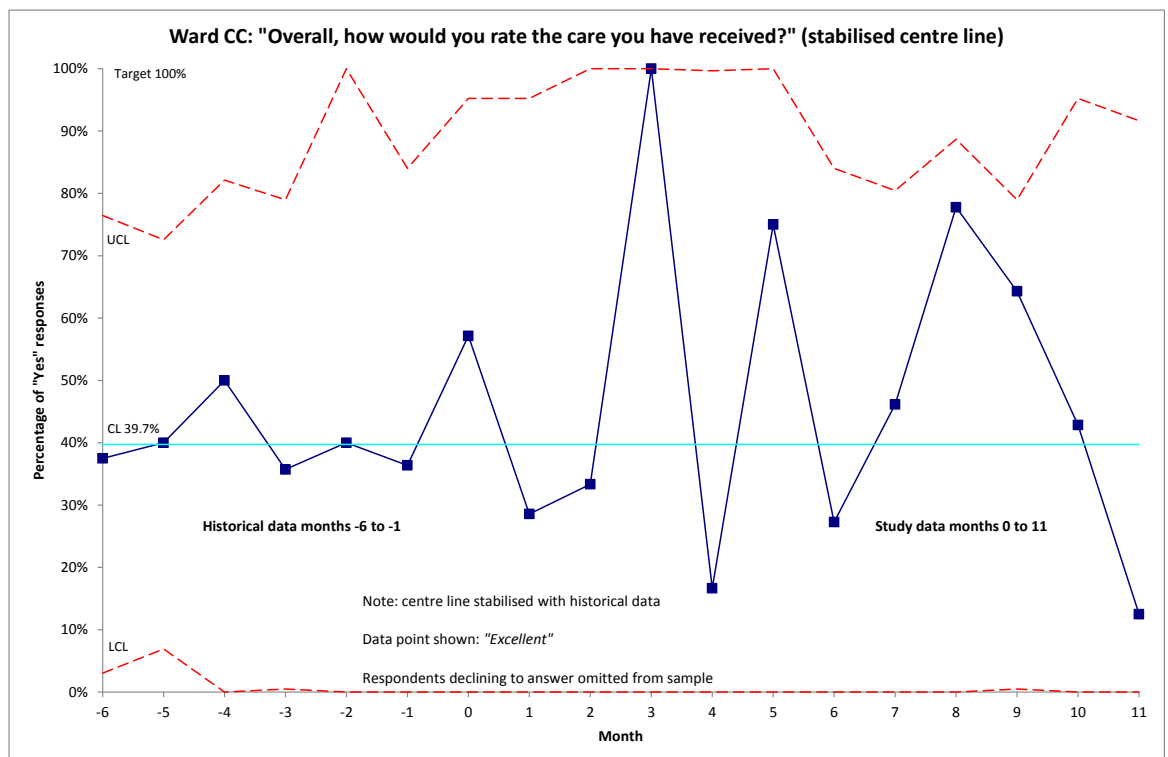
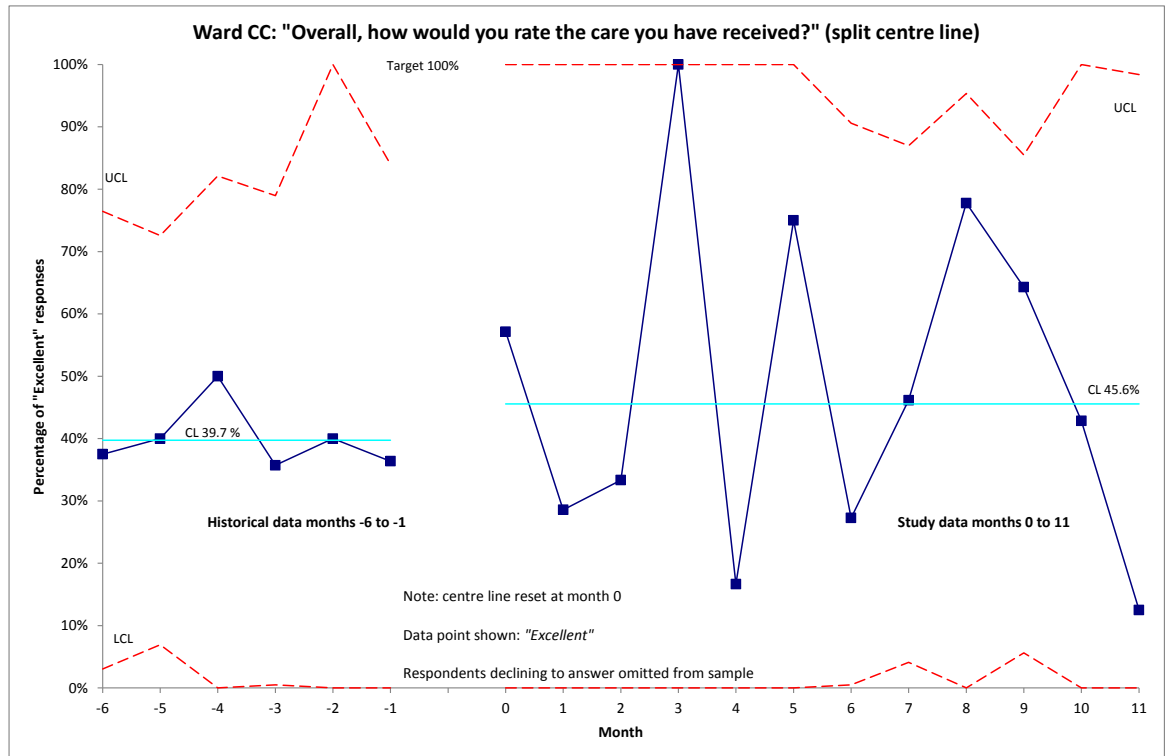


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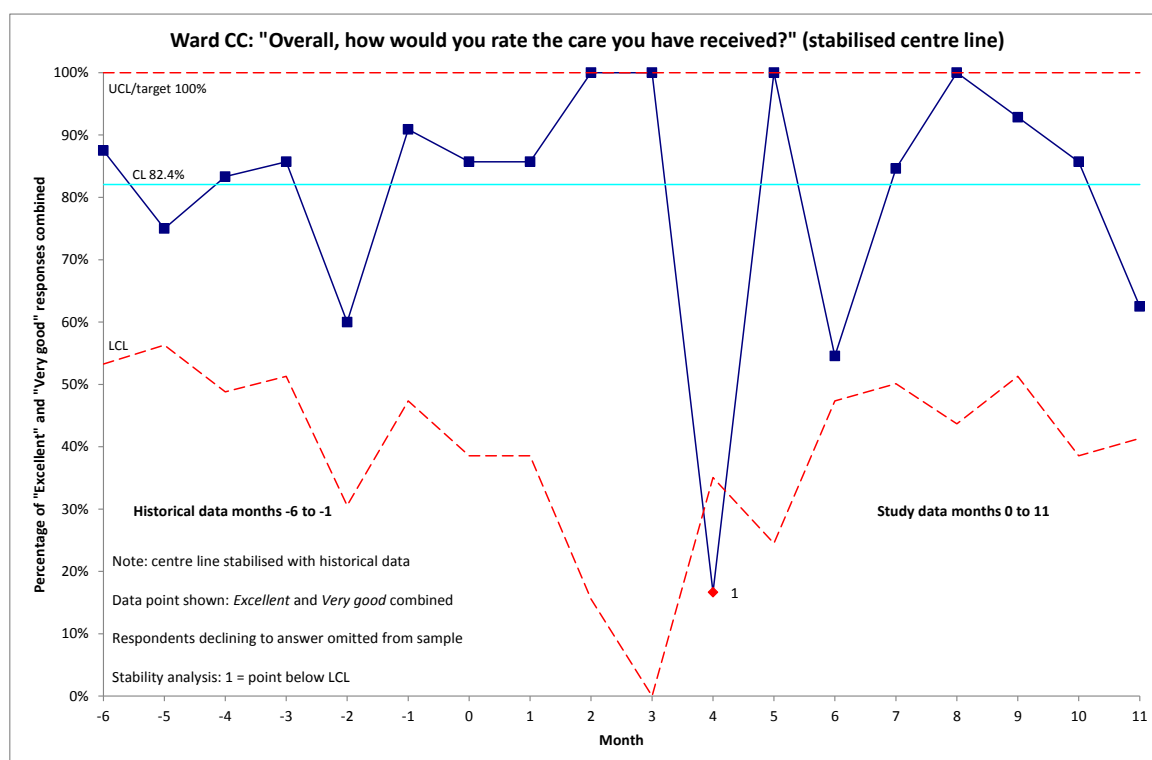
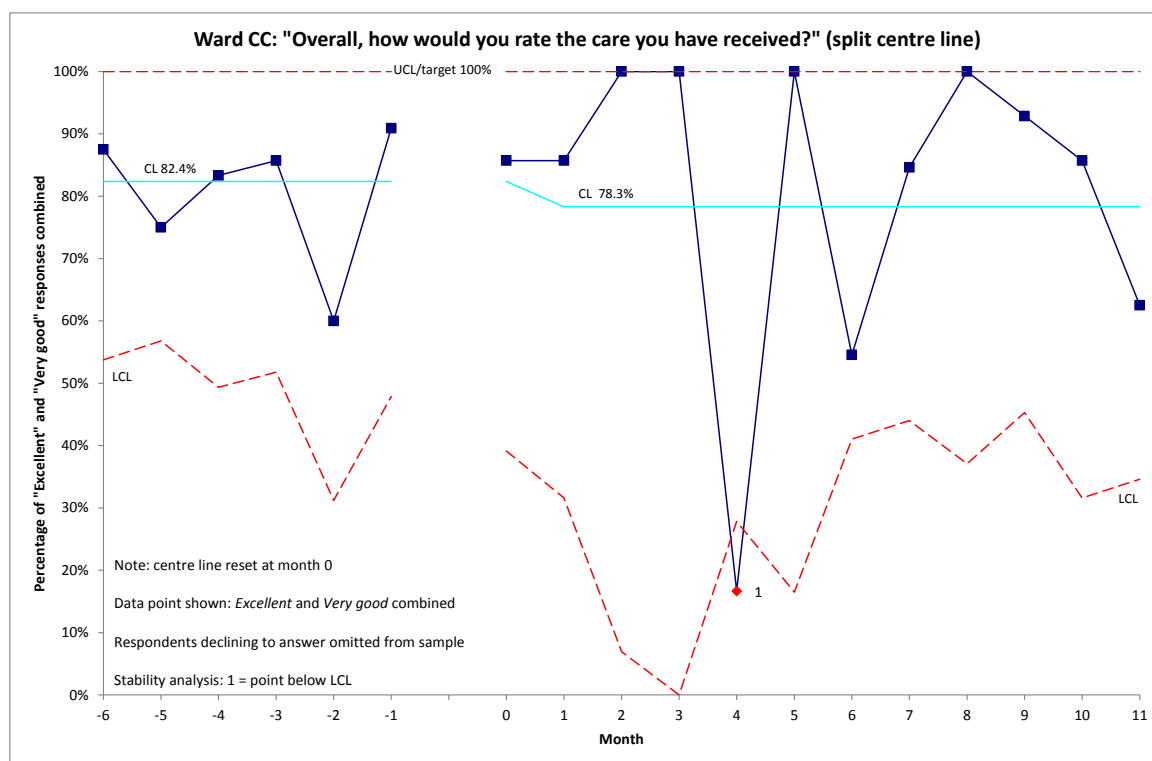
Ward CC question: *“Overall, how would you rate the care you have received?”*

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	6 (37.5%)	8 (50.0%)	2 (12.5%)	0	0	0	16
-5	8 (40.0%)	7 (35.0%)	1 (5.0%)	3 (15.0%)	1 (5.0%)	0	20
-4	6 (50.0%)	4 (33.3%)	2 (16.7%)	0	0	0	12
-3	5 (35.7%)	7 (50.0%)	0	0	2 (14.3%)	0	14
-2	2 (40.0%)	1 (20.0%)	1 (20.0%)	1 (20.0%)	0	0	5
-1	4 (36.4%)	6 (54.5%)	0	0	1 (9.1%)	0	11
Total	31 (39.7%)	33 (42.4%)	6 (7.7%)	4 (5.1%)	4 (5.1%)	0	78

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	4 (57.1%)	2 (28.6%)	0	0	1 (14.3%)	0	7
1	2 (28.6%)	4 (57.1%)	1 (14.3%)	0	0	0	7
2	1 (33.3%)	2 (66.7%)	0	0	0	0	3
3	1 (100.0%)	0	0	0	0	0	1
4	1 (16.7%)	0	3 (50.0%)	1 (16.7%)	1 (16.7%)	0	6
5	3 (75.0%)	1 (25.0%)	0	0	0	0	4
6	3 (27.3%)	3 (27.3%)	3 (27.3%)	2 (18.1%)	0	0	11
7	6 (46.1%)	5 (38.5%)	1 (7.7%)	1 (7.7%)	0	0	13
8	7 (77.8%)	2 (22.2%)	0	0	0	0	9
9	9 (64.3%)	4 (28.6%)	1 (7.1%)	0	0	0	14
10	3 (42.9%)	3 (42.9%)	1 (14.2%)	0	0	0	7
11	1 (12.5%)	4 (50.0%)	1 (12.5%)	2 (25.0%)	0	0	8
Total	41 (45.6%)	30 (33.3%)	11 (12.2%)	6 (6.7%)	2 (2.2%)	0	90



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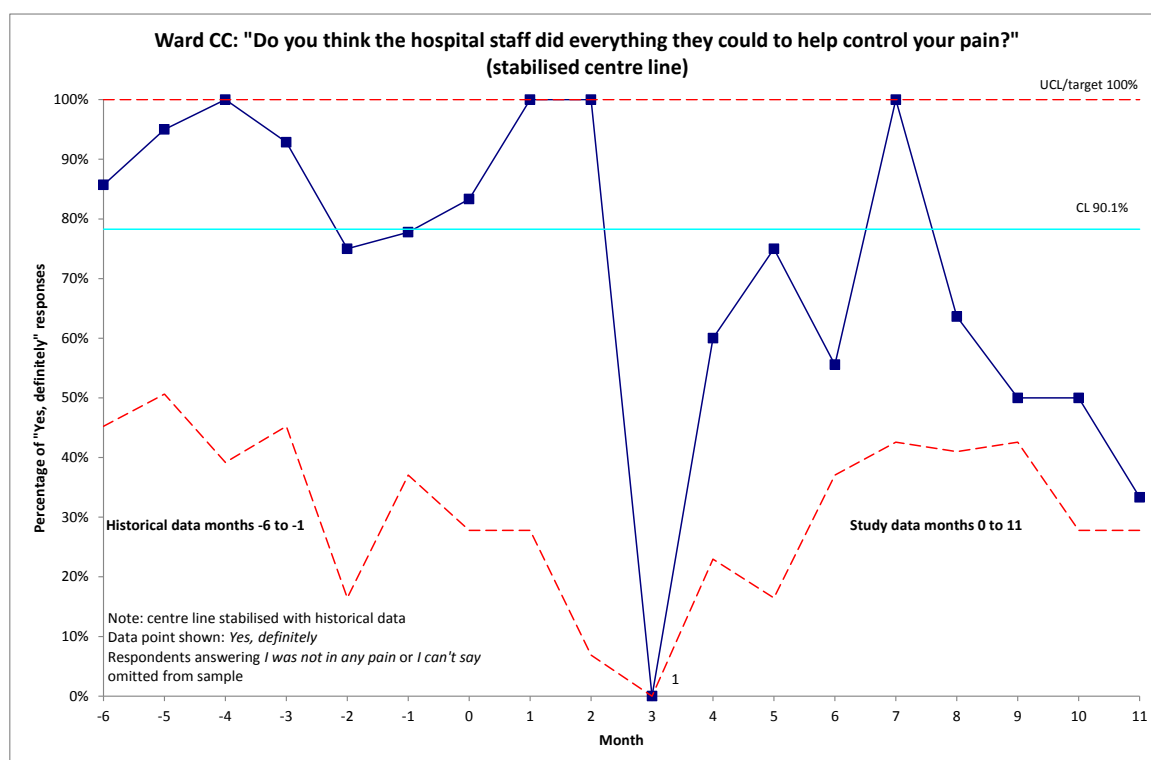
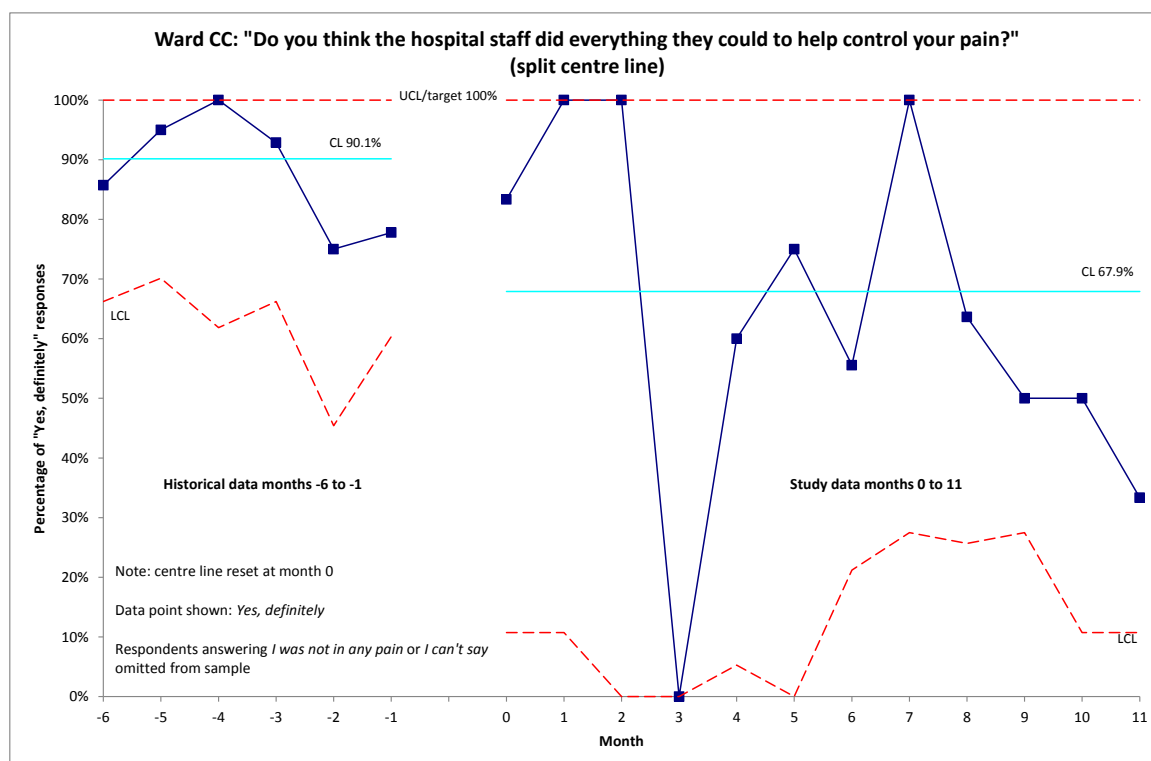
Ward CC question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	12 (75.0%)	0	2 (12.5%)	2 (12.5%)	16
-5	19 (95.0%)	1 (5.0%)	0	0	20
-4	10 (83.3%)	0	0	2 (16.7%)	12
-3	13 (92.9%)	0	1 (7.1%)	0	14
-2	3 (60.0%)	1 (20.0%)	0	1 (20.0%)	5
-1	7 (63.6%)	2 (18.2%)	0	2 (18.2%)	11
Total	64 (82.1%)	4 (5.1%)	3 (3.8%)	7 (9.0%)	78

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁷⁶	Subgroup size
0	5 (62.5%)	0	1 (12.5%)	2(25.0%)	-	8
1	6 (85.7%)	0	0	1(14.3%)	-	7
2	3 (100.0%)	0	0	-	-	3
3	0	1 (100.0%)	0	0	0	1
4	3 (50.0%)	2 (33.3%)	0	1(16.7%)	0	6
5	3 (75.0%)	1 (25.0%)	0	0	0	4
6	5 (55.6%)	2 (22.2%)	2 (22.2%)	0	0	9
7	12 (85.8%)	1 (7.1%)	1 (7.1%)	0	0	14
8	7 (63.6%)	2 (18.2%)	2 (18.2%)	0	0	11
9	6 (42.9%)	6 (42.9%)	0	0	2 (14.2%)	14
10	3 (42.7%)	2 (28.7%)	1 (14.3%)	1(14.3%)	0	7
11	2 (25.0%)	4 (50.0%)	0	0	2 (25.0%)	8
Total	55 (59.8%)	21 (22.8%)	7 (7.6%)	2 (2.2%)	7 (7.6%)	92

⁷⁶ Response added by Picker Institute to survey question in study month 3

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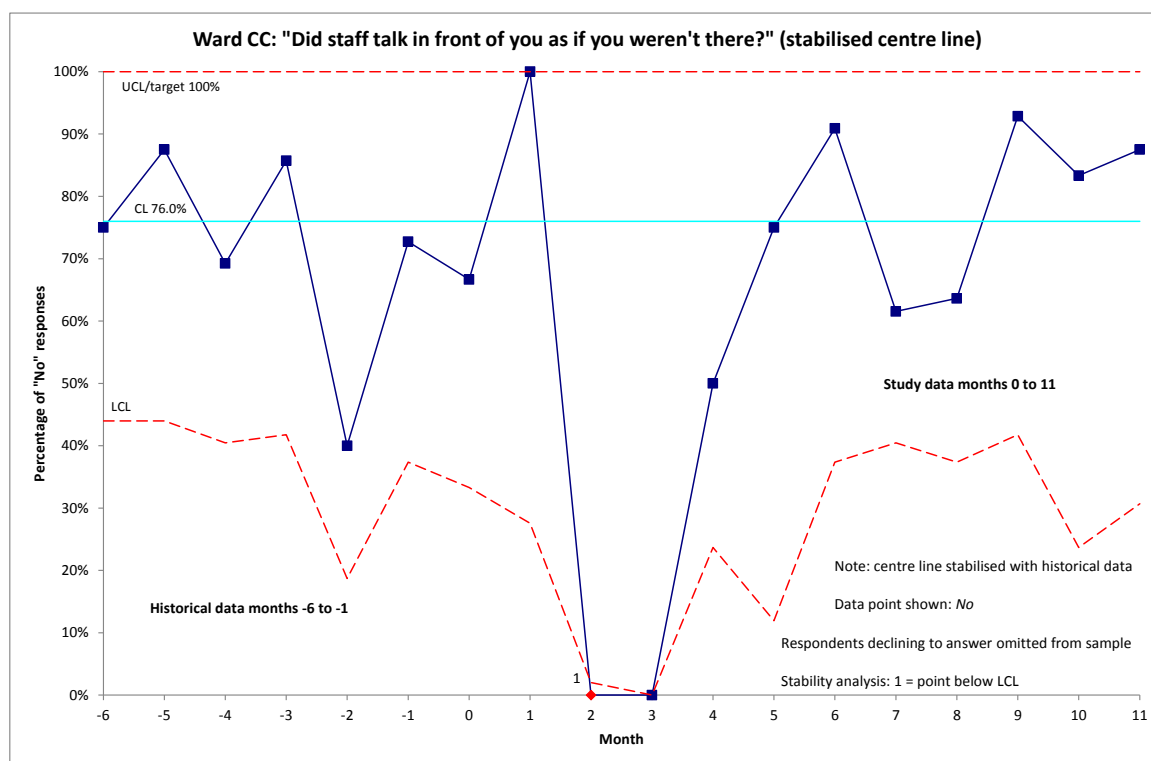
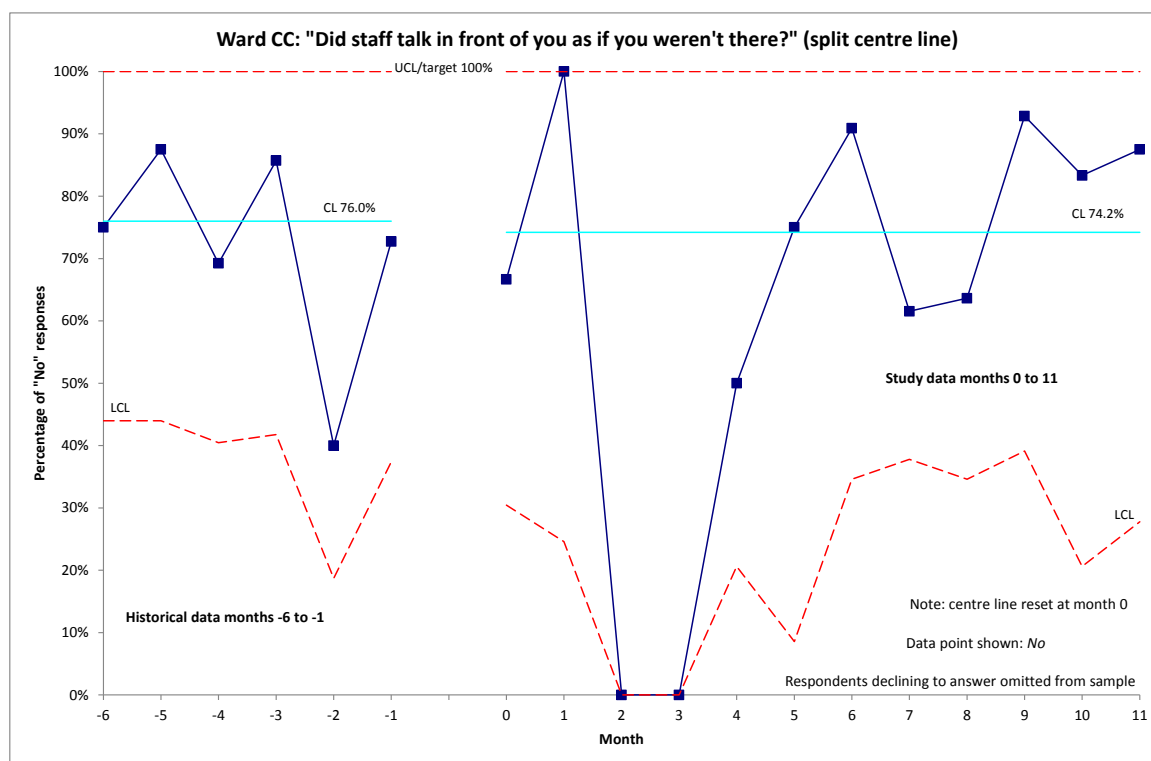
Ward CC question: “Did staff talk in front of you as if you weren’t there?”

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	4 (25.0%)	12 (75.0%)	0	16
-5	2 (10.0%)	14 (70.0%)	4 (20.0%)	20
-4	4 (28.6%)	9 (64.3%)	1 (7.1%)	14
-3	2 (14.3%)	12 (85.7%)	0	14
-2	3 (60.0%)	2 (40.0%)	0	5
-1	3 (27.3%)	8 (72.7%)	0	11
Total	18 (22.5%)	57 (71.3%)	5 (6.2%)	80

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁷⁷	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	3 (33.3%)	-	6 (66.6%)	0	9
1	0	-	7 (100.0%)	0	7
2	3 (100.0%)	-	0	0	3
3	0	1 (100.0%)	0	0	1
4	0	3 (50.0%)	3 (50.0%)	0	6
5	0	1 (25.0%)	3 (75.0%)	0	4
6	0	1 (9.1%)	10 (90.9%)	0	11
7	2 (15.4%)	3 (23.1%)	8 (61.5%)	0	13
8	3 (25.0%)	1 (8.3%)	7 (58.3%)	1 (8.3%)	12
9	0	1 (7.1%)	13 (92.9%)	0	14
10	0	1 (14.3%)	5 (71.4%)	1 (14.3%)	7
11	1 (12.5%)	0	7 (87.5%)	0	8
Total	12 (12.6%)	12 (12.6%)	69 (72.6%)	2 (2.1%)	95

⁷⁷ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

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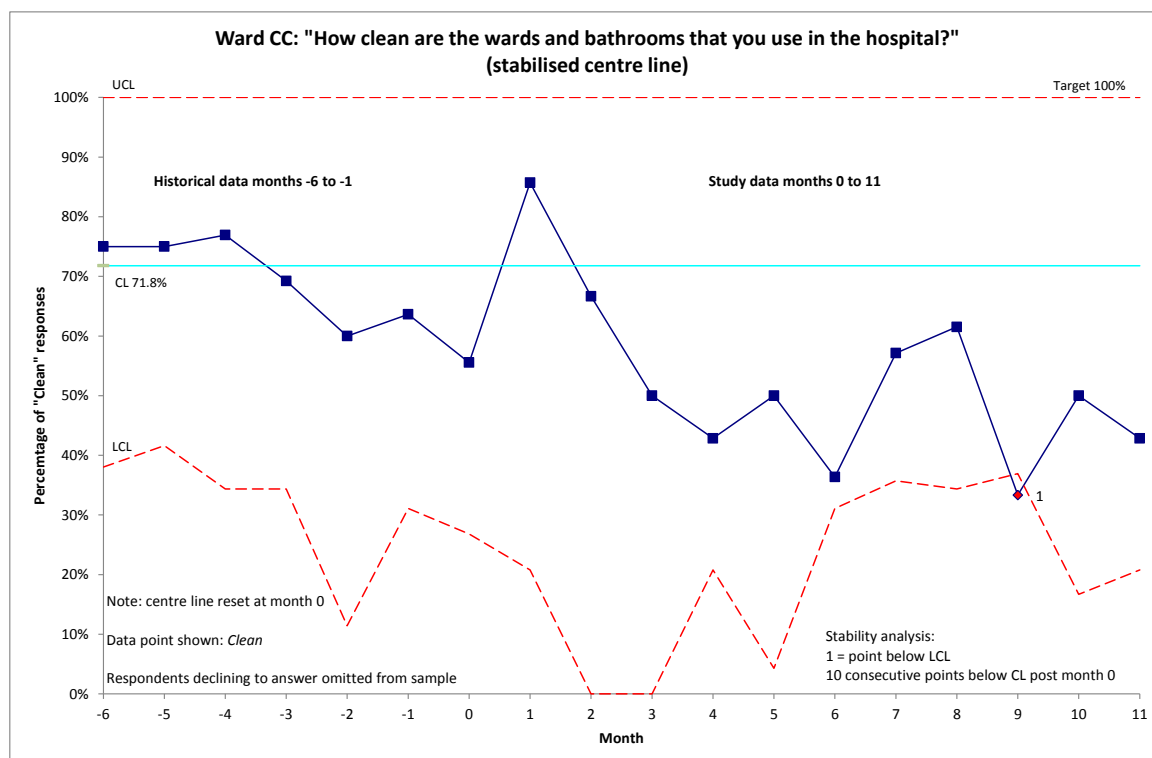
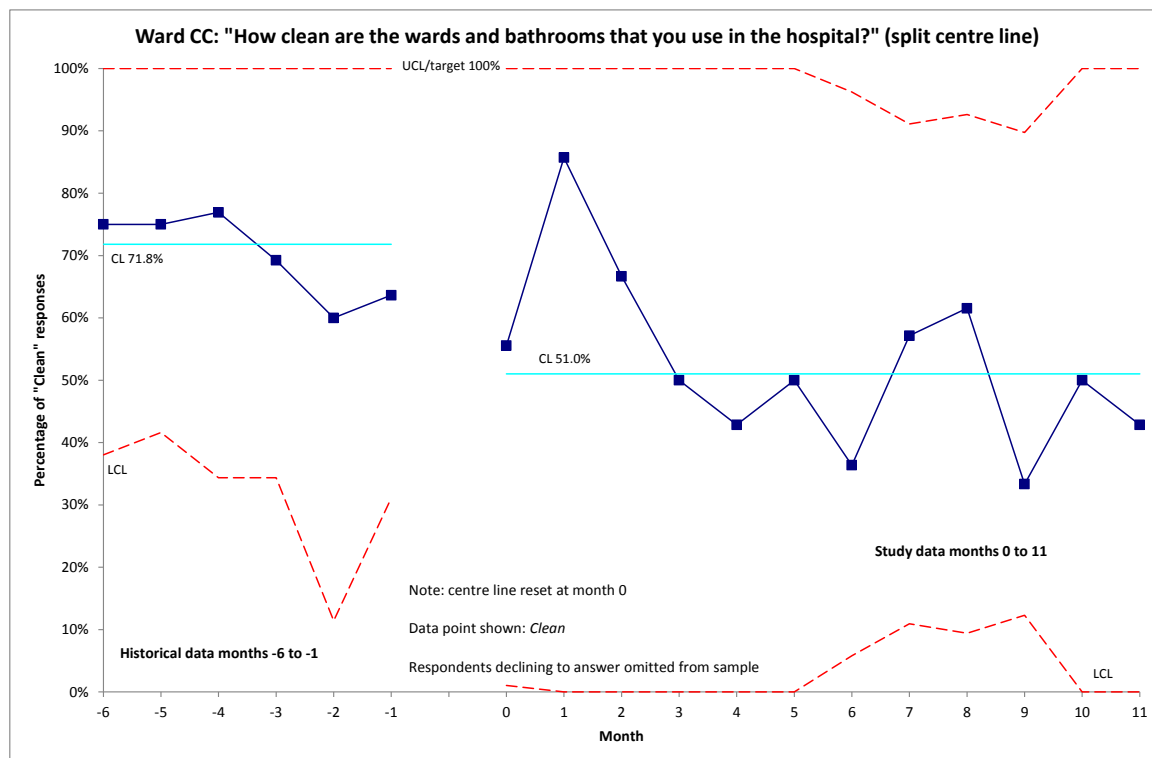


Ward CC question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	12 (75.0%)	2 (12.5%)	1 (6.3%)	1 (6.3%)	0	16
-5	15 (75.0%)	5 (25.0%)	0	0	0	20
-4	10 (76.9%)	3 (23.1%)	0	0	0	13
-3	9 (64.3%)	4 (28.6%)	0	0	1 (7.1%)	14
-2	3 (60.0%)	2 (40.0%)	0	0	0	5
-1	7 (63.6%)	4 (36.4%)	0	0	0	11
Total	56 (70.9%)	20 (25.2%)	1 (1.3%)	1 (1.3%)	1 (1.3%)	79

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	5 (55.6%)	4 (44.4%)	0	0	0	9
1	6 (85.7%)	1 (14.3%)	0	0	0	7
2	2 (66.7%)	1 (33.3%)	0	0	0	3
3	1 (50.0%)	1 (50.0%)	0	0	0	2
4	3 (42.8%)	1 (14.3%)	1 (14.3%)	2 (28.6%)	0	7
5	2 (50.0%)	2 (50.0%)	0	0	0	4
6	4 (36.4%)	4 (36.4%)	3 (27.2%)	0	0	11
7	8 (57.1%)	5 (35.7%)	1 (7.2%)	0	0	14
8	8 (61.5%)	2 (15.4%)	2 (15.4%)	1 (7.7%)	0	13
9	5 (33.3%)	9 (60.0%)	0	1 (6.7%)	0	15
10	3 (42.8%)	1 (14.3%)	2 (28.6%)	0	1 (14.3%)	7
11	3 (37.5%)	4 (50.0%)	0	0	1 (12.5%)	8
Total	50 (50.0%)	35 (35.0%)	9 (9.0%)	4 (4.0%)	2 (2.0%)	100

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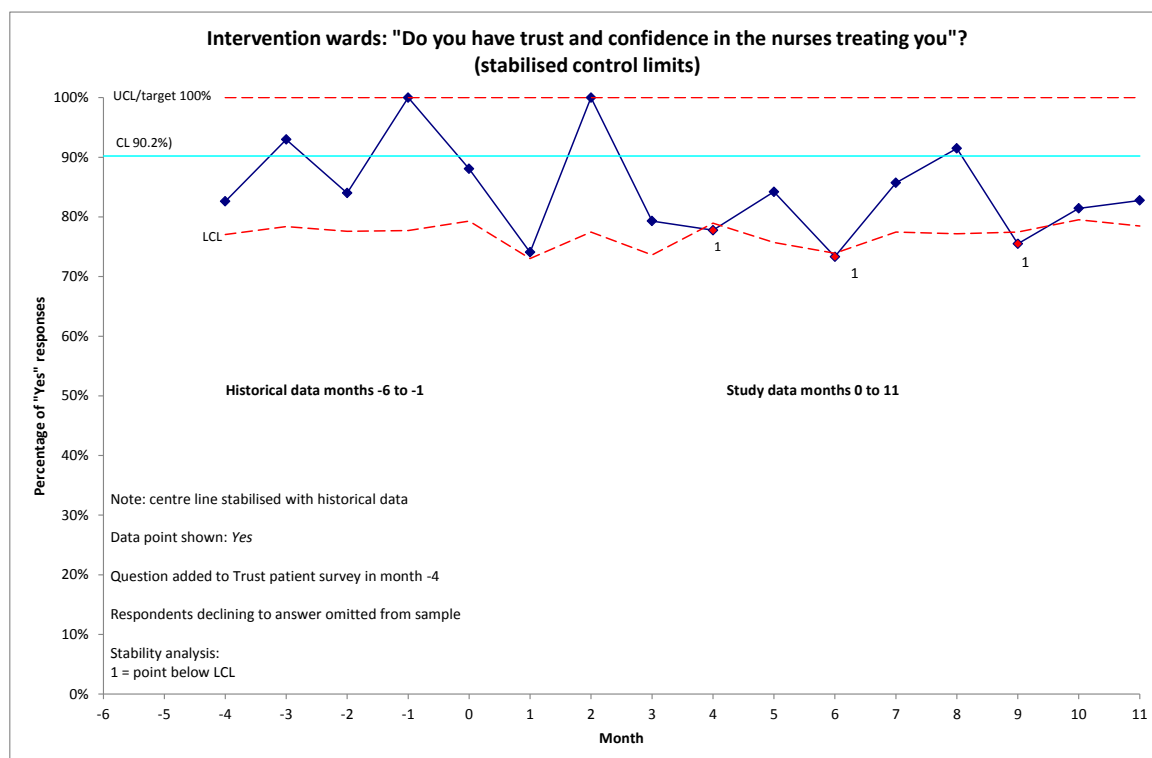
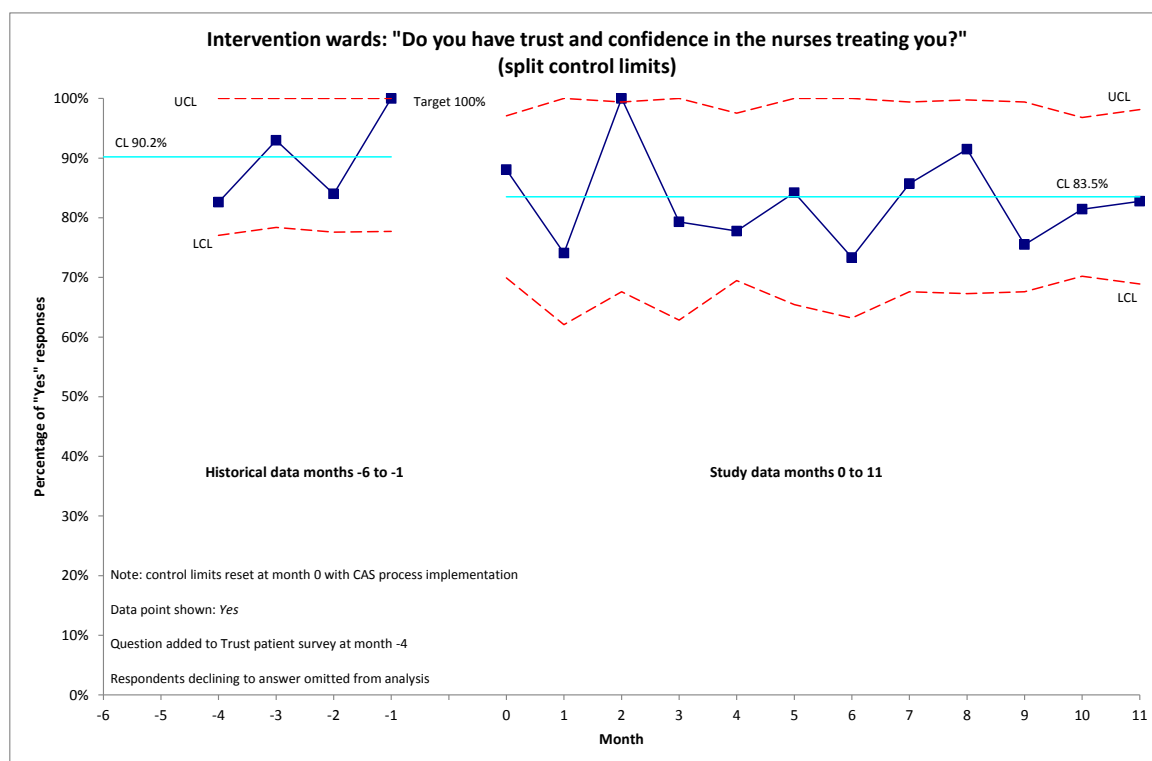
Intervention wards question: *“Do you have trust and confidence in the nurses treating you?”*⁷⁸

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	38 (82.6%)	5 (10.8%)	1 (2.2%)	2 (4.4%)	46
-3	53 (93.0%)	3 (5.3%)	1 (1.7%)	0	57
-2	42 (84.0%)	7 (14.0%)	1 (2.0%)	0	50
-1	51 (100.0%)	0	0	0	51
Total	184 (90.2%)	15 (7.4%)	3 (1.4%)	2 (1.0%)	204

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	59 (88.1%)	7 (10.4%)	1 (1.5%)	0	67
1	20 (74.1%)	7 (25.9%)	0	0	27
2	49 (100.0%)	0	0	0	49
3	23 (79.3%)	5 (17.2%)	1 (3.4%)	0	29
4	49 (77.8%)	11 (17.4%)	3 (4.8%)	0	63
5	32 (84.2%)	6 (15.8%)	0	0	38
6	22 (73.3%)	6 (20.0%)	1 (3.3%)	1 (3.3%)	30
7	42 (85.7%)	5 (10.3%)	1 (2.0%)	1 (2.0%)	49
8	43 (91.5%)	3 (6.4%)	0	1 (2.1%)	47
9	37 (75.5%)	11 (22.4%)	1 (2.0%)	0	49
10	57 (81.4%)	12 (17.1%)	0	1 (14.3%)	70
11	48 (82.8%)	10 (17.2%)	0	0	58
Total	481 (83.5%)	83 (14.4%)	8 (1.4%)	4 (0.7%)	576

⁷⁸ Question add to Trust patient survey in month -4

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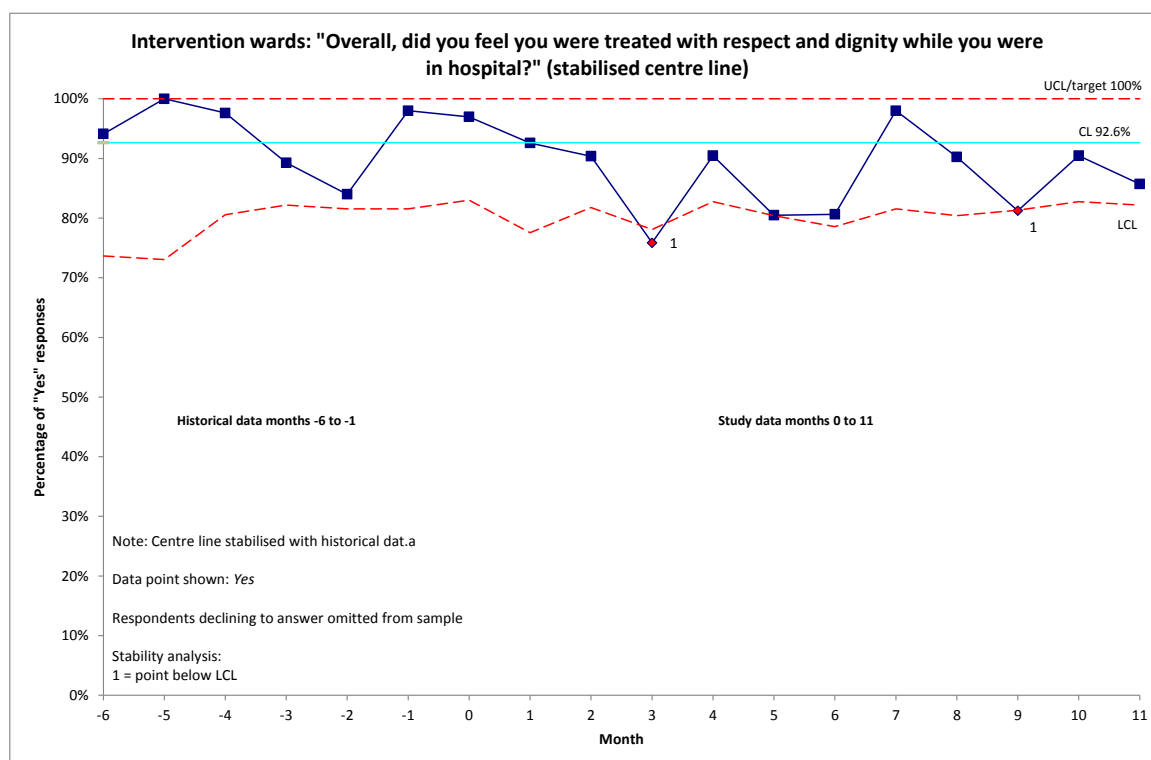
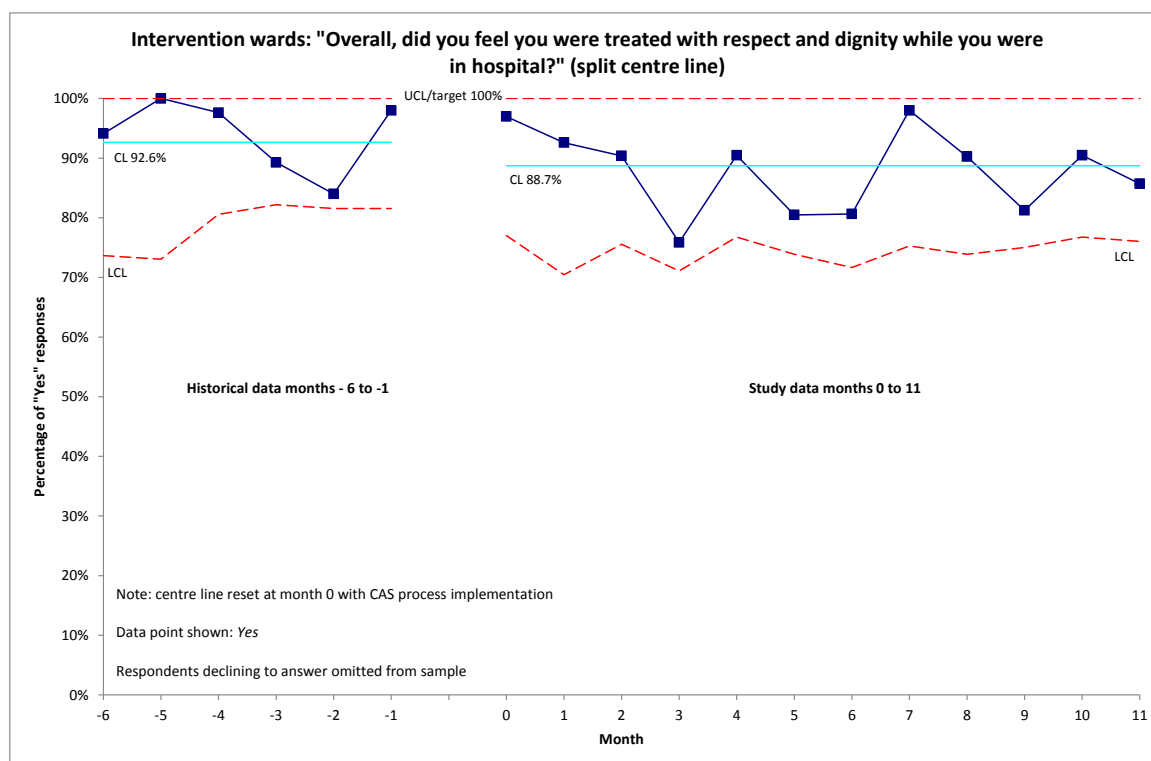


Intervention wards question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	16 (94.1%)	1 (5.89%)	0	0	17
-5	16 (94.1%)	0	0	1 (5.9%)	17
-4	41 (97.6%)	1 (2.4%)	0	0	42
-3	50 (89.3%)	5 (8.9%)	1 (1.8%)	0	56
-2	42 (84.0%)	8 (16.0%)	0	0	50
-1	49 (98.0%)	1 (2.0%)	0	0	50
Total	214 (92.3%)	16 (6.9%)	1 (0.4%)	1 (0.4%)	232

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	64 (94.1%)	2 (2.9%)	0	2 (2.9%)	68
1	25 (92.6%)	2 (7.4%)	0	0	27
2	47 (90.4%)	5 (9.6%)	0	0	52
3	22 (75.9%)	7 (24.1%)	0	0	29
4	57 (90.5%)	4 (6.3%)	2 (3.2%)	0	63
5	33 (80.5%)	8 (19.5%)	0	0	41
6	25 (80.6%)	6 (19.4%)	0	0	31
7	49 (96.0%)	1 (2.0%)	0	1 (2.0%)	51
8	37 (88.1%)	3 (7.1%)	1 (2.4%)	1 (2.4%)	42
9	39 (81.3%)	8 (16.6%)	1 (2.1%)	0	48
10	57 (89.1%)	5 (7.7%)	1 (1.6%)	1 (1.6%)	64
11	48 (85.7%)	8 (14.3%)	0	0	56
Total	503 (88.0%)	59 (10.4%)	5 (0.8%)	5 (0.8%)	572

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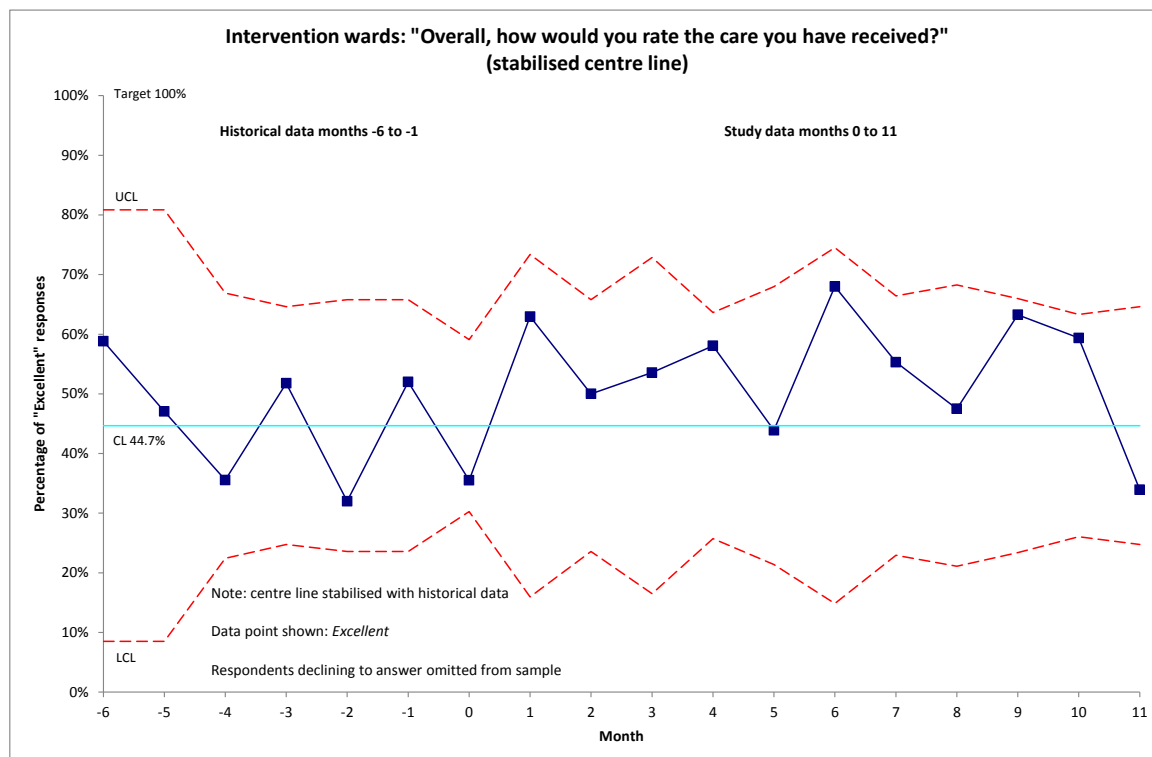
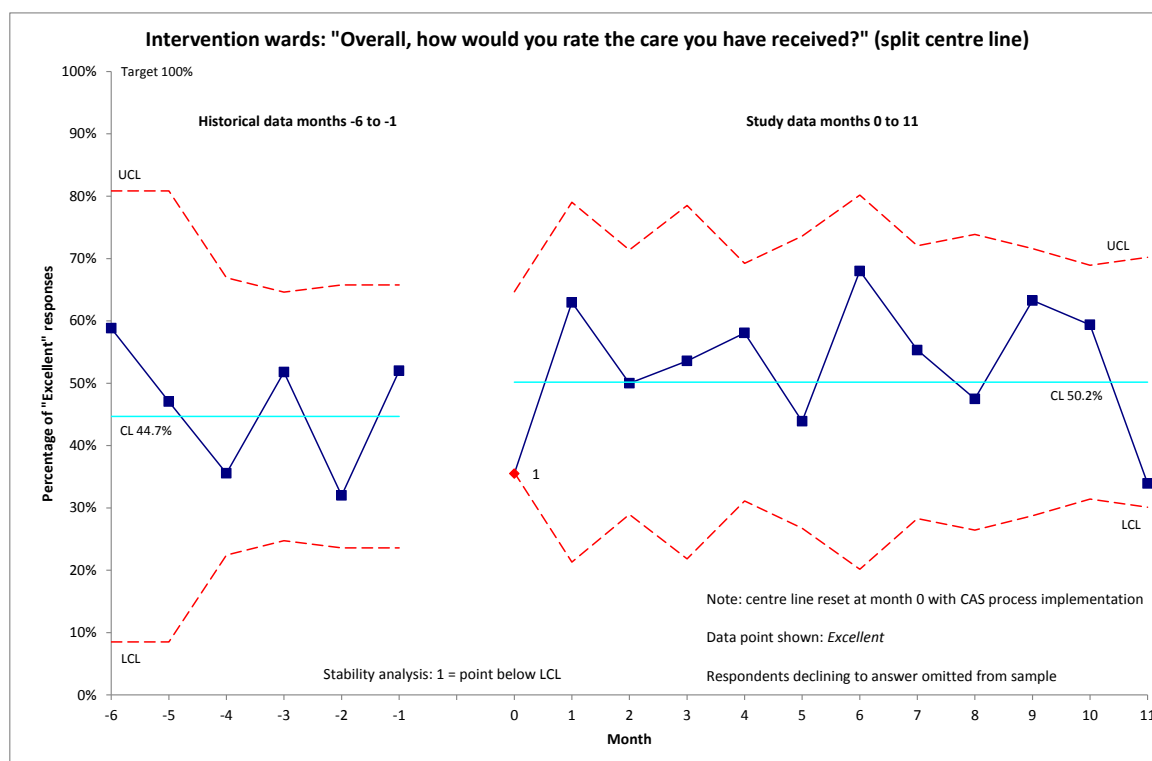


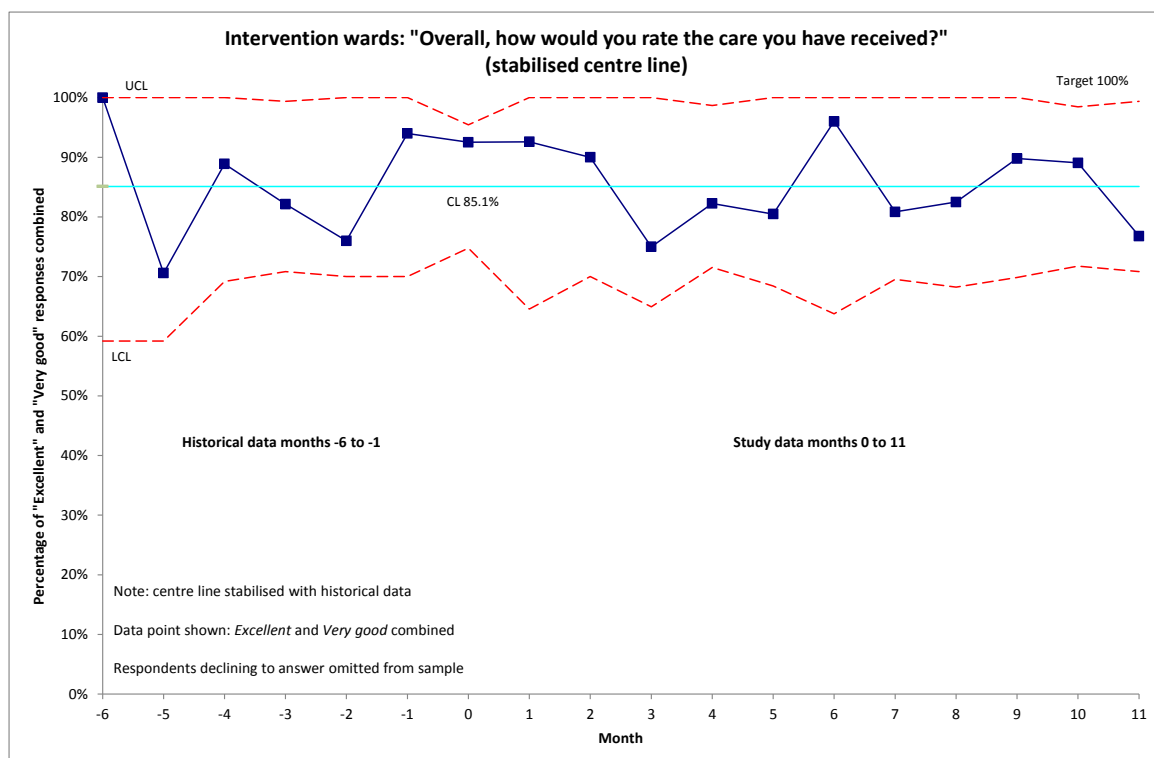
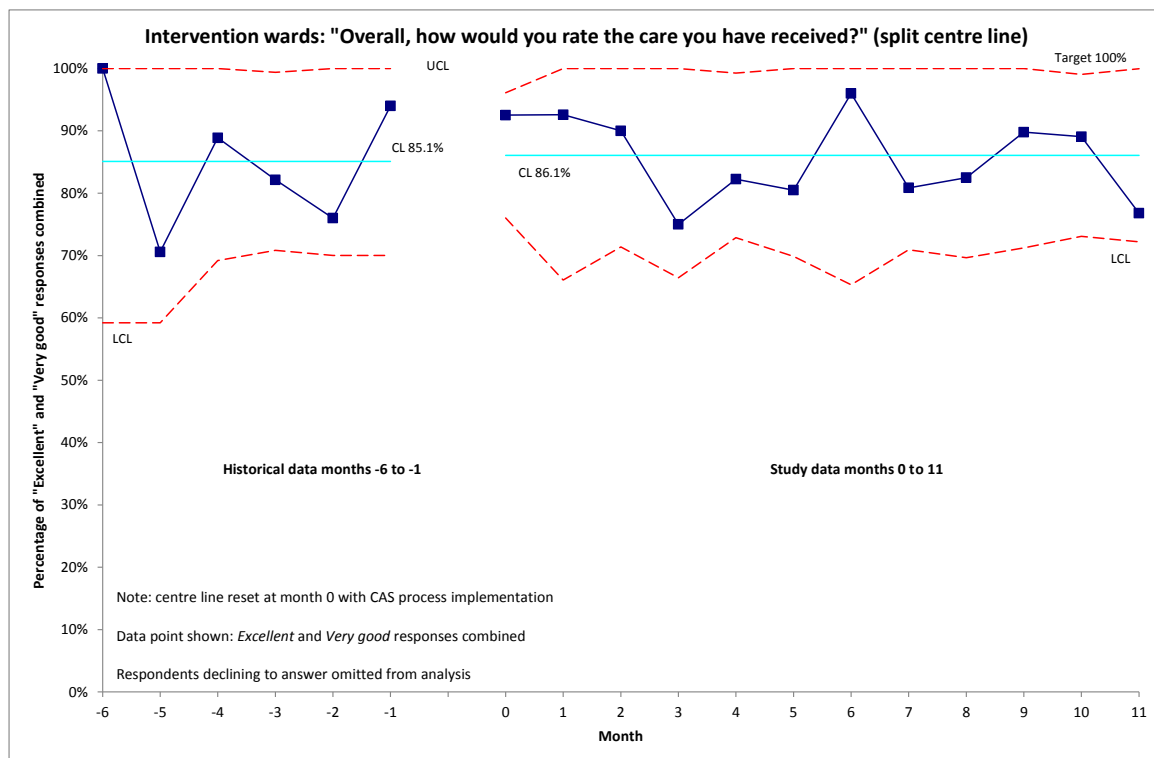
Intervention wards question: “Overall, how would you rate the care you have received?”

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	10 (58.8%)	7 (41.2%)	0	0	0	0	17
-5	8 (44.4%)	4 (22.2%)	4 (22.2%)	1 (5.6%)	0	1 (5.6%)	18
-4	16 (34.8%)	24 (52.2%)	4 (8.6%)	1 (2.2%)	0	1 (2.2%)	46
-3	29 (51.8%)	17 (30.4%)	7 (12.5%)	3 (5.3%)	0	0	56
-2	16 (32.0%)	22 (44.0%)	9 (18.0%)	3 (6.0%)	0	0	50
-1	26 (52.0%)	21 (42.0%)	2 (4.0%)	1 (2.0%)	0	0	50
Total	105 (44.3%)	95 (40.1%)	26 (11.0%)	9 (3.8%)	0	2 (0.8%)	237

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	38 (35.5%)	61 (57.0%)	8 (7.5%)	0	0	0	107
1	17 (60.7%)	8 (28.6%)	2 (7.1%)	0	0	1 (3.6%)	28
2	25 (50.0%)	20 (40.0%)	3 (6.0%)	1 (2.0%)	1 (2.0%)	0	50
3	15 (53.6%)	6 (21.4%)	5 (17.8%)	1 (3.6%)	1 (3.6%)	0	28
4	36 (58.1%)	15 (24.2%)	5 (8.1%)	3 (4.8%)	3 (4.8%)	0	62
5	18 (43.9%)	15 (36.6%)	7 (17.1%)	1 (2.4%)	0	0	41
6	17 (65.4%)	7 (27.0%)	0	1 (3.8%)	0	1 (3.8%)	26
7	26 (55.3%)	12 (25.5%)	5 (10.6%)	3 (6.4%)	1 (2.1%)	0	47
8	19 (46.4%)	14 (34.2%)	5 (12.2%)	1 (2.4%)	1 (2.4%)	1 (2.4%)	41
9	31 (63.3%)	13 (26.5%)	4 (8.2%)	0	1 (2.0%)	0	49
10	38 (59.4%)	19 (29.7%)	7 (10.9%)	0	0	0	64
11	19 (33.9%)	24 (42.9%)	12 (21.4%)	1 (1.8%)	0	0	56
Total	299 (49.9%)	214(35.7%)	63 (10.5%)	12 (2.0%)	8 (1.3%)	3 (0.5%)	599

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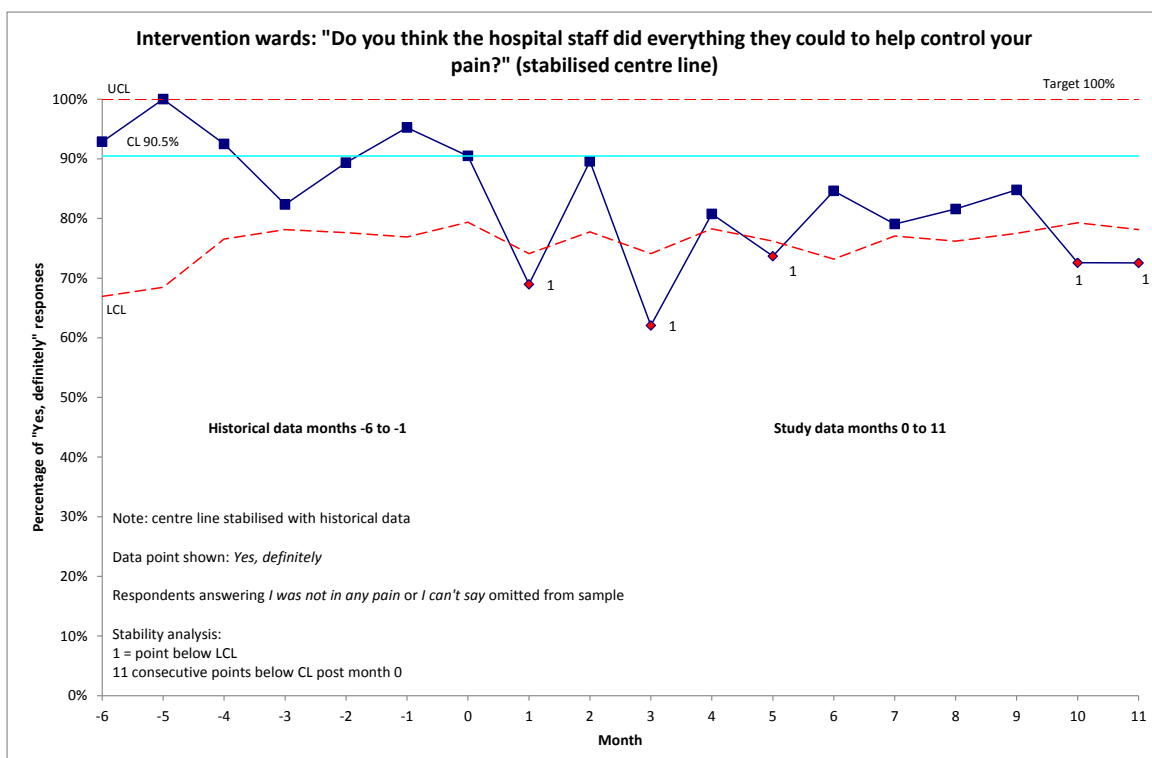
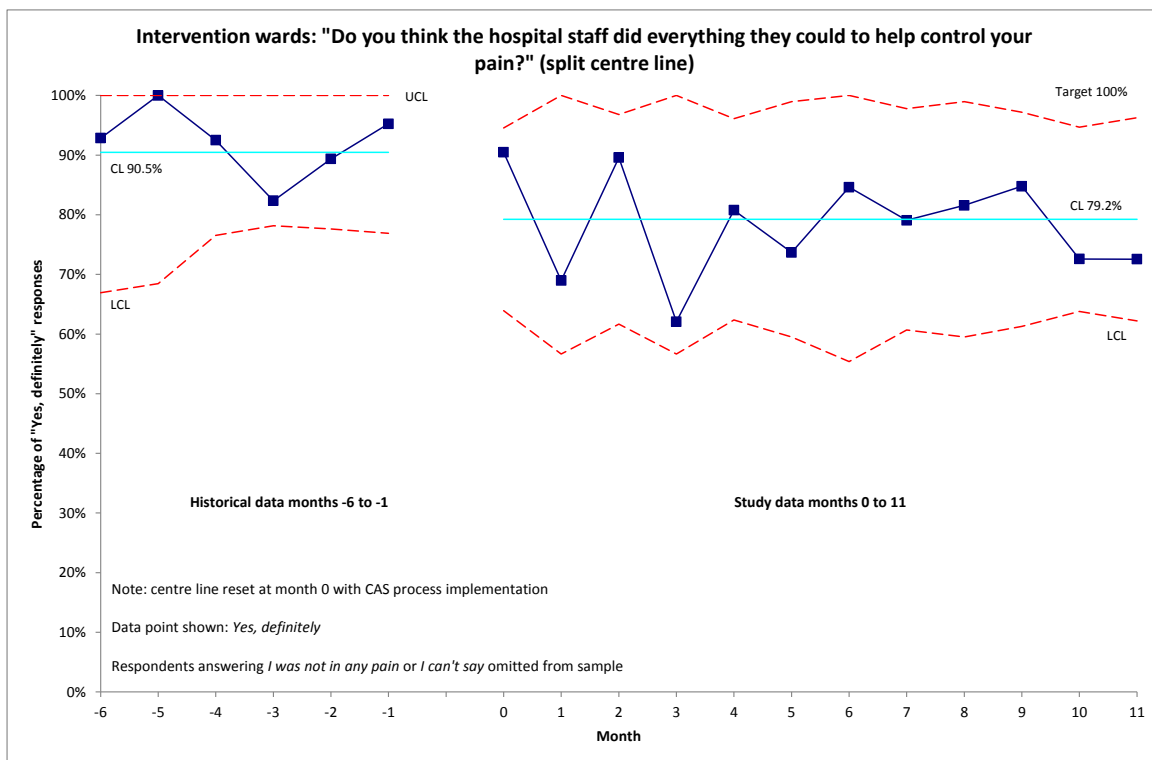
10. Appendices

Intervention wards question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	13 (81.3%)	1 (6.3%)	0	2 (12.4%)	16
-5	16 (100.0%)	0	0	0	16
-4	37 (84.1%)	2 (4.5%)	1 (2.3%)	4 (9.1%)	44
-3	42 (77.8%)	8 (14.8%)	1 (1.9%)	3 (5.5%)	54
-2	42 (85.7%)	4 (8.2%)	2 (4.1%)	1 (2.0%)	49
-1	40 (83.3%)	1 (2.1%)	1 (2.1%)	6 (12.5%)	48
Total	190 (83.8%)	16 (7.0%)	5 (2.2%)	16 (7.0%)	227

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁷⁹	Subgroup size
0	57 (85.1%)	5 (7.5%)	1 (1.4%)	4 (6.0%)	-	67
1	20 (71.4%)	3 (10.7%)	4 (14.3%)	1 (3.6%)	-	28
2	43 (79.6%)	5 (9.3%)	0	6 (11.1%)	-	54
3	18 (60.0%)	7 (23.3%)	4 (13.3%)	0	1 (3.4%)	30
4	42 (75.0%)	9 (16.1%)	3 (5.4%)	0	2 (3.5%)	56
5	28 (70.0%)	8 (20.0%)	2 (5.0%)	0	2 (5.0%)	40
6	22 (81.5%)	4 (14.8%)	0	0	1 (3.7%)	27
7	34 (68.0%)	3 (6.0%)	6 (12.0%)	0	7 (14.0%)	50
8	31 (73.9%)	3 (7.1%)	4 (9.5%)	0	4 (9.5%)	42
9	39 (79.6%)	5 (10.2%)	2 (4.1%)	0	3 (6.1%)	49
10	45 (67.2%)	16 (23.8%)	1 (1.5%)	0	5 (7.5%)	67
11	37 (66.1%)	14 (25.0%)	0	0	5 (8.9%)	56
Total	416 (73.5%)	82 (14.5%)	27 (4.8%)	11 (1.9%)	30 (5.3%)	566

⁷⁹ Response added by Picker Institute to survey question in study month 3



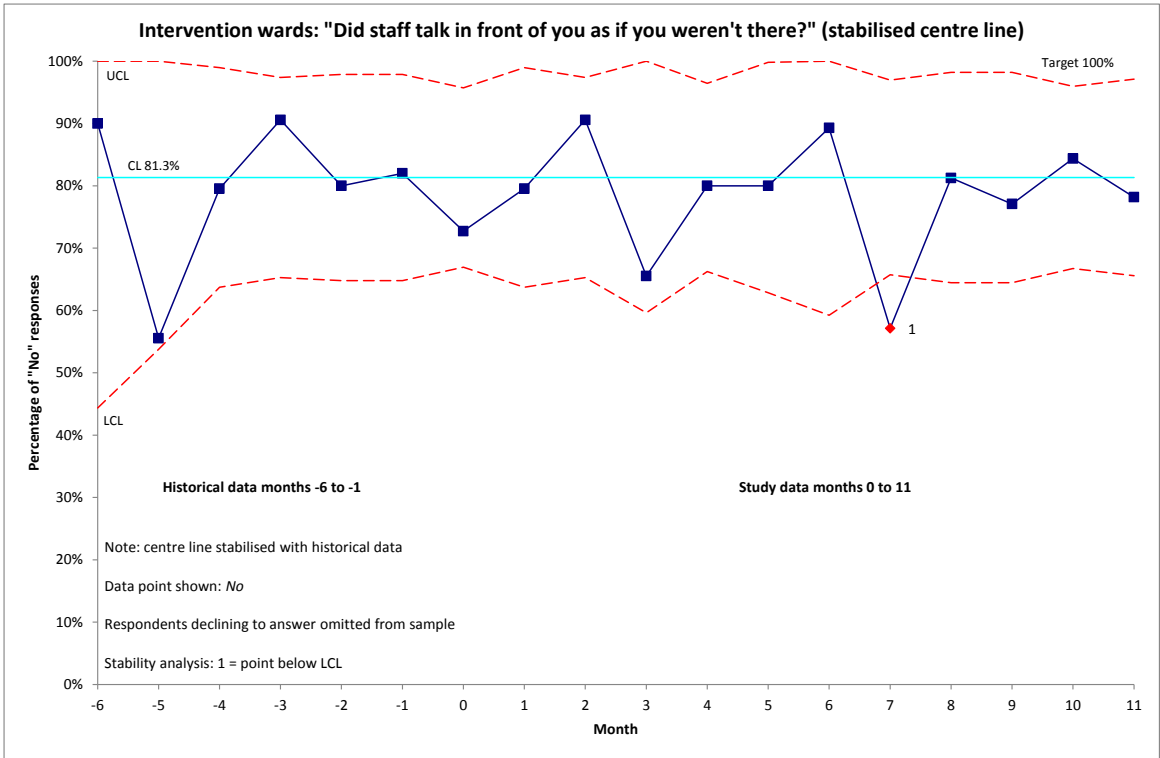
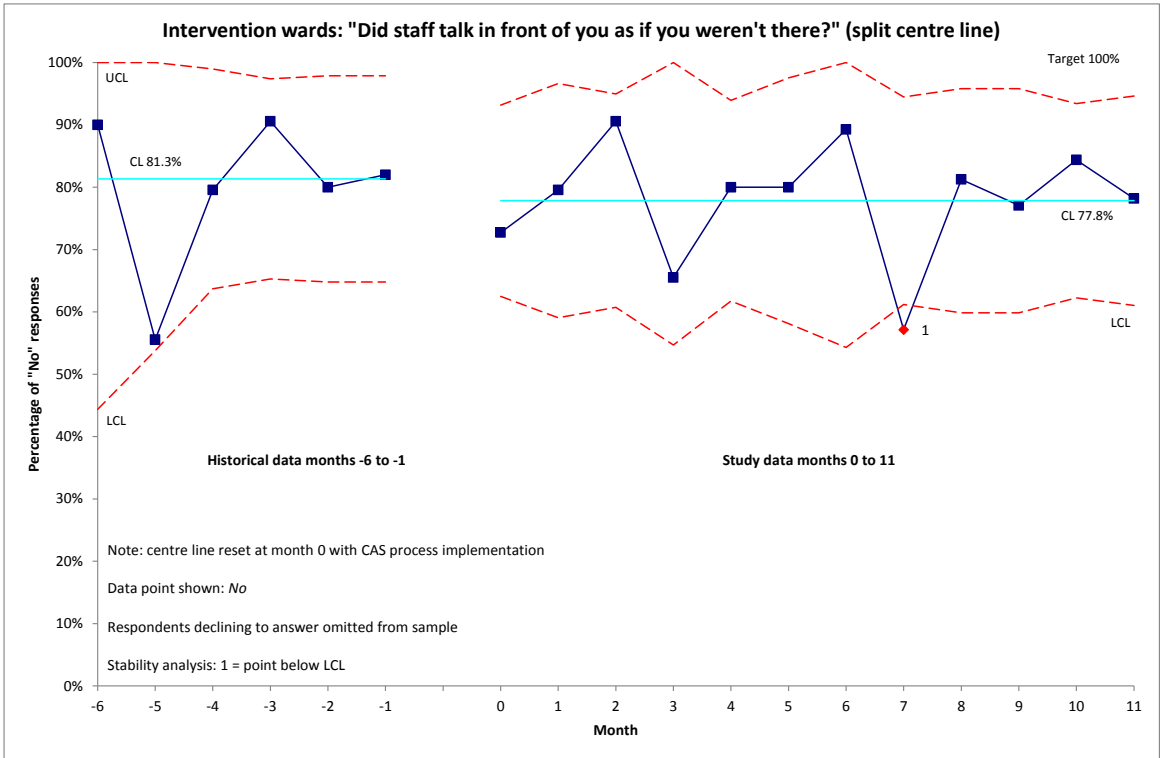
10. Appendices

Intervention wards question: *“Did staff talk in front of you as if you weren’t there?”*

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don’t know /declined	Subgroup size
-6	1 (10.0%)	9 (90.0%)	0	10
-5	4 (25.0%)	10 (62.5%)	2 (12.5%)	16
-4	9 (20.0%)	35 (77.8%)	1 (2.2%)	45
-3	5 (9.4%)	48 (90.6%)	0	53
-2	10 (20.0%)	40 (80.0%)	0	50
-1	9 (17.6%)	41 (80.4%)	1 (2.0%)	51
Total	38 (16.9%)	183 (81.3%)	4 (1.8%)	225

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁸⁰	Yes, sometimes	No	Don’t know /declined	Subgroup size
0	18 (26.9%)	-	48 (71.6%)	1 (1.5%)	67
1	9 (20.0%)	-	35 (77.8%)	1 (2.2%)	45
2	5 (9.2%)	-	48 (88.9%)	1 (1.9%)	54
3	2 (6.7%)	8 (26.7%)	19 (63.3%)	1 (3.3%)	30
4	2 (3.2%)	10 (16.2%)	48 (77.4%)	2 (3.2%)	62
5	1 (2.5%)	7 (17.0%)	32 (78.0%)	1 (2.5%)	41
6	2 (7.1%)	1 (3.6%)	25 (89.3%)	0	28
7	8 (14.0%)	16 (28.1%)	32 (56.1%)	1 (1.8%)	57
8	2 (4.2%)	7 (14.6%)	39 (81.2%)	0	48
9	1 (2.0%)	10 (20.4%)	37 (75.6%)	1 (2.0%)	49
10	3 (4.5%)	7 (10.4%)	54 (80.6%)	3 (4.5%)	67
11	2 (3.5%)	10 (17.2%)	43 (74.1%)	3 (5.2%)	58
Total	55 (9.1%)	76 (12.5%)	460 (75.9%)	15 (2.5%)	606

⁸⁰ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

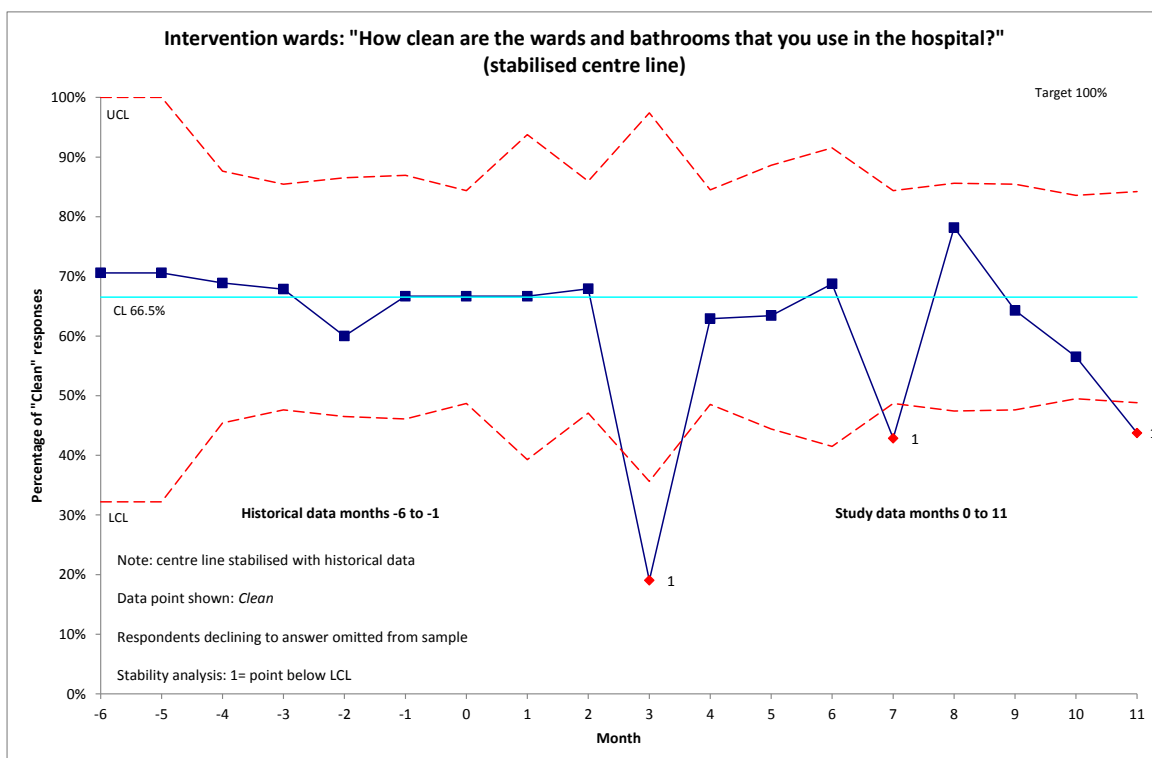
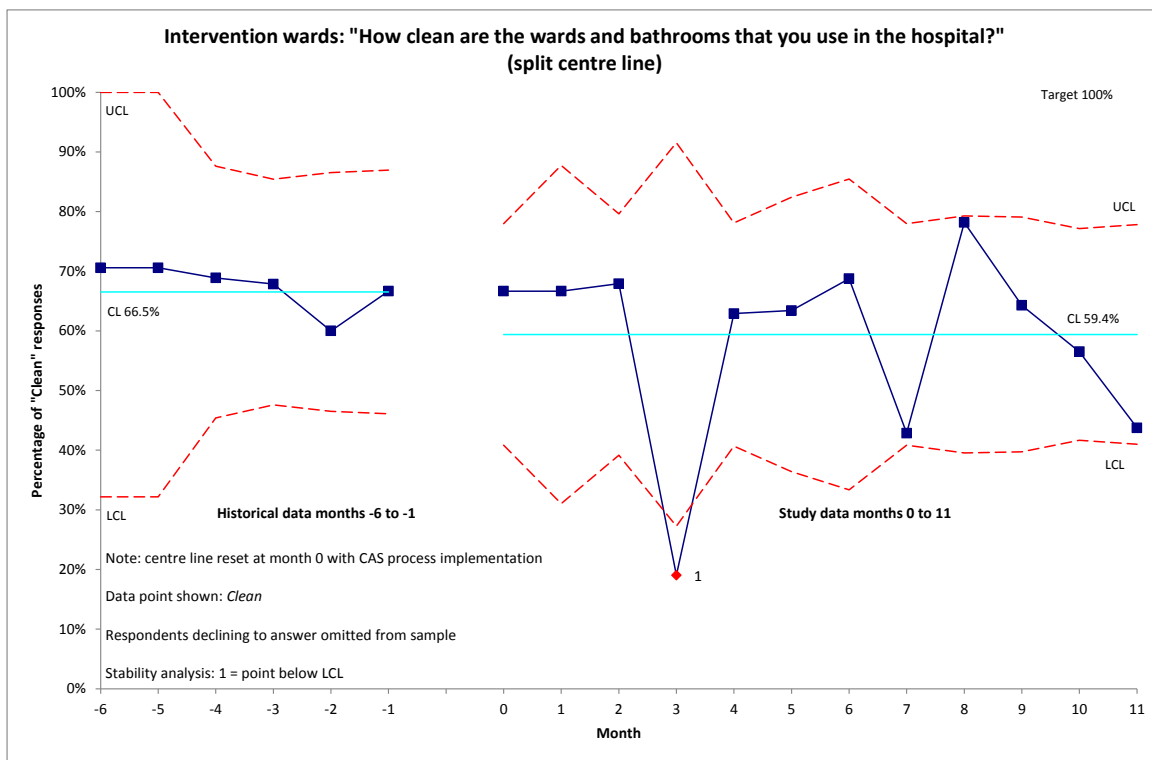


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Intervention wards question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	12 (70.6%)	5 (29.4%)	0	0	0	17
-5	12 (66.7%)	4 (22.2%)	0	1 (5.6%)	1 (5.6%)	18
-4	31 (68.9%)	13 (28.9%)	0	1 (2.2%)	0	45
-3	38 (66.6%)	16 (28.1%)	1 (1.8%)	1 (1.8%)	1 (1.8%)	57
-2	30 (60.0%)	17 (34.0%)	2 (4.0%)	1 (2.0%)	0	50
-1	32 (64.0%)	15 (30.0%)	1 (2.0%)	0	2 (4.0%)	50
Total	155 (65.4%)	70 (29.5%)	4 (1.7%)	4 (1.7%)	4 (1.7%)	237

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	42 (66.7%)	21 (33.3%)	0	0	0	63
1	18 (66.7%)	8 (29.6%)	1 (3.7%)	0	0	27
2	36 (66.7%)	11 (20.4%)	6 (11.1%)	0	1 (1.8%)	54
3	4 (19.0%)	15 (71.4%)	1 (4.8%)	1 (4.8%)	0	21
4	39 (62.9%)	17 (27.4%)	4 (6.5%)	2 (3.2%)	0	62
5	26 (63.4%)	12 (29.3%)	2 (4.9%)	1 (2.4%)	0	41
6	22 (68.8%)	9 (28.1%)	1 (3.1%)	0	0	32
7	27 (42.2%)	27 (42.2%)	7 (10.9%)	1 (1.6%)	2 (3.1%)	64
8	43 (78.2%)	10 (18.2%)	1 (1.8%)	1 (1.8%)	0	55
9	36 (64.3%)	17 (30.4%)	3 (5.3%)	0	0	56
10	39 (54.9%)	28 (39.5%)	0	2 (2.8%)	2 (2.8%)	71
11	28 (43.1%)	32 (49.2%)	2 (3.1%)	2 (3.1%)	1 (1.5%)	65
Total	360 (58.9%)	207 (33.9%)	28 (4.7%)	10 (1.6%)	6 (0.9%)	611



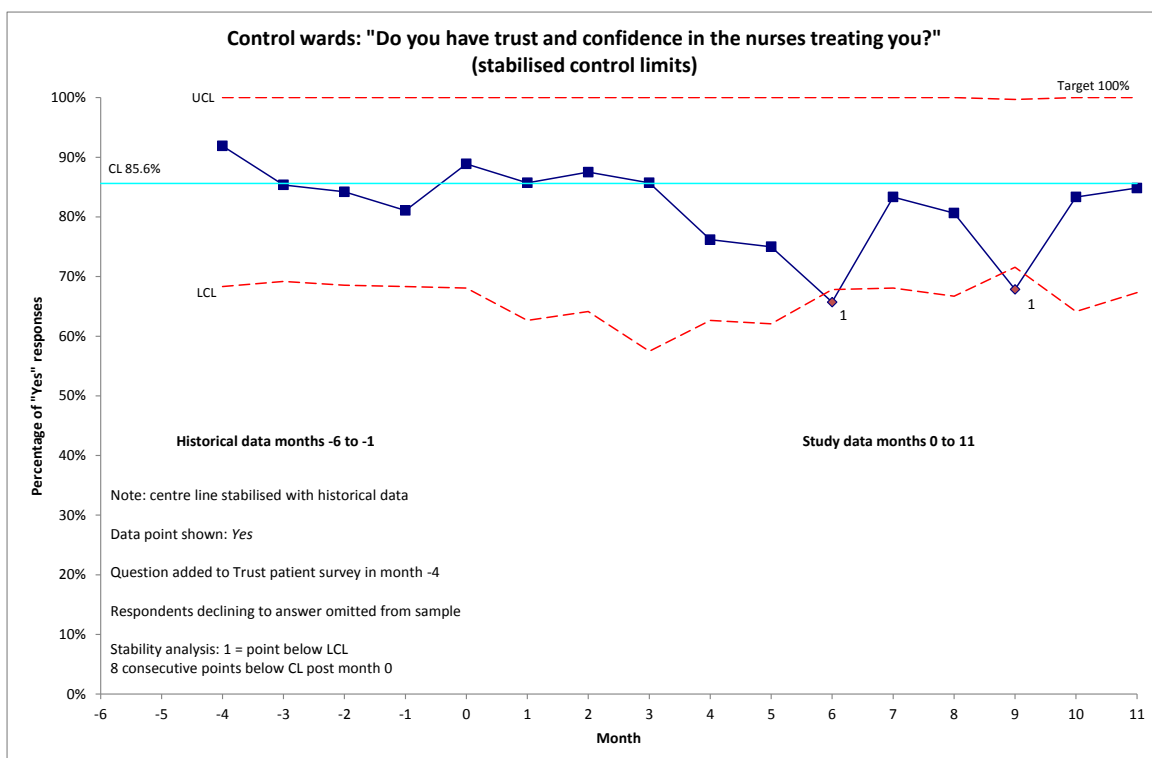
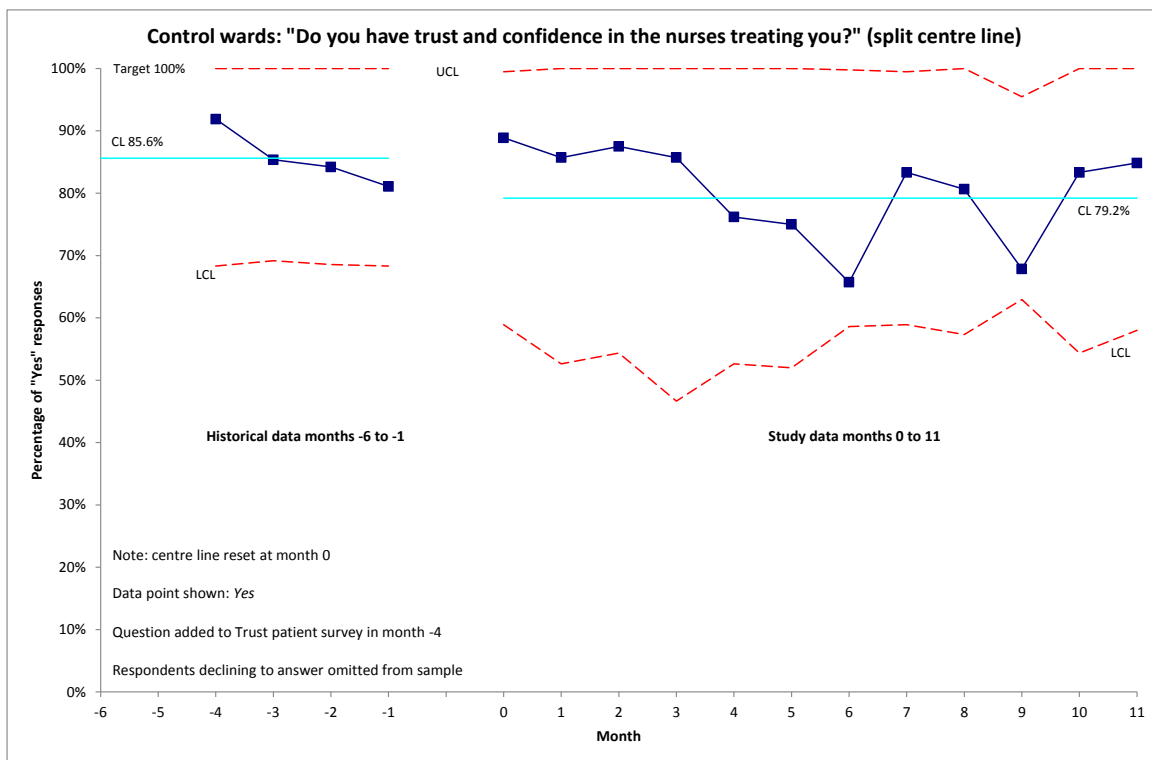
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Control wards question: *“Do you have trust and confidence in the nurses treating you?”*⁸¹

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-4	34 (89.5%)	2 (5.3%)	1 (2.6)	1 (2.6)	38
-3	35 (83.3%)	6 (14.3%)	0	1 (2.4%)	42
-2	32 (84.2%)	6 (15.8%)	0	0	38
-1	30 (79.0%)	7 (18.4%)	0	1 (2.6%)	38
Total	131 (84.0%)	21 (13.5%)	1 (0.6%)	3 (1.9%)	156

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	32 (88.9%)	3 (8.3%)	1 (2.8%)	0	36
1	18 (85.7%)	2 (9.5%)	1 (4.8%)	0	21
2	21 (87.5%)	3 (12.5%)	0	0	24
3	12 (85.7%)	2 (12.5%)	0	0	14
4	16 (76.2%)	4 (19.0%)	1 (4.8%)	0	21
5	15 (75.0%)	5 (25.0%)	0	0	20
6	23 (65.7%)	10 (28.6%)	2 (5.7%)	0	35
7	30 (83.3%)	4 (11.1%)	2 (5.6%)	0	36
8	25 (80.6%)	5 (16.2%)	1 (3.2%)	0	31
9	38 (67.8%)	17 (30.4%)	1 (1.8%)	0	56
10	20 (83.3%)	4 (16.7%)	0	0	24
11	28 (84.8%)	5 (15.2%)	0	0	33
Total	278 (79.2%)	64 (18.2%)	9 (2.6%)	0	351

⁸¹ Question add to Trust patient survey in month -4

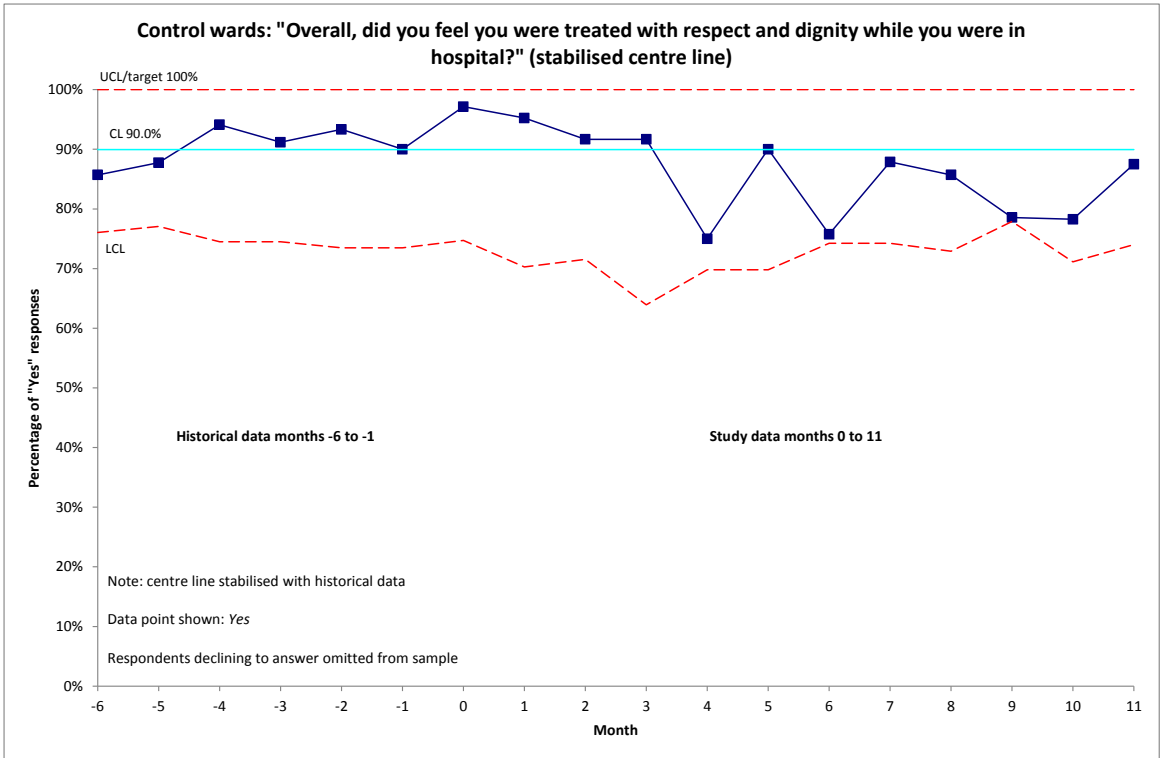
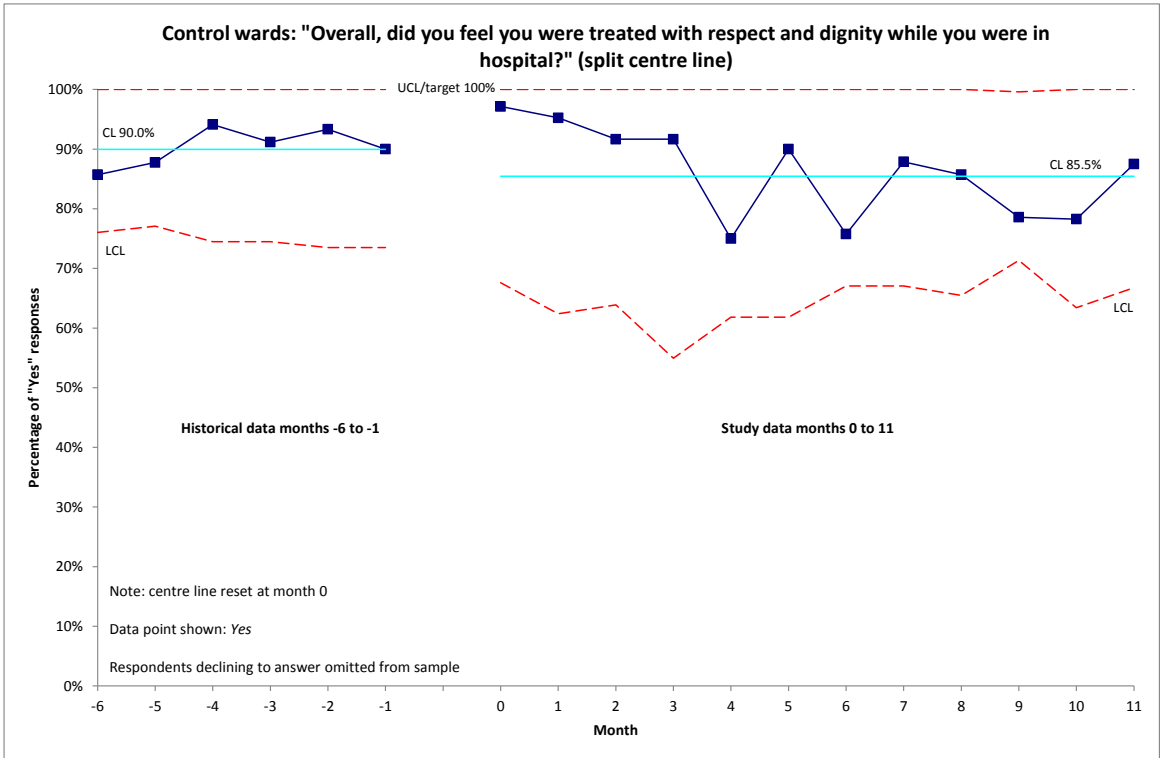


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Control wards question: “Overall, did you feel you were treated with respect and dignity while you were in hospital?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
-6	36 (85.8%)	3 (7.1%)	3 (7.1%)	0	42
-5	43 (86.0%)	3 (6.0%)	3 (6.0%)	1 (2.0%)	50
-4	32 (94.1%)	2 (5.9%)	0	0	34
-3	31 (88.5%)	1 (2.9%)	2 (5.7%)	1 (2.9%)	35
-2	28 (93.4%)	1 (3.3%)	1 (3.3%)	0	30
-1	27 (90.0%)	3 (10.0%)	0	0	30
Total	197 (89.1%)	13 (5.9%)	9 (4.1%)	2 (0.9%)	221

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes	Sometimes	No	Declined	Subgroup size
0	34 (94.4%)	0	1 (2.8%)	1 (2.8%)	36
1	20 (95.2%)	1 (4.8%)	0	0	21
2	22 (88.0%)	1 (4.5%)	1 (4.5%)	1 (4.5%)	25
3	11 (91.7%)	1 (8.3%)	0	0	12
4	15 (75.0%)	3 (15.0%)	2 (10.0%)	0	20
5	18 (90.0%)	2 (10.0%)	0	0	20
6	25 (75.8%)	7 (21.2%)	1 (3.0%)	0	33
7	29 (87.9%)	3 (9.1%)	1 (3.0%)	0	33
8	24 (85.7%)	3 (10.7%)	1 (3.6%)	0	28
9	44 (78.6%)	10 (17.8%)	2 (3.6%)	0	56
10	18 (78.3%)	4 (17.4%)	1 (4.3%)	0	23
11	28 (87.5%)	4 (12.5%)	0	0	32
Total	288 (85.0%)	39 (11.5%)	10 (2.9%)	2 (0.6%)	339

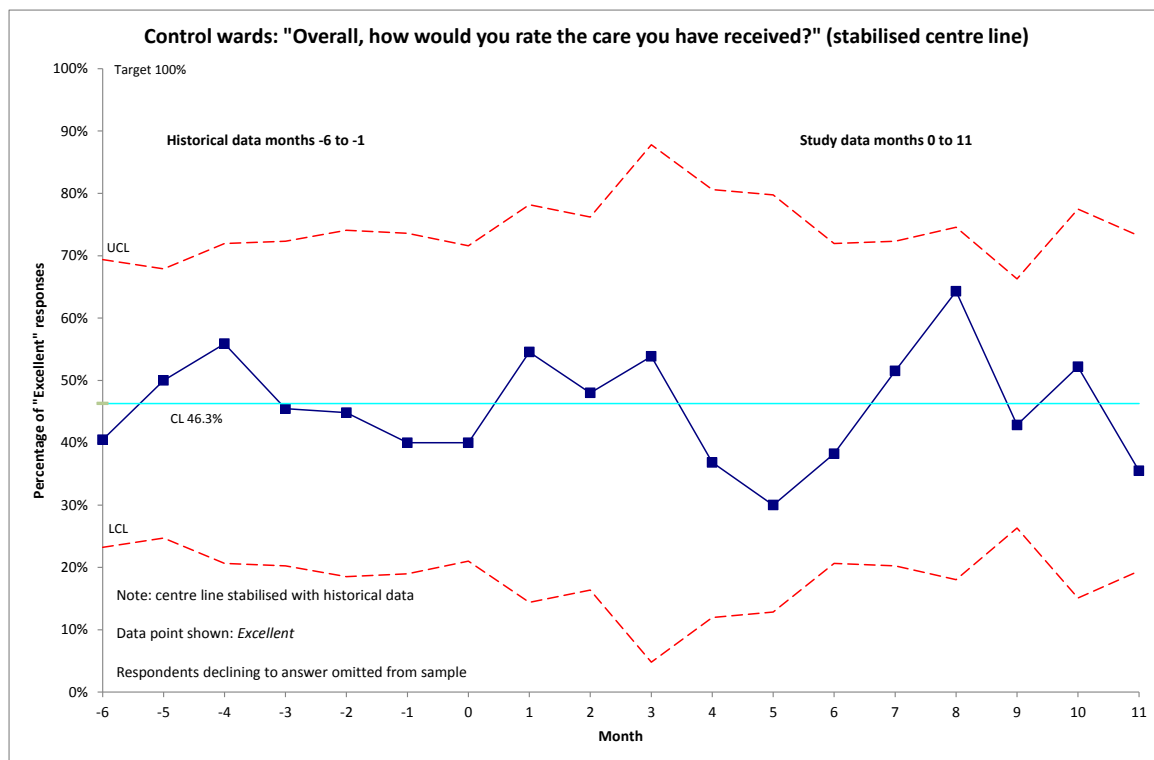
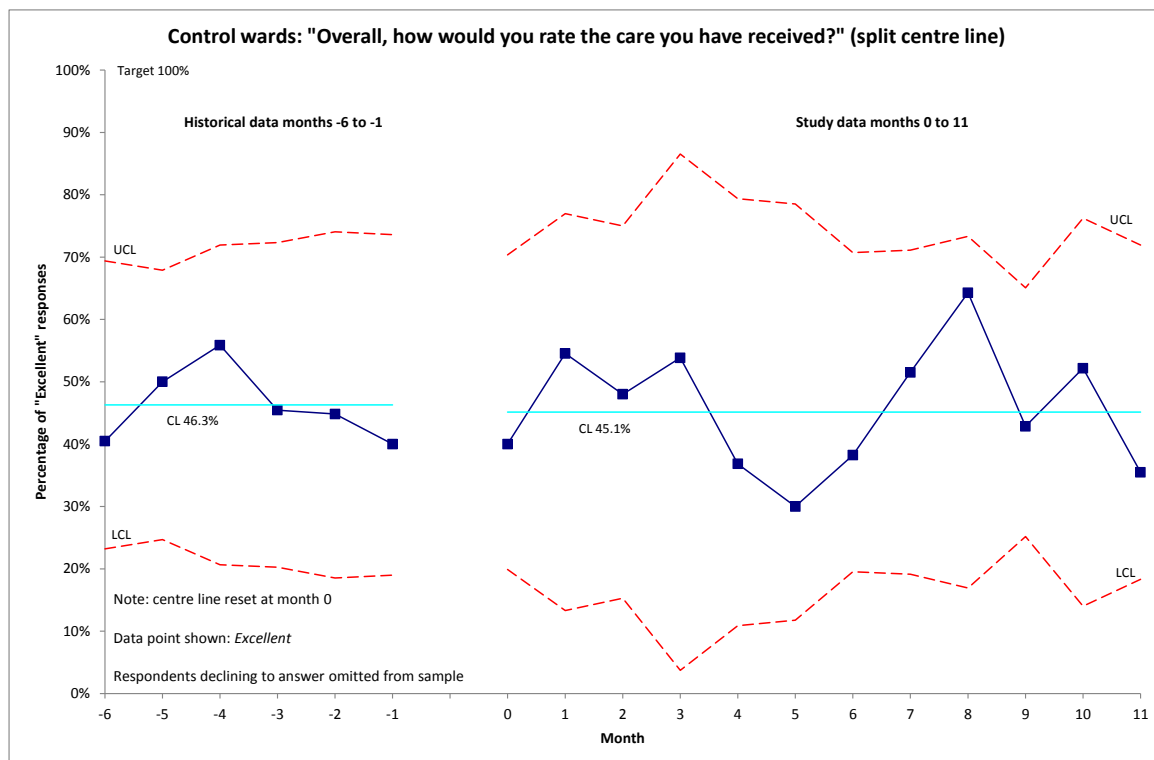


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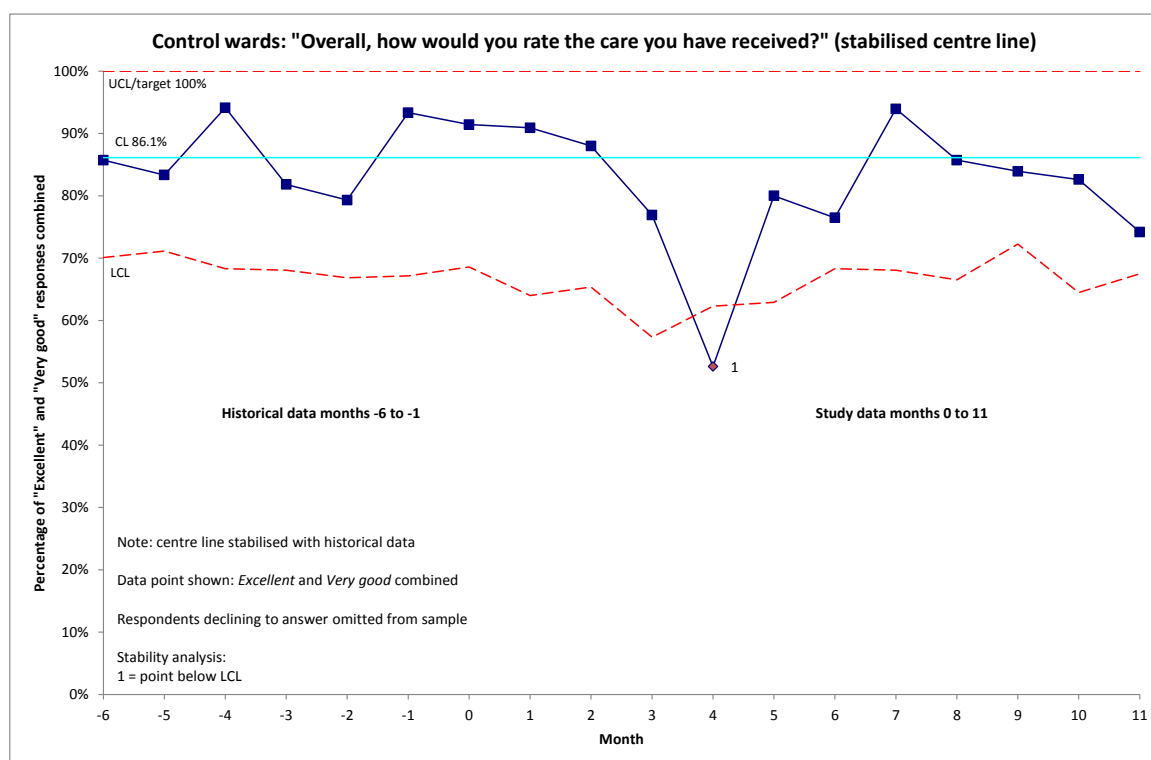
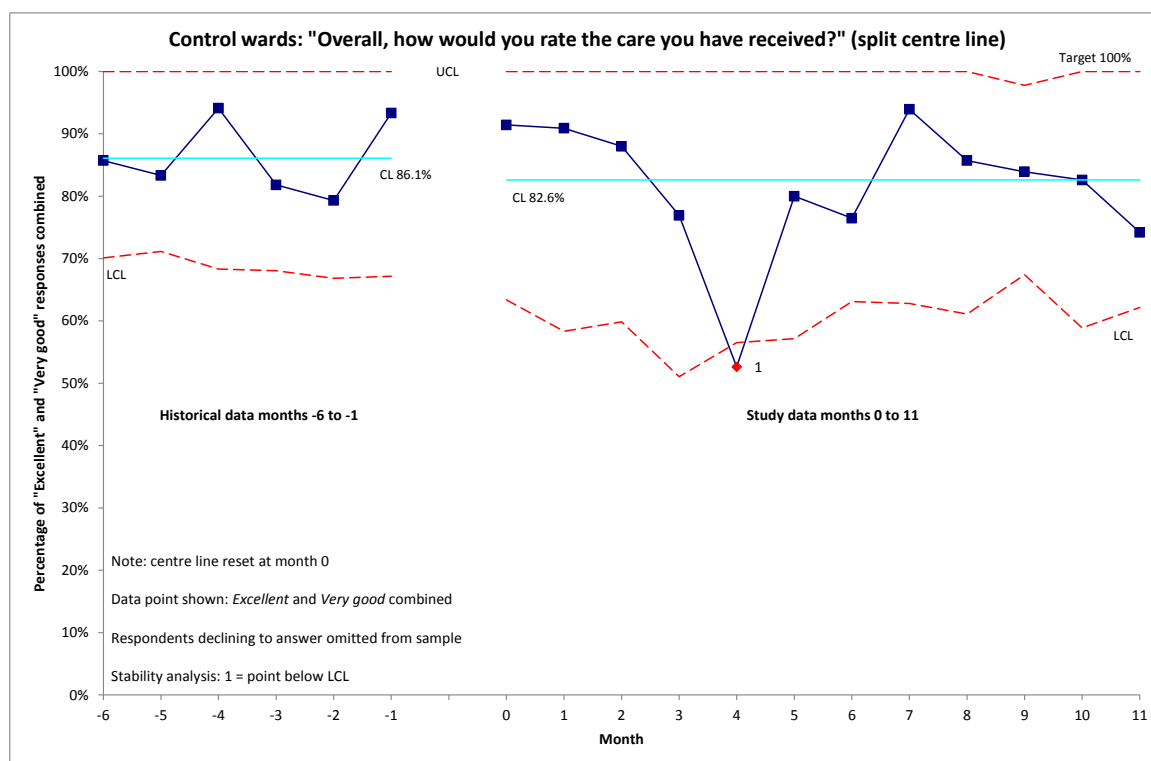
Control wards question: “Overall, how would you rate the care you have received?”

Response rates <i>n</i> = (%) per month (historical data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
-6	17 (40.5%)	19 (45.2%)	6 (14.3%)	0	0	0	42
-5	24 (50.0%)	16 (33.3%)	3 (6.3%)	4 (8.3%)	1 (2.1%)	0	48
-4	19 (55.9%)	13 (38.2%)	2 (5.9%)	0	0	0	34
-3	15 (45.5%)	12 (36.4%)	3 (9.1%)	1 (3.0%)	2 (6.0%)	0	33
-2	13 (44.8%)	12 (41.4%)	2 (6.9%)	2 (6.9%)	0	0	29
-1	12 (40.0%)	16 (53.4%)	1 (3.3%)	0	1 (3.3%)	0	30
Total	100 (46.3%)	88 (40.7%)	17 (7.9%)	7 (3.2%)	4	0	216

Response rates <i>n</i> = (%) per month (study data)							
Month	Response categories						
	Excellent	Very good	Good	Fair	Poor	Declined	Subgroup size
0	14 (40.0%)	18 (51.4%)	2 (5.7%)	0	1 (2.9%)	0	35
1	12 (54.5%)	8 (36.4%)	2 (9.1%)	0	0	0	22
2	12 (48.0%)	10 (40.0%)	3 (12.0%)	0	0	0	25
3	7 (53.8%)	3 (23.1%)	3 (23.1%)	0	0	0	13
4	7 (36.8%)	3 (15.8%)	6 (31.6%)	2 (10.5%)	1 (5.3%)	0	19
5	6 (30.0%)	10 (50.0%)	4 (20.0%)	0	0	0	20
6	13 (38.2%)	13 (38.2%)	5 (14.8%)	2 (5.9%)	1 (2.9%)	0	34
7	17 (51.6%)	14 (42.4%)	1 (3.0%)	1 (3.0%)	0	0	33
8	18 (64.3%)	6 (21.4%)	2 (7.1%)	1 (3.6%)	1 (3.6%)	0	28
9	24 (42.9%)	23 (41.1%)	6 (10.8%)	3 (5.4%)	0	0	56
10	12 (52.2%)	7 (30.4%)	4 (17.4%)	0	0	0	23
11	11 (35.5%)	12 (38.7%)	6 (19.4%)	2 (6.5%)	0	0	31
Total	153 (45.1%)	127(37.5%)	44 (13.0%)	11 (3.2%)	4 (1.2%)	0	339



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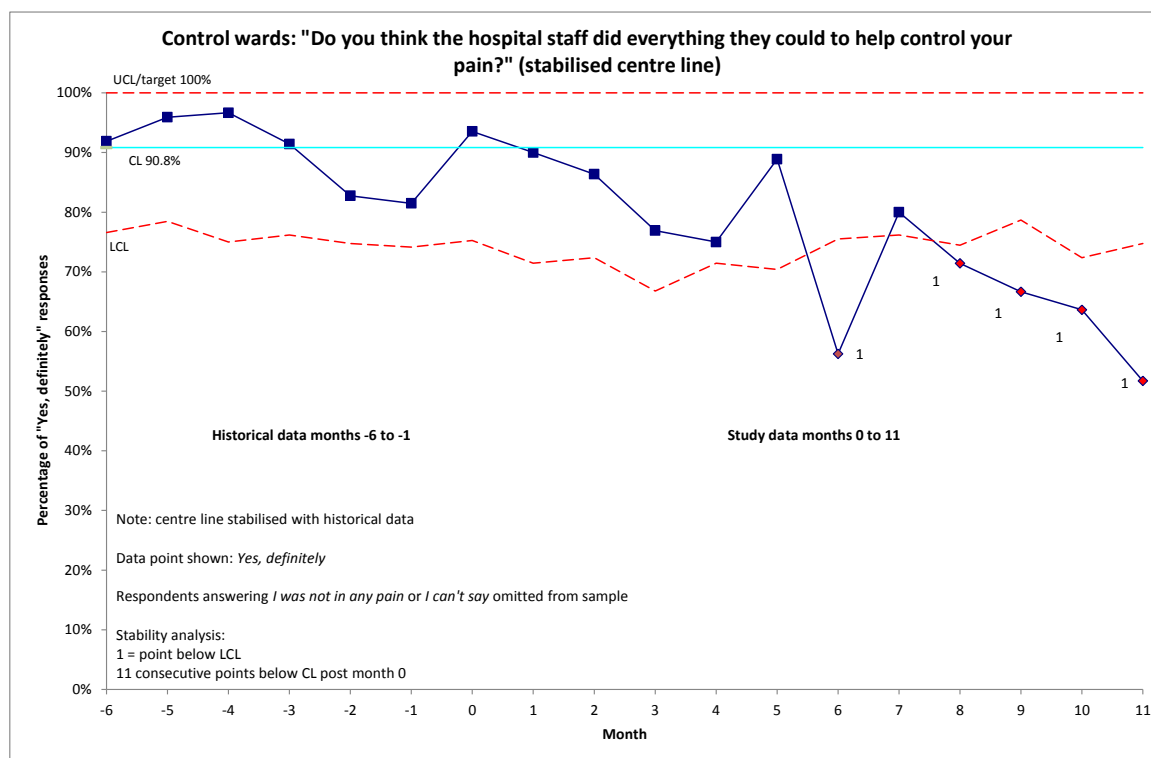
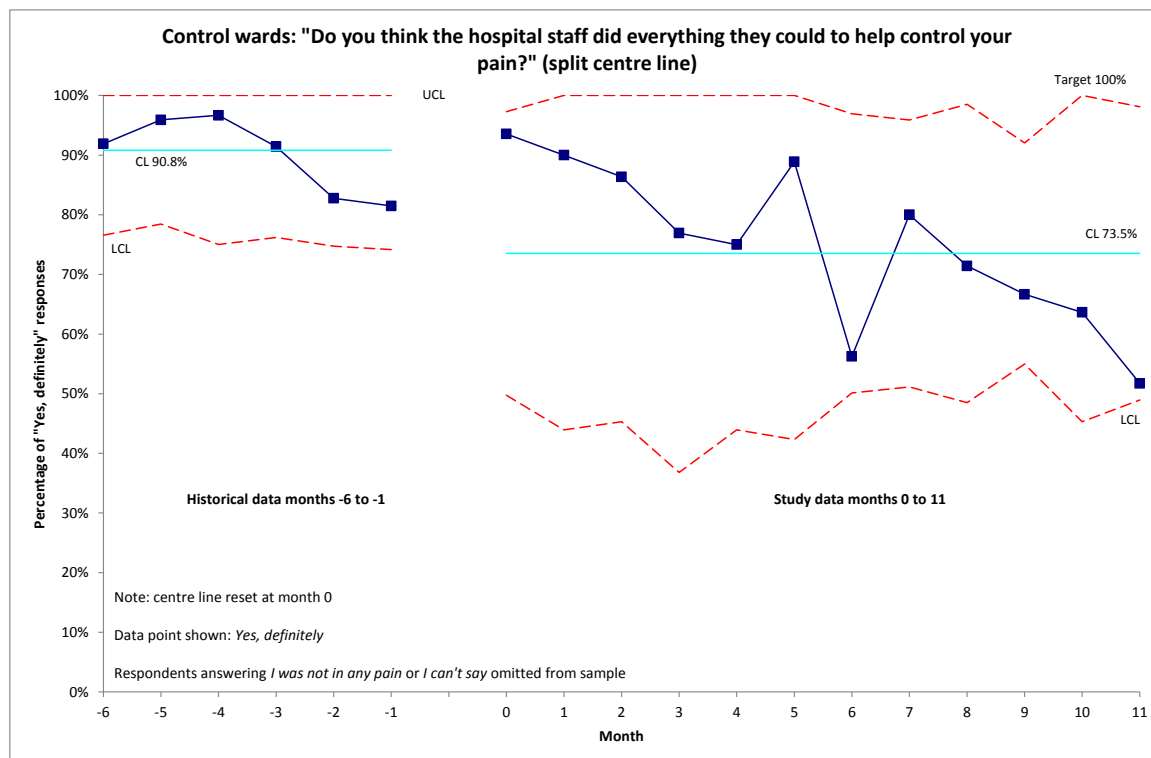
Control wards question: “Do you think the hospital staff did everything they could to help control your pain?”

Response rates <i>n</i> = (%) per month (historical data)					
Month	Response categories				
	Yes, definitely	Yes, sometimes	No	I can't say	Subgroup size
-6	34 (82.9%)	1 (2.4%)	2 (4.9%)	4 (9.8%)	41
-5	47 (92.2%)	2 (3.9%)	0	2 (3.9%)	51
-4	29 (85.3%)	1 (2.9%)	0	4 (8.8%)	34
-3	32 (88.9%)	2 (5.6%)	1 (2.8%)	1 (2.8%)	36
-2	24 (80.0%)	5 (16.7%)	0	1 (3.3%)	30
-1	22 (71.0%)	5 (16.1%)	0	4 (12.9%)	31
Total	188 (84.3%)	16 (7.2%)	3 (1.3%)	16 (7.2%)	223

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Yes, definitely	Yes, sometimes	No	I can't say	I was not in any pain ⁸²	Subgroup size
0	29 (80.7%)	1 (2.7%)	1 (2.7%)	5 (13.9%)	-	36
1	18 (85.7%)	0	2 (9.5%)	1 (4.8%)	-	21
2	19 (76.0%)	2 (8.0%)	1 (4.0%)	3 (12.0%)	0	25
3	10 (77.0%)	2 (15.3%)	1 (7.7%)	0	0	13
4	15 (68.2%)	3 (13.6%)	2 (9.1%)	2 (9.1%)	0	22
5	16 (84.2%)	2 (10.5%)	0	0	1 (5.3%)	19
6	18 (56.3%)	11 (34.3%)	3 (9.4%)	0	0	32
7	28 (80.0%)	4 (11.4%)	3 (8.6%)	0	0	35
8	20 (69.0%)	5 (17.2%)	3 (10.3%)	0	1 (3.5%)	29
9	34 (63.0%)	13 (24.1%)	2 (3.7%)	2 (3.7%)	3 (5.5%)	54
10	14 (60.9%)	6 (26.2%)	1 (4.3%)	1 (4.3%)	1 (4.3%)	23
11	15 (46.9%)	10 (31.3%)	4 (12.4%)	0	3 (9.4%)	32
Total	236 (69.1%)	59 (17.4%)	23 (6.8%)	14 (4.1%)	9 (2.6%)	341

⁸² Response added by Picker Institute to survey question in study month 3

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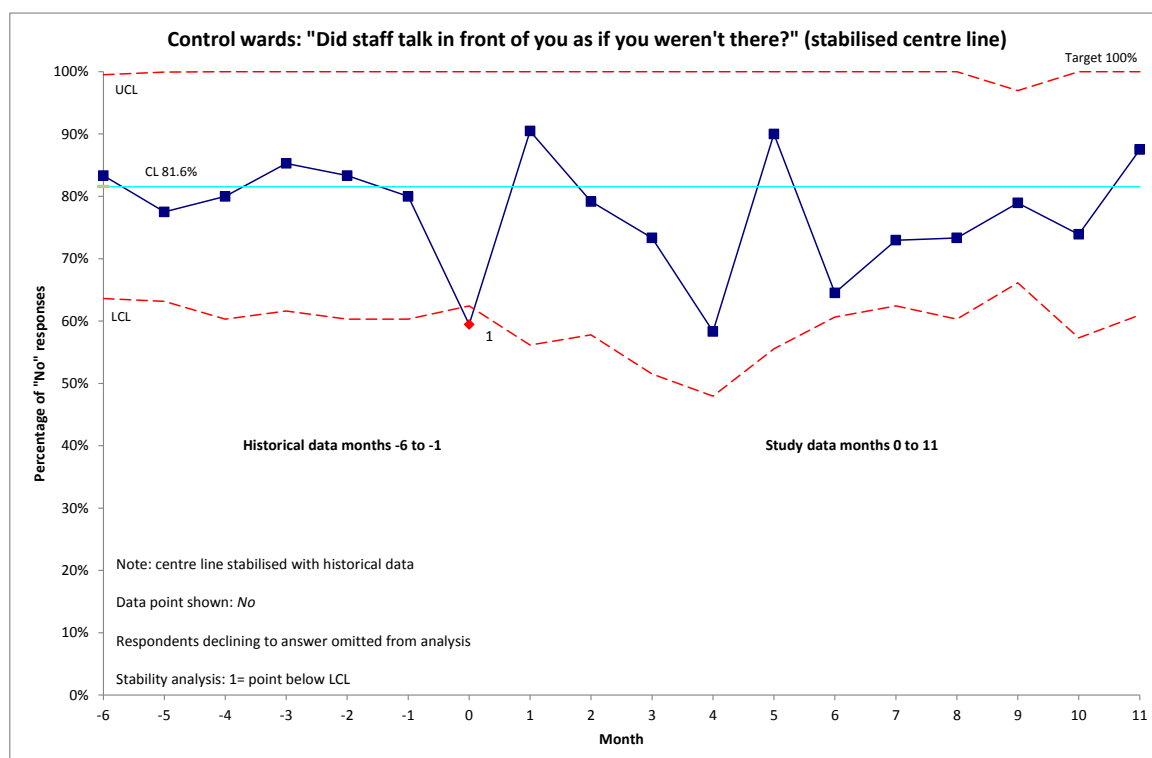
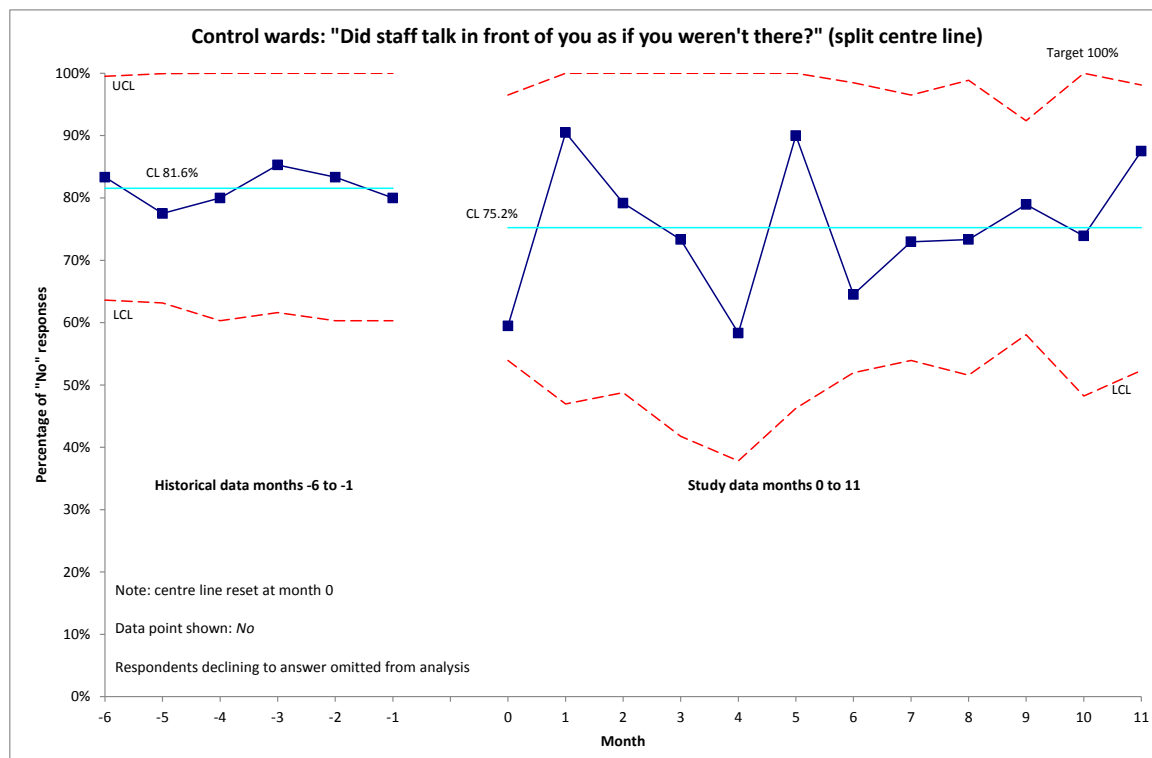
Control wards question: “Did staff talk in front of you as if you weren’t there?”

Response rates <i>n</i> = (%) per month (historical data)				
Month	Response categories			
	Yes	No	Don't know /declined	Subgroup size
-6	7 (16.7%)	35 (83.3%)	0	42
-5	9 (18.4%)	31 (63.2%)	9 (18.4%)	49
-4	6 (19.4%)	24 (77.4%)	1 (3.2%)	31
-3	5 (14.2%)	29 (82.9%)	1 (2.9%)	35
-2	5 (16.7%)	25 (83.3%)	0	30
-1	6 (20.0%)	24 (80.0%)	0	30
Total	38 (17.5%)	168 (77.4%)	11 (5.1%)	217

Response rates <i>n</i> = (%) per month (study data)					
Month	Response categories				
	Yes, often ⁸³	Yes, sometimes	No	Don't know /declined	Subgroup size
0	15 (40.5%)	-	22 (59.5%)	0	37
1	2 (9.5%)	-	19 (90.5%)	0	21
2	5 (20.8%)	-	19 (79.2%)	0	24
3	3 (20.0%)	1 (6.7%)	11 (73.3%)	0	15
4	1 (8.3%)	4 (33.3%)	7 (58.4%)	0	12
5	0	2 (10.0%)	18 (80.0%)	0	20
6	3 (8.6%)	11 (31.4%)	20 (57.1%)	1 (2.9%)	35
7	4 (10.8%)	6 (16.2%)	27 (73.0%)	0	37
8	3 (9.7%)	5 (16.1%)	22 (71.0%)	1 (3.2%)	31
9	3 (5.2%)	9 (15.8%)	45 (79.0%)	0	57
10	1 (4.2%)	5 (20.8%)	17 (70.8%)	1 (4.2%)	24
11	2 (6.1%)	2 (6.1%)	28 (84.8%)	1 (3.0%)	33
Total	42 (12.1%)	45 (13.0%)	255 (73.7%)	4 (1.2%)	346

⁸³ Response of “Yes” amended to responses of “Yes, often” and “Yes, sometimes” by Picker Institute in study month 3

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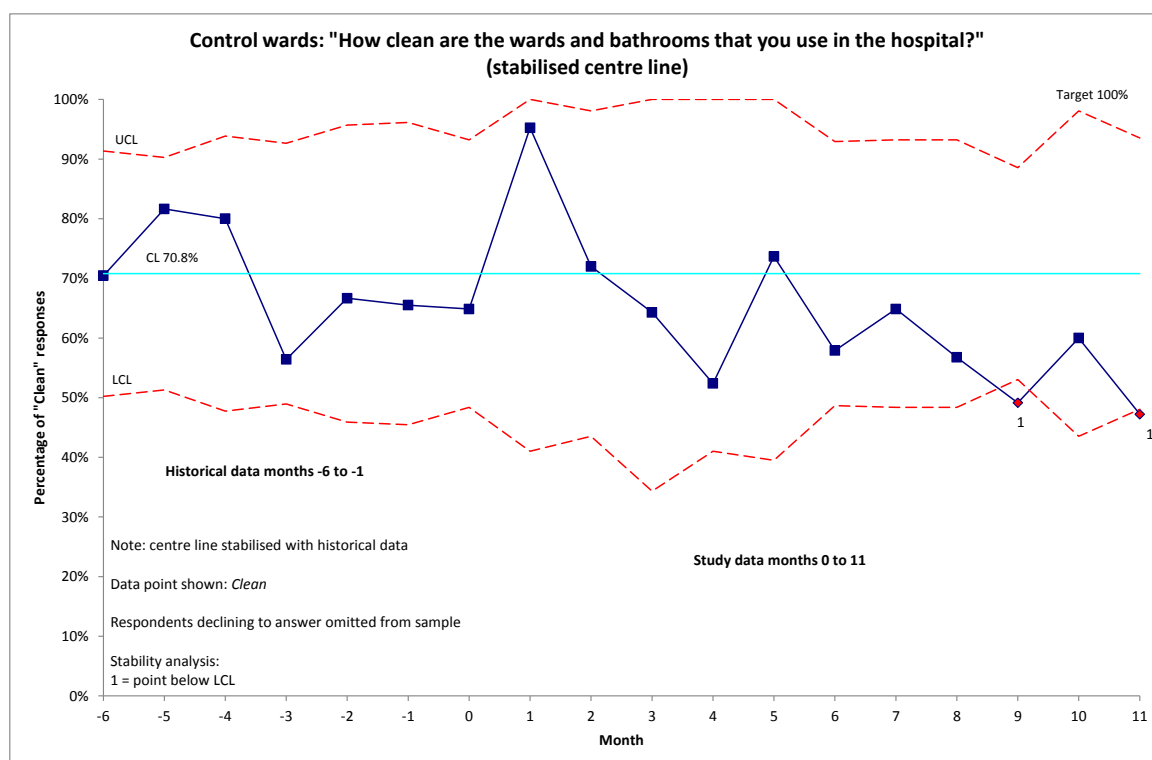
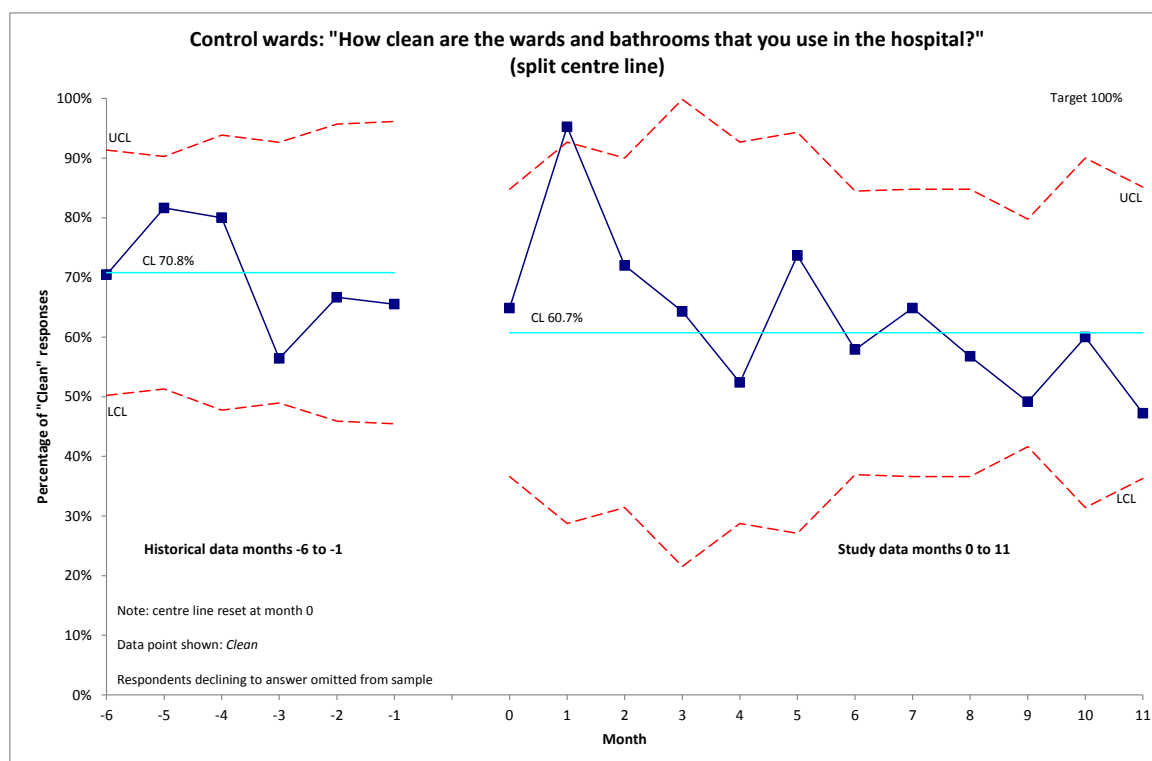


Control wards question: “How clean are the wards and bathrooms that you use in the hospital?”

Response rates <i>n</i> = (%) per month (historical data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
-6	31 (70.5%)	10 (22.7%)	2 (4.5%)	1 (2.3%)	0	44
-5	40 (81.6%)	8 (16.3%)	1 (2.1%)	0	0	49
-4	28 (80.0%)	6 (17.1%)	0	1 (2.9%)	0	35
-3	22 (59.5%)	10 (27.0%)	2 (5.4%)	1 (2.7%)	2 (5.4%)	37
-2	20 (66.7%)	7 (23.3%)	0	3 (1.0%)	0	30
-1	19 (63.4%)	9 (30.0%)	1 (3.3%)	0	1 (3.3%)	30
Total	160 (71.1%)	50 (22.2%)	6 (2.7%)	6 (2.7%)	3 (1.3%)	225

Response rates <i>n</i> = (%) per month (study data)						
Month	Response categories					
	Clean	Fairly clean	Not very clean	Not at all	Declined	Subgroup size
0	24 (64.9%)	12 (32.4%)	1 (2.7%)	0	0	37
1	20 (95.2%)	1 (4.8%)	0	0	0	21
2	18 (72.0%)	6 (24.0%)	1 (4.0%)	0	0	25
3	9 (64.3%)	3 (21.4%)	2 (14.3%)	0	0	14
4	11 (52.4%)	7 (33.3%)	1 (4.8%)	2 (9.5%)	0	21
5	14 (70.0%)	5 (25.0%)	0	0	1 (5.0%)	20
6	22 (57.9%)	11 (28.9%)	5 (13.2%)	0	0	38
7	24 (63.2%)	12 (31.6%)	1 (2.6%)	0	1 (2.6%)	38
8	21 (56.8%)	11 (29.7%)	4 (10.8%)	1 (2.7%)	0	37
9	29 (49.2%)	27 (45.7%)	2 (3.4%)	1 (1.7%)	0	59
10	15 (57.7%)	8 (30.8%)	2 (7.7%)	0	1 (3.8%)	26
11	17 (46.0%)	19 (51.4%)	0	0	1 (2.6%)	37
Total	224 (60.1%)	122 (32.6%)	19 (5.1%)	4 (1.1%)	4 (1.1%)	373

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