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Why do clinicians place indwelling urinary catheters with patients in acute medical care?

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Abstract

FACULTY OF HEALTH SCIENCES

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WHY DO CLINICIANS PLACE INDWELLING URINARY CATHETERS WITH PATIENTS IN ACUTE MEDICAL CARE?

By Catherine Lucy Murphy

Background: Indwelling urinary catheters (IUCs) placed for short-term use in hospital frequently become long-term catheters, increasing the potential for infections, trauma and other complications. Current research has focused on the prompt removal of IUCs in place, with no published review of interventions to reduce the initial placement. Furthermore, little is known about why clinicians place IUCs in acute medical care. Without this knowledge, the effectiveness of strategies aimed at reducing IUC use is likely to be sub-optimal.

Aim: To understand why clinicians decide to place IUCs in acute medical care.

Methods: (1) A systematic review of interventions to minimise the initial placement of urinary catheters in acute care. (2) A qualitative study in the A&E department and acute medical wards of a 1200+ bed hospital. Clinicians who made the decision to place an IUC were asked to participate in a retrospective think aloud interview describing how they came to the decision, later participating in a semi-structured interview to discuss their wider experiences of making the decision to place an IUC. A purposive sample and thematic analysis were used.

Results: (1) Eight (six uncontrolled) studies met the inclusion criteria for the systematic review, using a variety of interventions including clinician education and introduction of guidelines to reduce IUC use. Although seven demonstrated a reduction in the initial use of IUCs post-intervention (relative risk 0.19 – 0.86), the impact of individual interventions was unclear. Notably, each study provided a list of reasons considered to provide justifications for IUC use, with substantial variation between the lists. (2) 30 retrospective think aloud interviews and 20 semi-structured interviews were undertaken. Clinicians were influenced by cues taken from three groups; individual beliefs (e.g. on the clinical indication or IUC-associated risks), patient factors (e.g. age or gender) and organisational factors (e.g. resources or policy). Many spectrums of belief were found (e.g. varying opinions on using IUCs to protect skin from urinary incontinence).

Conclusions: This work establishes that understanding of interventions to reduce the initial placement of IUCs is poor and there is a lack of agreement on when the benefits of IUC use outweigh the risks. Clinical reasoning in this area is frequently inconsistent and IUC placement decisions vary widely, indicating that there is considerable scope for a reduction in use.

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Academic Thesis: Declaration Of Authorship

I, Catherine Lucy Murphy, declare that this thesis entitled ‘Why do clinicians place indwelling urinary catheters with patients in acute medical care?’ and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University.
2. 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.
3. Where I have consulted the published work of others, this is always clearly attributed.
4. 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.
5. I have acknowledged all main sources of help.
6. 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.
7. Parts of this work have been published as:

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Signed:

Date:

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Abbreviations

AUR	Acute urinary retention
CA-ASB	Catheter associated asymptomatic bacteruria
CAUTI	Catheter associated urinary tract infection
CQUIN	Commissioning for Quality and Innovation
DoH	Department of Health
EBP	Evidence Based Practice
ED	Emergency Department
IUC	Indwelling urinary catheter
HCAI	Health care associated infection
HPA	Health Protection Agency
MAU	Medical Assessment Unit
NDM	Naturalistic decision making
NHS	National Health Service
OPM&S	Older People’s Medicine and Stroke
QI	Quality Improvement
QIP	Quality Improvement Project
RCN	Royal College of Nursing
RCT	Randomised Controlled Trial
RPD	Recognition primed decision
RTA	Retrospective think aloud
UI	Urinary incontinence
UR	Urinary retention
UTI	Urinary Tract Infection
WHO	World Health Organisation

Chapter 1

Introduction

"*Whatever probability there may be that the bladder is empty and that the disease is in the kidneys, it will still be advisable in every suppression to make the matter certain by the introduction of a catheter.*"

Commentaries on the history and cure of diseases, William Heberden, 1710 – 1801, English Physician

1.1 Introduction

A urinary catheter is a tool used to perform many functions in acute care. It can monitor, measure, relieve, instil and control. Less tangibly, it can also save time, avoid risk, reduce workload, circumvent embarrassment and provide protection. However, even a cursory review of current literature on the use of indwelling urinary catheters (IUCs) makes three points clear. Firstly, there is agreement that the use of IUCs carries risks for patients and, therefore, should be minimised. Secondly, in recent decades, numerous policies, guidelines and associated local interventions have repeatedly attempted to address the problem of the overuse of IUCs in acute care, often with minimal success. Finally, although it is believed that IUCs are overused in acute care, the evidence on when the benefits of using an IUC outweighs the risks is weak. Simply put, it is believed that too many IUCs are used, but we do not know when the device should be avoided or how to improve practice.

This introductory chapter situates the problem of IUC overuse in the bigger picture of patient safety, provides a short background to recent, relevant policy and quality improvement projects (QIPs) in the area and expands on the rationale behind the research question and objectives. Finally, it provides an outline of the structure of this thesis, linking the chapters and explaining the aims of each section.

1.2 Patient Safety, Quality Improvement and IUCs

In order to understand how initiatives to reduce the use of IUCs fit into the wider context of current healthcare priorities, this section provides a brief overview of where IUCs fit into the rapidly developing fields of patient safety, evidence based practice (EBP) and quality improvement (QI).

Concern over IUC use has grown in line with the wider patient safety movement. Recognition of the number of patients harmed in the course of their medical care, whether due to drug errors, surgical mistakes, healthcare associated infection or another cause, has increased substantially since the mid-1990s, leading to the development of patient safety programmes in healthcare organisations globally. In 2004, the World Health Organisation (WHO) launched its patient safety programme aimed at co-ordinating improvement worldwide. However, WHO estimates that one in ten patients in developed countries continue to be harmed while receiving hospital care (WHO Patient Safety 2014).

A prominent subject in the field of patient safety is healthcare associated infection (HCAI). The World Health Organization ranks HCAI as one of the top 10 causes of hospital deaths worldwide (WHO Patient Safety 2014). High profile causes of HCAI such as meticillin-resistant *Staphylococcus aureus* (MRSA) and *Costridium difficile* have led to the introduction of initiatives such as the ‘Cleanyourhands’ campaign by the NHS in 2004, which received considerable attention in the media as well as in healthcare environments. It is interesting to note that although MRSA in particular receives considerable media focus, the Health Protection Agency (HPA) HCAI prevalence data from 2011 show that 6.4% of patients were diagnosed with an active HCAI, but less than 0.1% had a HCAI caused by MRSA. In contrast, 17.2% of the HCAIs were urinary tract infections, and 43% of these were associated with IUC use (HPA 2011).

Furthermore, infection is far from the only IUC related risk. Trauma, increased length of hospital stay, increased risk of delirium and other risks are associated with IUC use, and must be balanced with the perceived benefits of using an IUC. Does the benefit afforded by increased information, relief, comfort or protection outweigh the risk for infection, trauma or increased length of hospital stay?

In many ways the decision whether or not to an IUC is needed in acute medical care is a quintessential patient safety dilemma for a clinician. In August 2013, Don Berwick published a review on patient safety (National Advisory Group on the Safety of Patients in England 2013). In it he made the following observation that captures many of the conflicts that clinicians face when making the decision to place an IUC:

> “In addition to risks inherent in some treatments, there is also inescapable tension between the pursuit of safety and the pursuit of other healthcare priorities. If resources were infinite, many risks could be eliminated. But, resources are not infinite. Achieving a proper balance between risks and resources requires constant vigilance against reductions in resources – such as time, people or consumables – that raise risk to unnecessary and unacceptable levels. People at all levels of care and in all roles need to acknowledge this tension, so that dialogue remains clear, mature and open about how much risk to accept in pursuit of goals other than safety.”
>
> (National Advisory Group on the Safety of Patients in England 2013)

The complexity of assessing the accuracy of a decision to place an IUC lies in the difficulty in weighing up the potential harms with the potential gains, particularly as this process goes beyond measuring the harms and gains for one individual patient, but has implications for other patients in the immediate clinical environment due to impact on workload and resources, as well as society as a whole from the overuse of antibiotics. Furthermore, the risks and benefits for an individual patient are not restricted to purely clinical considerations, and the potential for a social, financial or cultural impact must be taken into account.

The following section outlines recent attempts to provide policy to guide clinicians in this multifaceted task. In order to provide context for current IUC practices, the brief summary of examples of national policies and guidelines in Table 1 gives an indication of the number of attempts that have been made to address IUC overuse in the last decade in England alone.

Year	Policy/ quality improvement programme	Aim	Clinical Instructions
2001	The Epic project: developing national evidence-based guidelines for preventing healthcare associated infections. Phase I: Guidelines for preventing hospital-acquired infections (Pratt et al. 2001)	Guidelines for preventing infections associated with the use of short-term indwelling urethral catheters	Only use indwelling urethral catheters after considering alternative methods of management
2003	Winning Ways – Working together to reduce healthcare associated infection in England (Department of Health)	Action Area Two: Reducing the Infection risk from use of catheters, tubes, cannulae, instruments and other devices	Urinary catheters will only be used when there is no suitable alternative, and even then kept in place for as short a time as possible
2006	Essential Steps to Safe Clean Care: Reducing Healthcare Associated Infections (Department of Health)	Reduce the occurrence of urinary tract infections related to indwelling urethral catheters	Assess the need for catheterisation. Avoid if possible
2007	Epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England (Pratt et al. 2007)	Guidelines for preventing infections associated with the use of short-term indwelling urethral catheters	Only use indwelling urethral catheters after considering alternative methods of management
2007	Saving Lives: reducing infection, delivering clean and safe care (Department of Health)	High Impact Intervention 6: To reduce the incidence of urinary tract infections related to indwelling urethral catheters	Catheter needed? Avoid if possible. Ensure catheterisation follows an assessment of clinical need which includes considering alternative options
2011	NHS Safety Express (NHS 2011)	50% reduction in UTI infections in patients with in dwelling catheters	Not given
2012	NHS Safety Thermometer (NHS 2012)	Systematic measurement of UTI in patients with a catheter in situ	Not relevant
2013	Epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England (Loveday et al. 2014)	Guidelines for preventing infections associated with the use of short-term indwelling urethral catheters	Only use indwelling urethral catheters after considering alternative methods of management

Table 1. Examples of national UK policies and guidelines to reduce urinary catheter use in acute care 2001-2014

Most recently, the current UK Government’s continued efforts to tackle IUC-related harm come in the form of the “Safety Express,” a quality improvement programme that uses the

"Safety Thermometer" to measure the prevalence of four specific healthcare associated harms, one of which is urinary tract infections (UTI) in patients with catheters. The Commissioning and Quality and Innovation Payment framework (CQUIN) links healthcare provider's incomes to local quality improvement goals, and one of the goals introduced for 2012-13 is use of the "Safety Thermometer".

Individual provider organisations are able to set improvement goals with the commissioners of the service. The most recent guidance (December 2013) from NHS England to providers and commissioners of acute care services in England regarding the reduction of IUC use is as follows,

> "A set reduction target for the use of catheters could be counter-productive, as there will be genuine clinical need for an unknown proportion of patients. The NHS Safety Thermometer uses a pragmatic measurement of catheter plus current antibiotics rather than the direct identification of catheter associated urinary tract infection. Incentivising reductions could be counter-productive as there will be genuine clinical need for both the catheter and the antibiotics in an unknown proportion of patients."
>
> (NHS CQUIN Guidance 2013)

The twice-used phrase "unknown proportion of patients" is thought-provoking. It highlights that there is concern that reducing the use of IUCs has the potential to cause harm. Clearly, the use of IUCs should only be reduced when the risk of use outweighs the benefits. However, identifying when this is the case is not straightforward and will be one of the key topics of this work.

The pattern of the production of multiple policies and guidelines to tackle the issue of overuse can be seen globally, and other countries have been less reticent about incentivising reductions in IUC use. Notably, in 2008, the Centres for Medicare and Medicaid Services ruled that additional costs caused by hospital acquired catheter associated UTI (CAUTI) would no longer be reimbursed. This ruling encouraged the increase in QIPS aimed at reducing IUC use in the USA.

It is evident that policy makers believe that current rates of IUC use continue to pose an unnecessary risk to patients. In tandem with national policies, numerous quality improvement programmes (QIPS) aimed at implementing the policies have been undertaken at a local level to bridge the perceived evidence-practice gap. The overall result is that considerable amounts of time, money and effort are being put into attempting to reduce the negative impact from unnecessary IUCs.

Literature reporting findings from both QIPS and research studies originates from many countries, but the highest profile attempts to reduce IUC use came from the state of Michigan in the USA. A group of clinicians across a diverse range of hospitals in Michigan responded to the US Department of Health and Human Services' plan to reduce the incidence of CAUTI by 25% by 2013 by introducing a range of measures to reduce IUC use, named the Keystone Bladder Bundle initiative. The success of this initiative resulted in the roll-out of the Bladder Bundle throughout the US and elsewhere. However, the 25% reduction in CAUTI rates reported in Michigan was not matched elsewhere, with only 6% being achieved nationally (Saint 2013).

Even in Michigan, where reduction rates were four times higher than the average achieved in the USA, it was recognised that the success of the implementation of the Bladder Bundle varied between sites. Harrod et al. (2013) undertook a qualitative study in Michigan hospitals to better understand how clinicians perceived the risks of implementing the initiative and how those perceptions impacted on their IUC related decisions and the subsequent success of the Bladder Bundle. They found that clinicians had to balance the risks of having a catheter in situ against the risks of not having one. For example, in some circumstances IUCs were perceived to help prevent falls therefore catheter associated risks had to be weighed against fall associated risks. They found that for some clinicians the association between placing a catheter and negative outcomes was weak, and clinicians developed "workarounds" to bypass the initiatives aimed to reduce IUC use.

Harrod et al.'s (2013) study was published after the data collection described in this thesis had been undertaken, but it supports the rationale behind the research question. It established that more attention needs to be given how clinicians make the decision to place an IUC and recognised that established work processes need to be considered when implementing an initiative, concluding that "pre-implementation assessments of how health-care providers use a specific device their reasons for such use" should be undertaken. This pre-implementation attempt to understand the meaning that clinicians place on the use of IUCs was not included in any of the literature reviewed for this study.

Additionally, there is an absence of published work on IUC related clinical decision making. It is recognised that understanding the processes and determinants of clinical decision making is key to designing better interventions (Catchpole 2013). Many of the authors who have reported on quality improvement projects have retrospectively noted the need to acknowledge the differences between clinicians' goals, priorities and behaviours and the impact on their decisions (Murphy et al. 2014). Other clinical areas have better appreciated the danger in ignoring this area. In the study of the overuse of antibiotics, it has been noted that policies and interventions often fail to consider the variety of factors that can influence the clinical decision making process and have responded with studies to assess the social and behavioural, as well as clinical determinants (Charani et al. 2013).

It was also evident that, whilst guidelines on IUC use generally include an instruction to only place an IUC when unavoidable, the focus of the literature on minimising IUC use is instead on the prompt removal of devices once already in situ. Published reports of interventions to minimise the use of IUCs by influencing the initial decision to place an IUC were found to be relatively scarce in comparison. Moreover, it was identified that a systematic review of the literature to prevent unnecessary IUCs being placed in acute care had not been published. That is addressed in this thesis.

1.3 Research Question and Objectives

Achieving a sustained, consistent impact on clinicians' IUC decision making behaviour is not straightforward. Furthermore, before further attempts are made to change practice, there is a need for greater understanding of what has already been tried and whether it worked, when the benefits of IUCs outweigh the risks, why clinicians currently make the decision that an IUC is needed and how these decisions could be influenced.

In order to better define the problem of overuse and contribute to finding solutions, this thesis addresses the following research question and objectives:

Question: Why do clinicians make the decision to place an IUC in medical acute care?

Objectives:

a. to analyse the effectiveness of interventions designed to minimise the initial placement of IUCs in acute care

b. to explore the factors that promote or inhibit the decision to place an IUC

c. to examine how clinicians reach the decision that an IUC is needed

d. to use the findings from the first two objectives to identify how the practice of IUC use could be influenced and the quality of care improved

This thesis is formed of two successive pieces of work; a systematic review and a qualitative study. The systematic review (Chapter 3) tackles the first objective and informs the qualitative study that addresses the next three objectives.

From the literature it became clear that not enough was known about interventions designed to prevent clinicians placing IUCs unnecessarily. Therefore, a systematic review of interventions to minimise the initial placement of IUCs in acute care was undertaken. The aim of the review was to evaluate the evidence of the effectiveness of interventions to minimise the initial placement of IUCs in acute care. This Review is presented in Chapter 3.

To achieve the next 3 objectives, a qualitative study was undertaken to analyse the factors that influence clinicians in acute medical care to make the decision that an IUC is needed. It considered the impact of the values, attitudes, knowledge and beliefs of individual clinicians and the influence of organisational and cultural factors on that decision. It examines how different patient groups and clinical environment affect the decision. It identifies variations and inconsistencies in use and where practice departs significantly from guidelines for IUC use. Clinical decision making theories are used to help interpret and understand the findings. Finally, current literature on quality improvement is used to evaluate the findings and propose strategies to tackle overuse.

Due to the differences between acute surgical and medical care, it is reasonable to assume that the IUC decision making processes and influences would be significantly dissimilar. The focus of the qualitative study described here is acute medical care.

1.4 Structure of thesis

The following section summarises how the study tackles the research question and objectives by explaining the aims of each chapter and the links between them.

1.4.1 Literature Review

- **IUCs**

The review starts with a full exploration of the literature on IUCs, leading to the rationale for the systematic review and qualitative study presented in this thesis. Associated international IUC guidelines and the supporting evidence are outlined. Risks associated with IUCs and alternatives to using IUCs are discussed. The literature review establishes that the evidence-practice gap for IUC use remains stubbornly wide.

- **Quality improvement**

This is followed by an overview of both quality improvement and clinical decision making literature to inform the development of appropriate data collection and analysis methods and provide sensitising concepts for the qualitative study described in chapters 4-6.

Although there are many papers reporting on attempts to improve the use of IUCs, there is little evidence of QI and patient safety theory being used to support these attempts. This is a new and challenging field of study within healthcare, both theoretically and in practice. Dixon-Woods et al. (2013) observed, “Quality and safety improvement initiatives in healthcare often display two disconcerting effects. The first is a failure to outperform the secular trend. The second is the decline effect, where an initially promising intervention appears not to deliver equally successful results when attempts are made to replicate it in new settings.” Therefore, in order to learn from lessons gained in other areas of patient safety and to inform this study as a whole and objective (d) in particular, the literature review provides an overview of current literature on quality improvement and the evidence-practice gap.

Figure 1 illustrates the relationships between what should be done (EBP/Guidelines), what is done (Clinical practice) and the gap in between. Gasziou (2011) described evidence based practice (EBP) and QI as, “Having similar goals, but focused on different parts of the problem.” EBP focuses on “doing the right thing,” whereas QI focuses on “doing things right.” In order to do the right things right and optimise IUC decision making, all parts of the problem need attention.

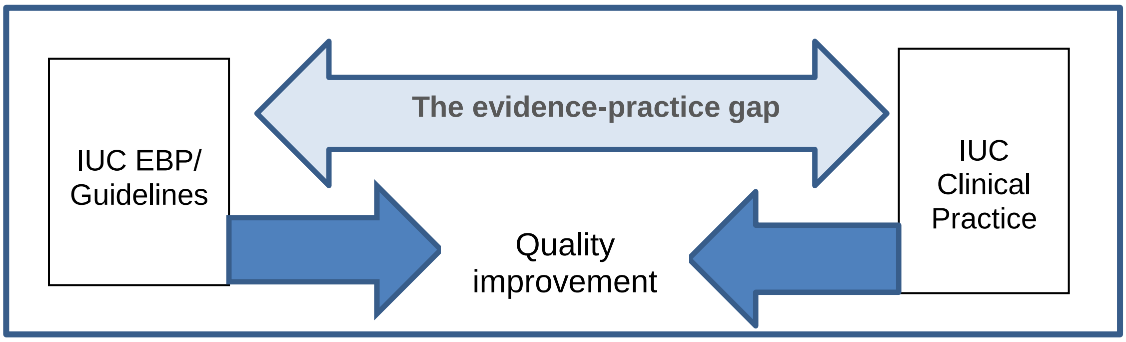


Figure 1. Reducing the IUC evidence-practice gap

The key focus of this study is to better understand the right hand box, IUC clinical practice, specifically placing IUCs in acute medical care. However, the numerous attempts to reduce the use of IUCs via policy, guidelines and quality improvement programmes over the last three decades have met with mixed success and in order to address objective (d), there is a need to understand current thinking in EBP and QI.

This section will briefly examine the evolution of evidence based practice (EBP), where it has and has not been successfully implemented, the barriers to EBP and the attempts made to close the evidence-practice gap. Finally, it establishes the importance of understanding decision making processes and the clinical context before introducing interventions attempting to change behaviour.

- **Clinical Decision Making**

Ribeiro et al. (2010) noted that non-adherence to clinical practice guidelines and protocols is a perennial problem due to the disconnect between assumptions about how clinical decisions are made and the actual practice of decision making. They concluded that clinicians are assumed to be far more deductive and rational than they really are and that, in the clinical environment, the risks and costs of making optimal decisions are often far greater than making satisfactory ones and clinicians place greater emphasis on social and environmental information, such as patient expectations, than would be expected.

This explains the need for the third section of the literature review which reviews the range of clinical decision making theories. The decision to place an IUC is at the centre of this study, therefore, an overview of clinical decision making theories and discussion of their relevance to this study is provided. Furthermore, decision making theories provide sensitising concepts to help understand the processes that clinicians use to reach their decisions and to help inform, organise and explain the interpretation of the data presented in the Results Chapter.

It has been observed that “Health decision making is both the lynchpin and the least developed aspect of evidence-based practice” (Spring 2008). Depending on the model used, EBP integrates three or more data sources (e.g. best available research, clinical experience and patient values) to make a clinical decision. How the clinician integrates these sources, what weight is given to different factors and the impact of different clinical contexts are rarely addressed.

It is beyond the scope of this literature review to fully appraise the considerable body of literature on decision making, therefore theories that have previously been demonstrated to provide an useful framework to understand real world clinical decision making are the focus of this section. The two key theories are Naturalistic Decision Making (NDM) (Klein 1999) and Sensemaking (Weick 1995).

Unlike many other decision making theories, NDM and sensemaking aim to understand decisions made in the real world. NDM focuses on planning, problem detection, development of mental models, mental simulation and managing uncertainty and risk, as well as decision making (Klein 1999). Sensemaking, as the name suggests, describes how people in organisations make sense of uncertain, ambiguous situations in order to make plausible decisions (Weick et al. 2005).

1.4.2 Systematic Review

In the Literature Review, it emerges that attempts to reduce the evidence-practice gap for IUC use have strongly focused on the prompt removal of devices already in situ, rather than minimising the initial placement. No published review of interventions to minimise the initial placement of IUCs in acute care was found. In order to fill this gap and inform the qualitative study, a systematic review was undertaken (Murphy et al. 2014). A full description of the methods used and the results are presented in Chapter 3.

The review establishes that, although interventions to minimise the initial placement of IUCs in acute care might be effective, little is known about individual interventions. However, it was also found that there was no consensus between the studies on what are justifiable indications for initially placing an IUC in acute care. Additionally, the review highlighted the importance of clinicians' beliefs and attitudes in any attempt to change practice. The findings of this review further underpin the need for the qualitative study described below.

1.4.3 Qualitative Study Methodology and Method

Chapter 4 introduces interpretive description, the qualitative approach that provides the framework for the design of this study. Interpretive description (Thorne 2008) was developed by nurses and other health professionals as an approach to qualitative research that fulfilled the needs of applied disciplines, in particular in healthcare. interpretive description takes questions generated from the clinical field and gives the researcher a design logic in which a variety of data collection and analytic strategies can be used in order to develop a “thematic or integrative description of a phenomenon of clinical interest, and do so in a manner in which the disciplinary objects of the study are made explicit within the interpretations” (Thorne 2008, p75). In the case of this study, interpretive description provides a logical framework to design the data collection and interpret the findings with the specific aim of developing useful knowledge on why clinicians place IUCs in acute care.

The chapter then describes in detail the data collection and analysis methods that were used to explore the factors that inhibit and promote the initial decision to place an IUC by clinicians on acute medical wards and an emergency department of a 1200+ in-patient bed general hospital. It explains why the methods were chosen, and describes their strengths and weaknesses in terms of answering the research question. Two data collection methods were used:

- retrospective think aloud (RTA) interviews with clinicians who have made a decision to place or not to place an IUC,
- semi-structured interviews with clinicians who have made a decision to place or not to place an IUC.

Thematic data analysis was used, guided by the methodology described above. Methods of enhancing the quality of the work are discussed and the sampling process is explained.

1.4.4 Qualitative Study Results

Chapter 5 presents the results. An overview of the 30 RTA interviews and 20 semi-structured is provided, including where the decisions were made and by whom.
The decision was made by different professional groups, in different clinical areas, with different patient groups. It was a specific decision (an IUC should be placed), but made for many diverse reasons. Therefore, one of the key challenges was how to present the findings in a coherent and meaningful way. To assist with this, a conceptual illustration is presented to help explain the descriptive themes that resulted from the data analysis and interpretation.

It was found that decisions to place an IUC were influenced by many factors, both clinical and non-clinical. The factors, their inter-relationships and the impact that they had on decision making are presented. Significant variation and inconsistency between clinical practice was found and is highlighted. Concepts from the review of QI/EBP and decision making literature were used to assist with interpretation and support the findings.

1.4.5 Discussion

Chapter 6 examines what this work adds to the current knowledge on IUC use. It builds on the findings from the previous chapter and the systematic review and provides an in-depth discussion of why and how clinicians made the decision to place an IUC and considers the relevance of clinical decision making theories to IUC decision making. It establishes that clinical reasoning in this area is inconsistent and that this impacts on the care that patients receive. It compares clinical practice to evidence and guidelines and considers where inconsistencies and variations in practice can shed light on the potential to reduce IUC use. There is a particular focus on the differences between decision making in the Emergency Department and in other clinical areas. The literature on QI and evidence-practice gap is used to inform a discussion on the factors that would need to be addressed to implement long-lasting change to reduce IUC over-use and the factors that influence clinicians' decisions that have not been taken in to consideration by existing interventions to change IUC practice are discussed.

From this discussion, questions that require further research and potential routes for QI are identified.

1.5 Summary

There is a growing body of literature to suggest that before trying to change practice, those who wish to improve patient safety and quality of care should try to understand why clinicians do what they currently do.

Before the data collection periods for the qualitative study in this thesis, I spent several days observing practice and orientating myself to the different clinical areas where I would be conducting interviews. I spent time talking to clinicians about their wards, learning more about the structure, culture and workings of their environments and, if they expressed interest, explaining what I would be doing during the study. During one observation session, I was informed by a consultant physician working in the older people's medicine department that he was in the business of getting catheters out rather than putting them in, and that he spent a considerable amount of time dealing with the consequences of some "ridiculous" IUC decisions made in the Emergency Department and Medical Assessment Unit. The next conversation I had was with a physician in the Emergency Department, who expressed concern that I might struggle to find many IUCs being used in that area, as they were placed infrequently and only if really needed.

These differing opinions on IUC use were given to me by clinicians physically less than 50 metres from each other, but wide apart in their beliefs, attitudes and experiences regarding IUC use. These, and many other conversations, reassured me, firstly, that answering the research question and tackling the objectives of this study would be worthwhile and would provide valuable insight into how and why clinicians reach the conclusion that the use of an IUC makes sense, and, secondly, that this knowledge would be valuable in informing initiatives to optimise IUC use in complex and inherently contestable clinical situations.

Chapter 2

Literature Review

2.1 Introduction

This review is divided into three sections. The first section takes an in-depth look at the use of IUCs in acute care and identifies the current gaps in knowledge and provides the rationale for this study. The second and third sections give shorter reviews of the fields of quality improvement and clinical decision making theories and research. Quality improvement theory (in contrast to descriptions of individual quality improvement projects) and clinical decision making literature in relation to the use of IUCs is sparse. Therefore, this literature review assesses work from non-IUC related areas in order to help design the qualitative study in this thesis, interpret findings and discuss their wider significance.

2.2 Indwelling Urinary Catheters

This section addresses 5 key questions:

- What are the risks associated with urinary catheter (UC) use?
- When are IUCs used and overused in practice?
- What do current policies and guidelines say about minimising the use of IUCs and what is the evidence supporting these documents?
- What attempts have been made to reduce the overuse of IUCs and how successful have they been?
- What are the gaps in current knowledge and what is the rationale for the study?

As devices placed in acute care usually remain in place for less than 14 days (Getliffe 2008), the main, but not exclusive, focus of this review is the short-term use of urinary catheters. Variations in the definition of “short-term” use can be problematic when evaluating the evidence available. Definitions vary from 7 days to 30 days (Tenke et al. 2008, Getliffe 2008, Hooton et al. 2010), which will be taken into account where relevant.

2.2.1 What are the risks associated with urinary catheter (UC) use?

Catheters (from the Greek “send down” or “thrust into”) are not new. In the first century AD, Celsus, writer of the Roman medical encyclopedia “de Medicina” noted the use of bronze UCs (Kirkup 1998) and UCs were found in the house of a surgeon in Pompeii (Carr 2000). In later centuries, vivid accounts describe the use of materials such as glass, pewter, reeds and animal skin to relieve urinary obstruction (Kirkup 1998). Heister (1743, p91) reported using a small goose quill to catheterise a female patient with good effect.

The use of such devices was understandably far from routine. The invention of gum elastic tubing in around 1782 facilitated the production of more malleable devices. In 1844, Charriere (after whom the unit of specifying the gauge of catheters is named) issued a catalogue offering UCs made from silver, pewter, gum elastic and ivory. When latex became available in the 1930s, Foley and Belnap produced and described a double-channelled balloon catheter similar to products still used today (Foley 1937). This technological advance heralded the start of the routine use of urinary catheters in healthcare. Currently, over 100 million IUCs are used annually (Nasr 2010).

Most simply put, a UC is a tube that goes into the urethra and enters the bladder. It provides a route to either drain or to instil medicines into the bladder. UCs can be made from various materials such as latex or silicone. They may have hydrophilic, silver or other coatings which are added with the aim of reducing UC-related complications such as trauma and infection. UCs vary in length and diameter (gauge), with shorter UCs generally more suitable for women and the longer UCs for men. Modern indwelling urinary catheters have small balloons on one end (usually between 2.5ml for a small child and 10ml for an adult) that are inflated once in the bladder to hold the IUC in place. The IUC may then be attached to a drainage tube and bag to collect urine (Getliffe 2003).

There are three key types of UC. Firstly, UCs can be indwelling, where the UC remains in place until the decision is made to remove it. Secondly, intermittent UCs can be used where the catheter is inserted in order to drain the bladder and withdrawn once drainage is complete. The third category is suprapubic catheters which enter the bladder via the abdominal wall. The focus of this study and therefore this literature review is the urethrally placed IUC.

The backlash against the overuse of IUCs started some twenty years after the introduction of latex catheters with Beeson's (1958) "Case against the catheter" which warned "The decision to use this instrument should be made with the knowledge that it involves risk of producing a serious disease." This quote is reproduced in the introduction of Saint et al.'s (2002) provocative editorial entitled "Indwelling Urinary Catheters: A one-point restraint?" This article has been cited numerous times in IUC related work. It likens the overuse of IUCs to the overuse of four-point limb restraints and suggested that lessons should be learnt from the reduction in use of such restraints. Whilst acknowledging that the use of IUCs play a much larger role in good patient care than physical restraints do, the article raises questions about why IUCs are frequently overused and suggests ignorance of recommendations, reluctance to remove an existing IUC in case another has to be inserted, staff convenience to deal with continence issues and lack of awareness that an IUC is in situ as key causes.

This section summarises the risks that IUC use can pose to patients and the solutions have been proposed to minimise those risks.

2.2.2 Catheter associated urinary tract infection (CAUTI)

Infection is the most high profile IUC related risk. In normal circumstances, urine is sterile and bacteria do not readily access or become established in the urinary tract owing to the bacteria-resisting epithelial cells and the flushing mechanism of micturition. (Getliffe et al. 2007). The insertion of an IUC disturbs these functions and potentially harmful microorganisms can be introduced into the bladder or the urinary tract either at the time of insertion or when the IUC is in situ. The bacteria can be either the patient’s own or can come from the wider environment. Bacteria can be introduced via either extraluminal or intraluminal routes, most commonly via the extraluminal surface from the perineum. Access via the intraluminal route is likely to be from bacteria migrating from the urine collecting system (Maki and Tambyah 2001). When microorganisms have reached the urinary tract they either cause infection by colonising the area or remain free floating and do not cause infection (Tew et al. 2005). The majority of cases of catheter associated bacteriuria are caused by a single organism, commonly *Escherichia coli*, *Pseudonomnas aeruginosa*, *Klebsiella pnueumoniae*, *Proteus mirabilis* or *Staphylococcus epidermidis* (Warren 1997, Haley et al. 1985).

At this point, it is important to differentiate between catheter associated bacteriuria (CA-bacteriuria), catheter associated asymptomatic bacteriuria (CA-ASB) and CAUTI. The difference has caused much discussion and has arguably led to the loss of research opportunities (Trauntner 2010). CA-bacteriuria is the term used to include both CA-ASB and CAUTI, when no distinction is made between the two. It is a term commonly used in guidelines and it is a frequently used outcome measure in clinical trials in this area. CAUTI requires the presence of symptoms or signs associated with UTI with no other obvious source of infection, plus $\geq 10^5$ colony forming units/ml of ≥ 1 bacterial species in a urine specimen where the patient has or has had in the last 48 hours an IUC, suprapubic or intermittent catheter. CA-ASB has the same criteria without the signs or symptoms of a UTI (Hooton et al. 2010).

There is increased awareness that CA-ASB and CAUTI are different conditions and the over-treatment of CA-ASB has been a cause of the unnecessary use of antibiotics, which in turn might increase the risk of antibiotic-resistant pathogens (Getliffe 2008). It has been demonstrated that a significant proportion of what is diagnosed and treated as CAUTI is in fact CA-ASB. Trautner (2010) notes that few, if any, of the numerous clinical studies and guidelines recently published establish the signs and symptoms that differentiate CAUTI from CA-ASB. CA-ASB is not a clinically significant condition and does not require treatment (Nicolle et al. 2005).

Despite this difficulty with differentiation, there is wide agreement that CAUTIs account for a significant proportion of healthcare associated infections. The European Centre for Disease Prevention and Control point prevalence survey of 2011-12 (published 2013) found that 18.2% of acute care patients in England had a urinary catheter in situ and the 59% of UTIs in acute care were associated with IUC use. According to Saint et al. (2000), the daily risk of developing CA-bacteriuria is between 3% and 6%, and a patient with an IUC in situ for seven to ten days has a 50% chance. Pickard et al. (2012) found that 11-13% of short term (one to three days) IUC users in hospital were treated with antibiotics for symptomatic UTI within six weeks of the device being placed. In a retrospective analysis of the notes of 70.4 million patients catheterised in hospital in the USA between 2001-10, 3.8 million (5.7%) were reported to develope a CAUTI. Furthermore, CAUTIs have been identified as a leading cause of bacteraemia (Maki and Tambyah 2001). Gentry and Cope (2006) state that 8.5% of bacteraemia cases are attributable to CAUTIs. Most recently, the Health Protection Agency (HPA) gave a figure of 7.5% (2011). There is great variation in the figures for CAUTI that develop into secondary bloodstream infections. Frequently quoted figures vary from 1-5% (Getliffe 2008).

Some risk factors for developing CAUTI are similar to developing other infections including malnutrition, an underlying chronic condition such as diabetes, bacterial infection at other sites and old age. Others are specific to catheter use, such as placement of the drainage tube above the level of the bladder, poor catheter care, female gender and prolonged catheterisation (Tew et al. 2004)

The individual and economic impacts of CAUTIs are difficult to accurately assess. Plowman et al. (1999) explored the cost burden of HAIs to healthcare, society and individuals and using micro-costing, which includes all costs of interventions, care and tests, estimated the extra financial cost of urinary infection at £1,122 per patient. Graves (2001) states that such figures can provide a guide to the economic benefits of preventing infection. However, although the assessment addresses the impact of acquiring a CAUTI on the health status of the patient, the impact on the well-being of individual patients undergoing interventions such as continuous bladder irrigation or taking intravenous antibiotics is difficult to measure.

Attempts to reduce infection

Attempts to reduce levels of CAUTI can be broken into 2 distinct areas. Firstly, reducing the risk of infection when using an IUC through care methods and selection of different equipment and materials. Secondly, reducing the use of IUCs thus reducing the risk of associated infection.

The focus of this work is on the latter approach, but it is useful to briefly review the evidence on infection prevention through care methods and materials selection in order to understand the limitations of this approach for preventing infection and why it is therefore necessary to also minimise use.

UC materials and design

Considerable attention has been given to antimicrobial urinary catheters. A recent Cochrane review (Schumm and Lam 2010) sought to determine the effect of type of IUC on the risk of UTI in adults undergoing short-term urinary catheterisation. 23 randomised and quasi randomised trials met their criteria and they concluded that the use of silver alloy IUCs used on a short-term (one week) basis appear to reduce the risk of asymptomatic CA-bacteriuria (RR 0.54, 95% CI 0.43 to 0.67), however, the positive effects decrease after this time. Whether this translates to a reduction in the risk of CAUTI is unclear. They also found that IUCs impregnated with antibiotics are effective in reducing asymptomatic CA-bacteriuria in adults catheterised for less than one week, but there was insufficient evidence to draw any conclusions for longer term devices. However, in a trial where over 6000 patients requiring short-term IUCs were randomly assigned to a silver alloy-coated catheter, nitrofural-impregnated catheter or a control catheter (standard polytetrafluoroethylene), Pickard et al. (2012) found that the use of antimicrobial-impregnated catheters was not effective for reduction of incidence of symptomatic CAUTI.

In summarising the problems associated with urinary catheter design and related biofilms (communities of microorganisms that are attached to a surface and are a key cause of IUC complications), Stickler (2008) stated that their prevalence exposes the many faults of the current design of IUC. He notes that “Catheters that are available today have roughly engineered surfaces, thick walls and narrow central channels that are extremely vulnerable to blockage.” He calls for manufacturers to improve the design of IUCs as the complications caused by the biofilms are unacceptable. Currently, there is no evidence that any IUC materials or design provide a solution to the problem of infection.

Catheter Care

There is a significant body of research directed at reducing the risk of infection when placing and maintaining an IUC. Recommended insertion and maintenance techniques are well established and have been well publicized. For example, in 2007 the Department of Health, UK published High Impact Intervention Care Bundles to highlight evidence based practice in seven key areas including a urinary catheter care bundle. There is a high degree of consistency between the guidelines on what constitutes best practice in this area. The two key recommendations made by the guidelines are that aseptic technique and sterile equipment should be used when inserting an IUC and a closed catheter drainage system should be used.

It has been found that IUCs inserted under sterile conditions in an operating theatre led to a lower incidence of CA-bacteriuria compared with IUCs inserted in other clinical environments (Tambyah et al. 1998, Shapiro et al. 1984). However, Carapeti et al. (1994) offered contradictory evidence when they found no statistical difference in levels of CA-bacteriuria between patients who received a IUC using clean (non-sterile) or sterile methods.

Even with the full implementation of the catheter care guidelines, it is evident that infection remains a significant risk with IUC use.

2.2.3 Non-infection related risks

Urethral trauma

Another key risk to patients when placing an IUC is injury to the urethra. Damage most frequently occurs due to excessive pressure being applied during insertion or from the inflation of the balloon whilst in the urethra (Thomas et al. 2009). Injuries are more common in men due to the longer urethra and difficulties caused by the prostate and can have long term consequences, including erectile dysfunction, incontinence and strictures (Carter et al. 2007). In a systematic review of non-infectious complications of IUC use, Hollingsworth et al. (2013) found that 3.4% of short-term catheterisations resulted in urethral strictures. Thomas et al. (2009) reported that 6% of inpatient referrals to a urology department in Ireland had resulted from urethral trauma due to male catheterisation. Dobrowolski et al. (2002) reported that a four year study based in Polish urology departments stated that 32.9% of all urethral injuries resulted from the use of IUCs.

Following a study of first year medical interns, Manalo et al. (2011) stated that improved levels of pre and post qualification training might help to reduce urethral injury and related complications. However, Cetti et al. (2010) questioned 51 first year doctors in the UK and found that 18% had never placed a male catheter and 45% had never placed a female catheter. These findings suggest that risk of urethral trauma remains significant.

Patient experience

In a review of literature exploring the experiences of patients with long-term catheters, de Jaegar (2011) suggests that living with a urinary catheter can have significant psychological, social and practical implications that patients must manage in order to live successfully with their IUC. Furthermore, in a study of 104 medical, rehabilitation and nursing care patients carried out by Saint et al. (1999) 61% of men with a long term IUC in place felt that it restricted their activity and only 42% felt it was comfortable.

However, relatively little research has been carried out into the impact of short-term IUC use in acute care environments. Pickard et al. (2012) reported that 18% of patients in their study of over 6000 patients receiving a short-term IUC stated that they experienced discomfort with an IUC in situ and 29% expressed discomfort on removal. Greer et al. (2011) carried out interviews with 95 patients in both medical and surgical ward in a tertiary care hospital. The study found that 35% of the patients felt that IUCs caused a significant amount of discomfort, however the majority stated that they preferred the placement of an IUC to using a bedside commode (84% aged 60 and over, 52% under 60). Less than half knew that there was a risk of UTIs linked to IUC use. Halleberg et al. (2013) conducted a qualitative study with 30 hip surgery patients and found that opinions of IUCs varied in from positive to negative, and that the impact of experience of having an IUC also varied.

This finding might potentially impact on decisions made by clinicians to initially place an IUC, but more research is needed in this area in order to better understand the impact of short-term IUC use on individual patient experiences and to assess levels of knowledge and the potential that patient education might have in minimising IUC overuse.

Reduced mobility

Although it seems intuitively likely that the presence of an IUC could hinder a patient’s mobility, there is currently little evidence to support this. Saint et al. (1999) undertook a survey with 104 male in-patients at a medical centre to establish their attitudes towards IUC and condom catheters. One of the questions asked was “Is the current urinary catheter (indwelling or condom) restricting you daily activity?” 61% of respondents with IUCs answered yes (compared with 24% with condom catheters). In 2002 Saint et al.

published the previously mentioned paper entitled “Indwelling urinary catheters: A one point restraint?” containing the following statement referencing the 1999 study.

> “[In a recent prospective study]……61% noted that it restricted their activities of daily living. Two respondents provided unsolicited comments that their indwelling catheter “hurts like hell”. For some patients, urinary catheters operate as physical restraints, tantamount to binding them to the bed; catheters substantially and unnecessarily limit patients' ability to function freely and with dignity. Restricted activity not only reduces patient autonomy but also promotes such nosocomial complications as venous thromboembolism and pressure ulcers. Thus, we believe that the overuse of indwelling urinary catheters shares many similarities with physical restraints applied to the extremities or torso.”

Both of the aforementioned papers have been much cited by authors, some of whom have translated the above statement and figures to state that IUCs restrict mobility. For example, “In addition to causing infectious complications, indwelling urinary catheters also cause discomfort and embarrassment and restrict mobility.” Cornia and Lipsky (2008). “Catheters also cause discomfort, restrict mobility and delay hospital discharge” (Meddings 2010). Whilst it is possible that IUCs do restrict mobility for some patients, Saint et al.’s findings were that daily activities, not mobility, were restricted. No evidence for short-term IUCs and their impact on mobility was found for this literature review.

It is notable that in a recent hospital audit in Wales out of a group of 55 patients who had IUCs in situ, the reason given for placing 43% of the devices was “reduced mobility” (Fowler 2012). The difference in beliefs about and attitudes towards the use of IUCs between groups of clinicians highlights the importance of cultural norms. Whether “reduced mobility” is cited as a justified reason for placing an IUC or a risk factor resulting from placing an IUC depends upon the organisational norms and the beliefs of the clinician.

Delirium

Inouye and Charpentier (1996) developed a model for predicting the onset of new delirium in older hospitalised patients based on two tandem prospective cohort studies with a total population of 508 patients. Their study identified five independent precipitating factors for developing delirium, including the insertion of an IUC. Inouye et al. (1999) carried out a study of a multi-component intervention aimed at preventing delirium in hospitalised older patients and included minimising the use of IUCs and reported a reduced incidence of delirium post-intervention.

Young and Inouye (2007) noted that understanding of the pathophysiology of delirium is limited and Inouye et al.'s (1999) concept of patient combining risk factors and stressor events that might trigger an episode of delirium has proved a practical approach to understanding the condition. He suggests that in addition to a major stressor such as serious infection acting as a trigger for delirium in patients with underlying risk factors, much lesser changes might have the same result. He highlights a change in medication as an example of a smaller stressor. Despite the fact that there does not appear to be any clear understanding of how the insertion of an IUC increases the risk of delirium, it seems that even small stressors can have a significant impact on the risk of developing delirium in some patients. It therefore seems reasonable to take this into account when making the decision to place an IUC.

Beyond short-term

The potential consequences of unnecessary short-term catheterisation go beyond the acute environment and IUCs placed for acute reasons may have long-term impact. McNulty (2009) undertook a qualitative study based in nursing homes exploring beliefs and attitudes towards urinary catheters and reported that many staff state that the majority of long-term IUCs are acquired in acute care. Furthermore, following a survey of 114 randomly selected care homes, Lomas et al. (2009) reported that most (57%) residents with IUCs acquired them as hospital in-patients.

2.2.4 What do current policies and guidelines say about minimising the initial use of IUCs and what is the evidence supporting these documents?

Considering the potential harm that can be caused by the use of IUCs, it is unsurprising that numerous policies and guidelines aimed at minimising the associated risks have been published. In the introduction to this thesis an overview of policies relevant to IUC use published in England in the last ten years gives a flavour of the high level of attention given to this area. Similar situations are found globally.

Field and Lohr (1990) describe guidelines as “systematically developed statements to assist the practitioners and patients in making decisions about appropriate healthcare for specific clinical circumstances.” Generally, clinical guidelines are published by organisations wishing to improve the quality of healthcare. In the last decade the reduction of CAUTI has become a focus for guideline developers as the profile of all healthcare associated infections has risen. In a review of recent publications of guidelines aimed at managing CAUTI, Trautner (2010) discusses the reasons for this sudden upsurge such guidelines and other healthcare associated infections. She highlights the policy change from the Centers for Medicare and Medicaid Services (CMS) (2008) in the USA who announced that they would no longer continue to compensate hospitals for the costs of hospital acquired UTIs because they perceived them to be reasonably preventable. Trautner points out that this policy accounts for the recent increase in interest in CAUTI prevention in the USA.

It is not feasible to review all published IUC related guidelines within the scope of this work. However, as this study focuses on the initial use of IUCs in acute care, it is important to gain an understanding of clinical guidance in this area, in particular what is deemed to be appropriate justification for initially placing an IUC. Therefore, Table 2 contains a summary of the indications to catheterise considered appropriate by different guidelines.

The following discussion aims to highlight areas of agreement and disagreement between the guidelines, and to demonstrate the problems that this lack of consistency creates when attempting to intervene to reduce unnecessary use of IUCs.

	HIPAC (Gould 2009)	RCN (2008)	NPSA (2009)	Australian and New Zealand Urological nurses Society (2008)	Dept for Health Hong Kong (2010)	IDSA (Hooton et al. 2009)	Infection Prevention Working Party (Netherlands 2005)	Stewart (1998)	Health Protection Scotland (2008)	European and Asian guidelines (Tenke et al. 2007)
Monitoring urine output	■	■	■	■	■	■	■	■	■	■
Perioperative	■	■		■	■		■	■		■
Acute urinary retention	■	■	■	■	■	■	■	■	■	■
Chronic urinary retention		■	■	■	■			■		
Instill medication/ irrigation		■	■	■			■	■		
Investigative purposes		■	■	■				■		
End-of-life care	■	■			■	■	■	■		
To protect skin/assist healing	■	■		■	■		■		■	
Manage Intractable incontinence			■	■		■		■		
Determine residual urine volume			■	■				■		
Prolonged immobilization	■									
Instrumental delivery				■						
Collect sterile specimen				■						
Very painful to change pad									■	
Poor bladder control & kidney failure									■	

Table 2. A summary of the indications considered appropriate for IUC use in guidelines

The guidelines reviewed here have been selected to provide an indication of guidelines used worldwide. Both widely used guidelines (such as Gould et al. 2009) and locally used guidelines (such as Department for Health Hong Kong 2010) have been included. The Stewart (1998) guidelines, published in the British Journal of Nursing have been included due to their on-going influence in the production of more recent guidelines in the UK and numerous NHS trust guidelines and further afield, including the Australian and New Zealand Urological nurses Society (ANZUNS) (2008).

It can be seen that there is complete agreement on the appropriateness of placing a urinary catheter to relieve acute urinary retention and to monitor urine output in critically ill patients. The majority of guidelines agree that perioperative needs, chronic urinary retention, comfort in end of life care and protecting vulnerable skin or assisting in the healing of skin where there is urinary incontinence are valid reasons for catheterisation.

However, Hooten et al. (The Diagnosis, Prevention and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America Guidelines) specifically state that the use of IUCs was not recommended to protect skin integrity when the patient has sacral pressure ulcers as no evidence had been found to support the use of IUCs over other urine containment methods.

It should be noted that grouping indications in this way is difficult due to the variations in language and terminology used and, even with similar indications, there is significant variation in detail. For example, when using an IUC to manage urinary incontinence where skin integrity is at risk the statements vary: Gould et al. state, “To assist in healing of open or perineal wounds in incontinent patients,” ANZUNS (2008) state, “To keep perineal area dry to assist healing,” HPS (2008) states, “The patient has open wounds or pressure sores around the buttocks that are frequently soiled/contaminated with urine.” All of these indications are open to interpretation by the clinician. What is a risk to the patient? What category of pressure ulcer would be classified as an open wound? This would potentially lead to inconsistent use of the indication guidelines within individual settings.

Urine output monitoring is another source of variation between the guidelines. The Infection Prevention Working Party Netherlands (2005) state, “Monitoring urine production under non-perioperative conditions if the patient is unable to urinate regularly on command,” Department for Health Hong Kong (2010) state, “To monitor urine output in critically ill patients” and Stewart “Acute illness: to monitor urine output.” Again, these statements are open to clinician interpretation.

Additionally, there is disagreement over the supporting evidence for two of the indications that the guidelines agree provide just cause for initially placing an IUC. There is debate over the appropriateness of using a urinary catheter to monitor urine output. On one side of the argument, NICE Clinical Guideline 50 “Acutely ill patients in hospital” (2007) states that the consensus opinion of the Guideline Development Group was that urine output should not be a core physiological parameter recorded to asses acutely ill patients due to the need for catheterisation to reliably assess urine output. However, the widely used Centers for Disease Control and Prevention (CDC) Guideline for Prevention of Catheter-associated Urinary Tract Infections (Gould 2009) gives measurement of urinary output in critically ill patients as an example of an “Appropriate Indication for Indwelling Urethral Catheter Use.” A study by Garcia et al. (2007) raised the issue of the inaccuracy of using IUCs to monitor urine output. They used a bladder scanner to assess the residual volume of urine for 150 ward or intensive care based patients who had IUCs in situ and found a mean of residual of 116ml (range 4 to 647). They concluded that due to air blocks and curls in catheter tubing, IUCs do not consistently completely empty the bladder. This was the only paper found on this subject and further inquiry in this area would be beneficial.

The guidelines also agree that acute urinary retention is an appropriate reason for placing an IUC. However, numerous studies have demonstrated the merit of intermittent catheterisation over IUCs, particularly in post-operative patients. For example, in a multi-centre randomised controlled trial (RCT), Hakvoort et al. (2009) demonstrated clean intermittent catheterisation was associated with lower rates of UTI and a shorter period of need for catheterisation when compared to transurethral indwelling catheterisation for the treatment of abnormal post-void residual bladder volume (PVR) following vaginal prolapse surgery. In a pre-surgery example, Furuhata et al. (1988) compared the levels of bacteriuria in patients waiting for prostate surgery who experienced acute urinary retention and found significantly lower levels both pre and post-surgery in the patients who had used intermittent catheterisation. Furthermore, a Cochrane Review (Griffiths et al. 2005) concluded that there is insufficient evidence to recommend using an IUC for a set post-operative period compared with removal immediately after the operation.

Conway and Larson (2011) published a review of “Guidelines to prevent catheter-associated urinary tract infection: 1980 to 2010” that broadly agrees with the observations made here. They compared 8 guidelines, including early and more recent guidelines from the same organisations, for example the Centre for Disease Control and Prevention (CDC) in the United States of America and Evidence-based practice in infection control (EPIC) in the UK. None of the EPIC guidelines (2001, 2007 or 2013) state appropriate reasons for using an IUC. The guidelines instead state “Only use indwelling urethral catheters after considering alternative methods of management”. However, the other six guidelines reviewed provided a list of indications considered appropriate. Three indications were considered appropriate by all six studies: acute urinary retention, meeting perioperative needs and monitoring the hourly urine output of critically ill patients. Other indications received less support, such as end of life care and to allow skin healing. The authors note that the introduction of bladder scanners to assess the need for catheterisation for urinary retention is a recommendation in the more recent guidelines.

Their report made some key observations. They noted that there had been remarkably little change in recommendations over the years and that this might partly be due to the use of existing guidelines to develop new guidelines. All but one of the guidelines cited previous guidelines in their source documents. Hooten et al. (2009) authors of the IDSA guidelines stated that their recommendations were based on earlier guidelines combined with literature published since those guidelines. Conway and Larson note that the consistency in guidelines would be most understandable where there is strong evidence for recommendations and that this is the case for some but not all of the long-standing recommendations. The insufficient evidence base is acknowledged by several of the guidelines.

The variation between guidelines and the use of weak evidence makes it difficult to assess whether a particular IUC has been placed appropriately. The conflicting guidelines also make it difficult for clinicians to know which guidelines to trust and this, paradoxically, might make it easier for them to bypass the guidelines in favour of clinical experience or cultural norms.

2.2.5 When are IUCs used and overused in practice?

The risks of IUC use are clear. However, what is less clear is when the benefits of use outweigh the potential harm. This not only makes clinical decisions difficult, it also makes establishing the scale of overuse problematic. Even confidently estimating the prevalence of IUCs is difficult because surveillance has been sporadic or non-existent. In 2005, Saint et al. observed that less than 25% of 719 hospitals surveyed in the USA had systems for monitoring which patients had urinary catheters and, as has already been noted, the most recent IUC related policy in England requires acute healthcare trusts to use the “Safety Thermometer” in order to monitor IUC use, something that has not consistently taken place before.

However, there are figures available. Hooton et al. (2009) state that from 15 to 25% of patients in acute hospitals have an IUC inserted at some point during their stay. The references used for these figures are not recent (Haley et al. 1981, Garibaldi et al. 1974), however the numbers appear to have remained reasonably constant to the present time. The Scottish National Point Prevalence Survey of Healthcare Associated Infection and Antimicrobial Prescribing 2011 surveyed 75 acute and non-acute hospitals between September and October 2011. A prevalence rate of 19.2% was found for in situ urinary catheter use. This figure was not significantly different from the rate found in a similar survey in 2005/6 and no significant variation was found between specialities. Van den Broek et al. (2011) reported on a study of the efficacy of an intervention programme in surgical, medical and intensive care units in 10 Dutch hospitals and across the course of the study 20% of the population of 16,495 hospitalized patients had a urethral catheter.

This indicates a relatively stable level of IUC prevalence. Figures from recent studies indicate that the number of IUCs that are placed for inappropriate reasons are more varied. A brief overview of figures from studies from different countries is given in Table 3.

Study/Country	Year	Sample	% with IUC	% overuse	Comments
Munasinghe et al. (USA)	2001	836	10.7	38	
Gokula et al. (USA)	2004	30,325	25.7	54	Females more at risk
Apisarnthanarok et al. (Thailand)	2007	895	100	15	Only patients with IUCs reviewed.
Raffaele et al. (Italy)	2008	4629	10	30	Significant variation between wards, risk factors include poor mental status and having a surgical intervention
Bhatia et al. (India)	2010	125	100	28	Only patients with IUCs reviewed. Females on medical wards particularly at risk
Tiwari et al. (USA)	2011	436	33	40	Older patients more at risk, but no difference between genders

Table 3. Examples of studies of inappropriate IUC use levels in acute care

Findings show overuse levels varying from 15% to over 50%. It seems that despite the attention already given to the risks of inappropriate IUC use it still continues. This raises the question of why this is the case and what can be done about it.

2.2.6 What attempts have been made to reduce the overuse of IUCs and how successful have they been?

There have been a growing number of attempts to implement guideline recommendations in order to minimise IUC use. There are two ways of reducing the use of IUCs. Firstly, by reducing the duration of use of an IUC already in situ. Secondly, by reducing the initial placement of the devices. Although, the first method will be briefly reviewed here, the second method will be the principle focus of attention.

Prompt removal of IUCs in situ

In the USA, a great deal of interest in IUC use and CAUTI prevention has been created by the work of Saint, Knoll, Meddings and others in the Michigan area as discussed in the introduction. One of their key projects has been the implementation of a patient safety initiative known as the Bladder Bundle (Saint et al. 2009). The Bladder Bundle focuses on reducing CAUTI with an emphasis on appropriate use and, in particular, prompt removal of IUCs. Websites such as www.catheterout.com have been developed in order to communicate evidence, best practice and methods of introducing change from this work and further afield.

Translating the guidelines into practice via quality improvement projects (QIP) such as the Bladder Bundle to attempt to change practice have focussed on attempts to decrease the duration of use rather than minimise the initial placement of IUCs. Numerous studies describe the attempts. It is beyond the scope of this review to systematically address all of these studies, but a summary of key studies and meta-analyses is provided in order to give an overview of the current position.

The majority of these studies measure catheter days per 1000 patients, incidence of CAUTI or duration of IUC use. One of the most commonly found interventions aimed at reducing IUC use is a stop order or clinician reminder that prompts the clinician to remove a device already in situ. Meddings et al. (2010) undertook a systematic review and meta-analyses of interventional studies implementing reminder systems to prompt IUC removal in hospital. Fourteen studies met the inclusion criteria and it was reported that the rate of CAUTI was reduced by 52% ($p < 0.001$) with the use of a stop order or reminder. The reduction in IUC use duration was 2.61 (37%) days per patient. The review concluded that clinical areas should strongly consider putting stop orders or reminders into place.

Other recent, notable studies looking at interventions to reduce IUC use include Van den Broek et al. (2011) who conducted a before-after study based at ten general acute care or university hospitals in the Netherlands to try to establish whether it was possible to reduce the number of IUCs in hospitals that have already had IUC guidelines in place for many years. The hospitals were divided into two groups – A and B. Group A carried out a three month period of collecting baseline measurements, before starting the intervention in month 4. Group B provided a control group for unintended changes for six months, not implementing their strategy until month 9. The data collection period was 17 months for each site. Each hospital designed its own implementation strategy based on individual hospital needs. The activities were subsequently divided into three categories – revision of protocols and materials, education and information and, finally, changing daily practice. A total of 16,495 patients were admitted to participating wards (intensive care, coronary care, surgical, neurology or internal medicine), with 3335 catheterised. The average duration of catheterisation decreased for all of the different types of ward, but the decrease was only statistically significant on the internal medicine and surgery wards. The largest reduction in prevalence was seen on the wards that had previously had the highest levels of usage. The results of the study did not provide evidence on the efficacy of one intervention over another. The study did not report on any change in the initial placement of IUCs.

Knoll et al. (2010) conducted another key study exploring the efficacy of multifaceted interventions to decrease unnecessary IUC use. An IUC "utilization task force" was formed at a tertiary care referral centre for veterans in 5 state region of the USA. A multi-phase programme of different combinations of interventions was devised with support from relevant stakeholders, including physicians and nursing leaders. Baseline levels of IUC use were established during 22 once-weekly audits of IUC use with in-patients. In intervention phase one, the task force team implemented an intervention bundle based on staff education, system re-design and feedback. During this phase, data on IUC prevalence was collected weekly over an 8 week period. After a one month break where no interventions were carried out, phase two began. During this six month period the intervention bundle from phase one was re-started, plus weekly hospital-wide audits of IUC use, including the presence or lack of a valid indication and order documentation was undertaken with feedback to nurse managers. Additionally, more reminder advertising was used near IUC supply areas, healthcare workers who removed IUCs early or correctly renewed documentation received a reward (edible treat, information flyer or badge). Phase three added to existing interventions by adding a IUC nurse to carry out daily checks on the appropriateness of IUCs and advocate for their removal if the IUC lacked the correct documentation. This final phase lasted two years, giving the project a total span of eight years. During the programme, daily IUC prevalence fell from 15.2% to 12.0% of patients. IUCs without an appropriate indication fell from 22.0% to 1.2%. It is notable that during the hiatus between phase one and phase two the use of IUCs bounced back to almost baseline level despite an initial 33% fall during phase one implying that sustained effort is required in order to achieve sustained change. Again, it was the prevalence of IUCs that is measured not the number of IUCs initially placed.

In a qualitative study, McNulty et al. (2009) reported on the level of urinary catheter use in nursing homes in England, in particular the removal of IUCs that had been placed in hospital before the patient moves to a nursing home. Despite the study taking place outside the acute care environment, it provides some useful insights. McNulty et al. (2009) noted that NICE guidelines CG2 Infection Control (2003) state that urinary catheters "should be used only after alternative methods of management have been considered" and that the key variable between homes with a high rate of catheter use and a low rate was the interpretation of "alternative methods of management have been considered." McNulty et al. (2009) gave illustrative quotes from staff in homes with high and low rates of IUC use. A nurse in a home with high rates of IUC use spoke about one patient, stating

> *The one that came from the hospital now, she’s a lot better, and if the catheter happens to drop then we will wait and see if she can be fine without the catheter.*

In contrast, a nurse from a home with low IUC use stated

> *She had a stroke and she was really poorly and she’d gone into hospital and they catheterised her……we assessed her, and there was actually no other reason for her to have a catheter except incontinence…..so we removed the catheter and took it from there.*

McNulty et al. (2009) found that to a significant degree, the subjective norms of the home dictated the level of IUC use.

Avoiding initial placement

Compared to reducing the duration of IUCs, less attention has been given to avoiding the initial placement. There are two methods of avoiding IUC placement. Firstly, by avoiding the initial use of any device and, secondly, if a device is necessary, avoiding an indwelling device.

There is general agreement that alternatives should be sought were possible (Hooten 2009). Alternatives to IUCs include intermittent and suprapubic catheterisation and external urine collection devices such as pads and condom catheters. The alternative that could be used depends upon the clinical need. For example, alternatives for urinary retention would be intermittent or suprapubic catheters, an alternative to promote skin healing in a male patient with urinary incontinence include a condom catheter.

A Cochrane review (Niël-Weise and van den Broek 2009) aimed to assess the advantages and disadvantages of suprapubic, indwelling urethral and intermittent urinary catheterisation. They analysed 14 studies comparing suprapubic and indwelling urethral UCs and concluded that indwelling urethral catheters caused more cases of bacteriuria, a greater need for recatheterisation and greater patient discomfort. Urethral UCs were compared with intermittent catheterisation in three studies which suggested that rates of bacteriuiria were lower with intermittent catheters, but their use was more costly. In both comparisons there was no evidence that increased rates of bacteriuria led to increased rates of UTI. Saint et al. (2006) carried out a randomised trial of condom catheters versus IUCs for men, and found the condom-catheters reduced the risk of CA-bacteruria.

It might be that these options can offer an alternative to IUCs. There have been several studies published comparing intermittent and IUCs in terms of infection rates, patient preference and voiding. However, there is little evidence found reporting on interventions to reduce the use of IUCs by replacing them with one of these alternatives.

The other key approach to reducing IUC use is by avoiding the use of any device at all. Bladder scanners have been an increasing used tool for this purpose (Conway and Larson 2011). Urinary retention can be assessed by placing an IUC or by bladder ultrasound. The bladder ultrasound scanners have the advantage of being non-invasive, but questions have been raised over their accuracy. Palese et al. (2010) carried out a meta-analysis of the effectiveness of ultrasound bladder scanner programmes in reducing urinary tract infection by reducing the need to catheterise. Their inclusion criteria stated that the intervention must compare the use of ultrasound bladder scanner with the clinical judgement of nurses in assessing acute urinary retention. Only three studies met their inclusion criteria.

Lee at al. (2007) reported on the difference in rates of IUC use before and after implementing such a programme in two neuro-surgical units in Taiwan. They found that after training nurses to use bladder scanners, the post-intervention group had a significantly lower level of unnecessary catheterisation (35.3% down to 7.0%). Frederickson et al. (2000) carried out two studies. Firstly, 50 patients undergoing general surgery were evaluated using bladder scanners to assess the need for an IUC when one had been requested. Secondly, a quasi-experimental study compared two groups of patients undergoing orthopaedic surgery, the first group receiving intermittent catheterisation based on the clinical judgement of a nurse and the second group assessed using a bladder scanner. The overall all results showed that the use of a scanner delayed or avoided the need for an IUC in 81% of cases. Slappendel and Weber (1999) carried out a before-after study on a total of 4116 patients where for a four month period post-surgical patients without spontaneous diuresis within 8 hours received an IUC and for the following four months, the same criteria applied, but patients were assessed with a bladder scanner and if the volume was less than the stated cut-off point catheterisation was not performed. The percentage of patients who were catheterised fell from 31.4% to 15.9%.

There are limitations to this meta-analysis. Firstly, the number of studies included in the review is small. Numerous studies were excluded as they did not compare expert nursing judgement with the use of the scanner. Secondly, the methodology of the studies included is weak due to the lack of use of randomised controls. However, given the nature of the intervention, it is clear that it would be difficult to carry out blinded RCTs in this area. Another key point, is the variation in bladder volume cut-off values which varied between the studies in this meta-analysis and in wider literature and practice (Lee et al. 2007). For the three studies the cut-off values were Lee et al. (2007) – 300ml, Frederickson et al. (2000) – 400ml and Slappendel and Weber (1990) – 800ml. Overall, it appears that introducing bladder scanners to assess residual urine volume can be effective in reducing the number of IUCs placed.

Since the meta-analysis discussed above was undertaken, further studies have added to the weight of evidence supporting the use of bladder scanners to minimise the use of IUCs. In one study, a retrospective chart review of patients admitted to a medical-surgical in-patient unit over a month period found that when patients who had been deemed unable to void urine were assessed using a bladder scanner there was an 80% reduction in catheterisation (Cutright 2011).

In addition to introducing bladder scanners, other research studies and quality improvement programmes have attempted to reduce unnecessary initial IUC use. However, in undertaking this literature review it became apparent that a systematic review of studies reporting specifically on the change in rates of initial placement of IUCs had not been published. Therefore a systematic review of interventions to minimise the use of IUCs in acute care was undertaken. This review is described in detail in the next chapter and the published systematic review (Murphy et al. 2014) can be found in Appendix A.

Briefly, the review found that due to the methodologically weak study designs, the variation in clinical environments and the low number of eligible studies, the evidence was not robust enough to determine the effectiveness of any intervention to minimise the overuse of IUCs. However, the review highlighted some important broader observations. What became clear in conducting the review, was that, whilst it seems probable that interventions to minimise the initial placement of IUCs in acute care can be effective, there are deep-rooted questions that need to be answered before the efficacy of interventions can be maximised and sustained. Rigorous attempts to understand decision making processes, beliefs about indication criteria, differences between disciplines and to identify the barriers to change are needed in order to better understand how interventions might work in different environments.

Since the review was undertaken, a paper has been published describing a comparative observational study in Israel that examined the impact of introducing a more restrictive urinary catheter policy on the number of patients who received an IUC (Shimoni et al. 2012). The guidelines issued for the intervention provided a more detailed description on when the use of an IUC was admissible, for example, relieving urinary retention with an IUC was only justified if there was a decrease in renal function, ureteric dilatation, recurrent UTI or patient discomfort. It was found from retrospectively reviewing patients' notes that the overall rate of catheterisation fell from 17.5% to 6.6% in a total study population of 1572. However, Shimoni et al. noted that adherence to the new guidelines remained a problem.

The importance of the culture of IUC use found in the systematic review has been identified elsewhere. In a qualitative study exploring nurses' perceptions of IUC use in older people, Dingwall and McLafferty (2006) reported that although nurses appeared to be increasingly knowledgeable about the risks associated with IUCs, the nurse's personal preference played a strong role in whether or not a patient had an IUC placed. They stated that indiscriminate use of IUCs to manage urinary incontinence continues despite awareness of the associated problems. Attitudes varied, with one nurse describing the decision to place an IUC as "drastic" but in other areas it was described as a "habitual" practice. The difference in organisational culture of IUC use identified by McNulty et al. (2009), previously discussed, further supports the need for improved understanding.

This view has been reiterated more recently in conjunction with IUC use QI programmes. Krein et al. (2013) state, "Preventing CAUTI requires that we understand not only what practices are or should be used but also the organisational context, culture and people that affect how these practices are implemented." Saint, Krein and colleagues have reported on two related qualitative studies exploring barriers to reducing the use of IUC use. Krein et al. (2013) identified three key barriers to reducing IUC use; difficulty with clinician engagement, patient and carer influence and clinical practices in Emergency Departments. Harrod et al. (2013) used Dixon-Woods et al.'s (2009) classification of how clinicians evaluate patient safety risks to explore the perception of IUC associated risk. They found that use of IUCs and IUC-associated risks were not always linked in the clinicians' minds, that they dealt with competing priorities and that they found ways round organisational pressures in order to use IUCs. They highlighted the need for pre-implementation assessment of practice before initiatives are introduced.

Although these studies were aimed at uncovering explanations on why IUC reduction strategies were not always successful, they provide some useful concepts for understanding IUC clinicians' decision making. Moreover, they highlight that changing clinicians' behaviour relating to using IUCs is likely to be complex and challenging.

2.2.7 Rationale for Study

The numerous attempts to reduce the use of IUCs via policy, guidelines and quality improvement programmes over the last three decades have met, at best, with mixed success. It has emerged that the cultural norms of organisations and the values, attitudes and beliefs of the individual clinicians practicing within the organisations that impact on IUC decision making are poorly understood. Without that knowledge, it is difficult to judge which IUCs are inappropriate and interventions are unlikely to reach their potential.

This has been emphasised by differences in the levels of IUC use in nursing homes depending on the organisations subjective norms (McNulty et al. 2009), by the variations between nurses' attitudes (Dingwall and McLafferty 2006) and in the systematic review of studies trying to minimise the initial placement of IUCs (Murphy et al. 2014) described fully in the next chapter, where studies reported on the importance of these factors in changing behaviour. It is also been demonstrated by the difference in attitude between clinicians who see reduced mobility as a risk factor of IUC and those who see it as an indication for IUC use. Additionally, the potential impact of the patients' beliefs has been highlighted as a factor that requires exploration. Finally, Harrod et al. (2013) have noted that even when IUC reduction initiatives report some degree of success, there remain areas of clinical decision making that are poorly understood, impacting on the efficacy of interventions.

Therefore, in order to maximise the potential of interventions and reduce the costs of repeated policy, guideline and QIP attempts to minimise the unnecessary use of IUCs in acute care, the question why and how clinicians reach the decision that an IUC is appropriate needs to be addressed.

2.3. Evidence-practice Gap and Quality Improvement

2.3.1 Introduction

The numerous attempts to reduce the use of IUCs via policy, guidelines and quality improvement programmes over the last three decades have met with mixed success. This gap between what clinical guidelines promote as optimum practice and the reality of clinical practice is far from unique in healthcare. In order to learn from existing research from other clinical areas and to understand why, despite the repeated attempts to implement clinical guidelines, the initial placement of IUCs in acute care appears to be sub-optimal, this section will review the literature on evidence-practice gaps. It will briefly appraise the evolution of evidence based practice (EBP), where it has and has not been successfully implemented, the barriers to EBP and the attempts that have been made to close the evidence-practice gap. Finally, it establishes the importance what Harrod et al. (2013) called pre-implementation assessment, that is understanding decision making processes and the clinical context before introducing interventions attempting to change behaviour.

The blurring in distinction between the evidence-practice gap and the guideline or policy practice gap is important to note. In the IUC literature many papers refer to clinical guidelines on the “appropriate use” of IUCs (Fakih et al. 2012, Knoll et al. 2011, Loeb et al. 2008), but the previous section established the evidence for when an IUC is or is not appropriate is not clear cut. The gap under scrutiny in these papers is more accurately a guideline-practice gap or policy-practice gap, rather than truly an evidence-practice gap. However, the body of work undertaken in the name of the evidence-practice gap has much to offer in understanding why clinicians make the decisions that do not conform to clinical guidelines and is therefore important to this study.

2.3.2 What is evidence based practice?

EBP is an approach that has developed in parallel with the global escalation of healthcare costs and the increasing complexity of service delivery. Improving capabilities combined with limited resources and increased access to information have combined to create a drive for quality improvement and consistency of provision.

Although it could be claimed that EBP has been undertaken to some degree throughout the history of healthcare, the modern movement is generally agreed to have started with Cochrane’s (1972) Effectiveness and Efficiency: Random Reflections of Health Services

(Claridge and Fabian 2005). In 1979 Cochrane wrote, “It is surely a great criticism of our profession that we have not organised a critical summary, by speciality or subspeciality, adapted periodically, of all relevant randomized controlled trials.” The spread of EBP gathered momentum in the 1990s with work from Chalmers at Oxford and Sackett at McMaster University in Canada (Bucknall and Rycroft Malone 2010, p4). One of the most widely used definitions of EBP is that of Sackett (1996), “Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.” Although this definition is directed at medicine, it has been used to incorporate a wider healthcare environment including nursing and allied health.

The term EBP has come to represent a range of “practices, techniques, attitudes and innovations in biomedical science and clinical practice – outcome measurement, the development of algorithms to guide patient care, clinical trial requirements for licensing new drugs, the notion of continuing medical education or ‘lifelong learning,’ software development for diagnostic decision making, electronic journals, Medline and the World Wide Web” (Lambert 2006). In the UK, the culture of EBP was introduced to the general population with creation of the National Institute of Health and Clinical Excellence (NICE) in 1999. One of NICE’s key roles has been to issue clinical guidelines that healthcare professionals in the NHS are required to take into account when making clinical decisions (NHS 2010).

The adoption of EBP by healthcare services has not been straightforward. EBP continues to evolve in response to criticism leveled at it and Buetow (2009) identified three phases of development for EBP. The first version emphasized the application of the best available research evidence to make clinical decisions and in doing so de-emphasized clinical experience (Evidence Based Working Group 1992). Version two in the mid-1990s evolved to acknowledge that research evidence needs to be complemented by patient preference and clinical experience (Sackett et al. 1996). Version three moves further to promote the use of clinical expertise in combining clinical state and circumstances, patient preferences and actions with research evidence (Haynes et al. 2002).

Figure 2 is taken from Satterfield et al.’s (2009) work that has developed a multidisciplinary model of EBP from Sackett et al.’s (1996) well-known three overlapping circle model showing the relationship between clinical expertise, patient preference and research evidence. It is worth noting that, even though in the early stages of EBP evolution, Sackett et al. stated that clinical expertise or patient preference could over-ride research-based evidence in some circumstances. They emphasised that EBM was not supposed to be “cook book medicine” (Sackett et al. 1996).

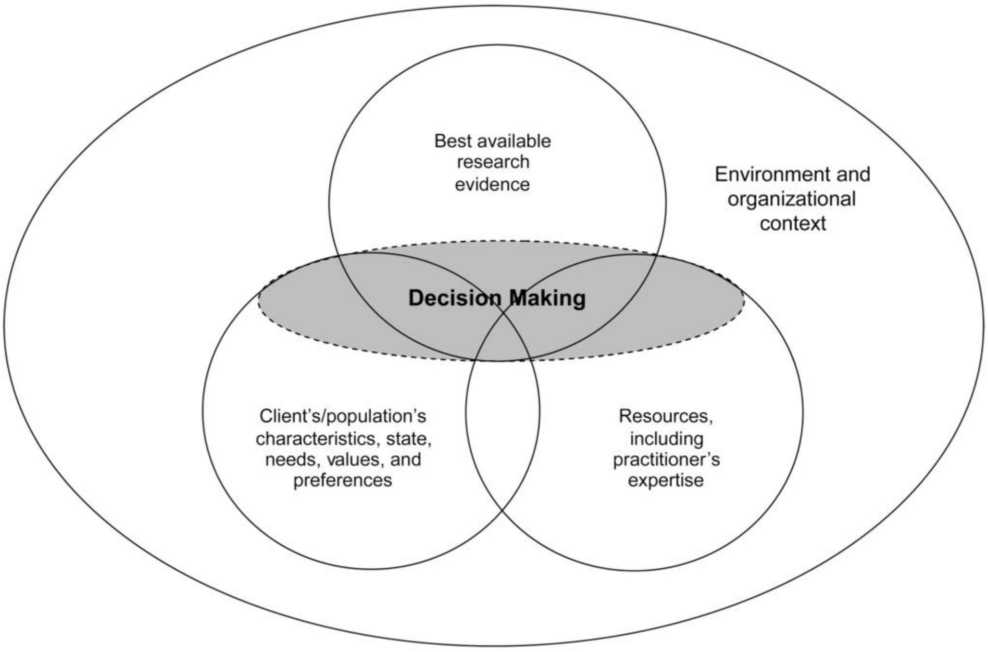


Figure 2. Satterfield et al.’s revised EBP Model (2009) (with permission)

The Satterfield et al. (1996) revised model has been adapted to respond to on-going criticism of the EBM model. The authors list the chief criticisms as a narrow definition of evidence, an unclear definition and understanding of the role of expertise, contextual and organisational factors are ignored and not enough attention paid to patient preferences. Alternative, if similar, EBP models have been developed, including Di Censo et al.’s (2005) which includes a fourth circle for Healthcare Resources.

Although the evolution of this model has been welcomed, issues regarding its application to the real world remain. Spring (2008) states that “Health decision making is both the lynchpin and the least developed aspect of evidence-based practice.” She comments that little consideration or guidance is given on how the three circles of EBP should be combined. Bucknall and Rycroft Malone (2010, p10) observe that whilst it is understood that EBP combines a number of sources of information, how the different components are judged and weighted is unknown.

Understanding more about the sources of information used and the mechanisms of clinical decision making for placing IUCs in acute medical care is one of the key goals of this study.

2.3.3 EBP Challenges

EBP challenges can broadly be divided into two key areas. Firstly, criticism of the philosophy and processes of EBP. Secondly, the failure of the EBP approach to change real-world practice. This review will focus on the second point, but it is worth briefly considering the much discussed objections to EBP as an approach in order to appreciate its potential limitations. Key criticisms of the EBP approach have been identified (Lambert 2006) and are summarised below:

- There is an on-going debate over what counts as evidence. Numerous hierarchies of evidence have been developed (Evans 2003) and although EBP has traditionally been heavily dominated by quantitative evidence, there has been some movement to include qualitative evidence as demonstrated by the development of the Cochrane Qualitative Research Methods Group.
- There is bias in EBP towards simple interventions to the detriment of complex interventions that are more difficult to test and provide evidence for.
- EBP de-emphasises clinical judgment.
- Clinical guidelines are formulaic and limit patient choice.
- Patients views are neglected. This point has received considerable attention in the last decade in the form of the development of the shared decision making approach. However, it is an area of research that has been neglected in the use of IUCs. In the NHS Constitution, the Department of Health, UK stated ‘NHS services must reflect the needs and preferences of patients, their families and their carers. Patients, with their families and carers, where appropriate, will be involved in and consulted on all decisions about their care and treatment’ (Department of Health 2012). The lack of evidence on patient preferences means that this aspect is not reflected in the guidelines.

The second key challenge facing EBP, the problem of implementing research evidence, has received a substantial amount of interest. Bales and Boren (2000) estimated that only 14% of new medical discoveries have made it into practice after 17 years. Furthermore, even when research findings make their way in to practice in the form of clinical guidelines, these guidelines are frequently not implemented. McGlynn et al. (2003) interviewed and reviewed the medical records of 6712 adults in the USA to assess whether they had received the recommended levels of care across 439 indicators for 30 conditions or preventative measures. Overall, participants were found to be receiving 54.9 percent of recommended care. The variation between standards of care received for different conditions was substantial. Receiving the highest levels of recommended care, at

78.7%, were patients with senile cataract, with the lowest levels for patients with alcohol dependence, at only 10%.

The phenomenal success of the EBP message in the last fifteen years is perhaps in itself one of the problems with implementation due to the scale of evidence now being produced. In excess of 10,000 new RCTs appear on MEDLINE every year (Chassin 1998) and as such it is easy to understand how clinicians cannot keep up with the latest evidence. Grosneth (2004) raises a further issue, that of the quality of evidence being produced, stating “Under these circumstances, one should not be surprised that clinicians accustomed to practicing in an environment where the majority of published studies are flawed and contradictory, might be slow to adopt recommendations based on the occasional high-quality study. The evidence-practice gap exists in large part because vast quantities of poor-quality studies make it difficult for physicians to find and believe a definitive study.” As the literature review of the available evidence supporting the development of IUC guidelines established, this is an important area for consideration in the lack of uptake of IUC guidelines.

Clinical guidelines attempting to implement research evidence are numerous and often complex and lengthy. Non-compliance with guidelines has been a problem since the adoption of EBP, with a search of the former NHS library resulting in 17 guidelines about how to develop guidelines (Carthey et al. 2011). Carthey et al. (2011) described the journey of a patient admitted to an NHS hospital with a fractured neck of femur and estimated that there were 75 clinical guidelines and trust policies covering the stages of care from admission to the emergency department through to discharge.

The success or otherwise of the introduction of clinical guidelines varies greatly with the characteristics of the evidence being introduced and the behavior that is being changed. Grol and Grimshaw (2003) gave the example of the publication of evidence that found that conservative treatment was as successful as myringotomy for children with acute otitis media. The simple publication of this evidence was enough to make clinicians change their practice, probably due to their doubts regarding the efficacy of what had previously been standard care.

One well explored example of an area where clinical guidelines have not been consistently adopted is in the use of antibiotics (Schouten et al. 2006). Despite numerous attempts to address the issue, antibiotics are still regularly over-prescribed (Butler 2012). A recent study explored the variation between European countries in antibiotic prescribing levels for treating lower respiratory tract infection (Brookes-Howell et al. 2012). They undertook semi-structured interviews with 80 primary care clinicians across 9 countries and found that clinicians' accounts gave both internal factors (such as commitment to shared decision making and professional ethos) and external factors (such as patient expectation and lack of consistent guidelines) as explanations for prescribing differences.

Several studies looking at what kinds of information clinicians use to inform decisions (Thompson et al. 2002, Marshall et al. 2010) have demonstrated that human sources are much preferred to written sources. Gabbay and Le May (2004) explored how clinicians in primary care arrive at individual and collective healthcare decisions. They concluded that explicit research evidence was rarely accessed, instead 'mindlines' created through interactions with each other, patients, opinion leaders and pharmaceutical representatives were used.

In a review of alternative approaches to evidence for EBP, Marks (2002) states that,

> *On the face of it, the judicious use of current best evidence in the making of decisions is an ideal, model procedure. Who could wish to behave otherwise? The trouble is that the majority of decisions are not based on the current best evidence, but on out-dated evidence, opinions preferences and routines. For want of a better name , this non-EBP traditional approach may be termed "Opinion Based Practice" (OBP).*

Marks suggests that proponents of EBP have ignored psychological and sociological theory on decision making and behaviour change and in doing so have failed to understand clinical realities. This subject is explored in more detail in the following section on clinical decision making theories and research.

2.3.4 QI and the Implementation of EBP

The implementation of EBP has received a growing amount of attention with the acceptance that healthcare evidence is of no benefit if clinicians do not use it (Oborn et al. 2010). A brief overview of implementation literature is provided, focusing on the barriers to implementation.

Approaches to implementing EBP have evolved throughout the last two decades. When, in the late 1990s, policy makers first realised that EBP was not easy to implement, the first response was to "say it more and say it louder" (Poses 2012). Shojania and Grimshaw 2005 identified four over-lapping phases in the development of implementation methods: Passive diffusion (publishing with the hope that clinicians would read and respond to new evidence as it was published), guidelines and systematic reviews (synthesising primary evidence and the provision of recommendations), quality improvement initiatives (for example "Plan, do, study, act") and, most recently, systems re-engineering (more radical, organisation based overhauls of the system). All of the above methods have been used in QI attempts to change IUC decision making behaviour.

- **Implementation Theories and Frameworks**

In healthcare, implementation science, (otherwise known as Knowledge Translation, Quality Improvement, Translation Science and other names) has been developed using building blocks from many other disciplines and research traditions. Greenhalgh et al. (2004) identified 11 research traditions, including diffusion of innovation, marketing and economics and medical sociology, that inform implementation science in healthcare. They come from different disciplines and are applicable at different levels, individual, group and organisation (Bucknall and Rycroft Malone 2010, p7).

Different disciplines present different perspectives on why guidelines might not be followed. Grol and Grimshaw (2003) explore examples of how these different perspectives might approach difficulties in integrating handwashing guidelines into practice. This example has been adapted for difficulties in uptake of UC guidelines. The Adult-learning perspective might hypothesize that clinicians need to experience the negative potential of using IUCs for themselves before changing their behaviour. Cognitive theories might propose that clinicians' poor knowledge of the impact of the risks of IUC use might lead to poor uptake. Social influence theories might consider that social norms within wards and from clinical and managerial leadership promote the routine use of IUCs. Finally, behavioural theories might promote external factors that can be modified by feedback and external reinforcement as key.

It has been frequently observed (Mitchie et al. 2008, Grimshaw et al. 2004) that theory is rarely explicitly used in individual healthcare change implementation programmes. Eccles et al. 2005 suggest that implementation attempts without the use of theory is an "expensive version of trial and error." One of the reasons that theory has not been regularly used is the sheer range of theories available that are relevant to implementation. Critiques of theory use have suggested that choosing a theory would be an arbitrary process due to the limited evidence supporting individual theories (Bhattacharyya et al. 2006).

Furthermore, there are an increasing number of models and frameworks to guide EBP implementation, for example Precede-Proceed (Green and Kreuter 1991), PARIHS

(Kitson et al. 1998) and PRISM (Feldstein and Glasgow 2008). None of the studies aimed at reducing the use of urinary catheters discussed in the previous section stated that a model or framework or theory had been used in the design of their intervention. Most theories and frameworks describe to varying levels of detail the need to understand the context of the implementation and potential barriers to care. Again, despite the on-going resistance to changing practice in this area, none of the IUC use studies reported on any work undertaken to identify barriers to change. This is a common occurrence. In a systematic review of the effectiveness of allied health clinical guidelines, Hakkennes and Dodd (2008) found that only one of the fourteen eligible studies reported identifying barriers to change.

- **Individual Implementation Interventions**

Behaviour change is not straight forward. Poses (1999) elaborated on the apparent resistance to behaviour change demonstrated by physicians and commented that many well-intentioned interventions have failed to achieve their goals. He highlighted that improving knowledge of probabilities does not necessarily improve behaviour. For example in the 1980s, it was demonstrated that antibiotics were overused for treating pharyngitis. It was also demonstrated that physicians were overestimating the probability of streptococcal pharyngitis and this was strongly correlated with their decision to prescribe antibiotics. It was believed that by improving the physicians' judgements as to when a patient had streptococcal pharyngitis the use of antibiotics would correspondingly decrease. This was not the case. An intervention was successfully introduced to improve diagnosis, but the use of antibiotics did not fall. This finding suggests that more complex mechanisms than probability and decision analysis are taking place.

The evidence on the efficacy of individual interventions, for example education strategies, computer reminders and audit feedback, is growing, but evidence on patient-mediated, organisational and resource interventions remain sparse (Grol and Grimshaw 2003). Implementation science literature regularly notes that attempts to implement EBP are often based on anecdotal or common-sense strategies in contrast to the aims of EBP itself (Shojania and Grimshaw 2005, Marks 2002).

Evaluations of intervention strategies are however increasing in number. The first substantial review of interventions (Oxman et al. 1995) concluded that there was “no magic bullet” to improving practice, but that many interventions provided modest benefits. These findings have been repeated since (Grimshaw et al. 2004). The mechanisms by which these interventions work are poorly understood, but it has been concluded that multifaceted approaches are generally more effective (Grimshaw et al. 2001).

Another area of implementation that is beginning to receive more acknowledgement is the disconnect between healthcare researchers and healthcare providers. Lomas (2007) suggests that there is not only often a lack of understanding between the two groups, but also a lack of respect. He states that researchers fail to see clinical decisions as part of a complex process and instead view them as discrete events. He suggests that all research projects should include a healthcare service decision maker as a co-investigator in order to promote knowledge exchange.

Furthermore, it appears that the social, cultural and organisational context of how clinical decisions are made has been neglected. Lambert (2006) notes that “informal sociological and cultural context information that many clinicians hold about their individual patients when practicing EBM in clinical settings is not available.” This is true for the area of IUC decision making.

- **Barriers to Implementation**

Firstly, it is important to note that this study is not focused on identifying the barriers to the implementation of the IUC clinical guidelines. Instead, it is focused on understanding why clinicians make the decision that they do. Checkland et al. (2007) highlight that using the term “barriers to change” reveals the normative assumptions that are central to EBP, commenting there is the belief that, “change is by definition good, and barriers can and should be removed.” In a qualitative study of psychiatric nurses’ attitudes towards EBP, Crawford et al. (2002) found that barriers, “are not just barriers, but represent a meticulously constructed and intelligently flexible set of strategies for limiting the impact of evidence based practice upon practice.” Checkland et al. (2007), who undertook a qualitative study to explore the adoption of national initiatives in general practitioner (GP) practices in the UK, supported this argument and concluded that, “attempts to procure change via the linear model of implementation implies by the metaphor ‘barriers’ to change will fail and that questions of participants’ identity need to be considered.”

It is hoped that studying the “barriers” that clinicians provide to rationalise their practice when it is not in line with guidelines or hospital policy will help to understand the ways in which they individually and collectively legitimise their actions. It is therefore beneficial to review work on barriers to change from implementation science, in addition to the work of Harrod et al. (2013) and Krein (2013) that was outlined in the previous section.

Most theories used to implement evidence based guidelines acknowledge the importance of understanding barriers to success (Flottorp and Oxman 2003). One of the most influential studies of barriers is Cabana et al.’s (1999), “Why don’t physicians follow clinical practice guidelines? A framework for improvement,” which sysnthesised data from 76 studies that described at least one barrier to adherence to clinical guidelines. The studies included 5 qualitative interviews with clinicians and 120 surveys asking questions on potential barriers. They identified barriers that could be put in the following groups: lack of awareness, lack of agreement, lack of self-efficacy, lack of outcome expectancy, inertia of previous practice and external barriers. The qualitative studies highlighted external barriers, in particular patient characteristics and time constraints. The authors devised a framework for classifying barriers.

Van Bodegom-Vos et al. (2012) undertook a qualitative study to understand barriers to the use of rheumatoid arthritis guidelines. They noted that interventions aimed at changing healthcare providers behaviour where guidelines have previously been issued and not followed have been implemented without clear information about why clinicians did not follow them. They undertook 4 focus groups with general and specialist physical therapists to identify barriers to guideline use using Cabana et al.’s (1999) conceptual framework to inform both data collection and analysis. They found that the barriers to guideline use broadly followed those already described in the literature, including lack of agreement with the guidelines, lack of motivation, lack of self-efficacy, patient factors, environmental factors and lack of knowledge of the guidelines.

Schouten et al. (2006) undertook semi-structured interviews with clinicians with the aim of better understanding the barriers to optimal antibiotic use in acute care. The authors used Cabana et al.’s framework to assist in describing the full range of barriers. They identified barriers in all elements of Cabana et al.’s framework.

Michie et al.’s (2005) noted that EBP guidelines are often not implemented effectively and described the development of a theoretical framework using psychological theory to guide implementation work. They noted that attempts to explain behaviour change have resulted in the proposal of a multitude of theories, each with many constructs and with no rationale basis for choosing between them. A group of healthcare experts were enlisted to develop a framework and they identified 128 constructs in 12 domains to explain behaviour change and potential barriers.

Oxman and Flottorp (2003) undertook a study to identify the barriers for implementing guidelines on treating two conditions; urinary tract infections and sore throats. They found the key barriers were complexity of changing routines, concerns over loss of income with changes in practice, fear of failing to treat a serious condition, patient expectations and clinicians concerns about the guideline evidence base. Oxman and Flottorp (2003) concluded that the use of “qualitative methods helped identify barriers and generate ideas for tailoring interventions to support the implementation of guidelines for the management of urinary tract infections and sore throat”.

The work of Cabana et al. (1999), Mitchie et al. (2005) and Oxman and Flottorp (2003) has been adapted to provide a succinct summary of frequently identified barriers to the decision to follow clinical guidelines, shown in Table 4. For clarity, the factors have been grouped as internal or external to the clinician.

	Factor	Potential Barrier
External	Organisational Constraints	- Time constraints - Fear of complaint - Lack of resources - Conflicting organisational goals
	Patient Factors	- Patient preferences - Carer preferences - Applicability to patient - Subjective judgement of patient
	Guidelines	- Contradictory guidelines - Accessibility - Disagree with interpretation of evidence - Too rigid
	Social/Professional influences	- Usual routines - Clinical training - Opinion leaders - Local leadership - Team norms
Internal	Knowledge	- Clinical uncertainty - Information overload - Lack of agreement with guidelines - Conflicting patient related goals - Condition specific heuristics
	Beliefs	- Self-efficacy - Perceived control - Self-confidence - Outcome expectancies - Rejection of “cook book” approach to healthcare - Interpretation of probabilities
	Attitude/goals	- Goal priorities - Compulsion to act - Intrinsic motivation
	Emotion	- Stress - Cognitive overload - Anticipated regret
	Skills	- Competence to undertake alternative - Interpersonal skills

Table 4. Potential EBP barriers adapted from Grol and Grimshaw (2003), Mitchie et al. (2005) and Cabana et al. (1999)

These barriers act as sensitising concepts for the analysis and interpretation of the data from the study described in this thesis. For example, was there clinical uncertainty regarding the content of guidelines? Were there competing clinical goals? Did clinicians have knowledge of alternatives to IUCs?

2.3.5 Section Summary

As Spring (2008) states, “To pave the road towards evidence based decision making, we need to learn more about the complex decisions that are the staples of clinical care.” In order to understand why IUC guidelines have not been optimally implemented, the decisions clinicians make in the real world need to be fully described and analysed. Using existing literature on QI and the evidence-practice gap, it can be postulated that these decisions will vary depending on the reason the IUC is being placed, who is making the decision, the patient’s views, the clinical environment and organisational and other contexts. For example, patient views on the use of an IUC for managing urinary incontinence are likely to be stronger than patient views on the use of an IUC to monitor hourly urine output.

The goal of this study is to understand why clinicians behave as they do now, what goals current practice achieve and what can be learnt from their expertise that might assist in the development of more acceptable guidelines and establish gaps in the existing evidence base. Current EBP/QI literature assists with achieving that goal.

2.4 Clinical Decision Making Theories and Research

2.4.1 Introduction

It has been established that clinical decision making plays a crucial role in understanding the evidence-practice gap and implementing QI initiatives. The clinical decision to place an IUC is the focus of this study. However, there is little literature addressing this decision directly, with only one study found. Cowey et al. (2012) undertook a qualitative study to determine what the influences the decision to place an IUC with stroke patients. They found that practice varied widely with complex, unwritten rules in use and that the decision to catheterise belonged to either nurses or physicians depending on the reason. The results from their study will be compared to the new findings in the Discussion Chapter.

As there is lack of studies in this area, it is beneficial to review the literature on different approaches to studying clinical decision making (including sensemaking) and review how studies in other clinical areas have examined decision making. This review focuses on the literature on the clinical decision making of individuals, with the understanding that this is interwoven with communities and organisations in which they make those decisions, whether that is a professional group, clinical environment, hospital trust or other.

The study of clinical decision making has grown alongside the development of decision theory in other disciplines with the increasing awareness that clinical decisions too frequently result in sub-optimal outcomes and the potential negative impact that can have on patients (Patel et al. 2002).

Mintzberg (1973) defines decision making as a “commitment to action”. The landscape of decision making theory and research is vast and its development has encompassed multiple disciplines, including economics, psychology, medicine, marketing, computer sciences and organisational science. Decision theory can be loosely divided between normative (explain how decisions should be made), prescriptive (how to achieve normative decisions) and descriptive (how decisions are actually made). It is not possible within the scope of this document to give a full account of the literature. Instead a brief overview of the current schools of thought and applications of decision making theory will be presented, with a more in-depth exploration of how clinical decision making can be studied in a real-world environment.

2.4.2 Classic Decision Making Theory

The Classic Decision Making (CDM) is a normative approach that assumes people make rational decisions based on statistical probabilities. It assumes that “decision makers are objective, have complete information and consider all possible alternatives and their consequences before selecting the optimal solution” (Huczynski and Buchanan 2001, p630). The roots of CDM can be traced to Francis Bacon’s work on inductive reasoning, Descartes use of the scientific method, Bernoulli’s proposed expected utility model and Baye’s statistical rules. By the second half of the twentieth century, strong arguments were being made that, even with all the necessary information available, this is not the way people make decisions.

2.4.3 Judgment and Decision Making

The early 1950s saw the beginnings of Social Judgement Theory (SJT). Brunswik developed his lens model (1952), an approach where a variety of differently weighted information cues are linked to a judgement and regression equations can be used to compare judgements. It can be used to explore how different people reach different decisions using the same information. In 1956, Herbert Simon described the theory of bounded rationality, a theory he referred to as “satisficing”, combining “satisfy” and “suffice”. In contrast to CDM, he proposed that people do not seek to maximise utility through their decisions. Indeed, they could not do so as they cannot assimilate the required level of information in order to ensure gaining the optimal outcome. They have bounded cognitive abilities. Instead, they aim for something which is "good enough."

Judgement and decision making (JDM) theory continued to develop. In their seminal work "Judgement Under Uncertainty: Heuristics and Biases" (1974) Kahneman and Tversky proposed that human judgement derives from qualitatively different processes than described by normative theories. They stated that people use heuristics as simplifying mechanisms in their cognitive processes, heuristics are far from meeting high scientific ideals for data gathering on objective frequency of variables and all heuristics will fail under some conditions.

They identified many heuristics, notably availability and representativeness, which they argued could result in bias and error (hence this area of work is commonly referred to as heuristics and biases – H & B) . The availability heuristic describes the mechanism by which people tend to over or under estimate frequency based on the ease or difficulty of recalling an event. For example, when a potential influenza outbreak is the subject of media interest, clinicians might overestimate the likelihood of a patient having 'flu. The representativeness heuristic describes the tendency to judge the probability of an event based on it similarity to a population. In many cases this might be an accurate judgement. As Kahneman (2011, p151) states, "On most occasions, people who act friendly are in fact friendly." However, he counters that inaccuracies can occur with the "excessive willingness to predict the occurrence of unlikely (low-base rate) events."

Gigerenzer (1996) takes a more positive view towards heuristics. He postulates that the judicious use of heuristics is a "fast and frugal" method of achieving good decisions. Gigerenzer et al. (1991) reconsidered SJT to propose that people have a repertoire of domain-specific heurestics "way the human mind can take advantage of the structure of information in the environment to arrive at reasonable decisions." He proposes that heuristics are what we use so that we are not paralysed by inaction when an optimum decision is out of reach.

2.4.4 Dual Process Theory

Since Kahneman and Tversky's (1974) initial work, there has been significant progress in the area of cognitive psychology that proposes that there are two key systems at work in the mind. Several similar theories were developed at similar times in linked disciplines

(Evans and Frankish 2009), all proposing that there is a quick, automatic, effortless part of the mind, generally called system 1, that contributes impressions, feelings and associations to the process of thought. For example, identifying stereotypes, estimating distance, assessing first impressions, uncomplicated driving for an experienced driver, following a well-known dance routine and making the decision to place an IUC following a frequently used, simple algorithm are likely to be system 1 processes. System 2 undertakes the effortful computations and is capable of constructing ordered, purposeful thoughts within a limited capacity. For example, driving in difficult conditions, writing an essay, undertaking long division, learning a new dance routine and deciding whether the benefits of an IUC would outweigh the risks for a patient in an unfamiliar context are likely to use system 2 processes.

This adds another dimension to decision making that is key for clinicians; intuition. Herbert Simon (1956) provided a concise definition of intuition that separates it from any mystical connotations. He stated, “The situation has provided a cue; this has given the expert access to information stored in the memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition.”

In a simplified explanation of the dual mind process, Kahneman (2011) commented that system 2 (analytical) can overrule system 1 (intuitive) and have the final say in decisions. However, using system 2 is effortful and there has to be a reason to evoke its use and, more recently, it has been realised that even when system 2 overrules system 1, it is still strongly influenced by the intuitive processes and assumptions of system 1. The link between the two systems that prompts the use of system 2 when system 1 conclusions need to be questioned is known as metacognition.

2.4.5 Prescriptive theories

What all of these theories have in common is that they offer potential solutions to less than optimal decision making. Kahneman (2011) suggests “debiasing” techniques, learning to recognise system 1 cognitive minefields and actively employing system 2 thinking, Gigerenzer and Todd (1999) recommend simple “fast and frugal” algorithms. Proponents of Brunswickian principles have proposed that people use outcome feedback to test a priori hypotheses (Brehmer & Joyce 1988).

These “prescriptions” are aimed at shifting decisions towards the normative ideals. What appears to be neglected in much of this research is an understanding of how people make decisions in the real world. Baron (2004, p3) observed that “Good descriptive models help to create good prescriptive models. We need to know the nature of the problem before we try to correct it." Good descriptive models might also challenge the normative models. In the case of IUC use, good description of why clinicians make the decision that an IUC is appropriate might challenge the assumptions that guidelines are built on.

Many studies have explored the use of heuristics and biases in healthcare, with a substantial body of literature on this subject dominating medical decision making literature. The large majority of these studies are not based in real world environments, but instead present scenarios or questions to clinicians who are asked to make decisions or judgements based on the information provided. In these circumstances, optimal decisions can be identified and errors, where sub-optimal decisions are made, can be found.

2.4.6 Descriptive Decision making

In contrast to above, the following section considers theories that help to understand how decision making actually happens, focusing on Naturalistic Decision Making and Sensemaking.

2.4.7 Naturalistic Decision Making

Naturalistic Decision Making (NDM) explores how decisions are made in a real world context. Tversky and Kahneman's heuristics and biases (H&B) approach that has played a substantial role in the study of decision making since 1970s is largely a hypothesis testing, laboratory based theory and not assessed in the natural environment. The laboratory-based approach aims to approximate real world conditions, but cannot easily replicate the impact of emotion, stress, organisational restraints and many of the other factors considered in section 2.3.4. NDM claims that H & B research has demonstrated that people do not make optimum decisions, they rely on heuristic rather than algorithmic strategies, they rarely generate alternatives, they do not calculate probability and utility estimates or create decision trees (Klein 2008). Instead, people use prior experiences to rapidly categorise situations and synthesize schema to make decisions.

NDM research resulted from frustrations with the lack of relevance of CDM in real world environments and usually takes place in participants' own environment. It focuses on collecting data on cognitive functions such as sensemaking, situational awareness and planning (Maarten Schraggen et al. 2008). NDM research is carried out in the field in order to develop descriptive accounts. One of the key attributes of NDM is that decision making is not seen in isolation, but in the context of situation awareness, problem solving, expertise development and planning (Salas and Klein 2001). NDM has been defined as the study of “experienced people, working as individuals or groups in dynamic, uncertain and often fast-paced environments, who identify and assess their situations, make decisions and take actions whose consequences are meaningful to them and to the larger organisation in which they operate. The key contextual factors are: ill-structured problems, uncertain, dynamic environments, shifting, ill-defined goals, feedback loops, time stress, high stakes, multiple players and organisational goals” (Zsambok et al. 1997, p5).

This can describe the decision to place an IUC in some circumstances. Decisions are often made quickly, there might be a high degree of factual uncertainty and frequently there will be conflicting goals. The degree of time pressure is variable, as is the speed of situational change, both with individual patients and within the wider environment.

NDM is a fairly young body of thought, with its origins at a conference in 1989 where researchers sought to combine diverse work that had recently emerged that had found that people do not carry out utility analysis or anything like it when making a decision. The researchers were working in environments where there were no normative models available, for example fire-fighters attending a major fire. Klein et al. (1986) discovered that in these domains, people do not develop a list of options to evaluate, rather they use their experience to recognise patterns and identify a typical action. They mentally simulate the consequences of carrying out the action and will proceed if there are no negative consequences predicted.

One of the key observations of NDM is that decision making in real world environment rarely involves weighing up alternative options, rather the serial assessment of one single option is undertaken. Klein’s (1986) seminal work with firefighters and military commanders led to the development of the Recognition Primed Decision (RPD) Model. This model serves as the prototypical NDM model (Lipshitz et al. 2001). It is descriptive, but also provides a framework to identify the characteristics of decision making for individuals and groups, for example experts versus novices.

Klein proposed that proficient decision makers make sense of a situation by effortlessly matching it to one of the prototypical situations they have previously experienced. If no pattern is found, the expert searches for further information. A decision is made and mental simulation used to check the potential outcomes of the decision. Therefore RPD is a blend of intuition and analysis. Mental simulation might be used to create a story to understand the current situation and test a course of action. The course of action must satisfice. Experts decisions are assumed to be better not because their processing moves towards the normative, but because their heuristics are more refined.

When interviewing experts on their beliefs about their decision making, Klein and others have found that the experts often believed that they did not make decisions, they just acted. This belief was based on the fact that they only considered one option so were not making a choice between 2 or more options. However, Klein concluded that they were making the decision to act and 80-90% of difficult decisions made in dynamic, high pressure environments were made in this way. This might be an important observation for the use of IUCs where many of the decisions made can be habitual and the level of time and situation stress vary. This is discussed in the Results Chapter.

Bond and Cooper (2006) carried out a search for literature on the use of RPD in emergency clinical decision making and found 12 papers and concluded that the model provides a good theoretical description of decision making in this environment. However, they note that, “Once the initial urgency of a clinical emergency has passed, alternative strategies of the decision making become apparent. Hypothetico-deductive approaches and guideline led decisions are more likely as time progresses and the urgency of the situation reduces.”

There is a body of research on clinical decision making using the RPD and other NDM models aimed at understanding how individual clinicians within specific professional groups make decisions in their work. An example of RPD being used in this way is provided by Flin, Youngson and Yule (2007) in their study of how surgeons make intraoperative decisions. The aim of their study was to better understand how decisions are made in order to be able to train surgeons to be better prepared for practice. They used the RPD model as a basis for their analysis and found a combination of intuitive, analytical and rule based decision processes were in use. A further example is provided by Denig et al. (2002) who studied the cognitive processes of GPs making prescribing decisions and found that 40% of decisions could be described as ‘habitual’ and although not all the available information was considered, over 90% of GPs made “first choice” decisions (decisions independently ranked as the optimum option).

In contrast to the above studies, this study aims to examine how a particular clinical decision is made rather than looking at the broader decision making attributes of a group.

However, variation in how different professional groups approach the decision is a key area of focus. Additionally, variations in the decision making between clinicians with different levels of experience is explored.

Although there has been some NDM research within healthcare, the bulk is found in emergency and surgical care. As Gore et al. (2006) observe, “Medical research has otherwise been slow to acknowledge both the conceptual and the practical benefits of the NDM approach to understanding and supporting clinical decision making. This may be attributable to an understandable preoccupation with ‘optimal treatment decisions’ involving error minimization or elimination, and a cultural imperative to practice medical science with objectivity and rationality.”

NDM is not without critics. In particular, there has been a debate between H&B and NDM communities. Many of those working in the field of decision research have proposed that H & B and NDM should be seen as mutually beneficial, some arguing for a broadening of decision science to encompass the spectrum of approaches (Patel et al. 2002, Kerstholt and Ayton 2001). Indeed Kahneman and Klein (2009) two of the chief proponents of H & B and NDM respectively published an article entitled “Conditions for intuitive expertise – a failure to disagree” that highlighted the similarities rather than differences in their fields. The debate between the communities is extensive and a full discussion is beyond the scope of this work, but two criticisms key to this study are highlighted below.

- Criticism 1 Approach to subject matter experts

On the face of it, NDM and H&B seem to have little to agree on in this area. NDM researchers compare the performance of experts with that of the most successful practicing in the field. H & B researchers compare the judgements of professionals with formal models or algorithms. NDM do not see experts as infallible, but respect their skills and experience. H & B research tends to focus on experts’ flaws and ways of fixing them. NDM sees the strengths in heuristics and does not assume that bias is an inevitable feature of decision making. However, H&B researchers are predisposed to recommend the replacement of informal judgement with algorithms. NDM researchers are sceptical of attempts to impose universal structure and rules on judgements made in complex situations.

However, further investigation reveals that these difference tend to be emotional rather than intellectual. Both approaches agree that experts can develop useful intuition skills in the right circumstances. Both Klein and Kahneman (2009) endorse Simon's (1957) definition for skilled intuition. They conclude that for useful recognition skills to be developed, two conditions must be achieved: cues must be available and valid and people must have the opportunity to learn the relevant cues. They observe that it is only possible to develop these skills in an environment with sufficient regularity and that provides feedback on decisions taken. For example, they state that expertise in long-term weather forecasting or long-term political forecasting is unlikely to lead to accurate predictions. Skilled intuitions will only develop in an environment of sufficient regularity. Long-term forecasts eg political or economic are impossible. However expertise develops well in livestock judging, test pilots and photo interpreters.

- Criticism 2 Approach to error

Within the H & B framework, errors are defined as failures to meet normative standards. Decision theorists have questioned what constitutes an error in the field of NDM (Doherty 2001). Gonzalez (2001) questions whether decisions can be improved if there is no understanding of what constitutes optimal standards and expert decisions are seen as the gold standard. This is a fundamental question in healthcare where the minimisation of error is key to patient outcomes.

The NDM response to these questions is that normative standards do not exist in many fields and departure from prescribed norms can even improve performance in some circumstances (Lipshitz et al. 2001). Furthermore, Lipshitz (1998) states, "Prescriptions which are optimal in some formal sense, but which cannot be implemented are worthless." The decision to place an IUC lacks normative standards due to the lack of reliable evidence on when the benefits of IUCs outweigh the risks. 'Errors' or inappropriate IUCs are difficult to define.

In order to improve decision making, NDM aims to assist experts in the application of their skills and to aid non-experts to become experts more efficiently. Therefore standards should be inferred not from formal theory, but by what experts actually do, for example expert consensus guidelines. However, Elstein (2001) has highlighted that significant variation in practice exists in areas where there is not general consensus and that other decision tools need to be brought into use in these situations. At the very least, NDM can contribute to understanding of what the errors are, when they occur and what are their consequences (Gore et al. 2006).

2.4.8 Sensemaking

Sensemaking has been adopted as a significant part of NDM, but has its origins in the work of Karl Weick from the 1960s onwards. Sensemaking is not a decision making theory per se, but can act as a framework to develop understanding of how decisions are made. Sensemaking comes from the work of Karl Weick (notably ‘The social psychology of organizing’ 1969, ‘Sensemaking in organisations’ 1995 and ‘Organizing and the process of sensemaking’ 2005). Very simply, sensemaking is the attempt to make sense of events.

Sensemaking and decision making are not the same thing. Eisenberg (2006) observes that decision making “prompts us to blame bad actors who make bad choices,” while sensemaking, “focuses instead on good people struggling to make sense of a complex situation.” Sensemaking is the process that leads to decisions that lead to behaviour. Sensemaking does not have a strict definition, rather it has constituent parts. Table 5 lists and describes these parts, as adapted from Weick (1995, p17).

Characteristic	**Description**
Identity Construction	Sensemaking begins but never ends with the individual, no individual is a lone sensemaker, this results in a collective identity.
Retrospection	Retrospection allows for sensemaking and will impact on what people notice.
Enactive of sensible environments	As people talk and create narratives it helps them to understand what they think and do. They are both creating and making sense of their environment.
Social context	Sensemaking is an individual and group activity, and it is difficult to separate the two.
Ongoing	Sensemaking does not have a beginning or a past tense. It is about an activity or a process rather than an outcome.
Focus in contextual cues	People take cues from the context they are facing to decide what is important and what to focus on.
Plausibility rather than accuracy	The sensemaker is seeking plausibility rather than accuracy.

Table 5. Characteristics of Sensemaking (adapted from Weick 1995)

Again, this literature was used to inform data analysis and interpretation in this study. One of the central themes of sensemaking is that it notices, brackets and labels cues. Once this has occurred, the world is simplified. This leads to plausible, if not necessarily accurate decisions. However, Weick et al. (2005, p409) note that what is plausible for one group may not be for another. Differences in IUC cultural norms between clinical areas were highlighted in the literature review and it is interesting to examine whether a plausible decision in one area is accepted in another and whether there are variations in the underlying sensemaking processes between areas. This is addressed in the Results and Discussion Chapters.

An example of sensemaking in use in a clinical environment is provided by Checkland et al.'s (2009) qualitative study on making sense of 'barriers' for practice based commissioning in four GP practices in the UK. Sensemaking was used as a framework to help understand the results. They found that although similar 'barriers' were identified by the practices (lack of time, complexity of documents), but the sensemaking behind the stated barriers was different in each practice and thus different approaches to facilitate change would be required. This work raises the potential dangers in accepting the types of barriers to practice identified in the previous section as accurate for all groups.

In contrast to the above study, Battles (2006) used sensemaking as a conceptual tool to bring together well established methods of risk assessment, such as root cause analysis and probabilistic risk assessment to create a patient safety framework. They stated that their goal of using sensemaking was to understand and eliminate threats to patient safety by establishing how clinicians made sense of the events leading to an event.

There is some overlap between NDM and sensemaking. Indeed, Klein, one of the key proponents of NDM, has drawn attention to the connections between NDM and sensemaking (Klein et al. 2006). He suggested that, "The NDM perspective offers a way of finding some interesting questions about sensemaking. Perhaps more important, it provides an empirical base that anchors the theoretical ruminations in concrete examples and findings."

2.4.9 Section Summary

The decision making theories discussed here offer different approaches for assessing different aspects of clinical decision making, together providing a broader picture. The aim of this study is to understand decision making in real world practice. Although normative and prescriptive decision making theories are of interest, particularly when trying to modify clinician behavior, initially it is descriptive theories that offer the most to this study.

NDM and sensemaking provide explanations of the work and processes of decision making that can be used to interpret the data and organise the results and “to learn more about the complex decisions that are the staples of clinical care” (Spring 2008). This study considers whether the structures provided by either NDM or sensemaking provide a useful framework to help to understand the decision to place an IUC.

Chapter 3

Systematic Review

3.1 Introduction

This chapter follows on from the literature review in the previous chapter to report on a systematic review of the evidence on the efficacy of interventions aimed at minimising the initial use of indwelling urinary catheters (IUCs) in adults in acute care. Whilst undertaking the literature review, it became clear that there was a gap in knowledge on the efficacy of attempts to change clinicians' decisions to initially place IUCs. Before progressing to a qualitative study to explore clinicians' attitudes and beliefs towards this decision, it was clear that this gap should be addressed both in order to understand the current situation and to add to the analytical framework supporting the qualitative study.

To aid the complete and transparent reporting of this systematic review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was used as a tool to guide the structure of the review (PRISMA statement 2009).

This review was published in the International Journal of Nursing Studies (Murphy et al. 2014) (Appendix A).

3.2 Rationale and objectives

The previous chapter establishes that the need to minimise overuse of IUCs is widely accepted. Despite a substantial body of literature reporting that IUCs are overused in acute care, there is a lack of evidence-based guidance for the use of interventions to minimise their inappropriate initial placement.

This chapter provides a systematic review to analyse the available literature to address the objective of analysing the effectiveness of interventions designed to minimise the initial placement of IUCs in acute care. It examines the processes employed to design the eligible studies, any theoretical background used to inform the design and the variation and relationships between interventions and implementation strategies used in order to understand the complexities caused by the interplay between the clinicians, disciplines, settings, patients, organisations and evidence. As a specific clinical question has been identified and it was anticipated that this work would be synthesizing the results from discrete, quantitatively-based primary studies, a systematic rather than realist or integrative approach to the review was taken.

The goals of this systematic review were to

- provide a narrative synthesis of the evidence currently available on the effectiveness of interventions to minimise the initial use of IUCs in adults in acute care environments
- determine the future research required to build on existing knowledge

To help reach these goals, this review used three tools to assist in evaluating the eligible studies, each be discussed in the appropriate section of the review. The three tools used were:

- The Cochrane Effective Practice and Organisation of Care Group data extraction checklist (2002)
- Cochrane Collaboration's tool for assessing risk of bias (2011)
- The Standards for Quality Improvement Reporting Excellence checklist for quality improvement reporting (SQUIRE)

It is worth noting that the interventions in the studies within this review are quality improvement interventions. Unlike other areas of healthcare research such as drug trials, quality improvement studies can be carried out on a local, small-scale basis. Despite their local nature, small-scale projects have the potential to generate understanding that can help develop knowledge that can be applied further afield (Harvey and Wensing 2003). Combining more formal research studies and local projects brings both the benefits and challenges of different experiences in diverse contexts, using varying methodologies and reporting standards which will be discussed in this chapter.

3.3 Method

3.3.1 Eligibility Criteria

Studies incorporating an intervention to reduce the initial placement of IUCs in an acute care environment with patients aged 18 and over and reporting on any change in the incidence of IUC placement were eligible to be included in the review. Due to the small number of published studies addressing this topic, all study designs have been included.

3.3.2 Information Sources

A comprehensive search strategy was used on numerous electronic databases (MEDLINE, CINAHL, National Health Service Centre for Review and Dissemination, Cochrane Library, ProQuest Dissertations and Theses Database) from inception to July

2011. Additionally, the reference lists of all studies included, conference proceedings and infection control guidelines were consulted.

3.3.3 Search

Keywords used to search the databases were combinations of “ur* catheter*” and “urinary tract infection.” A combination of Medical Subject Headings (MeSH) and text words were used to search Medline. The MeSH subject headings were “urinary catheterization/utilization” and “urinary tract infection/prevention and control.”

3.3.4 Study Selection

In order to assess eligibility, the titles of the studies found were initially scanned, with full text retrieved for any studies that potentially met the stated criteria. During the scanning process, a table of reasons for exclusion was maintained in order to summarise the results of the search. The full-text articles were reviewed to establish eligibility (see Figure 3 for a flow chart of the results). Eligible studies were put in the review and, again, the reasons for excluding studies was recorded and summarised. Table 1 provides an overview of the eligible studies.

3.3.5 Data Collection Process and Data Items

The first of the three tools utilized in this study is the Cochrane Effective Practice and Organisation of Care Group (EPOC) data extraction checklist (2002). The Cochrane Collaboration is an international, not-for-profit organisation providing information on the effects of health-care. Systematic reviews produced by the Cochrane Collaboration are used by policy makers worldwide. For example, in the 116 guidelines published by the National Institute for Health and Clinical Excellence (NICE) by February 2011 Cochrane reviews were cited 731 times (Alderson and Tan 2011).

The EPOC checklist was chosen as a well-established tool for obtaining data from multiple study designs (Centre of Reviews and Dissemination 2009) and it broadly follows the PICOS (population, intervention, comparison, outcome, study design) format appropriate to this review. One potential issue is that data extracted is subject to interpretation by the reviewer and what is reported in the studies may not be what took place and data might be missing (AHRQEHC Program 2011). Ideally, to check the validity of the process and outcomes, the data should be extracted by at least two experienced researchers and validated by the authors of the papers, however, that was not possible within the limitations of this study.

The form assisted in the complete and consistent extraction of data in order to summarise data in a common format. This in turn helps with the synthesis and comparison of the studies. Where information is not available or not clear, this is reported on the form. The results are shown in Appendix A.

3.4 Quality Appraisal Methods

The concept of quality in research is complex. Numerous attempts have been made to establish a definition of quality and standard methods for assessing studies. The CRD (2009) state that when assessing studies for a systematic review, the truth of the findings and the relevance to the question being asked are paramount, with the following criteria likely to be of importance:

- Appropriateness of study design
- Risk of bias
- Other issues
    - Choice of outcome measure
    - Statistical issues
    - Quality of reporting
    - Quality of intervention
    - Generalisibility

All of the above criteria are addressed in this review. The second and third tools used in this review assist with this assessment. The risk of bias was assessed using the Cochrane Collaboration’s tool for assessing risk of bias (Higgins and Green 2008, updated 2011). Developed since 2005 by a Cochrane Collaboration working group, the tool provides a domain based guide to assessing different categories of bias. The Cochrane Handbook chapter on assessing bias (Higgins and Green 2008), describe bias as a systematic error or deviation from the truth that results in the overestimation or underestimation of the true effect of an intervention. The key types of bias identified in the Cochrane Handbook are as follows:

- Selection bias – where systematic differences occur between groups within the study
- Performance bias (known as intervention bias in the EPHPP tool) – where systematic variation occurs between the groups other than the intervention
- Attrition bias – variation in the drop-out rates between groups
- Detection bias – variation between the groups in how outcomes are measured

- Reporting bias - variation between groups in how outcomes are reported

This tool is not designed to assess uncontrolled before and after studies and therefore some questions raised by the tool regarding randomisation are not applicable to all studies included in this review and where its use is not applicable, this is stated. The results are shown in Appendix A.

The final tool used in this review was the SQUIRE guideline designed specifically to identify the strengths and weaknesses in the reporting quality of quality improvement studies. The guideline consists of 19 checklist items, with several sections in each items giving a total of 49 questions that address how different areas of the studies have been reported. Each question has been answered “Yes” where the question is fully answered, “No” where the question has not been addressed and “Part” where there is some, but not full information provided. The results are shown in Appendix A.

The guideline provides a framework for both QIPs and research studies, and allows for a variety of study designs. It was anticipated that reporting for QIPs would focus more on local needs and research studies on the limitations and generalisability of the outcomes. These potential variations were explored.

3.5 Summary methods and synthesis of results

As the eligible studies were both clinically diverse and methodologically weak, a narrative synthesis was undertaken. A narrative synthesis relies on words rather than figures to synthesise and explore the findings of a systematic review. The CRD (2009) provides a framework for the narrative synthesis process. In line with that framework, this review will include a range of textual, tabular and case descriptions to synthesise and explore relationships between the studies, where applicable propose theory for what works, where and for whom and it will assess the robustness of the synthesis.

3.6 Results

3.6.1 Study Selection

A flow chart of studies found is given in Figure 3.

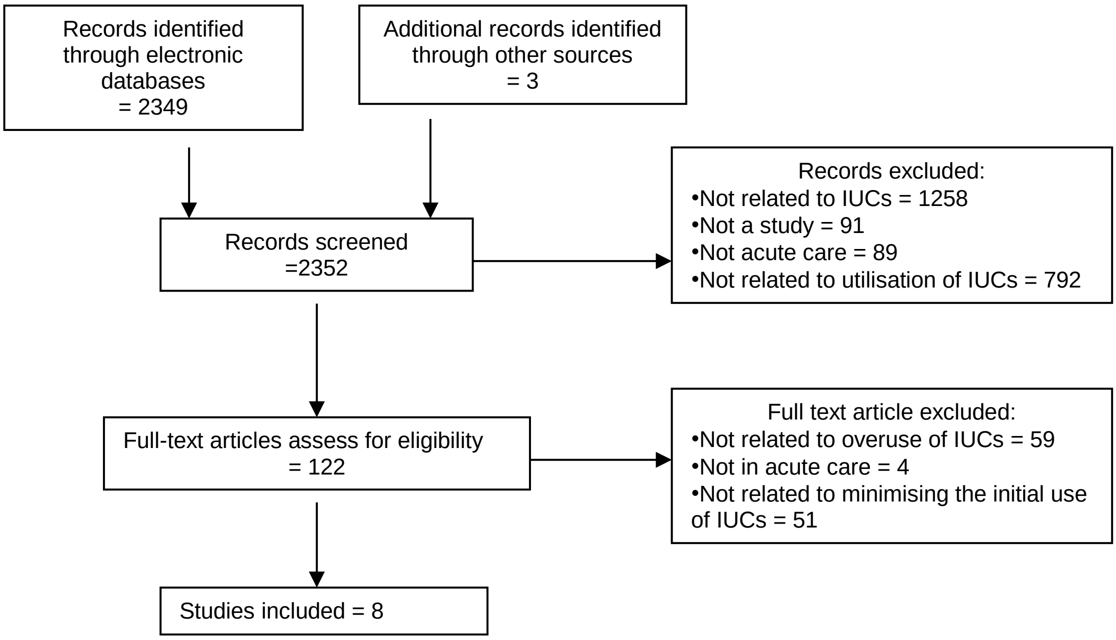


Figure 3. Flow diagram of studies identified

The titles of studies initially identified were scanned for eligibility. The majority of these were excluded as unrelated to the objectives of this review. Of the 122 studies where the full-text was assessed, 59 were rejected as the study was not related to the overuse of IUCs and 51 were rejected because, although related to the overuse of IUCs, changes in the initial use of IUCs were not reported. Only 8 studies reported a change in initial IUC use brought about by an intervention in acute care.

3.7 Study Characteristics

An overview of the eligible studies is provided in Table 6. Appendix A provides the data extracted using the EPOC tool and the key points are discussed below.

Reference	**Setting**	**Intervention**	**Study Design**	**Results**
Topal et al.. 2005 USA	Teaching Hospital Patients admitted to 4 General medical units	• Handheld bladder scanners • MDT Education	Uncontrolled Before/after intervention	Device use fell from 1164/883 (19.7%) to 81/894 (9%) RR 0.46
Voss 2009 USA	Community hospital Medical Unit Patients 65 and over	• Education in appropriate use of catheters	Uncontrolled Before/after intervention	Device use fell from 32/97 (33%) to 13/85 (15.3)% RR 0.46
Slappendel and Weber 1999 Netherlands	Specialist orthopaedic hosptial Surgical unit	• Bladder Scanner made available • IUC guidelines adapted	Before/after intervention	Device use fell from 602/1920 (31%) to 349/2196 (16%) RR 0.52
Stephan et al.. 2006 USA	Teaching hospital Surgical unit	• Educational sessions • Posters • Guidelines	Controlled Before/after intervention	Device use fell from 99/280 (35.3%) to 79/259 (30.5%) RR 0.86
Danchaivijitr et al.. 1992 Thailand	13 hospitals Medical and surgical wards	• Clinician Reminder	RCT	Device use increased from 8.1% to 8.6%

				RR 1.06
Patrizzi et al.. 2009 USA	Teaching hospital Patients admitted to medical unit from ED	• Catheter insertion kits removed from bedside • Bladder scanner made available • Education from CNS • Indication checklist • Audit/Feedback on IUC numbers	Uncontrolled Before/after intervention	Device use fell from 11/149 (7.38%) to 3/163 (1.84%) of patients admitted RR 0.25
Gokula et al.. 2007 USA	Teaching hospital Emergency Department	• MDT Education • Indication checklist reminder • Guideline Change	Uncontrolled Before/after intervention	Device use fell from 2.38% to 0.45% of visitors to ED RR 0.19
Fakih et al.. 2010 USA	Teaching hospital Emergency Department	• Indication Check list • Education for physicians – one off lecture • Emergency Physician "champion"	Uncontrolled Before/after intervention	Device use fell from 212 of 1421 (14.9%) to 110 of 1041 (10.6%) of patients admitted from ED RR 0.71

Table 6 Overview of Included studies

RR, relative risk

All but two of the studies had an uncontrolled before-after intervention design. One was a randomised control trial (Danchaivijitr et al.) and one was a controlled before-after intervention design (Stephan et al.). All but one of the studies reported a reduction in the percentage of patients receiving a catheter following the intervention. Danchaivijitr et al. reported a slight increase in use with a relative risk of 1.06. The relative risk of receiving an IUC in the other studies fell to between 0.19 and 0.86 of the original figure.

Six of the studies had multifaceted interventions that used two or more methods of implementation. Interventions used were the introduction of bladder scanners, education of clinicians in the appropriate use of IUCs, the introduction or adaptation of IUC guidelines, indication checklist reminders, removal of IUC kits from bedsides, feedback on IUC usage and introduction of physician's IUC "champion,"

All but one study took place at a single hospital site. Danchaivijitr et al. (1992) collected data from 13 randomly selected hospitals in Thailand and was one of only two studies not set in the USA, the other, Slappendel and Weber (1999), was conducted in the Netherlands. Three of the studies took place in an emergency department (Fakih et al. 2010, Gokula et al. 2007, Patrizzi et al. 2009), two in surgical units (Stephan et al. 2006, Slappendel and Weber), two within medical wards (Topal et al. 2005, Voss 2009) and one both medical and surgical wards (Danchaivijitr et al. 1992).

Total sample size in terms of number of patients was given in all of the studies and ranged from 182 (Voss 2009) to 16,959 (Danchaivijitr et al. 1992). The duration of data collection varied from Voss at 8 weeks to Topal et al. (2005) and Stephan et al. (2006) at 2 years.

Five of the studies (Topal et al. 2005, Slappendel and Weber 1999, Patrizzi et al. 2009, Voss 2009 and Stephan et al. 2006) could be categorised as local quality improvement projects (QIP) rather than formal research. Distinguishing between research and QIPs is not always clear cut and there is often overlap between the methods used. Cosco et al. (2007) established three criteria to help to differentiate: the study's purpose, the degree of generalizability possible and the risks associated with the study. QIPs tend to be part of larger programmes to improve care at a local level, tailored to local needs and the needs of the participants. Research studies are focused on generating knowledge that can be used away from the study environment.

3.8 Quality Appraisal

3.8.1 Methodological Quality

Study Design

Danchaivijitr et al. (1992) conducted a randomised controlled experiment, with cluster randomisation at ward level. All of the other studies were uncontrolled before and after studies, with the exception of Stephen et al. (2006) which was a controlled before and after study.

Uncontrolled before and after studies can provide a reasonable and pragmatic option for individual settings to gauge the impact of the introduction of quality improvement policy. However, due to their intrinsically weak methodological nature, the use of uncontrolled studies is not recommended to assess the efficacy of interventions (Eccles et al. 2003). There are numerous well documented threats to validity with uncontrolled before and after design. It is impossible to account for confounding factors and healthcare trends across the study periods. Additionally, there is evidence that there is a tendency to over-estimate effect from intervention in uncontrolled before and after studies. Lipsey and Wilson (1993) undertook an overview of meta-analyses of psychological, educational and behavioural interventions and concluded that the effects from uncontrolled studies are greater than from controlled studies. Grimshaw et al. (2000) commented that the evaluation of guideline implementation strategies should not be based on uncontrolled before and after studies, the results of which should be treated with caution. It is worth noting that the two controlled studies included in this review had the least positive results, with an increase in IUC use in Danchaivijitr et al.'s (1992) study.

Despite the assumption that studies using an uncontrolled before and after design can be viewed as methodologically poor, the quality assessment tool remains a useful method of identifying individual strengths, weaknesses, sources of bias and of drawing comparisons between the studies.

Risk of Bias

Appendix A provides the results from using the Cochrane Risk of Bias tool and the results are discussed below.

Selection Bias

The study undertaken by Danchaivijitr et al. (1992) was the only randomised controlled experiment, with cluster randomisation taking place at ward level. The methods of allocation, concealment of allocation and the potential for contamination were not fully reported. Stephan et al. (2006) did not state how allocation of control and intervention groups took place within their study. Therefore, both of these studies have had the risk of selection bias recorded as unclear.

In all other studies, the patients in the samples are likely to be representative of the target population in which the study took place. In all studies, data was collected from a set number of consecutive patients or from all patients within a set time frame.

Detection bias

It is possible, but not clear, that the lack of blinding influenced the outcome or the outcome measurement and therefore the risk of bias has been rated as unclear for all studies. Although data was collected from standard medical records (computer or paper based) in all of the studies and there is little room for confusion as to whether or not an IUC has been placed, it is possible that the knowledge that the intervention had taken place could influence measurement. Fakih et al. and Voss both identified the risk of bias caused by missing/inaccurate data due to retrospective data gathering from notes.

Performance bias

The most significant source of bias in all of the studies is likely to be caused by performance bias. With the exception of Danchaivijitr et al. (1992), all of the studies had an element of clinician education within their interventions. None of the studies state whether the clinicians were aware of the data collection periods or if the aims of the studies were made explicit. However, particularly for the quality improvement projects, the nature of the interventions suggests that clinicians would be aware of the objectives and that the use of IUCs would be monitored. For this reason, all studies except Danchaivijitr et al. (1992) were given a high risk rating in this category.

Attrition Bias

For Slappendel and Weber (1999), Gokula et al. (2007), Danchaivijitr et al. (1992) and Patrizzi et al. (2009) the results for this domain are unclear. For the remaining studies, the risk of incomplete outcome data has been rated as low as the reasons for missing outcome data was unlikely to be related to the true outcome or is unclear as the level of incomplete data was not reported. For example, Topal et al. (2005) reported that, pre-intervention, twelve patients were excluded due to the presence of chronic indwelling catheters and four due to incomplete data and, post-intervention, twelve patients were excluded due to the presence of chronic IUCs and two were excluded due to incomplete data.

Reporting Bias

For all of the studies the primary outcomes are clear and have been reported on and, therefore, the risk of bias in this domain has been rated as low.

Other bias

Three of the studies in this review identified potential sources of bias within their own studies not specifically included in the risk of bias tool. Potential confounders identified include the variation to commitment to infection control by physicians and variation in clinicians' skills (Stephan et al. 2006), variation in physician preference regarding the use of protocols (Voss 2009), the presence of a senior clinician on ward rounds (Voss 2009), variations in unit based practice (Gokula et al. 2007, Stephan et al. 2006, Voss 2009) and the potential for pre and post intervention populations to have varying demographic and clinical factors (Gokula et al. 2007).

3.8.2 Reporting Quality

Using the SQUIRE guidelines reveals that the reporting standard of the 8 studies was variable, although none fully reported on more than half the relevant criteria. The local background to the studies was poorly reported. Only two of the studies reported on the local nature and severity of the problem being addressed, both of which were QI studies (Slappendel and Weber (1999) and Patrizzi et al. 2009). None of the studies fully specified the elements of local care that were likely to influence change.

Descriptions of the study designs and the interventions were also poor. None of the studies fully stated the primary QI/research question. None of the studies addressed ethical issues, suggesting that the methods employed were of limited ethical concern. Only two of the studies (Stephan et al. 2006 and Gokula et al. 2007) described the intervention sufficiently that it could be reproduced and only Patrizzi et al. 2009 indicated the local factors that led to the choice of interventions.

Reporting on the results of the studies was more consistent, with all eight studies presenting data on changes in outcomes, providing at least some information on elements of the settings that provided context for the intervention and providing some information on the strength of the association between the observed change and the intervention.

There was a great deal of variation in items addressed in the discussion sections of the studies. All but one (Slappendel and Weber 1999) reported on successes and difficulties in the implementation of the intervention, however only two (Voss 2009 and Slappendel and Weber 1999) drew comparisons with the relevant findings of others. Half of the studies (Voss 2009, Stephen et al. 2006, Gokula et al. 2007 and Fakih et al. 2010) considered possible sources of bias or confounding. All of the studies at least partially addressed the potential usefulness of the intervention, but none fully explore the implications of the current study for further studies.

The studies provide varying a degree of detail on what the interventions were, how they were carried out and what the results were. There is a significant lack of detail on why the interventions were chosen and why the authors believed the interventions worked or did not work. There were few reports of attempts to understand which elements of multi-component interventions worked and at which level. Although general background to the problem of overuse of IUCs was provided in most studies, it is not clear whether any attempts to analyse the local problem were undertaken, thereby making the context of the intervention unclear.

3.9 Intervention characteristics

The CRD (2009) state that a key factor when gauging of the quality of a study is assessing the quality of the intervention, specifically, whether or not the intervention has been appropriately used, described and delivered. The interventions used in each study are listed in summary of the studies provided in Table 1. Appendix A categorises the intervention components according to the EPOC taxonomy of types of intervention. Using this taxonomy the types of intervention included are “Changes in physical structure, facilities and equipment” (provision of bladder scanners, catheterisation insertion kits removed from bedside), “Educational meetings” (to introduce new guidelines, training on the appropriate use of catheters) “Distribution of educational materials” (new IUC guidelines), “Local consensus process” (designing new guidelines) and “Reminders” (introduction of IUC indication checklists).

The most common form of intervention was “Education,” with all except one (Danchaivijitr et al. 1992) including some kind of clinician education. There was a wide variation of methods used within this category from one-to-one nurse education from a clinical nurse specialist, to changes in protocols and guidelines.

All but two of the studies (Danchaivijitr et al. 1992, Voss 2009) had multi-component interventions. Although none of the studies directly compared efficacy of different components of interventions or combinations of components of interventions, some studies noted the importance of combining different mechanisms. Topal et al. (2005) state the importance of combining increased awareness of the risks of catheterisation with directives to avoid unnecessary use in order to obtain cultural change. According to Patrizzi et al. (2009), practice change was dependent upon addressing a combination of education, behavioural and cultural factors. Gokula et al. (2007) stated that combining education and reminder methods was vital to their success, commenting that Danchaivijitr et al.’s (1992) use of reminders alone reduced the recorded inappropriate use of catheters, but not the number of catheters used. Fakih et al. (2010) commented on the importance of the designated change leader in enforcing compliance with the education and reminder system aspects of the intervention. Stephan et al. (2006) note, that “feedback of performance and results” was only made available after the intervention but might be critical in ensuring a sustained effect.

The majority of the interventions were aimed at changing the behaviour of both physicians and nurses. However, in two studies (Danchaivijitr et al. 1992 and Fakih et al. 2010) the interventions were aimed at physicians only. It is interesting to note that, despite the focus on physicians, both of these studies commented upon the influence that nurses have on the decision to catheterise. Fakih et al. (2010) observed that in order to address inappropriate IUC utilization, indications must be used by both emergency physicians and nurses. The intervention in Patrizzi et al.’s (2009) study is designed by and aimed predominately at nurses. However, collaboration and communication with physician colleagues is noted as important to support the change in practice.

Variation between interventions, clinical settings and populations minimises any useful comparison between the studies. However, it is worth noting several of the studies discussed the importance of addressing individual clinicians beliefs, cultural norms and organisational barriers in changing practice. Topal et al. (2005) stated, “The power of collaboration among physicians and nurses played a vital role in our success. We recognised that the 40-year culture of indwelling catheter use was an interdisciplinary norm and that the norm was likely motivated differently for doctors and nurses.” Patrizzi et al. (2009) observed that, “Collaboration, communication and teamwork between the two units were major factors in the projects success” and with reference to the routine placement of IUCs, “This almost ritualistic behaviour was difficult to change because of it enculturation into standard ED nursing practice.” Fakih et al. (2010) reported that, “Recognising the factors that lead nursing to inappropriate placement of UCs may help us target the noncompliance with UC indications.”

Whichever method of implementation was used, all of the studies used a checklist of accepted indications for placing an IUC as part of their intervention, either during education sessions or as part of new guidelines or in the form of a reminder checklist. A summary of the indication criteria used by each study is provided in Table 7.

Topal et al. 2005 USA	• Acute urinary retention or obstruction • Urinary output monitoring if patient was unable to collect • Postoperative requirements in specific urological or gynaecological procedures or on contiguous structures of the genitourinary tract • Urinary incontinence with open sacral or perineal wounds • End-of-life care
Voss 2009 USA	Included • Chronic history of prolonged catheterisation or suprapubic catheter • End-of-life care • Aggressive treatment with diuretic medications or fluids • Wound care management with incontinence • History of being difficult to catheterise • Having a catheter placed by a uroligist
Slappendel and Weber 1999 Netherlands	• Pre-operative incontinence of urine • Post-operative incontinence of urine after spinal or epidural anaesthesia • Blood loss during surgery of more than one litre • A medical history of prostatic enlargement • Abdominal approach for surgery to lumbar spine • Long-term use of an epidural catheter, • Unexplained restlessness and a bladder volume of more than 800ml • No spontaneous diuresis 8 h after surgery and a bladder volume of more than 800ml
Gokula et al. 2007 USA	• Obstruction of the urinary tract distal to the bladder • Alteration of the blood pressure or volume status requiring continuous, accurate urine volume measurement • A need to measure output accurately in an uncooperative patient (e.g. intoxication) • Continuous bladder irrigation for urinary tract haemorrhage • Urinary incontinence posing a risk to the patient (e.g. major skin breakdown or protection of nearby operative site) • To permit urinary drainage in patients with neurogenic bladder dysfunction and urinary retention • Palliative care for the terminally ill
Danchaivijitr, 1992 Thailand	• Urinary retention • Recording hourly urine output • Injury to urethra • Irrigation of urinary bladder
Patrizzi et al. 2009 USA	• Deep sedation • Haemodynamic instability

	• Incontinence with skin breakdown • Uncleared spinal radiographs in female patients only • Urinary requirement for indwelling catheter (>300ml bladder volume)
Fakih et al. 2010 USA	Published recommendations, plus indications pertinent to an ED setting, including • Acute hip fracture until surgical correction • Short-term use for unresponsive or severely agitated patients • Emergent pelvic ultrasound for evaluation of ectopic pregnancy • Severe hypoxia • Patients undergoing emergency surgery
Stephan et al. 2006 USA	• Operating Room o Interventions with foreseen duration of surgery >5 hours o Total hip replacement or related surgery if the patient met 1 of the following conditions: age >75 years, an ASA class of 3 or greater, obesity or urinary incontinence o Total knee replacement if the patient met 1 of the following conditions: age >80 years, obesity or urinary incontinence • Postanaethesia care unit, catheterisation required the following criteria o Clinical judgement of a physician o No routine requirement for urination before discharge o No routine determination of bladder volume by ultrasound and no decision for catheterisation based on bladder volume measurement o Urinary catheter inserted because of long duration of surgery must be removed before discharge form the unit

Table 7 - Summary of stated indications to place an IUC

The studies used different methods to develop their lists of criteria. Topal et al. (2005) and Patrizzi et al. (2009) used existing guidelines. Voss (2009), Gokula et al. (2007), Fakih et al. (2010) and Stephan et al. (2006) developed the lists locally. Danchaivijitr et al. (1992) and Slappendel and Weber (1999) did not state the method of development.

There is significant variation in the indicators listed for each study. It might be expected that variation would occur between studies with medical or surgical settings, but even within these two groups these is little consensus on what is an acceptable indication of IUC use. Even with similar criteria, there is variation in detail. For example the use of an IUC to manage urinary incontinence where skin integrity is at risk Gokula et al. (2007) state, “Urinary incontinence posing a risk to the patient (e.g. major skin breakdown or protection of nearby operative site)”, Patrizzi et al. (2009) state, “Incontinence with skin breakdown, ” Voss (2009) state, “Wound care management with incontinence” and Topal et al. (2005) state, “Urinary incontinence with open sacral or perineal wounds.”

All of these indications are open to interpretation by the clinician who must assess, for example, the risk to the patient, how skin breakdown is defined, whether urinary incontinence with any skin breakdown provides justification or only skin breakdown in the sacral or perineal area, and the grade of pressure ulcer that should be classified as an open wound. This provides the potential for the inconsistent use of the indication guidelines within individual settings and inhibits the wider standardisation of IUC use indication checklists.

Urine output monitoring is another source of variation between the studies. Topal et al. (2005) state, “Urinary output monitoring if patient was unable to collect,” Gokula et al.

(2007) state, “A need to measure output accurately in an uncooperative patient (e.g. intoxication)” and Danchaivijitr et al. (1992) state, “Recording hourly urine output.” Again, these statements are open to interpretation by individual clinicians.

Another area of variation is the measurement of urine volume in the bladder. Only two of the studies provide figures for the volume of urine required in the bladder before an IUC is placed. Patrizzi et al. (2009) required a volume of more than 300ml, while Slappendel and Weber (1999) required a volume of more than 800ml in addition to unexplained restlessness.

Levels of acceptance and adoption of the indication checklists varied widely. Fakih et al. (2010) noted that over half of the IUCs were placed without physicians orders and of that number around half did not fit any of the indications. The authors of the study believed that this might reflect a difference in what physicians and nurses judged appropriate indications for IUC use. The wide variation in the use and reported acceptability of the indication lists was notable and it is difficult to know whether this was caused by differences in content or format. It has been suggested by Mitchie et al. (2008) that the clarity and specificity of behavioural instructions are important to adoption, but are often overlooked. None of the studies discussed the intrinsic characteristics of the design of the indication instructions or the interface between the instructions and the end user.

Danchaivijitr et al. (1992) reported that on 3.5% of IUC placements prescribers did not use the indication sheet and that overall it was seen as highly accepted. It was found that the indication sheet reduced catheter use recorded as inappropriate (27% down to 14.3%) but not actual number of catheters used, which rose slightly. Topal et al. (2005) found that 14.8% of placements post-intervention did not meet the stated criteria and Voss (2009) reported that the appropriate use of IUC fell from 57.1% to 53.8% with the introduction of the indications. Gokula et al. (2007) found that appropriateness of use increased from 37% at baseline to 51% following the intervention. There was a fall in IUC placement, but only 12% of the indication sheets were completed with a poor acceptance rate for the indication sheet of only 40%.

3.10 Discussion

3.10.1 Summary of evidence

Overall, the evidence is not robust enough to determine the effectiveness of any intervention to minimise the overuse of IUCs due to the methodologically weak study designs, the variation in clinical environments and the low number of eligible studies.

There were only eight studies meeting the outcome criteria for this review. Many were excluded as they did not measure the change in levels of initial IUC placement. One of the reasons that reduction in initial placement has received less attention than the prompt removal of IUCs already in situ might be due to the outcome measures used for CAUTI rates and catheter use reduction interventions. Commonly, catheter days for the patient population or frequency of CAUTI per 1000 catheter days are measured. Fakih et al. (2011) used a simulation model to compare 100 hypothetical interventions to reduce the rate of CAUTI, analysing the impact on frequently used CAUTI rate (CAUTI per 1000 catheter days) and their proposed “population CAUTI rate” (CAUTIs per 10,000 patient days). They concluded that, when evaluating the effect of a CAUTI reducing intervention, the measure should include the risk to all patients receiving care in the hospital. The adoption of this approach might lead to a greater focus on the initial inappropriate use of catheters.

Examining the efficacy of interventions is made complex by the range of methods used and the variation in study design. It appears that the interventions implemented within the studies included in this review might improve clinical practice, but the impact varies enormously as would be expected when comparing, for example, an intervention introducing the routine use of bladder scanners with an intervention to introduce the use of an indication sheet. In a review of guideline dissemination methods and implementation strategies, Grimshaw et al. (2006) found that the majority of studies comparing dichotomous data observed improvements in care. However, reviews of implementation of evidence strategies have demonstrated considerable variation in the success of similar interventions (Eccles et al. 2005). One key area of consensus highlighted by the studies was the importance of a multidisciplinary approach to the successful implementation of the intervention, a view supported by Zwarenstein et al. (2000) in a Cochrane Review that concluded the “interprofessional interventions can lead to positive changes in healthcare.”

Although all but one of the studies reported a reduction the initial placement of IUCs, the uncontrolled before-after design of 6 of the studies leaves room for considerable doubt about the true efficacy of interventions. The only randomised controlled trial (Danchaivijitr et al. 1992) was poorly reported and it was interesting to note that the results from this study showed no reduction in the use of IUCs. Furthermore, any impact interventions have on practice might be short lived. Only one study (Gokula et al. 2007) reported IUC use for more than a six month period. Clinicians may revert to previous behaviour patterns after the initial introduction of a stimulus to change and follow-up times of under a year do not assess the sustainability of the impact of an intervention (Alexander and Hearld 2009). Where interventions have been successful in reducing CAUTI rates, Saint et al. (2009) note that little is known about the sustained impact of such interventions.

Although it is not possible to make recommendations on the efficacy of the interventions, a number of broader observations can be made.

Firstly, the majority of the studies included in this review were categorised as quality improvement projects, thus providing further confirmation that such studies have the potential to provide a significant contribution towards efforts to improve patient experience and outcomes (Sales 2009). This highlights the importance of achieving a high level of methodological and reporting quality in local QIPs as well as formal research studies.

One particular area of weakness in all of the studies was reporting on how the content and design of the interventions were chosen. There were no reported attempts to understand the decision making processes of the clinicians involved and none of the studies referred to a theoretical model or previous diagnostic work to discover barriers to change or address cultural norms and individual beliefs regarding the use of IUCs when designing interventions. Eccles et al. (2005) note the importance of working with theories to understand both the processes that underlie clinical practices and how change in care practices can be effected. They note that the lack of theoretical framework to guide the selection of implementation methods may limit the success of projects. Furthermore, Foy et al. (2011) argue that the characteristics and context of interventions are so varied that useful comparisons are difficult without the use of theoretical models to provide a consistent vocabulary and more efficient method of generalisation. Additionally, the focus of the studies included in this review was on changes in outcomes rather than processes. Harvey and Wensing (2003) note that undertaking formal evaluation of local experiences can assist in the development of understanding of complex change processes brought about by interventions, thus assisting generalisable lessons to be learnt from local projects.

Calls for the improved reporting of interventions to improve healthcare have been increasing in recent years (Michie et al. 2009). The need for a standardised, comprehensive approach to reporting is clear. Where systematic reviews of interventions have found improvements in healthcare outcomes there is often little explanation of which mechanisms result in the change and how the processes are taking place (Michie 2009). The use of a tool such as SQUIRE to improve reporting standards might improve the transferability of the knowledge gained from these studies to other locations. There is a particular lack of reporting on the specific local problem of the overuse of IUCs in all of the studies. Without this information it is difficult to understand how any intervention works.

Variation between the methodological quality and reporting standards of the studies identified as QIPs and those identified as research was not significant. This is partly due to the limited methodology and reporting standards of the research in this area. If, as is likely considering the increasing pressure to minimise the use of IUCs, local QIPs continue to focus on this area a number of issues should be addressed when publishing reports of the studies. Again, the use of a tool such as SQUIRE would help to articulate a clear description of aims, context and intervention.

Finally, but crucially, there is a need for greater understanding of when the placement of an IUC is necessary and the eventual development a set of consistent, evidence based, setting-appropriate, clinician-friendly indicators for the initial placement of an IUC. Further discussion and an attempt at expert consensus on appropriate indications for placing in acute care and the development and adoption of consistent, unambiguous terminology would clearly be beneficial in attempting to develop knowledge on minimising IUC overuse.

3.10.2 Limitations

This review is limited by the quality issues (both methodological and reporting quality) and the heterogeneous characteristics of the studies included. The interventions used by the studies varied considerably, for example the introduction of a bladder scanner compared to the introduction of an indication sheet. The eligibility criteria for this review also allowed for variation in clinical area. Furthermore, the lack of agreement on when the benefits of using an IUC outweigh the risks makes any evaluation of differences in rates of inappropriate catheterisation difficult.

There was no scope for valid statistical comparison between the studies. Within the limitations of this review it is not feasible to contact the primary authors for to provide missing information. The tools used to extract data and assess quality have not been used by two or more reviewers and the studies were identified one reviewer.

3.10.3 Implications for practice and research

This is the first systematic review of evidence on an important clinical quality issue. The evidence found is not robust enough to determine the effectiveness of any intervention to minimise the overuse of IUCs or make any recommendation for QIP strategies.

However, this work does highlight that quality improvement interventions designed to minimise the initial placement of IUCs would benefit from work to understand pre-intervention the local culture of use and the causes of overuse. Additionally, it has been made clear that, if a list of indicators for appropriate IUC initial placement is used to guide practice, it should be unambiguous and appropriate to the setting. Currently the evidence is weak, but it might also be beneficial to combine both an educational component and a practical/resource based component within the intervention.

There are deep-rooted questions that need to be answered before the efficacy of interventions can be maximised. There is a need for greater understanding of when the placement of an IUC is necessary, what constitutes IUC overuse and the eventual development a set of consistent, evidence based, setting-appropriate, clinician-friendly indicators for the initial placement of an IUC. To inform this work, it would be beneficial to explore how and why clinicians make decisions in a real world context.

3.11 Conclusions

The studies eligible for this systematic review utilised a variety of strategies to try to reduce the unnecessary initial placement of IUCs, the majority using a multi-component, multi-disciplinary intervention approach that included clinician education and at least one other mechanism. The efficacy of these interventions is unclear.

While the inappropriate use of IUCs in acute care continues to cause unnecessary harm to patients, more methodologically robust, well reported studies researching the potential of interventions to reduce the initial placement of UICs are required. Vigorous attempts to understand decision making processes, beliefs about indication criteria, differences between disciplines and to identify the barriers to change are needed in order to better understand how interventions work in different environments.

3.12 Implications for Qualitative Study

The results of this systematic review add weight to the findings of the literature review in the previous chapter in demonstrating that changing clinical behaviour around the use of IUCs is complex and challenging. It has been reiterated that the cultural norms of organisations and the values, attitudes and beliefs of the individual clinicians practicing within the organisations that impact on IUC decision making are poorly understood. Without that knowledge, it is difficult to judge which IUCs are inappropriate and interventions are unlikely to reach their potential.

Chapter 4

Methodology and Methods

4.1 Introduction

The Literature Review and systematic review outlined the gaps in knowledge surrounding the decision to place IUCs in acute medical care. The work by Harrod et al. (2013), Krein et al. (2013) and others highlighted the importance of achieving in-depth understanding of clinicians' IUC related beliefs and subsequent decision making processes before attempting to introduce initiatives to optimise the use of IUCs. Furthermore, it was also found that the strength of the evidence is insufficient to provide consistent clinical guidance on when the benefits of IUC use outweigh the risks.

The systematic review addressed the first objective of this thesis, analysing the effectiveness of interventions aimed at minimising the initial placement of IUCs in acute care. The following chapters will focus on the following three objectives:

b. to explore the factors that promote or inhibit the decision to place an IUC

c. to examine how clinicians reach the decision that an IUC is needed

d. to use the findings from the first two objectives to identify how the practice of IUC use could be influenced and the quality of care improved

In order to do this, data was collected in the emergency department (ED), medical assessment unit (MAU) and acute medical wards of a 1200 in-patient bed general hospital using two methods (retrospective think aloud interviews with clinicians who made a decision to place an IUC and semi-structured interviews with clinicians who undertook a think aloud interview). Thematic analysis was then undertaken.

This chapter explains in detail the choice of research methodology and methods. It briefly discusses the ontological and epistemological assumptions of qualitative inquiry and introduces interpretive description, an approach specifically designed to fit with the complex practice-based questions that clinicians are likely to ask (Thorne et al. 2004), as the methodological guide to the study. It then goes on to explain the study design and techniques used to collect and analyse the data.

4.2 Research Methodology

4.2.1 Introduction

The research question is exploratory in nature, seeking clinicians' opinions, beliefs and experiences. It was evident when thinking about designing a study to effectively address this question that a qualitative approach would provide the most useful methodology.

Qualitative methodologies have developed from disciplines including sociology, anthropology, psychology and philosophy. Although there is some overlap, each of these disciplines is based on a particular set of beliefs with distinct goals (Giacomini 2010, p126). Researchers in healthcare have taken these methodologies, used them in their study environments and have sought, not only to make the results credible, but also to achieve clinical relevance.

Methodology matters because it, "will influence (and be influenced by) the objectives, research questions and study design and provide the research strategy and thus have a profound effect on the implementation of the research" (Carter & Little 2007).

- **Ontological and Epistemological beliefs**

Qualitative methodologies are underpinned by epistemological and ontological foundations. Ontological beliefs address the essential nature of reality, directing research by providing the assumptions on what knowledge can be found and, equally importantly, what cannot be found. A fundamental divide exists between realism, where entities exist, unaltered by ideas, and idealism, which considers "the phenomena of research as comprised of our ideas about things" (Giacomini 2010, p129).

Epistemologies provide the next level of theory, by describing how phenomena can be accessed (Giacomini 2010, p129) and how knowledge can be developed. Epistemological processes are associated with appropriate research methods. For example, the positivist epistemology is based on realist ontological beliefs which would be linked to hypothesis testing methodologies using methods such as randomised controlled trials. However, an interpretive epistemological approach (ontologically underpinned by idealism) would support ethnography as a methodology and might use non-participant observation as a data collection method.

Outside of academic work, qualitative data collection methods, such as semi-structured interviews or focus groups, are frequently used in QIPs without any reference to their methodological or epistemological foundations. Indeed, it is acknowledged that there is not yet an established “optimal methodology” (Grol et al. 2003) for research on healthcare quality improvement. However, as Giacomini (2010, p126) highlights, “In health research, it has become imperative to identify which methodologies best suit which questions of policy and practice to appraise research practices and results.”

Choosing a methodology that can logically address the research question and objectives is an important stage in a study and helps to ensure that the underpinning epistemological approach and the chosen methods of data collection and analysis are consistent with the aims of the study. According to Silverman (2013, p113) methodologies are “not right or wrong, only more or less appropriate”. Therefore, in choosing a methodology for this study, commonly used qualitative methodologies (ethnography, phenomenology, case study and grounded theory [Robson 2011, p79]) were considered in turn.

Ideally, the methodology chosen needed to have the flexibility to achieve outcomes with both clinical and theoretical relevance, to acknowledge a range of factors from socially constructed professional norms to the impact of lack of resources and to allow for methods that could be feasibly employed within the confines of the PhD study. When considering phenomenology, grounded theory and ethnography in turn I found, that although these approaches would provide useful guidance for tackling the research question in some respects, none appeared to fully assist in addressing the objectives of the proposed study. The search for a well-fitting methodological approach was complicated by contradictions in the literature (for example, disagreement on whether ethnography is a method, a methodology or both), the inconsistent use of terminology and variations between interpretations of methodologies. However, Denscombe (2003, p3) stated that, “The crucial thing for good research is that the choices are reasonable and that they are made explicit as part of any research report”. Therefore, in brief summary:

- I concluded that phenomenology would not be a good fit with this study as it is interested in describing the lived experience of participants, whereas this study aimed to describe and interpret participants’ experiences of making specific clinical decisions.

- I struggled to reconcile elements of what I wished to achieve with the tenets of grounded theory partly because the aim of the work was not purely to generate theory, but to identify factors that could inform clinical practice.
- Hammersley and Atkinson (2007, p3) state that in ethnography researchers generally participate in people’s lives in order to observe their social world, and that data collection is relatively unstructured. In this study, I wanted to find out

about one very specific area of a group of clinicians' work, therefore ethnography did not appear to be a suitable approach.

- Although case study offered a flexible approach, I did not feel that the literature describing the methodology provided sufficient guidance for a novice researcher.

This led to the search for a more compatible framework and the adoption of interpretive description as a methodology to guide this study. A discussion of interpretive description and, including a brief overview of the three dominant qualitative methodologies that contributed to its development, are provided below.

4.2.2 Interpretive Description

Interpretive description is a qualitative research methodology with the specific aim of generating knowledge relevant for the clinical context of applied health disciplines (Hunt 2009). It is a fairly recent addition to the family of qualitative methodologies, first introduced by Thorne et al. in 1997. However, the use of interpretive description appears to be growing. A search on Pubmed resulted in over 100 studies that had used interpretive description being identified, and over a third of those were published in the last 12 months. Recent examples cover a broad range of healthcare issues, including "Flying Blind: Sources of Distress for Family Caregivers of Palliative Cancer Patients Managing Pain at Home" (Mehta et al. 2014), "The enduring impact of what clinicians say to people with low back pain" (Darlow et al. 2013) and "Decision-making process of prenatal screening described by pregnant women and their partners" (Watterbjork et al. 2013).

It was developed in response to the frustration experienced by some clinician researchers who had been unable to identify a methodology that was fully compatible with the aims of their research (Sandelowski 2008, p12). The three traditional methodologies (ethnography, grounded theory and phenomenology) have commonly been used by clinical researchers, however, according to Cutliffe (2005) and others, many of these researchers departed from the methodological frameworks in significant ways. Other commentators have observed that attempts by clinical researchers to fit their studies into the required standards led to methodological "slurring" (Morse 1989, p7, Johnson et al. 2001).

Interpretive description can trace its roots back to some of the well-established qualitative methodologies (ethnography, grounded theory and phenomenology) (Thorne 2008, p26). However, when mapping the epistemological and ontological neighbourhoods of health research methodologies, Giacomini (2010, p137) placed interpretive description in between the ontological positions of realism and idealism, whereas ethnography, grounded theory and phenomenology were situated firmly in idealism. Epistemologically, interpretive description was placed in pragmatism, whereas ethnography, grounded theory and phenomenology were given the label of interpretive methodologies. This reflects interpretive description's strategic problem-solving aim and goal of generating "clinically useful, applicable knowledge" (Giacomini 2010, p137).

With a pragmatic epistemological foundation, lying between realist and idealist ontology, interpretive description assumes that phenomena exist independently, but recognises that we access and comprehend these phenomena via our ideas (Giacomini 2010, p132). The term pragmatic suggests that practical rather than theoretical problems determine how phenomena interest researchers. Interpretive description is a pragmatic practice-informing methodology developed within the clinical field of nursing. It requires a practice goal and an understanding of current empirical evidence surrounding that goal (Thorne 2008, p35). "Interpretive description, is a strategy for excavating, illuminating, articulating and disseminating the kind of knowledge that sits somewhere between fact and conjecture." (Thorne 2008, p15)

Interpretive description, has its roots in the traditionally dominant qualitative methodologies. This section will briefly describes those methodologies and explain how interpretive description departs from them.

- **Grounded theory**

The aim of Grounded Theory is to characterise the "systems of meanings occurring within groups and constructed through social interaction" (Giacomini 2010, p139). The fundamental characteristics of Grounded Theory are much debated even amongst its originators, Glaser and Strauss (Walker & Meyrick 2006). The theory was initially developed in the 1960s from Glaser and Strauss's sociological research with the goal of providing researchers with a method of systematically developing theory grounded in data and drawing on the symbolic interactionism work of Blumer (published in 1969).

Variants of the original theory have been developed by researchers including the originators Glaser and Strauss who developed substantially different perspectives on data analysis procedures. Differences in opinion have also arisen from the tendency of Grounded Theory researchers to "treat social meanings as objectively real entities versus subjectively relative ideas" (Giacomini 2010, p139).

Whilst interpretive description accepts the usefulness of the constant comparative analytic approach used in grounded theory, it is less convinced of the usefulness of “theorising the dialectic between social forces and individual interpretation per se” (Thorne 2008, p31). Instead, interpretive description accepts that social behaviour might influence the phenomenon under study, but chooses to focus in that insight when it is of pragmatic use (Thorne 2008, p31).

- **Ethnography**

Ethnography has evolved from anthropological beginnings to be adopted by a broad range of disciplines. It is the study of people, communities and their cultures, with data typically being collected through lengthy periods of time spent in the field observing the subjects in the natural environment. The aim is to capture “social meaning and ordinary activities” (Brewer 2000, p6).

Ethnography has been used for over 50 years in healthcare research (Pope 2005) and can be useful for defining problems, exploring factors associated with a phenomenon or designing interventions to fit with a target population (Goodson & Vasar 2011). However, according to interpretive description, the focus of ethnography is to understand human nature, contrasting with interpretive description where the focus is to solve a clinical problem (Thorne 2008, p28).

- **Phenomenology**

Phenomenology is concerned with understanding and seeking to illuminate the fundamental essence of lived experience (Fade 2004). It has been used widely within healthcare qualitative research to understand healthcare or illness from a patient’s perspective (Biggerstaff & Thompson 2008).

Thorne (2008, p29) states that phenomenologists “perceive reality as that which exists because it is experienced through the essential structure of human subjectivity.” Again, according to interpretive description, the concern with uncovering the essential essence of human experience is not compatible with the goal of solving a clinical problem.

It was this dissatisfaction with the traditional methodologies that led to the conception of interpretive description (Thorne et al. 1997). It was developed to facilitate a focus on building knowledge that informs clinical practice, initially in nursing, but this has been expanded to cover all applied health disciplines (Thorne et al. 2008, p23). It is therefore well-suited to this study that aims to understand an area of clinical decision making, but also to identify the clinical applications of that understanding.

Thorne et al. (1997) used key tenets from Lincoln and Guba's (1985) work on naturalistic inquiry to inform the development of seven characteristics of interpretive description studies. Table 8 below lists these characteristics and explains how these assumptions are adopted by this study.

Interpretive description study characteristics	**This study**
Conducted in as naturalistic context as possible	Took place in the environment where the decision were made
Attend to the value of subjective and experiential knowledge	Explicitly sought the subjective and experiential knowledge of clinicians
Pay attention to human commonalities as well as individual variance	Looked for, and found, similarities and differences in experiences and beliefs
Reveal issues that are not bounded by time and context, whilst carefully considering the time and context of the study	Acknowledged that the study is in one place and time, but offers findings that have relevance beyond those confines
Acknowledge that the socially constructed element of human experience cannot be separated from its essential nature	Recognises the existence of socially constructed reality and its influence on the decision making process
Allows that in the world of human experience, reality might involve multiple, potentially contradictory, realities	Found multiple, often contradictory realities
Recognises the influential relationship between the knower and the known	The relationship and its impact is acknowledged and discussed in the following chapters

Table 8. Characteristics of interpretive description studies (adapted from Thorne 2008, p74)

Although these characteristics provide the underpinning for interpretive description, the choice of techniques for data collection and analysis can vary and the interpretive description approach to research design is discussed in the applicable methods sections below.

The purpose of an interpretive description research plan is to “create a solid foundation of the principles underlying the choices you are going to be making along the journey, and to articulate a logical and credible sequence of intended intellectual and procedural activities in order to reach your goal” (Thorne 2008, p103). To aid this process, interpretive description advocates the use of a framework of existing knowledge to scaffold the study. In contrast to some traditional qualitative methodologies, interpretive description research questions and study designs should be located within an existing body of knowledge to provide links to what is already known (Thorne et al. 1997). The framework for the study presented in this thesis is provided by the literature review and by the research question and objectives.

- **Limitations**

Two key limitations of interpretive description have been identified by researchers who have employed the methodology in a range of clinical research settings. One key limitation reported is the relative youth of the methodology. Although the approach is gaining in popularity, there has perhaps not yet been sufficient time to find, report and respond to all the inevitable teething problems. Hunt (2009) found that there was uncertainty on how far to develop the interpretation of data to maintain consistency with interpretive description’s framework and yet undertake sufficiently detailed exploration of the data. This has been, at least to some degree, addressed by the publication of Thorne’s (2008) book, “Interpretive Description,” that provides a comprehensive overview of the methodology.

A second potential limitation is that interpretive description has its roots firmly in nursing. It has been noted that interpretive description fits broadly in the pragmatic region of epistemology (Giacomini 2010, p137) and has its origins in “nursing’s philosophical and theoretical foundations” (Thorne et al. 1997). However, as Oliver (2011) notes, as interpretive description is “considered by researchers in other fields it becomes more important to articulate a theoretical position that can span the applied disciplines to support interpretive description inquiry.” Indeed, this study included clinicians from both nursing and medicine, with the data reflecting a range of clinical thinking. Care has been taken that the analytical framework, design and discussion of the findings of this study represent both nursing and medical positions. It is, however, acknowledged that, as a nurse, I inevitably bring beliefs and experience from that clinical position, and these might have influenced both my choice of methodology and the design and implementation of the study. This is discussed further in the section on reflexivity later in this chapter.

4.3 Research Design and Process

The aim of the study was to understand as fully as possible the factors that influence the IUC decision making process in acute medical care. Although interpretive description is not prescriptive in its recommendations on how to undertake a study, it does provide a framework within which to use data collection and analytical strategies. The philosophical underpinnings of interpretive description were discussed in detail the previous section, and the key characteristics that provide the foundations for the development of this study are important to note:

- conducted in a naturalistic environment
- focuses on the importance of subjective and experiential knowledge
- acknowledges socially constructed elements to human experience
- recognises that “reality” in terms of human experience may involve multiple, potentially contradictory realities
- attends to the time and context in which expressions are enacted

(Thorne 2008)

These principles were taken into consideration throughout the design of this study and are highlighted where relevant. The next section of this chapter explains the research design, including how the methods were chosen, sampling strategy, approach to quality assessment and ethical considerations. The following section describes in detail how the data was collected and analysed, including the practicalities of undertaking interviews, process of coding and synthesising the data.

The following sections describe the methods chosen to answer the research question and objectives, explaining the two methods of data collection, including sampling, recruitment, consent and process. It then details the data analysis and interpretation processes, including examples of coding and the construction of themes. Issues of quality are discussed throughout. The methods are based on the methodological assumptions provided by interpretive description as defined in the previous section.

4.4 Data Collection Design

Two methods of data collection were used; retrospective think aloud (RTA) interviews and semi-structured interviews. Interviews as a data source have strengths and weaknesses that have been vociferously debated (Sandelowski 2002). Interviews offer a flexible and adaptable method of investigation, that can be tailored to the research question, but allow new lines of inquiry to be developed. However, the usefulness of the data depends on the willingness of the participants to honestly and openly answer the questions. Newton (2010) describes the aim of interviews, “The success and validity of an interview rests on the extent to which the respondent’s opinions are truly reflected; the interviewee’s “voice”, communicating their perspective” (Newton 2010).

Interpretive description states that “people who have lived with certain experiences are often the best source of expert knowledge about those experiences” (Thorne 1997). Interviews are a common source of data for healthcare qualitative studies and interpretive description acknowledges the usefulness of interviews in building knowledge on clinical issues (Thorne 2008, p79). However, Thorne (2008, p128) cautions that many “human experiences are inarticuable,” and that interviewees may say what they believe the interviewer wishes to hear and what is easy to explain, rather than articulate confusing thoughts that are sensed rather than understood. It is therefore expected that interviewers should “retain some humility about what it is they are uncovering, and have an obligation to reflect the particular relationship to time and place that their findings reflect” (Thorne 2008, p129).

In this study where clinicians were being asked about their decisions, it was anticipated that there could be some degree of wariness and therefore less access to true opinions. Every effort was made to prevent this by stressing that the focus of the study was to better understand current clinical decision making and no judgement would be made on the accuracy of the decision, and by reassuring clinicians that the data would be anonymous. Furthermore, I was careful not to place myself in a professional camp by revealing my clinical background, unless I was specifically asked. My identity badge gave my role as “Researcher” and I referred to myself as a PhD student rather than a nurse.

Alternative methods of data collection, such as focus groups or non-participant observation, could have been used. Observation can provide detailed information on the overt actions and outcomes of decisions, but miss unobservable processes. Undertaking observation would not be feasible within the limitations of this study, as the timing and location of the decisions to place a catheter are unpredictable. Additionally, Think Aloud more fully captures processes that take place in what Aitken et al. (2011) refer to as a “cognitive black box.”

Overall, interviews were seen as the most pragmatic and useful method of collection. Moreover, interviews are consistent with the epistemological position of seeking “probable truths” (Thorne 2008, p230) and “patterns and themes within subjective human experience not so much to grasp at its essence as to understand what we are likely to encounter in future clinical practice and to have some meaningful sensitivity around it" (Thorne 2008, p79).

Two types of interview were used. This provided for triangulation of data in order to increase depth of understanding of the phenomenon being examined rather than the increasing the validity of the findings (Melia 2010). The RTA interviews gathered data about specific incidents of decision making, while the semi-structured interviews sought accounts of more general beliefs and experiences. Whilst data gathered by the two methods were analysed together to add depth of understanding to the developing themes, a record was kept of which of interview influenced each theme and is discussed in the later in this chapter and the Results Chapter.

4.4.1 RTA interviews

According to Ericsson and Simon (1993), concurrent and retrospective verbal accounts (think aloud technique) provide unique information about retrieval of knowledge and past experience that cannot easily be assessed by more traditional observations. Atiken et al. (2010) demonstrated that assessment decisions were more frequently identified by think aloud method, whereas management decisions were identified using observation. Ericsson (2006) states that the think aloud technique gives overt expression to sub-vocal verbalisations demonstrating that participants say that they rely on rules when they do not. Fonteyn et al. (1993) commented that think aloud (TA) technique provides rich data about individuals rather than easily analysed data on a population, but comparisons can be made across subjects and inferences drawn about the overall reasoning process. However, data on human cognition from think aloud is incomplete as thoughts are quicker than speech.

Concurrent think aloud (CTA) method asks participants to verbalise their thought processes as they carry out a task. This is thought to provide a valid representation of the participant's short-term memory at that time. Retrospective think aloud (RTA) method asks participants to recall their thought processes whilst they carried out a task. This combines accessing short term and long term memory. Concurrent data collection gives the sequence of thought processes as well as the content and provides the closest connection between thoughts and verbal report when verbalisation is spontaneous. The longer the time gap the higher chance for inferential bias, but RTA has the advantage of potentially providing logic inference and strategy explanation thus providing a more complete picture of reasoning.

Think aloud technique (both concurrent and retrospective) has been used across many fields (including engineering, computing, psychology and social sciences), but the majority of studies have been simulations rather than in a real world environment (e.g. Funkesson et al. 2007 - nurses' decision making when dealing with pressure ulcer prevention, Junnola et al. 2002 – nurses decision processes about cancer patients). More recently, this lack of real world research has been recognised with regards to clinical decision making and a number of studies including Ribeiro et al. (2010) have attempted to record think aloud in a natural environment.

Although CTA has some advantages over RTA, the timing and location of a decision to place an IUC is unpredictable and the use of CTA was not considered feasible, therefore RTA was used for this study.

The limitations associated with RTA are that there is the risk that participants may provide incomplete or inconsistent information or they may unintentionally augment information by using long-term rather than short-term memory (Ericsson 2006). In order to limit the level of long-term memory utilised, the RTA data was gathered within four hours of the decision being made. This time frame was identified in the pre-pilot work as the minimum amount of time realistically required to arrange the RTA session to fit in with clinicians' daily schedules. This time limit was tested during the pilot study and found to be the shortest feasible time limit.

The aim of the RTA interview was to capture the decision processes about the specific decision under discussion; to discover how the clinician had met the patient, what their involvement was and how and why they had reached the decision that the specific patient would benefit from an IUC. The RTA interview was not aimed at investigating wider beliefs and experiences.

4.4.2 Semi-structured interviews

The second qualitative method of data collection was semi-structured interviews, which were to collect opinions and personal experiences of the clinicians making the decision to use an IUC. All clinicians were invited to take part in a semi-structured interview, however it was not possible to undertake these interviews with 10 out of the 30 clinicians due to unavailability for a number of reasons, including moving jobs, sickness, going on maternity leave and workload.

Semi-structured interviews are a widely used method where the researcher can gain responses to an agenda of open-ended questions, but the participant has input into the time and attention given to each area (Green and Thorogood 2009, p94). Both the interviewer and participant have the freedom to pursue avenues of interest in more detail (Britten 2006, p13).

A combination of pre-set questions and follow-up probes were used in order to encourage clinicians to tell me what was important to them, but also to maintain boundaries and keep the interview relevant to the research question. The interview schedule provided the foundations for the semi-structured interviews, but each one developed in slightly different directions depending on the clinicians own beliefs and priorities. The semi-structured interviews provided the flexibility required to explore this topic where there is little previous work, allowing “new questions to emerge as relevant avenues of information are suggested” (Kelly 2010).

4.4.3 Inclusion and Exclusion Criteria

The following criteria were used to include or exclude decisions from the study:

- Inclusion
    - ➢ any case in the study area where the decision has been made within the last four hours to place an indwelling urinary catheter on a patient aged 18 years or older

- Exclusion criteria
    - ➢ any case where the patient has previously had an IUC within the last 48 hours
    - ➢ any case where the decision to catheterise was made over four hours previously
    - ➢ any case where the patient is under 18
    - ➢ suprapubic catheterisation
    - ➢ intermittent catheterisation

4.4.4 Pilot Study

A pilot study was undertaken to check the feasibility and usefulness of the methods chosen. In particular, the availability and willingness of clinicians to participate in the study and the reality of finding out when the decision had been made to place an IUC were under scrutiny. The pilot study helped to refine the finer details of the study such as the best place in each department or ward to undertake interviews. Fortunately, no alterations to the protocol were required and the pilot study transitioned into the main part of the study without any problems. The data gathered in the pilot study (the first five RTA interviews and the first three semi-structured interviews) was included in the results with remainder of the study.

4.4.5 Participant information sheets and Consent Forms

Participant information sheets (PIS) and consent forms were developed (Appendices B and C). The PIS forms explained the study and the role of clinicians who chose to participate, outlined any risks in taking part, provided contact details and ethics approval details. The consent form gave a list of boxes for the clinicians to initial if they consented to take part in the different aspects of the study. Both forms were developed in line with university and NHS guidance.

Although these forms required careful thought to ensure that all ethical and practical aspects of the study and the clinicians' involvement were taken into account, it was not a particularly complex process due to the nature of the study. There was no requirement to address potential cognitive or language limitations that participants might have and no risks of participation were identified.

4.4.6 Sample

Interpretive description states that however large the sample size, it will not be "representative" in any meaningful sense (Thorne 2008, p88). In order to establish an appropriate sample size and sampling procedures, interpretive description recommends that "there is no fundamentally right way to sample, but rather we conduct our study on the basis of some transparent sampling logic and report on our findings in keeping with what we understand our sample to represent" (Thorne 2008, p89). The aim of this study was not to make statistically generalizable conclusions, but to better understand the range of factors that influences how and why clinicians make the decision to place IUCs. interpretive description states that studies should aim to demonstrate Representative Credibility by ensuring that the claims made in the findings of the study are consistent with the data sampled.

When considering sample size, Thorne (2008) suggests that the researcher needs to consider what knowledge is needed and the options for getting as close to the knowledge as possible in a way that is ethical. It is also advised that time and resources should be considered when deciding on the scope of the study and that the problem can be reasonably tackled with the resources available.

One of the reasons that the research question in this study was limited to decisions made in acute medical care was that it was anticipated that decisions made in surgical care or outside of acute care would be substantially different, and addressing the broader question would be beyond the scope of the resources available.

Convenience, purposive and theoretical sampling approaches can all play a role in interpretive description. Although the intent of Interpretive description, is to uncover clinically relevant knowledge rather than undertake formal theorising, aspects of theoretical sampling, such as gaining maximal variation as patterns emerge from early data, have proved useful (Thorne 2008, p91). This provides another example of where interpretive description is happy to adopt useful tools from other methodologies. Similarly, purposive sampling, often used in phenomenology and ethnography, can be used to identify potentially rich sources of data. The use of convenience sampling is recognised as a pragmatic option, but comes with a warning that the sample might skew or limit findings and this must be considered during the interpretation of results (Thorne 2008, p89). It is worth noting that there is considerable confusion in the literature on the differences between purposive and theoretical sampling, and it seems that the two descriptors are sometimes used interchangeably (Coyne 1997).

The sampling approach used in this study would most accurately be described as purposive. Patton (1990, p182) stated that all qualitative sampling is purposeful and lists 15 strategies for finding information rich cases, including selecting deviant cases or confirming cases. In this study, clinicians were asked if they had made the decision to place an IUC within the last four hours, and, if they had, there was no way of knowing if the decision would deviate from other decisions in some way or would confirm what had already been found. However, during the design of the study, clinical areas where it was likely that the decision to place an IUC would be made were identified and deliberately chosen in order to maximise the chances of achieving an adequate sample size across a range of clinical environments.

The data collection took place in the emergency department (ED), medical assessment unit (MAU), older people’s medicine and stroke (OPM&S) wards and cardiology wards of a 1200+ in-patient bed general hospital. These units were chosen to provide data from different parts of patients’ journey through the hospital. Initially, when any decision was made to place an IUC within one of the data collection areas, during a data collection period, the case was included in the study (depending on clinician availability). Following preliminary data analysis from the early cases, a purposive sampling approach was used to ensure that decisions made for a variety of reasons (for example measuring hourly output or end of life care) are used, plus any particularly complex or data rich cases were chosen. Additionally, it was decided before data collection began that if a clinician made the decision to place an IUC for the same reason more than twice, further cases would not be included to ensure a breadth of data. This situation did not arise.

Preliminary data analysis took place concurrently with data collection to assess when the needs of the study were met. All decision makers were asked to take part in the semi-structured interviews. If the decision maker made more than one decision captured by think aloud, they were only asked to undertake the interview once.

30 RTA and 20 semi-structured interviews were undertaken. This number is higher than that of most healthcare related think aloud studies reported in the literature. This is because the majority of published studies collected data on the numerous, varied decisions made by a few clinicians during routine care. However, this study gathered data on single decisions made by numerous people for a variety of reasons. For this reason, the length of each RTA interview was shorter than in most published studies.

The sample size was increased during the study (following a substantial amendment with NHS and local approval – Appendix D) from 20 to 30 RTA interviews. The increase was deemed to be beneficial in order to gain a wider variety of decisions from different areas, professions and for different indications. The sample of 30 did not provide saturation as described in grounded theory literature. True saturation would have been difficult to achieve with the range of possible decision combinations. However, the sample size provided sufficient data to meet the objectives of this study and by the final stages of data collection, there were no significant new themes being found during the analysis process.

4.4.7 Quality Issues

The assessment of quality in qualitative research is an area that has been much debated. In particular, attempts to apply measures of reliability and validity traditionally associated with quantitative work have been rejected by some researchers (Robson 2011, p155). Lincoln and Guba (1985) and many others have adopted the terms credibility, transferability, dependability and confirmability. However, others argue that rejection of traditional terms devalues qualitative research by suggesting that it is “unreliable and invalid,” (Morse 1999).

Thorne (2008, p223) states that, “Various qualitative theorists have synthesised sets of general principles that are more or less accepted across the qualitative spectrum.” It is from these principles that evaluative criteria that can be used to assess are derived. The four criteria are as follows,

- Epistemological Integrity – ensuring that the research question and objectives are epistemologically in alignment with the process of data collection and interpretation,
- Representative Credibility – demonstrating that theoretical claims are consistent with sampling of the phenomenon, universal inferences are not claimed for small (or large) sample sizes,
- Analytical Logic –evidence of the reasoning processes used to interpret the data is accessible and interpretation is grounded in the data,
- Interpretive Authority - interpretation fairly represents the data and bias is accounted for.

Thorne (2008)

These criteria will be addressed throughout this work. This chapter has already considered Epistemological Integrity when discussing the fit between interpretive description and the research question and methods and Representative Credibility in explaining how the sample was selected. Analytical Logic will be addressed in the explanation of the process of thematic analysis and Interpretive Authority will be considered in the reflexivity section of this chapter and in the Discussion Chapter. Beyond these evaluative criteria, interpretive description accepts, “that there is considerable value in recognition of some kinds of knowledge as probable truth (Johnson 1996, Kikuche & Simmons 1996), or the best that we have available until we are confronted with compelling reasons to abandon it” (Thorne 2008, p230). The concepts of validity and generalizability and their applicability to qualitative research have been much discussed and interpretive description recognises that although searches to find absolute truths are unlikely to be rational, probable truths can provide a pragmatic and valuable contribution. This issue will be examined in relation to this study in the Discussion Chapter.

4.4.8 Ethical considerations

Ethical approval was given by the University and the NHS REC committee. The NHS letter of approval is given in Appendix E.

There were no benefits for the participants other than the opportunity for their opinions to be heard. There were no anticipated risks to participants. If a participant was at any time uncomfortable discussing their practice or a particular case, they had the option to terminate the interview or continue to another discussion area without providing a reason. This was made clear in the introduction to the interviews.

It was decided that, in the unlikely event of being informed of practice that was deemed to have serious or life-threatening consequences during the interviews, respect for confidentiality would need to be balanced with concern for the patient and the clinical manager of the ward or department would be informed in order to decide the most appropriate course of action. Fortunately, this situation did not arise.

4.4.9 Data Storage

Data was transcribed by the researcher. It was stored in electronic form on a password protected university computer in a password protected data file. Any paper versions were shredded and disposed of as confidential waste. A master file of signed informed consent forms has been maintained in accordance with University and Trust guidance.

4.5 Data Collection

4.5.1 Entering the Field

Following informal discussions with department managers and senior nursing staff and being granted a research passport, I undertook pre-pilot shadowing in the hospital where the study will take place**.** Written notes were taken. The aim of this was to observe how the clinical areas function, when IUC decisions are likely to be made and by which clinicians, to inform the detailed design of data collection found below. The clinicians with whom I discussed the study were supportive of both the aims of the study and the proposed methods.

During this period, I was allocated an Internal Collaborator, who was a senior clinician in the Emergency Department. We had several meetings to discuss the practicalities and theory behind the proposed study. His suggestions on the finer points of the data collection methods and introductions to other key staff proved to be invaluable, as was his enthusiasm for the importance of the topic of the study.

4.5.2 Observational Preparation

In each clinical area, field observations were made and recorded both for individual decisions and about the area more generally. When considering the clinical environment, particular attention was paid to several key factors:

- Lay-out of the area, whether there were small bays and side rooms or large bays. Where were the nurses' stations/clinical stations situated and how many were there?
- How many members of staff were there? What was the ratio between registered nurses, medical staff, allied health professionals and support staff? What was the ratio of senior to junior medical and nursing staff? Did nursing and medical staff have separate or joint rooms for breaks?
- Did the area appear to be busy?
- How was the area organised?
- How did staff interact with each other? How did nurses refer to medical staff? How did medical staff refer to nurses?
- How did the staff interact with me? Did they have time to speak to me? Were they interested in the research?
- What was the age and physical ability of patients?

This period of observation provided useful contextual information for undertaking both the data collection and analysis. A brief overview of the findings from this observation are provided in the Results Chapter.

4.5.3 Data collection period

Data collection took place between March and September 2013, with a break during August whilst NHS ethics and site Research and Development approval was given to increase the sample size from 20 to 30 RTA interviews. Data was mainly collected between 9am and 4pm during weekdays, although collection was also undertaken at weekends, on a Bank holiday and at night. It became apparent during the course of the first few collection periods that the best time for collecting RTA data was around lunchtime when staff had been at work for several hours, had completed ward rounds and decisions to catheterise had recently been made.

4.5.4 Retrospective think aloud (RTA) interview protocol

The following protocol was used:

- Where possible, staff (clinicians and ward clerks) were introduced to the project at department meetings. The RTA process and semi-structured interview was explained, information sheets and consent forms distributed (Appendices B and C) and a folder was pinned to the notice board to collect completed consent forms. As attendance to staff meetings was limited, a poster (Appendix F) including contact details was displayed in staff areas and additional information sheets and consent forms were made available. A minimum of one week was given between displaying the poster and starting data collection to allow ample time to read and consider the study and ask any questions.

- Data collection periods were discussed and agreed with ward/department managers, allowing for different times of the day and night, on week days and weekends. The clinical directors of each department were informed of when data collection would be starting.

- Quiet rooms/areas where data collection can take place were identified for each session.

- In each data collection period, the wards and departments were visited and I informed the nurse in charge that I was present. In each area, available clinicians were asked if the decision to place an IUC had been made within the last few hours. Care was taken not to interrupt direct patient care.

- When a decision had been made and the clinician had agreed to participate in the study and signed the consent form, they were asked to provide a brief reason for the catheterisation (e.g. monitor urine output). If it appeared to be a data rich case fitting with the purposive sampling requirements (initially all decisions), then the clinician was asked to spend 5 to 10 minutes undertaking retrospective think aloud within the time frame of 4 hours post decision.

- In a quiet area/room, the clinician who made the decision was asked to retrospectively think aloud to recall their decision making process and the context of the case. It was explained to patients that the focus of the interview was the specific decision and not wider views. A schedule for the RTA process is provided in Appendix G.

- The session was digitally recorded and written notes taken. The data was transcribed. Data was anonymised (for the participant and patient) during this process. Each decision was given a case number.

- 30 RTA interviews were undertaken.

4.5.5 Semi-structured interviews with clinicians

All RTA participants were invited to attend a semi-structured interview where they were encouraged to describe their experiences and provide more detail about the context of the decision making environment.

The interview schedule was developed to include an explanatory introduction, initial ice-breaking questions and topic questions. It was found quickly that the ice-breaking questions were not required and that, as time was usually limited, they were not used.

The literature on IUC use, decision making and quality improvement, combined with the research question and objectives were used to devise the schedule. Open questions were asked and care was taken not to introduce bias with leading questions. Topic questions were developed to dig gradually to greater depths of detail about clinicians' IUC related beliefs and experiences. Although probe questions varied between each interview, the schedule was shown to be a good tool and remained unaltered through the data collection periods.

The following protocol was followed:

- The Semi-structured interviews were introduced at the same time as the think aloud process.

- Staff who participated in an interview session were asked if they were happy to participate in a think aloud session and, if so, a mutually convenient time was be arranged and, where possible, a room was booked for the session to take place within four weeks of the retrospective think aloud session.

- The clinicians had already consented to take part in the semi-structured interview and were reminded of this and asked if they were happy to proceed.

- The schedule presented in appendix H was used for guidance during the interview session.

- The data was transcribed. Data was anonymised during this process.

- The decision case number will be used for identification.

4.5.6 Overview of the interview process

Overall, the clinicians interviewed (and many others with whom I had discussions) were interested and enthusiastic about the research topic. When told about the research they almost all expressed views, some fervently, on catheter use. Many made jokes about the unglamorous nature of the study, but agreed that such issues were fundamental to care and that it was essential to get practice right. Only a couple of clinicians did not feel that there was a problem with current practice. However, many more believed that the sub-standard practice took place outside of their own work environment.

Many clinicians were interested in my background and why I was undertaking the study. There was some suspicion, usually expressed humorously, that I was from “management.” One physician asked if I was there to “Find the naughty doctors” and a nurse who I knew from nurse training called out to a colleague I was about to interview, that, “It’s OK, she’s one of us!” I frequently reiterated that the aim of the study was to understand the decision from the clinicians point of view and that there were no right or wrong answers. Despite this, on several occasions, once the recorder was turned off, I was asked by concerned interviewees “Was I too outspoken?” Reassurance was given that they had not been too outspoken and that their words would remain anonymous.

Any reluctance to be interviewed was generally put down to time restraints or a dislike of being recorded. When initialling the consent form, some of the clinicians paused to read carefully the section on data use. All interviewees were reassured before interviews that any data used would be anonymous. Some interviewees appeared slightly nervous throughout the interview, with regular glances at the digital recorder, but most soon appeared to forget that they were being recorded and relaxed into an easy conversation and some appeared from the start to relish the chance to share their views.

The RTA interviews were short, only a few minutes. This was because there was a time restrictions and, if staff were available at all, they could often only spare a few minutes. The RTAs took place in the clinical environment, usually in a quiet corner of the department, but sometimes at the shared desk or in a staff room. When asked to describe the decision making processes behind individual catheterisations, the responses were often fairly sparse, describing routine decisions. This was particularly the case if the indication was to monitor urine output. For many of the responses, there was an element of that’s the way things are done around here, in which case getting more detail could be difficult and this was re-visited during the semi-structured interviews.

The semi-structured interviews were longer (10-30 minute) and tended to take place further away from the immediate clinical environment, for example quiet desks or empty offices. In the case of consultants (nurse and physicians), quiet office space was generally available and the interviews were usually pre-booked at a convenient time. The luxury of time and space seemed apparent in the more reflective nature of some of the consultant's interviews (although this could also have been due to higher levels of experience). The consultants were generally keener than others to debate the wider issues that using catheters addresses, such as reducing delayed discharge and the psychosocial aspects of having a catheter.

Different aspects of reasoning and decision making were revealed by the two different types of interview. The RTA interviews usually presented decisions as black and white, with a high level of clinician certainty, whilst the semi-structured interviews addressed the grey areas, spectrums of views and how clinicians make sense of uncertain situations. However, the RTA interviews revealed the use of combined indications (where two or more indications were used to make the case for IUC use) whereas the semi-structured interviews alone would not have revealed this aspect.

4.6 Data Analysis

Interpretive description uses inductive analytic processes to reconstruct the data, in order to gain new understandings of the clinical phenomenon being studies. Interpretive description borrows analysis techniques such as constant comparison and the use of memos from other qualitative methodologies, but does not provide a "cookbook" guide to analysis. Instead, guidance is provided on what is required to understand the nature and meaning of the study in hand, and to ensure that research design decisions remain coherent with the original intention of the study. Interpretive description places an emphasis on conceptualising the findings. Thematic description, "can 'show' the audience how elements within the larger phenomenon can be ordered and organised to reveal aspects that would have been obscured through any other presentation framework" (Thorne 2008, p173).

The data was coded, analysed and interpreted to provide a thematic summary of the phenomenon in order to interpret the data. Thematic analysis was chosen as it is a flexible approach and can be focussed on the research question and objectives, it is suitable for a novice researcher, it allows movement between the inductive and deductive aspects of analysis and provides a means of transforming large quantities of data into useful results. A disadvantage of thematic analysis is that it can be remain descriptive, with little attempt at interpretation (Robson 2011, p477). Efforts to avoid this pitfall were made during the process of analysis, as is demonstrated in the results and discussion.

Data analysis took place alongside data collection. The interview data collected was transcribed within a few days and the analysis process began immediately. Morse (1994, p225) describes four steps of cognitive processes that produce the conceptualisation that interpretive description requires. These can be adapted to this study as follows,

- Comprehending – learning everything about the decision, starting with data collection, but continuing through analysis and holding off from making judgements
- Synthesising – combining factors or events to describe patterns, decontextualizing individual influences and finding common features
- Theorising – suggesting possible explanations and questioning the data using insights from external sources
- Recontextualising – communicating what has been found in a form that might have relevance in other contexts

These processes were broadly followed in this study. The data was collected in order to understand as much as possible about the phenomenon of IUC decision making in the context of the wards where data collection took place. The data was broken down using codes and then re-built into themes using the patterns and relationships found. The literature review provided ways of organising, describing and explaining the influencing factors and decision making processed that were found and these findings were examined and presented in a way that might have relevance in other settings or for other questions. The remainder of this chapter focuses on the first two of these processes (comprehending and synthesising) in the form of thematic analysis. The processes of Theorising and recontextualising are described in the Results and Discussion Chapter.

Data from both the RTA and the semi-structured interviews were analysed together in this method, but the influence of each method was noted during memoing and the subsequent development of themes and is discussed in the Results Chapter.

The four quality evaluation criteria used in interpretive description are presented at the beginning of this chapter. Analytical logic is demonstrated in the explanation of the coding and interpretation processes described here. Thematic analysis of the transcripts was undertaken in order to identify manifest and latent themes emerging from the data (Marks and Yardley 2004, p57). The coding frame was developed with the research objectives in mind, whist being open to unanticipated themes. The key aims of the analysis was to explore associations between attitudes and behaviours, explain key decision influencing phenomena, generate ideas and theories and identify classifications of mechanisms affecting practice. The literature review provided sensitising concepts be used to inform the analysis, but not limit emerging concepts.

It was noted that the misinterpretation of frequency is a potential pitfall of qualitative analysis. “Although “always” and “never” are unlikely, credible research reports do guide the reader to understand whether a particular conceptualization derived from a strong majority of cases, a particularly influential case, or the researcher’s suppositions based on available evidence within a limited data set” (Thorne 2004). This highlights that the data collected is situated in a particular time and place with individual clinicians and provides insight into what influences them. Although it can provide insight and ideas, it is not generalisable to wider populations.

Various software packages are available to assist with the analysis of qualitative data. I decided, as a novice researcher, not to use one of the packages in order to carry out the process myself and familiarise myself with all aspects of analysis.

4.6.1 Comprehending

The interviews were transcribed into tables with three columns; one for the text, one for initial codes and one for emerging themes (example provided in Table 9).

Theme	Data	Code
Retention Clinical Environment	So in ED one of the most common ones would be if someone was massively shocked, they’re not peeing and you need to record their fluid balance, erm they’ve come in acutely confused and they’re clinically in retention, or you’ve bladder scanned them and they’ve got a massive bladder maybe something like 750mls and they’re not PUing then you’d pop a catheter in. And the other common one is a fractured neck of femur, obviously they need a catheter, and you may as well put it in down here for nursing issues as they’re going to need it post op anyway. Sometimes occasional ones where people have got massive pressure sores and people are soiling themselves then you might want to put one in for pressure area care, but that’s not really down here more up on the wards, but if its obvious its going that way then you might as well just bosh one in down here, but don’t tend to make that decision down here a lot. We don’t really put many in down here, mainly just fractured neck of femurs are the ones where I tend to put them in.	Sepsis Cognitive Retention Scanner “Pop a catheter in” NOF Pressure sores “Bosh one in” Comparison with other wards
	What about, because I know you have been on the wards fairly recently, is there any difference between there and the ED with the attitude towards using a catheter?	
Clinical Environment Resources	I think where you’ve got more time to think about it and you’ve got more time to wait for more elderly people to PU you can wait longer and longer and bladder scanners are easier to get hold of so you’re not just going on your clinical decision, so you can make a more objective, you know you’ve got numbers and you can wait for a longer time, whereas here you have to make a decision quite quickly and you just have to go for it and not mess around, if you think they’re going to need a catheter then just put one in and get them up to the wards.	Time Age Scanner Clinical judgement Time/decision
	And does that influence your decision?	
Contingency avoidance	I think so, because they’re going to disappear off to MAU and they may not be seen for 12 hours and if they’re, are they in retention, aren’t they in retention I’m not quite sure, they might be left for 12 hours, no-one will see them and they’ll have a bladder the size of the planet and be really uncomfortable and it’s really cruel.	Retention Time Patient comfort

Table 9. Example of Early Coding

After transcription, the data from each interview was read and re-read repeatedly. Initially, simple codes were used to label all data that could potentially be relevant to the phenomenon. Even at this early stage some of the transcribed interview was not coded, for example my introductory question or any participant responses that were clearly not related to the phenomenon in question.

In addition to the initial coding, a file of memos was developed as themes emerged and patterns and relationships became apparent. Memos were written from the transcription of the first interview onwards, added to and refined as new examples of the phenomenon being explored were found. The memos were used to ask questions, find patterns between codes and to develop and elaborate on themes and their dimensions (Table 10).

1	Job not done: “Whether it’s recorded all the time, it’s sometimes hit and miss” (D30 SS) – it’s said in a tone of “ that wouldn’t happen in my profession” by doctors in a slightly disparaging way about nurses. Some defend it with busyness reasons, but others clearly think well if I didn’t get bits of my job done then I’d be in trouble – a “can’t get the staff” feeling. Varies between wards.
2	Risks of use are often risks of not using. There’s a clash between indication and risk for example, use a catheter because of decreased mobility, but using a catheter will decrease mobility. Use a catheter because of UTI sepsis, but can cause UTI. Use because of frailty, but is a bigger threat to the frail.
3	“obviously it’s not without risk” (d30 SS) – a common statement about catheters – it’s unspecific and general , not personal to the patients, and seems to imply that the risks are minimal rather than probable.
4	Removing Risk to clinician – much easier to know that you were wrong not to put a catheter in than wrong to put one in.
5	Workload “because it can only add to your work load later if you’ve popped it in, take it out and they then go into retention later in the shift” (D30 SS)
6	Hourly outputs: “and if he wasn’t going to need hourly urine monitoring then I imagine he might be able to self-catheterise” (d29 RTA) – are hourly outputs really needed? Could the amount not be measured every 2-3 hours?
7	“pop a catheter in” – pop suggests a quick, benign procedure. It minimises the event. What if it was replaced with “aseptically insert”? would people feel differently about it? Is this the language that clinicians use with patients?
8	“on other wards” - a culture of them and us, of being apart from the rest of the hospital, of having special requirements and needs. Especially in ED.

Table 10. Early memos

4.6.2 Synthesising

The development of themes and sub-themes (see Table 11.) was guided by the objectives of the study. The objectives provided a focus for the study, but did not set an expectation for specific findings or provide a framework for analysing the data. The literature review provided some “sensitivity codes” for memo development (e.g. satisficing decisions where the decision-maker knows that the decision is probably not the optimum solution but will be satisfactory in the circumstances or the use of clinical mindlines to develop clinicans’ beliefs). Other memos were developed without any prior knowledge of any related research or theory, for example the use of catheters to avoid contingencies.

A process of re-coding and memo writing helped to separate “what ideas are core to the phenomenon and which is more usefully understood as context” (Thorne 2008, p158). For example, a clinician expressing an opinion that a group of staff are generally overworked or unreliable provides context to why the decision is made, but a clinician expressing a concern that without a catheter a patient will not be properly cared for because the ward that they are going to is understaffed is core to understanding the core issue. Identifying the norms, values and beliefs that lead clinicians to decide that placing a urinary catheter made sense was the overarching aim.

As themes were established, each interview transcript was examined for relevant data which was put in a table by sub-theme. The data was broken down using codes and re-built thematically, as Table 11 demonstrates with the example of sub-theme Patient Gender. Where relevant, the quotes were grouped by interview type (semi-structured or RTA) and by individual clinician and by clinician group (physician or nurse, and then clinical environment) to assist with interpretation and finding relationships or patterns.

Patient Gender	I think there is definitely a difference in attitudes towards the catheterisation of patients depending on male or female, mostly because almost none of the nurse on the ward can catheterise the males so it’s then left to the doctors who are of course always very busy. And so if it’s a female catheter to happen then there’s a lot more yeah just crack on put it in, they don’t question it so much, but if I as a nurse identified a male patient I thought needed a catheter there seems to be a lot more questioning around it especially because it then requires the doctor to put it in. There’s always more reticence to catheterise the males, they’ll say oh just try him again with a bottle and I think perhaps because a man can pass urine with a higher level of comfort in the bed with a bottle than a female with a bed pan then arguably when doctors are very happy for us to catheterise women with less evidence of them needing it, sometimes the assumption is made that they’re actually clinically in retention rather than just unable to release their bladder on a bedpan because it’s uncomfortable and undignified. So there is definitely different attitudes to the different genders I personally think. D8 SS OPM&S Staff Nurse Erm, when we trained as nurses, I don’t ever remember doing any training to catheterise a woman I think we just picked it up on the ward and you’re free to go off and try it and do whatever, but of course catheterising a man is completely different. Since I’ve been catheterised I’ve been trying to get on a catheterisation course and that would be much easier if I could do it, but I can’t and that’s a bit of an issue. D10 SS ED Staff nurse Female tend to be more nursing, but male catheters are done usually done by the doctors. D17 SS MAU Registrar I think with females it’s not so bad because everyone can do that,

	but with males they can be more reluctant because there's no-one on the ward who can do it. I mean that man on MAU we'd asked for him to be catheterised the day before and no-one had done it and we asked for it again the next day so. D21 SS MAU Registar I've never understood that about male and female catheters. I've put a handful of female catheters in, yet I've put hundreds of male catheters in, yet I would class a female catheter as more difficult and yet it's the other way round for nurses. D26 SS ED consultant physician

Table 11. Example of quotes grouped by theme and interview type

If a piece of data was relevant to more than one theme then it was replicated wherever relevant. The data could then be viewed from different angles to gain various perspectives. For example, the following excerpt could be considered useful in several different themes; different clinical beliefs, the use of alternatives to indwelling catheters or the impact of patient age on decision making.

> "I've worked with consultants who don't mind using in and out catheters for retention, but I've worked with consultants who think they are not appropriate, especially in an elderly population with damage to the urethra if they're not properly popped in and out, so they're not particularly happy with you using them." D30

This process was the core analytical process where the "mindwork" (Woolcott 2009) took place. During this process it became apparent that the important factors could be grouped into four inter-related themes of what influenced clinicians decision to place an IUC. Those factors were the clinician making the decision and their beliefs and values, the patient, organisational factors and the clinical environment where the decision took place. The process of how clinicians used the influencing factors with the themes to reach the decision was considered with reference to the decision making theories and models in the literature review. After lengthy emersion in the process of data analysis, there was one theory which stood out as providing a valuable description of the way that the clinicians worked; that was Weick's (2005) Theory of Sensemaking. The influencing factors and how they were combined are discussed in detail in the next two chapters.

4.7 Reflexivity

Interpretive description states that the researchers' reflections on their ideas held regarding the phenomenon of study and the design and implementation of study should be acknowledged and documented (Thorne 2008, p109) and this process forms part of the Interpretive Authority quality criteria previously highlighted. Reflexivity is commonly a component of qualitative study and, although there are various definitions of the term, it is generally accepted that it requires some form of critical self-awareness about assumptions, research design and implementation (Potvin et al. 2010). Reflective notes were maintained throughout this study, particularly throughout the period of data collection and analysis, and could be divided into two key areas; the influence of prior assumptions and personal impact on data collection. A brief summary of the key points raised by those reflections is provided.

Firstly, as interpretive description allows that a priori knowledge will be used to provide an analytical framework, it should be acknowledged that my knowledge and experience as a nurse prior to undertaking the study would be from the particular viewpoint of a newly qualified nurse. Indeed, my choice of interpretive description as a methodology with its foundations in nursing philosophy might have been influenced by my nursing background. The assumptions that I brought to the study had evolved from my experience as a healthcare assistant (for example, the belief that IUCs reduce nursing workload), as a pre-registration nurse (for example, nurses can be reluctant to make IUC related decisions) and from the literature review (for example, the overuse of IUCs is a particular problem in Emergency Departments). Having a priori beliefs and experiences is inevitable in nursing research. It is important that these beliefs are explored, acknowledged and taken into account in during the research process. To enable this, I actively identified my underlying beliefs and sought to challenge them during the process of research design, data collection and analysis, by seeking contradictory evidence. For example, when designing the semi-structured interview schedule, every attempt was made to keep the questions free from the influence of my a priori assumptions on the use of IUCs.

Secondly, during the course of interviewing, I paid attention to my role in the process. McNair et al. (2008) contest that reflexivity enables, “improved probing, fewer assumptions, avoidance of premature interpretation, and an accentuated sense of curiosity” when undertaking interviews. For example, I was aware that how I was perceived had an impact on the data that I would collect. In particular, I wanted to avoid the clinicians feeling judged for their decision making or beliefs. I observed when interviewees appeared more open or closed in their answers and examined the influence of my demeanour or behaviour on their responses. I found that adopting a chatty, informal, but professional manner generally prompted a more open discussion of clinicians’ beliefs.

This reflexive approach has been used throughout the process of undertaking this study to keep assumptions in check, to improve the quality of the work and even to generate ideas to aid interpretation. However, it is acknowledged that, despite these attempts, “It is not always possible to stand back and examine the effect of one’s preconceptions, especially if one is not always aware of what they are” (Robson 2011, p137).

The process of reflexivity continued during the dissemination of this work through national and international conference presentations and papers. Both the systematic review and the qualitative study reported in this thesis received considerable interest from different clinical groups (a list of presentations given and awards received for the work included in this thesis is given in Appendix I). The feedback and questions that clinicians and others have raised regarding this work provide a further source of ideas and beliefs that assist with reflection.

4.8 Summary

The choice of methodology and methods for a study should be dictated by the research question and objectives. This work aimed to understand clinicians’ beliefs, values and attitudes about making the decision to place IUCs in acute medical care. Therefore, this chapter explained why interpretive description was selected to guide this study, how and why interviews were used to collect the data and the approaches taken to analyse the data in order to develop thematic description and interpretation. The methods used are consistent with interpretive description and provide a logical, clinically orientated approach that allows for the critical interpretation of the findings. Quality issues are highlighted and woven through the chapter. The analytical framework provided by the literature review and research question guided the study and provided boundaries for both the data collection and analysis.

Clinicians acknowledged the importance of the topic of IUC use and were generous with their time, consenting to be interviewed and providing a rich source of previously untapped data for analysis. The results from this work are presented in the following chapter.

Chapter 5

Results

5.1 Introduction

This chapter provides the results from the analysis and interpretation of the transcripts of the 30 RTA interviews and 20 semi-structured interviews with clinicians.

IUCs are tools used for many different reasons in acute medical care. They are used to monitor, to reassure, to manage workload, to inform, to relieve, to provide comfort, to control and many other tasks. During the process of analysis, it became clear that the factors influencing the decision-making processes for each of these reasons are varied and, often, complex. Therefore, one of the key challenges in analysing, organising and presenting this data was to create an accurate, meaningful and useful interpretation of a decision that is influenced by such a broad range of factors.

In order to assist with meeting this challenge, the findings are derived using the perspective and boundaries provided by the research question and objectives (b) and (c):

- to explore the factors that either promote or inhibit the decision to place an IUC
- to examine the decision making processes of individual clinicians

The final objective (to use the results from the previous objectives to consider how the practice of IUC use could be influenced) is covered in more detail in the Discussion Chapter.

The practice of IUC use is explored, clinicians' motivations, goals and priorities are identified. The impact of clinicians' beliefs, experiences, work environments, relationships with colleagues, available resources, workload and numerous other factors that inhibit or promote the use of IUCs is considered.

This chapter starts with an overview of the interviews, including details of the profession and seniority of the clinicians who made the decisions, the clinical area in which they worked and the reason they gave for their decision. The second, and main, part of this chapter is the presentation of the interpretation of the data through the development of five key themes and their associated sub-themes derived from analysis of the data. A model of the inter-relationships between the themes is presented (Figure 3. Section 5.3) and the findings for each theme are presented in turn.

The fifth theme, Making Sense of the Decision, uses Weick's (1995) work on sensemaking as a framework to assist in explaining how clinicians used cues and processes from the other themes to arrive at a decision.

Where notable differences between the data from the RTA interviews and the data from the semi-structured interviews were found, this is highlighted and discussed. The majority of the quotes given come from semi-structured interviews. This is partly because the semi-structured interviews were substantially longer than the RTA interviews and partly because the focus of this study is not on specific incidences of decision making, rather clinicians beliefs, opinions and experiences. However, it is worth noting that some findings would not have been made without the use of the RTA interviews, for example the use of combined indications to support one decision to place an IUC. Furthermore, data from the RTA interviews provided valuable assistance in moulding the semi-structured interviews.

5.2 Overview of interviews

Table 12 shows where and by whom the decisions were made. Nearly half of the decisions were made in the Emergency Department (ED). Nearly three quarters of the decisions were made by physicians. The semi-structured interviews are indicated in brackets.

	Emergency Dept	Medical Assessment Unit	OPM&S	Cardiology	Total
Consultant Nurse	1 (1)	0	0	0	1 (1)
Sister	0	0	2 (2)	0	2 (2)
Staff Nurse/nurse practitioner	3 (2)	0	2 (2)	0	5 (4)
Consultant Physician	6 (3)	2 (2)	1 (1)	0	9 (6)
Registrar	3 (2)	4 (2)	2 (1)	2 (1)	11 (5)
Junior physician	1 (1)	0	1 (1)	0	2 (2)
Total	**14 (9)**	**6 (4)**	**8 (6)**	**2 (1)**	30

Table 12. Summary of where and by whom decisions were made

Of the thirty decisions made, 18 were for men to receive catheters and 12 for women. All patients were aged 60 or over, except two, both women, one in her 20s and one in her 50s.

The semi-structured interviews were undertaken with twenty clinicians. Fortunately, clinicians from all clinical areas and professional groups were represented in the semi-structured interviews, although it was noticeably more difficult to get time with the registrars due to their workload.

This information is provided in order to give context for evaluating the data analysis and interpretation later in this chapter. It does not provide a representative sample of where and by whom catheter decisions are made. Instead, it highlights that the majority of the interviews were provided by senior and mid-level physicians who work in the areas of the hospital dealing with patients in the first few hours and days of their admission. It is likely that this does reflect where decisions to place catheters are most frequently made, but this data can neither support nor rule out this assumption.

Table 13 shows the breakdown of where decisions were made by the indication provided as the reason for catheterisation. In OPM&S, it was stated that all but one of the catheters were placed to relieve retention. ED and MAU had a wider variety of indications, including almost a quarter of catheters placed for more than one reason (combination). Only one catheter was placed purely for patient comfort and only one to manage urinary incontinence (UI), however both of these indications were present in combination with other indications. Protecting skin integrity was not stated as an indication by itself, but was combined with other indications, e.g. monitoring output, skin integrity and patient comfort. A total of seven IUCs had combined indications.

	Emergency Dept	Medical Assessment Unit	OPM&S	Cardiology	Total
Output	6	2	1	1	10
Retention	3	2	6	-	11
Comfort	1	-	-	-	1
Incontinence	-	1	-	-	1
Combination	4	2	-	1	7
	14	7	7	2	30

Table 13. 30 stated indications from RTA interviews

A more detailed overview of each decision (patient gender and age, reason for admission, reason for catheter and who made the decision) is provided in Appendix J.

5.3 Themes and sub-themes

The processes of coding, analysis and interpretation described in the Methods Chapter led to the identification of five themes and fourteen sub-themes of factors and processes that influenced the decision to place an IUC (Table 14.)

Theme	Description	Sub-themes
1. Clinical Environment	Where the decision took place	
2. Individual clinician's beliefs	Clinicians' beliefs about when a catheter should be used (including inappropriate use and removal), alternatives to using a catheter and formative experiences of catheter use	Retention
		Output
		Skin
		Urinary Incontinence
		Combined indications
3. Individual Patient	How individual patient factors influence decisions	Age
		Gender
		Patient/carer opinion
4. Organisational and professional influences	How do wider organisational and professional factors impact on the decision?	Resources
		Professional differences
		Organisational priorities and policies
5. Making sense of the individual decision	Making sense of the risks and benefits of catheter use	Making life easier
		Avoiding contingencies

Table 14. Summary of themes and sub-themes influencing the decision.

The themes did not influence decisions in isolation from one another. There are inter-relationships and overlap between many of the themes and sub-themes within the model. For example, the decision to place an IUC to maintain skin integrity might be linked to patient gender, resource availability and organisational priorities. The division of factors into themes and sub-themes is an artificial abstraction to aid understanding of the individual influences at play. In reality, the decision to place an IUC is often complex and multi-factorial. Where there are prominent inter-relationships and patterns between themes, these are highlighted and discussed. Figure 4 illustrates the relationships between the five themes identified.

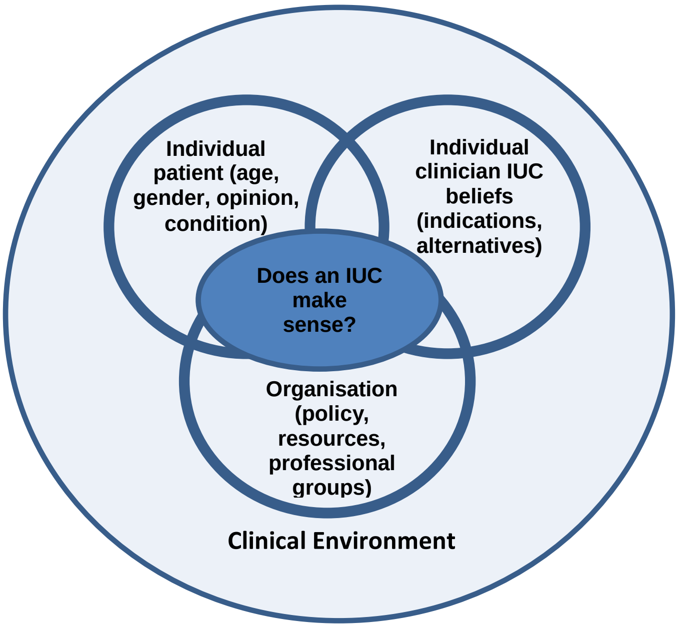


Figure 4. Influences on placing an IUC

The presentation of these findings, including Figure 4, is described as “conceptualising through thematic description,” where “The thematic summary can ‘show’ the audience how elements within the larger phenomenon can be ordered and organised to reveal aspects that would have been obscured through any other presentation framework.” (Thorne 2008, p173).

Figure 4 illustrates how clinicians combined IUC-related beliefs, with their understanding of the patient in front of them and their experience of the background of organisational culture, pressures and boundaries. These factors were used to make sense of the decision they were making within a specific clinical environment. Different decisions took different cues from each theme, giving different weights to each area. Each of the themes and their inter-relationships are explored in depth.

5.4 Theme 1 - Clinical Environment

The clinical environment theme (i.e. the ward or department where the decision took place) weaved its way through the other themes and influenced how clinicians made sense of almost all of the decisions. The clinical environment dictates where the patient is on their hospital journey, how well the patient’s social/physical/cognitive status is known to staff, how clinicians perceive time pressures, how they relate to colleagues and the resources available. Junior and mid-level physicians, most of whom had recently changed their clinical area of work, confirmed that they used different cues to make decisions depending on where they were. For this reason, the theme of clinical environment provides the background to the model and is entwined with the other themes.

The pervasive influence of clinical environment means that it is important to understand the structure and workings of the clinical areas where data collection took place and a summary of the variations between them. This description of the clinical areas is not an attempt at “thick description” as described by Gertz (1973) forming part of the results themselves, rather it is an important contextual background to frame the findings from the data. This description comes from a mixture of sources, including hospital data (e.g. number of patients seen annually), fact-based information provided by clinicians and other staff (e.g. clinician training programmes and staff ratios) and my own observations made and recorded in a note book during field work. Whilst this description does not form part of the data analysis or interpretation, it does provide context that would be advantageous to appreciate when reading the interpretation. I have attempted to make the description as objective and value-free as possible, it is however appreciated that even my choice of what to describe will inevitably contain bias to what I find important.

Finally, returning to results from the data, a summary of what the clinicians saw as the variations between the clinical environments is given. These findings are illuminating by themselves, but they also provide decision-making context for the remainder of the chapter.

5.4.1 Emergency Department (ED)

The main department comprised a “Majors” ward of 23 bays and a separate 4-bedded resuscitation area (resus). The ED treats almost 200 adults on a daily basis.

It was the noisiest of all the departments, with patients frequently being moved in and out, regular tannoy announcements asking for staff or informing of incoming patients, sometimes noise from distressed or confused patients. Many patients had relatives, friends or carers with them. Police officers and security guards were also in regular attendance.

The ratio of physicians to nurses is high. During the day, there might be four or more consultant physicians, plus several registrars and junior doctors in majors alone, plus usually two consultants (nurse or physician) in resus. The department had three nurse consultants who work alongside the physician consultants, almost 30 nurse practitioners in addition to staff nurses. In contrast to other departments, there were no healthcare support workers. Several physicians commented that the nursing staff was highly experienced and knowledgeable. Nursing staff were heavily engaged in undertaking observations and tests, including taking blood samples and undertaking ECGs. Because of the nature of the department, the amount of time spent on nursing tasks such as washing and assisting with oral intake was low.

Time was key within the department. At the entrance to Majors was a large patient information board with a senior nurse who acts as the department co-ordinator noting the time of admission of each patient and when they need to leave to avoid breaching the 4 hour target for patients to be seen, treated, then admitted or discharged in ED. At busy times, a queue of patients on trolleys quickly developed at the entrance to Majors, and it would not be unusual to see between 3 and 10 trolleys in a line acting as a glaring reminder that patients need to be dealt with and moved on. Unsurprisingly in such a fast-paced environment, patient names were not usually used and patients were referred to as the reason they are there and their bay number (e.g. “the hip lady in bed 7”).

5.4.2 Medical Assessment Unit (MAU)

The MAU comprised four main, purpose built rooms off a central corridor. With the exception of four isolations rooms, the patients’ beds were all visible to a desk area which is in the centre of the large rooms. The unit treated adult patients with all manner of medical conditions who have either come through from the Emergency Department or have been sent by their GPs. The unit admits just under 20,000 patients per annum. There was a high volume and rapid turnover of patients with a guideline of a maximum of a 48 hour length of stay, although in practice this is regularly exceeded. There was pressure to move patients out of the unit either to be discharged or to another area of the hospital.

There was a higher ratio of physicians to nurses than the wards, but not as high as ED. There are health care support workers working alongside the trained nurses. It was considered a high pressure area for junior and mid-level physicians due to the wide variety of patients. For both nurses and physicians the high number of admissions and discharges was one of the key challenges.

The unit was quieter than the ED, but with more on-going activity than a normal medical ward. Many patients had friends, relatives or carers waiting with them.

5.4.3 Older People’s Medicine and Stroke (OPM&S)

OPM&S was for patients aged 65 and over and is spread over several wards. Data was collected in the acute medical and acute stroke wards. The wards were similar to each other in lay out, with corridors leading to large multi-bedded bays and single occupancy rooms. The wards had around 30 beds each.

The acute medical wards provided generalist geriatric care with patients usually admitted from MAU. The acute stroke ward provided care for patients in the first six weeks following a stroke, with patients coming from ED or admitted directly on to the ward. In both areas there was a high ratio of nurses to physicians, and the high number of physiotherapists and occupational therapists on the stroke ward was noticeable.

The relationship between nurses and physicians appeared to be traditionally hierarchical, with physicians doing paperwork together, and had far less interaction with nursing staff when compared to ED and MAU. Senior nurses appeared to have a management, rather than hands on patient-care role. Nurse specialists such as infection prevention and tissue viability were present in an advisory capacity.

The stroke ward had a bay for critically ill patients, often being thrombolysed and on a schedule of frequent observations. The stroke ward seemed to have a higher number of relatives in attendance. In talking to staff, one of the key differences between the acute stroke ward and the acute medical ward was that before having a stroke event, patients arriving on the stroke ward were often medically well, whereas patients on the acute medical ward often have chronic conditions. It is likely that this has an impact on expectations for the long-term needs of patients and how clinicians view their requirements and future prospects. Walking around the wards, the acute medical wards appeared to have a higher number of patients who were very elderly, appeared frail and appeared to have cognitive impairment.

Compared to ED and MAU, patients appeared to have less visitors and visiting times were more restricted. Visitors were more visible on the acute stroke ward. The acute medical wards were generally quieter, with less non-ward staff.

5.4.4 Cardiology ward

The cardiology ward had around 30 beds, mainly single–occupancy rooms, with some small bays. Patients were a mixture of cardiology and other acutely ill medical patients.

Unsurprisingly, many patients had continuous cardiac monitoring with a bank of monitors at the nurses station.

The nursing staff was the most visible professional group, with physicians often quite difficult to locate. I did not speak to a consultant physician during data collection periods. It was the only ward that used physician assistants. The number of specialist nurses and allied health staff appeared to be lower compared to OPM&S wards. The ward appeared quieter and calmer than other areas. Visiting hours were restricted.

5.4.5 Variations between the clinical areas

The influence that the clinical and cultural (e.g. goals, priority setting and resource levels) differences between the areas had on IUC decision making was striking and will be considered throughout the results. However, variation in time pressure was noted by the majority of the clinicians interviewed as the key distinction between the areas and is worth discussing separately. Data supporting this theme came from both the RTA and semi-structured interviews.

The comparison most frequently made was between ED and OPM&S. A widely expressed view was that compared to the ED there was more time in OPM&S wards to assess the need for an IUC by watchful waiting or further assessment as described by a junior physician in ED.

> “I think where you’ve got more time to think about it and you’ve got more time to wait for more elderly people to PU you can wait longer and longer whereas here you have to make a decision quite quickly and you just have to go for it and not mess around, if you think they’re going to need a catheter then just put one in and get them up to the wards” D29 SS ED Junior physician

A culture of making numerous decisions rapidly in order to move patients through the system quickly was apparent in the ED. Several clinicians observed that the decision to place an IUC in ED was often part of a bundle of care, often routine and taught to junior doctors as “part of their ABCDEs” (D21 MAU registrar).

Whilst some clinicians accepted quick decisions as part of the culture of the ED (and to a lesser extent, MAU), others considered it to be short-term thinking, potentially with negative consequences for staff, patients and the Trust:

> "In MAU you're just looking at the short term, you're inserting that catheter you're achieving what you want to achieve, but it's looking at the long-term. I mean we've got to TWOC *[Trial Without Catheter]* these patients and perhaps we'll have to wait for their bowels to be open before we TWOC them and that might be a couple of days to get bowel care and everything sorted, then you TWOC them, then they don't pass urine, and you're thinking retention and encouraging them and it ends up increasing their hospital stay as well." D19 SS OPM&S Sister

The limited time spent in ED and MAU not only restricts the amount of time that can be spent on making a decision, but according to some clinicians also means that the goals and priorities of those areas are focused on short-term considerations. The influence of time limitations and clinical focus can be seen throughout the next four themes.

5.5 Theme 2 - Individual Clinician's Beliefs

This theme focuses on clinician's IUC related beliefs (Figure 5.), including indications for placing an IUC, alternatives to using an IUC and risks associated with IUCs. Clearly, these beliefs are fundamental in influencing clinicians' decision making.

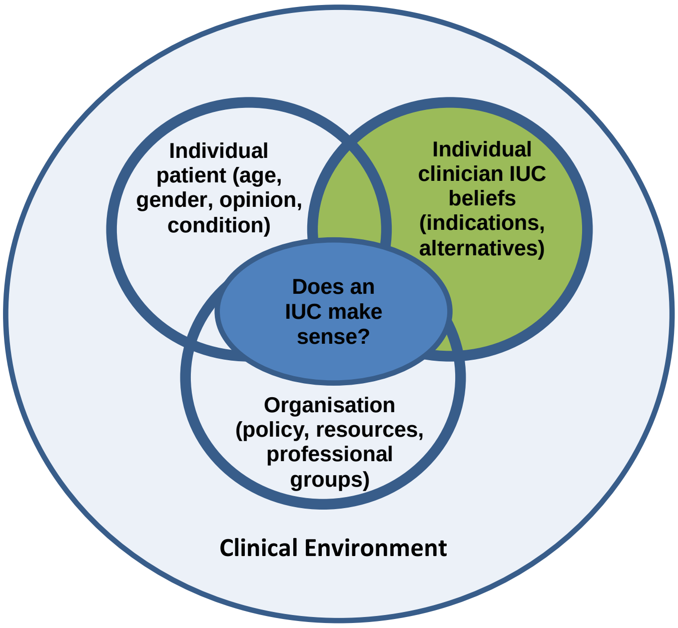


Figure 5. Influences on placing an IUC highlighting - individual clinicians' beliefs

Clinicians were asked when they believed the decision to place a urinary catheter was justified and what in their clinical area were the most common reasons for catheterising. This generally led to a discussion on the range of indications, where the decision was not black or white and how their views differed from the views of others or had changed through the course of their careers or in different clinical areas. The subject of alternatives to IUCs was rarely brought up by the clinicians, but they were asked their opinion on options such as pad weighing and intermittent catheterisation. They were also asked about their views on the risks of using IUCs.

The RTA interviews revealed that clinicians combine indications to justify the use of an IUC. It is unlikely that this would have been identified through the semi-structured interviews. Conversely, topics such as uncertainty of when to use an IUC to relieve urinary retention would not have come to light using just the RTA interviews as clinicians tended to not to express any lack of confidence in their decision making for specific patients.

5.5.1 Urinary Retention

Relieving acute urinary retention (AUR) was the most common reason for catheterisation overall. Most of these decisions occurred in OPM&S (six out of 11) and the other five in ED and MAU. Six out of a total of seven catheterisations in OPM&S were for this reason. The underlying causes of AUR were believed to be constipation or infection.

The key themes found for the decision to place an IUC for AUR were:

- variation in the physical markers indicating catheterisation for AUR is required
- fear of the consequences if AUR is not treated

There was a high degree of uncertainty expressed by many physicians on when a patient required an IUC for AUR, both when using a bladder scanner and when not. Typically, clinicians questioned whether a bladder scanner reading showing between 300 and 500mls of urine was enough to warrant catheterisation, and whether physical symptoms of discomfort needed to be present. Many physicians (both junior and senior) expressed a desire for greater clarification of this topic. This was articulated by an OPM&S consultant physician,

> “From my point of view if someone is peeing, but they’ve got a 300-400ml residual and their kidneys are fine, but they’re partly emptying their bladder and they are comfortable then I’ve got more and more happy just to leave it then treat what the cause is and speak to urology and you know if it’s prostatic or whatever, give them something to… but sometimes it is a bit tricky you do a bladder scan and they’ve got a residual of 200 and everyone’s very twitched to get a catheter in.” D11 SS OPM&S Consultant Physician

Typically, clinicians claimed that they were more likely leave a patient without a catheter for longer compared to their colleagues,

> “I think some people are more inclined if clinically they have symptoms, pain in their tummy, a palpable bladder, they haven’t passed urine its fairly obvious even if the bladder scanner says 300ml some people would tend to put one in, whereas I tend to err on the side of give them every chance and I think anywhere from 500 and above would probably be a reasonable amount, I mean they’re not completely accurate you could get a little bit more or a little bit less.” D30 SS OPM&S Junior physician

Clinicians stated that, compared to their colleagues, they were more likely to wait longer to catheterise to relieve AUR. This suggests that they recognised that catheterisation sometimes takes place too early. However, one clinician reported catheterising a patient to find a residual volume of only 100mls in the bladder, but leaving the IUC in situ as he felt there was a risk of the patient going in to AUR in the near future and did not want to re-catheterise. This clinician anticipated that AUR was likely to occur and made the decision that leaving the IUC in place would reduce his workload on a busy night duty.

Fear of missing AUR and the potential consequences appeared to be at the forefront of clinicians’ minds (particularly physicians).

> “Having worked for a bladder surgeon that had to deal with the consequences of not dealing with acute retention. It is disaster if it’s missed.” D12 SS ED Consultant Physician

Clinicians in ED and MAU recalled examples of patients who had been harmed due to missed AUR.

> “Yes, when somebody had a residual volume of nearly a litre and nobody had examined their abdomen and they were in urinary retention and we needed to send them to urology, then yes” D6 SS MAU Consultant physician

Age was highlighted as a risk factor to missing AUR.

> “We’ve had patients referred in with abdominal pain, for some reason not going for surgery, and nobody had examined their abdomen or spoken to the patient and had put them down as being confused because they were elderly and they weren’t

> confused, they were in pain and nobody was listening to them and they were in huge amounts of retention.” D17 SS MAU registrar

The use of intermittent catheterisation (IC) to relieve AUR was not mentioned by any of the clinicians. When asked if they would consider IC for this purpose, the overall view was negative. In general it was felt that the underlying cause of UR needed to be dealt with, probably taking a few days, therefore an IUC was the most appropriate option in order to avoid repeat catheterisations. IC was considered to be problematic for three key reasons; repeat of urinary retention, lack of staff time to carry out multiple catheterisations and patient discomfort/harm. Most clinicians reported a lack of experience with using IC. Junior physicians were influenced by their seniors’ attitude to IC use,

> “Yes, I’ve seen them used a couple of times I think that’s probably management lead on what they prefer you to do. I’ve worked with consultants who don’t mind using in and out catheters for retention, but I’ve worked with consultants who think they are not appropriate, especially in an elderly population with damage to the urethra if they’re not properly popped in and out, so they’re not particularly happy with you using them. I haven’t had a great deal of experience with using them to be honest.” D30 SS OPM&S Junior physician

Other clinicians cite lack of staff time as a barrier to using IC.

> “Ideally, of course, everybody should be having intermittent catheterisation not an indwelling catheter, but there’s no way we would be able to do that. Even patients who do that at home, they self-catheterise, they come in and they drop their function and they end up with a permanent catheter, because that can’t be maintained. And sometimes they deteriorate and then can’t manage. It is definitely an area we need to be better at.” D11 SS OPM&S Consultant physician

The combination of uncertainty on when an IUC is needed and fear of the consequences of missing a patient with AUR could well lead to over-zealous use of IUCs. Clinicians welcome the extra information provided by bladder scanners when available, but remained anxious about their decision making. A spectrum of beliefs was held on the usefulness and practicality of IC as an alternative to IUCs that suggests the topic warrants further discussion.

5.5.2 Monitoring Urine Output

Monitoring urine output was the second most commonly given for placing a catheter, given in ten out of 30 decision interviews. The majority of these decisions (eight out of ten) were made in ED or MAU. Generally, clinicians wanted an accurate measure of fluids coming out of a patient in order to assess their condition and to adjust treatment accordingly. Unsurprisingly, it was predominantly a physician made decision to catheterise for this reason.

Two key grey areas were identified for this indication. In what circumstances is it beneficial to monitor a patient's urine? And, if monitoring is required, is it important that an IUC is used or could another method be adequate? These questions were highlighted by a consultant physician in MAU.

> "I suppose along the lines of sepsis, where you've got an acute kidney injury, but you're not entirely sure whether you're going to need to monitor the urine output and that can sometimes be dependent on how, whether you think you're going to be able to monitor their urine output in other ways, so if perhaps are you going to be able to close enough nursing to monitor every time they go on the commode and if they're not hypotensive and if you're not going to be doing aggressive fluid resuscitation, so you know that borderline between infection and sepsis, so that can be a bit of a judgement call sometimes" D6 SS MAU Consultant physician

Some physicians felt that the grey area was fairly narrow and that most physicians would agree on the same course of action when presented with the same facts.

> "The medical indication is generally agreeable, if you see someone who needs an input output chart and they need to be monitored then I think nine out of ten of the consultant teams would agree that was what was needed" D30 SS OPM&S Junior physician

However, others believed that there was variation and some groups of physicians are more likely to want to know urine outputs than others. Unsurprisingly, renal physicians were found to be in this group.

> "I certainly have experienced with the renal doctors, they seem to insert a catheter at a much lower threshold when you want to refer somebody to the renal team, they'll always ask what's their hourly urine output" D6 SS MAU consultant physician

Sepsis was the most frequently cited condition that was seen to require urine putput monitoring. The recent drive to improve the management of sepsis (e.g. the Surviving Sepsis Campaign) has promoted achieving a urine output of > 0.5ml per Kg as a therapeutic goal of treatment of severe sepsis and septic shock. This was raised by several ED physicians.

> "I think the whole country could improve the way in which we manage sepsis there's good evidence that what we call goal directed therapy can show good benefits and if somebody is septic and requiring IV fluids to prop up a blood pressure, concurrently to the fluids going in and antibiotics going in then we should be thinking about catheterising so we can watch what goes in and what comes out." D22 SS ED Consultant physician

This clinician went one to remark that it had to be an "active decision" not to catheterise a septic patient in ED. However, another ED consultant physician expressed the opinion that there was a lack of knowledge over when a patient was septic (and probably does not require urine output monitoring) or severely septic (probably requiring output monitoring)

> "The problem is that most people don't call sepsis sepsis when it's sepsis and don't call severe sepsis severe sepsis when it's severe sepsis and there's a whole sort of advertising thing going on at the moment to get people to understand sepsis better because actually a septic patient doesn't need a catheter, because your septic patient is your 25 year old lying on the sofa with a UTI, that's sepsis. But catheters should definitely be considered in the severe sepsis category. I think the answer is no, catheters shouldn't be used for sepsis, but they should be considered in severe sepsis, but I don't think that people know what sepsis and severe sepsis – not everybody knows that." D26 SS ED Consultant physician

The Surviving Sepsis Campaign International Guidelines for Management of Severe Sepsis and Septic Shock (2012) use a blood serum lactate level of four or higher as a marker of severe sepsis. However, as the same ED consultant physician highlights, patients with this marker vary considerably in presentation.

> "You do get severely septic patients whose lactates are five, but actually their blood pressures are alright, they're only a little bit tachycardic, they're quite well and they're chatty, then they can pee in a bottle for you quite nicely, but they're still severely septic because their lactate is 4 and a half, so you don't necessarily need to put a catheter in that patient, you could get them to pee in a bottle." D26 SS ED consultant physician

A nurse consultant in ED observed that although guidelines provide straightforward rules, practice not only varies by patient clinical presentation, but also by patient demographics.

> “I mean if you follow the guidelines then it’s very objective, it’s very black and white, someone gets a tick in this box therefore they have got severe sepsis and get a catheter. But in practice someone can tick one box but no others and remain, you know you think actually they’re pretty well and supportive medicines will be OK here. And others tick one box and look really crook and you think subjectively you think a lot more is going on with this, this one who ticks a box is more likely to crash and burn than this one so I might have a lower threshold for putting a catheter in this one than that one because ….. So in short, although there are some objective criteria there’s always a degree of subjectivity put in that and I think added to that there will be individual clinical variation and also within that there will be the demographics, you know some groups rightly or wrongly, we’ll feel less keen to put a catheter in than others.” D3 SS ED Nurse Consultant

The need to catheterise for monitoring output was sometimes queried by nurses. One staff nurse in ED commented,

> “If a patient’s difficult to catheterise they sometimes say oh don’t bother we don’t really need it now and you think either she does or she doesn’t.” D10 SS ED Staff nurse

This nurse said that this was not an opinion she expressed to her physician colleagues. However, one more senior nurse in OPM&S reported directly questioning the need for the catheter.

> “I’ve challenged, I’ve said do we really need this catheter. The doctors. For measuring output. But then you’ve got to weigh up what’s the best interest of this patient? You know, what information do we need form this patient, what information can’t we get without a catheter, why do we really need it. And I have to say that I’ve been overruled and I’m not happy with that, I’m not happy to do it. But if you’re saying that’s what you want then …but I’m getting to the stage now when I would challenge more.” D19 SS OPM&S Sister.

As this nurse points out, when the decision has been made the urine output needs to be monitored, the next question is does it require an IUC to do the job. Two factors arose here; how closely does the output need to be monitored and if another method is used, will it be effective? The general view was that alternative methods such as using urine bottles, pad weighing or otherwise collecting patients' urine were usually not satisfactory. Two key reasons were given for this. Firstly, as the following comment from an ED consultant physician summarises, it was felt that alternative forms of measurement were not accurate enough,

> "I think you need to know, it's all well and good to say I'll collect their urine specimens but you're never quite sure you're going to get all of it if they wet the bed and that 20mls per hour difference can be the difference between them actually having an adequate urine output or not. And someone where their urine outputs low you need to know exactly how much they're producing." D12 SS ED Consultant physician

Secondly, time was considered to be an influencing factor. Waiting for a patient to pass urine, rather than measuring urine being drained from the bladder, was not considered to be sufficiently proactive.

> "If there is one in it's because they're hypotensive or their kidney function has gone off therefore we need to be much more responsive rather than waiting four hours or whatever to weigh their pad." D11 SS OPM&S Consultant physician

However, another ED consultant physician, whilst agreeing that some patients do require strict monitoring, drew attention to the comfort provided to physicians by hourly numbers on a urine output chart provided by a catheter with a urometer attached, and that it might not always be necessary to monitor so closely.

> "Yes, I think if you get oh I had a trickle at 8 this morning and it's now 8 at night and they haven't pee'd since, then they need really strict monitoring of their urine output and maybe they've got an acute kidney injury, you know what I mean, then that's a different category of patient, but you don't have to just throw catheters at people to get the 5ml, the 10 ml when actually they're telling you that they're peeing really good volumes and their renal numbers are OK. So it doesn't matter, but it's easy for doctors isn't it, you know it can be written on a chart and it looks really neat and you know that they're producing. If you look at a chart and they've got a hundred mls, two hundred mls, three hundred mls then they're weeing and it's OK, but if it's 80mls, 5mls, 70mls then that's different and they need very close monitoring." D26 SS ED Consultant physician

In MAU, a consultant physician remarked that non-clinical factors were taken into account in the decision to place an IUC. If he felt that the level of nursing care did not meet the necessary level to ensure urine output was monitored without the use of an IUC that would influence his decision.

> I probably wouldn't make the decision just on the level of nursing, but it would probably be one of the things that I would take into account. Having said that, you can put a catheter in, ask for hourly urine outputs and get them every four hours as well, so…." D6 SS MAU Consultant physician

Some areas were seen as worse than others at monitoring urine output with or without a catheter. It seems a reasonable assumption that if specialist clinicians who meet patients in MAU and follow them to wards (for example renal specialists) believe that patients are unlikely to be carefully monitored without an IUC then they are more likely to request that an IUC is placed.

> "Sometimes it's difficult, we're better here on this ward because that's what we're meant to do, but certainly on wards where you've just got Out to Toilet or you know or weeing in a bottle but it's not been recorded." D21 SS MAU Registrar

It appears that the default action with many acutely ill patients is to make the decision to place an IUC, with little consideration given to how important it is to know precise measurements or the potential for using alternatives. These actions are often directed by care pathways such "Six Steps to Surviving Sepsis." Several senior clinicians asserted that clinical judgement should be used above guidelines to make the decision, but also reported that they frequently followed guidance without giving alternative options much thought. The consultant physician (D26) quoted above also admitted "I really don't think about the decision at all."

5.5.3 Using a catheter to protect skin integrity

Using an IUC to protect skin integrity provided a wide range of strongly held opinions. At one end of the spectrum were a minority of clinicians who stated that if the patient was incontinent of urine an IUC should be placed to protect skin integrity where there was no existing skin damage. For example, a nurse practitioner in the ED

> "For comfort and, you know, skin integrity because what we don't want is for her to be passing urine and to be sat in it when she moves on to somewhere else and that's why we catheterised her really." D2 RTA ED Nurse practitioner

This view appears to be tied into the management of urinary incontinence with the protection of skin legitimising using a catheter for this purpose. This was a view shared by some physicians,

> And our beds are not geared towards comfort, they're geared towards being mobile so it's not a great environment for someone who's wet with potential pressure areas and lying in their own wee, so…. D12 SS ED Consultant

> "It would be for management of her pressure areas because we wouldn't be able to control her urinary continence otherwise without having a urinary catheter in." D4 RTA MAU Registrar

However, this opinion was only found in clinicians in the ED and MAU. A more commonly held view was that if there was existing damage and the patient was not easily continent, then it was reasonable to use an IUC. This is illustrated by a registrar in MAU.

> "Oh, I would put a catheter in for skin protection, definitely if they've got bed sores and they can't get to use a bedpan or have any difficulty with mobility then I would put it in for that, because I've seen pressure sores get quite bad from that. And then you can sometimes be, erm, how available the staff are, whether they can get to the patient quick enough." D17 SS MAU registrar

Again, there is a link to how urinary incontinence is managed and the implication that the catheter would not necessarily be required if the staff were able to provide optimal care. As this care is provided by nursing staff, then it's unsurprising that the use of IUCs for skin protection can be a source of conflict between nurses and physicians. Several physicians appeared uncomfortable with IUCs being used for skin integrity that they believed was the result of sub-standard nursing care, but believed it was a pragmatic solution to the problem.

> "Often the reason urine burns happen is because they aren't being cleaned properly, I would hope that we would be able to manage that in a better fashion here in the hospital, but I'm also not naïve enough to realise that that is always the case. And so those who have already got significant burns and it's going to make it much worse and more painful I think there's a very high rationale to use one to allow recovery time for the skin". D22 SS ED Consultant physician

The language used by physicians when discussing this indication could be revealing. The use of the word “genuine” in the following quote from a junior physician suggests that there are cases when skin integrity is used as the indication without real clinical need.

> “I think if it is genuine skin integrity and you could be introducing an infection there then that’s a risk we’d probably remove, the benefit would outweigh the risk in that case” D30 SS OPM&S Junior physician

At the other end of the spectrum are clinicians, all in OPM&S, who believed that using an IUC for skin integrity is very rarely a good indication for placing an IUC. Only one clinician stated that maintaining or improving skin integrity was never a good indication for IUC use, a sister in OPM&S who felt strongly that IUCs are overused for this reason.

> “That is NOT a reason to put a catheter in. I just think that is just an easy option. If a patient is constantly wet and they’ve just got a leaking bladder well you need to consider, we’ve got pads for that which are very absorbent and if we are doing our regular checks and if we are doing what we are supposed to be doing and we have the time to provide that level of care then that shouldn’t be a problem.” D19 SS OPM&S sister

Two key factors appeared to influence where clinicians views on using IUCS for this indication fell on the spectrum. Firstly, a difference between nursing and medical staff, with nurses generally expressing more desire to improve patients’ comfort by managing urinary incontinence and protecting skin. Some medical staff agreed with this view, others (and a minority of nurses) felt that was unnecessary with good nursing care. The second factor was probably had more impact on practice and that was whether the clinician (nurse or physician) was in ED/MAU or OPM&S. There was generally more resistance to IUC use for this indication in OPM&S.

The language used when discussing skin integrity is worthy of note. The most common skin related problem was consistently described as “pressure” related. Not one of the interviewees referred to moisture lesions, incontinence associated dermatitis or any other similar description. Frequently, “protecting pressure areas” or a similar phrase was used to indicate preventing urinary incontinence related damage. Clarifying the language used and the causes of pressure damage and the causes of urine related damage could be important if attempts were made to optimise the use of IUCs to prevent skin damage.

5.5.4 Urinary incontinence

Using an IUC for managing urinary incontinence is controversial and has been much discussed. Few clinicians stated that they considered urinary incontinence (UI) alone a justifiable reason for placing an IUC. However, many clinicians recognised that they are used for this reason ("I think there's still a lot of usage of catheters for incontinence." D11 OPM&S cons). It appears that it might not be professionally acceptable to say that it makes sense for a patient with urinary incontinence to have an IUC, but is considered a practical, pragmatic option in some circumstances. It was also frequently combined with other indications to provide the justification for an IUC (see Combined Indications section below).

Only one clinician stated that he had made the decision to place a catheter due to UI alone, and that was at the patient's request.

> "He's become incontinent of urine and he's basically requested a urinary catheter before he came in and really wants to have one just to stop him having accidents with the furosemide which is obviously needed because he's fluid overloaded with his heart not pumping as well as we would like. So basically on patients request to manage symptoms and make his life a little bit easier is why we'd want to put a catheter into him." D17 RTA MAU Registrar

However, it was also a significant factor in many other decisions. For example, in decision 16, it was combined with poor mobility and desire to maintain patient dignity with a patient receiving diuresis.

> "OK, so she's an elderly lady who I met in the A&E department who is septic, she's also got an element of fluid overload, so she needs some diuresis, we're going to give her some furosemide, but because of the sepsis she's not going to manage to get to the commode or the lavatory so for a practical point of view and her own dignity I felt a catheter was appropriate." D16 RTA ED Registrar

One ED consultant physician stated that he would place an IUC in a critically ill patient to avoid the risk of incontinence whilst moving the patient between clinical areas.

> "If you're transferring someone for example to CT that's critically ill, I would be more likely to catheterise someone than not simply because you've got a patient who is potentially going to wet themselves in the CT scanner and the that's going to cause problems for the CT scanners, it's going to cause problems for the

> patient, you don’t want them lying in their own urine.” D12 SS ED Consultant physician

Again, there was a difference in views expressed by ED /MAU and OPM&S staff. Members of the ED/MAU staff were more likely to state that IUCs to manage UI were a pragmatic option, particularly mentioning older patients and poor mobility.

> “Now if you’ve got somebody who is very elderly, very immobile, maybe bedbound and leaving them in damp wet clothing where you know it would be more pleasant in a way for the patient to have a catheter in to facilitate their nursing care. I think that’s justifiable. Erm it can be argued.” D13 SS ED Consultant physician

The above quote acknowledges that the issue can be argued either way. A consultant nurse in ED reflected on the motivation for catheterising a patient with UI, suggesting an IUC makes life easier, but for who?

> “A confused patient, perhaps in a bed, immobile, repeated bed changes and linen changes and everyone’s saying actually wouldn’t it be easier to put a catheter in because this patient’s remaining incontinent of urine and this is perhaps the fourth time we’ve changed him in the six hours he’s been with us. So it’s trying to weigh that up against are we just, why are we doing this, is it the right thing for the patient?” D3 SS ED Consultant nurse

There was acceptance that it might not be optimum practice, but was an unavoidable reality.

> “More likely, in terms of them being doubly incontinent etc, because they become difficult to manage otherwise. And I don’t necessarily think that’s the right answer, but it’s a practicality of life unfortunately.” D12 SS ED Consultant physician

Factors influencing the use of an IUC for UI included the mobility level of the patient and whether there was enough nursing staff to assist with toileting.

> “If there are issues in terms of their mobility and what the nursing staff situation is, that would influence my decision” D4 SS MAU Registrar

It was striking that many staff in both ED /MAU and OPM&S had strong opinions about the use of IUCs to manage UI in other clinical areas, believing the care in their own area to be superior. Some ED physicians commented that patients are likely to get catheters when they go to the wards so they might as well have one now. However, in OPM&S staff (both nurses and physicians) tended to consider that placing an IUC to manage UI was unacceptable and carried out for the benefit of staff rather than the patient.

> “Why have they got a catheter? Yeah, I mean we have a couple of independent patients that come up with them that I feel they should have been taken out long ago, you know that kind of thing, but we take them out pretty quickly up here.” D14 SS OPM&S Staff nurse

> “You know you’ve seen it in the notes incontinent of urine plus, plus therefore catheter inserted with no discussion and no, and actually that’s just a bit lazy really, and that certainly shouldn’t happen.” D11 SS OPM&S Consultant physician

However, there were exceptions in OPM&S, for example when a patient was administered IV diuretics for heart failure.

> “For a patient who’s old and frail and in heart failure, to sit in litres and litres of urine all day, or to have to get up and down when they’re already in heart failure often puts them under quite a lot of stress. To have their pad changed 7 or 8 times a day … it’s a balance of risk and benefit isn’t it.” D11 SS OPM&S Consultant Physician

This is perhaps the most controversial indication for using an IUC. It appears to be usually combined with a more professionally acceptable indicator (e.g. output monitoring) and given as an additional rather than sole justification. However, it is also combined with less quantifiable, more subjective indicators such as patient dignity and comfort. Patient and carer opinion were given more weight than with other indications and this is the only indication where there was the likelihood of shared decision making.

One area where clinicians appeared to use sometimes contradictory reasoning to make sense of IUC use for managing UI was when repeated pad changes were required. Whilst the majority of clinicians were adamant that IUCs should not be used for nursing convenience (i.e. to avoid repeated pad changes), (“Convenience is not a reason to put a catheter in.” D13 ED Consultant physician) they also stated that in some circumstances using an IUC to avoid repeated pad changing is justified for patient comfort and dignity issues, particularly if there are not enough nurses available.

Again, there is a spectrum of views. For example, the clinician talking about D12 stated that if there was a chance a patient would be incontinent of urine then it was reasonable for them to have an IUC, whereas other clinicians seem to believe that only after multiple episodes of UI was a catheter a sensible option, or it was not an option of UI at all. The practice of IUC use varies by clinical area allowing clinicians to deviate more or less from what is generally professed to be optimum continence care (i.e. UI should not be managed with an IUC). This is discussed further in the section on clinical areas below.

5.5.5 Combined indication

When data collection and analysis started, one of the first points that became clear is that, although lists of individual indications are used in catheter policy and guidelines, in practice two or more indications are often combined in the decision to place an IUC. This was revealed by data from the RTA interviews and would not have become apparent from the semi-structured interviews alone.

Tangible indications, in particular, monitoring urine output, were frequently combined with less tangible indications (e.g. patient comfort, protecting skin). Seven of the 30 decisions described in retrospective interviews were combined indications. However, it is possible more than seven of those decisions were influenced by factors linked to more than one indicator, but the clinician only stated one. In interviews of this type, clinicians are likely to state what they consider to be culturally acceptable (within their environment, profession and the situation).

The indications most commonly combined with another was the desire to manage urinary continence. This occurred even when the patient was normally continent of urine, particularly if IV diuretics were being administered. One registrar in MAU concluded that the patient would be more comfortable with an IUC,

> "So basically she was just going to pee a lot and she was very frail and we needed to monitor how much urine was coming out and also for her more in terms of comfort, because if there was continuous wee then she'd be quite wet." D4 RTA MAU registrar

The promotion of patient dignity was cited by this registrar,

> "She needs some diuresis, we're going to give her some furosemide but because of the sepsis she's not going to manage to get to the commode or the lavatory so for a practical point of view and her own dignity I felt a catheter was appropriate." D16 RTA ED Registrar

The view that it was safer for the patient not to have to mobilise to the commode or toilet whilst they were receiving diuretics was also expressed.

> "I was on cardiology before this so a lot of people were on infusions and diuretics so it was essential to know what was coming out, also safety wise to make sure they weren't getting up and down all the time while they were on diuretics." D30 SS OPM&S Junior physician

The desire to manage urinary continence was tied by the clinicians to patient comfort, dignity or safety. This view of an IUC as a pragmatic aid to an ill patient was summarised by a consultant physician in ED,

> "So they may get a catheter just because they're crook and they're breathless and can't get up to get to the commode or whatever, and we've given them a diuretic and maybe it's best that we stick a catheter in." D26 SS ED consultant physician

A clue to the unstated use of combined indications was clinicians' views on when IUCs would be removed. During the RTA interviews, clinicians were asked when they anticipated that the IUC that they had decided to place would come out. The question was asked to illicit more detail about their reasoning for the initial need for the device. The usual response was along the lines of "when they don't need it any more." What was notable was that the reasons the clinician gave for when the catheter would probably be removed often were not the same as the reasons given for initially putting it in. This was particularly the case in very ill patients who had a IUC inserted to measure urine output, but clinicians frequently referred to mobility and self-care as factors linked to removal, for example in D7 where the stated reason for IUC insertion was to monitor urine output,

> "It'll come out as soon as she's well enough to start looking after herself" D7 RTA ED Registrar

The gap between the patient being ill enough to require accurate hourly urine output monitoring and the patient being well enough to look after herself seems wide. It is possible that the clinician making this decision had similar reasoning to the clinicians making the decisions in D4 and D16 above.

Others believed that the catheter could become a long-term device and this was linked to the patients mobility or functional ability rather than the reason given for the catheter being placed, which in the example below was to monitor urine output.

> "Erm, realistically I think it'll probably be in for a long time because he's going to rehab. It crossed my mind because I think once they're in they stay in and then he

> goes to rehab and he ends up with one. But knowing what I know of him over the last few weeks, I don’t see him getting to the stage where he walks to the toilet any time soon.” D18 RTA Cardiology registrar

This highlights that clinicians are aware that there is a risk of the IUC being placed becoming a long-term option, however it is unclear how much this influences their decision. Perhaps more importantly, it highlights an acceptance of IUCs being used for mobility, UI and patient comfort reasons. It also raises the point that making the decision to place a catheter appears to sometimes be easier than the decision to remove a catheter.

Other combinations of indications were given, including monitoring urine output combined with retention. The identification of the frequent use of combined indicators is potentially significant for the development of any IUC minimisation policies. The recognition that the decision to place an IUC makes sense to clinicians based on multiple, perhaps unstated, reasons would be relevant when designing an intervention including a list of indictors.

5.5.6 Risks of IUC use

Finally in this theme, the clinicians perceptions of IUC associated risks and the influence these beliefs had on decision making is examined . Many clinicians commented that they saw IUCs as a low risk option for solving problems.

> “So it’s the simplest way of doing things, it provides you with a quick answer and it’s relatively safe” D12 RTA ED Consultant physician

> “Regarding short-term catheters then they’re not too worried about if you pop one in, but long-term obviously not so much.” D14 SS OPM&S Staff nurse

> “Do I have to be honest with this answer do I? [laughs] To be honest I probably don’t appreciate the risk. I can’t imagine that we appreciate the risk as much as we probably should do. But as a relatively common and straightforward procedure you assume that it’s going to be a straightforward catheter, erm….” D26 SS ED Consultant physician

However, when asked about IUC associated risks, all clinicians mentioned infection as the key risk.

> “The consultants especially are quite hot on getting the catheters out just because of the unnecessary risk of infection of having it in.” D8 SS OPM&S Staff nurse

> “I suppose the thing we worry about with catheters is introducing an infection and it being a foreign body and getting infected” D9 SS Cardiology Registrar

> “You know there’s always risks about putting catheters in, introducing infection that sort of thing, so if it can be justified clinically not to put one in, then don’t put one in. Anything you do to a patient carries risk and if there are viable alternatives to manage that patient then don’t do it. Do no further harm.” D13 SS ED Consultant physician

> “You want to avoid it at every possible angle because of the risk of infection.” D19 RTA OPM&S Sister

A risk that was mentioned by around half of clinicians was trauma. There was substantial variation on whether trauma was a risk or not. Views on trauma as a risk factor appeared to depend on the clinician’s individual experiences. Some observed that male catheterisation in particular could cause trauma.

> “Men who’ve been catheterised is from lack of experience…. Not inserting the catheter properly is probably the worst thing I’ve seen, he had a balloon inflated in the prostate which was awful and required quite specialist intervention. Erm not putting the foreskin back and causing extreme discomfort.” D25 SS OPM&S Sister

However, others believed the risk from trauma to be low.

> “I think the potential for trauma without using specialist equipment like an introducer with a catheter is really minimal. I’ve never seen a significant complication from trying to insert a catheter.” D18 SS Cardiology Registrar

The potential for harm caused by short term catheters becoming long term or the catheter causing an extended stay in hospital was also mentioned by a number of clinicians, both nurses and physicians, in all clinical areas.

> “I think once they’re in they stay in and then he goes to rehab and he ends up with one.” D18 SS Cardiology Registrar

> "I mean we've got to TWOC these patients and perhaps we'll have to wait for their bowels to be open before we TWOC them and that might be a couple of days to get bowel care and everything sorted, then you TWOC them, then they don't pass urine, and you're thinking retention and encouraging them and it ends up increasing their hospital stay as well." D19 SS OPM&S Sister
>
> "The potential knock-on costs of extended hospital stay because of an infection is not to be under-estimated." D8 SS OPM&S Staff nurse
>
> "They fail multiple TWOCS and getting them out of hospital is a nightmare." D29 SS ED Junior physician
>
> "We don't think about getting them out." D21 SS MAU Registrar

One sister in OPM&S felt very strongly that the risk of IUCs was underestimated and ignored by many of her colleagues. She mentioned several potential harms that no other clinicians mentioned.

> "You've got the discomfort of the patient and you might actually be taking away that person's continence, you know, especially at this age group, you're depriving them of all of that, so you have to think in the long term as well, how is this going to affect the patient's quality of life and so on, so my main concern would be infection and basically it's putting somebody through a horrible procedure and is it really necessary?
>
> "With patients with dementia, you've got to consider are they going to try to yank it out? They yank the catheter out with the balloon still inflated, now that's high risk. And then another one's just put back in because with the trauma they might go into retention from that. You've got a patient with a UTI, with a delirium, its probably delirium on top of a dementia if you've got somebody coming to an OPM&S ward, so that's high risk and you're inserting something in someone who has a dementia, they've already taken several knocks, having an infection is going to make their dementia worse and so on. It's so serious to me. It's a big thing and my boys and girls up here need advocating for.
>
> "It sounds like I'm really against catheters, I'm not, but I just think that there are so many risks especially for our older patients that can't fight back so well, and when someone has a dementia, you're introducing yet another thing that could shorten their life span and give them something else to deal with." D19 SS OPM&S Sister

Once the interview had finished, this nurse apologised for her passionate summary of the damage that she had seen IUCs cause and the way that this damage can be dismissed by other clinicians. She asked if I thought that she had said too much. Her concern with being perceived to be too anti IUCs was interesting to note and she stated elsewhere in the interview that she had in the past disagreed with the placement of an IUC for measuring output, but been over-ruled by a physician. It appeared that she felt that she had to moderate the expression of her views on the risks of IUCs to conform to professional norms.

When weighing up the decision to place an IUC, the clinician’s assessment of risk will undoubtedly play a role. Again, a spectrum of beliefs was found. Those clinicians who feel it is a simple, low risk option are more likely to make the decision that an IUC will be beneficial compared to those who perceive far higher associated risks.

5.6 Theme 3 - Individual Patient factors

This theme focuses on the individual patient's impact on the clinician's decision making (Figure 6.). For example, all other things being equal, how would a clinician's decision differ between an seventy year old woman and a twenty year old man presenting with the same condition?

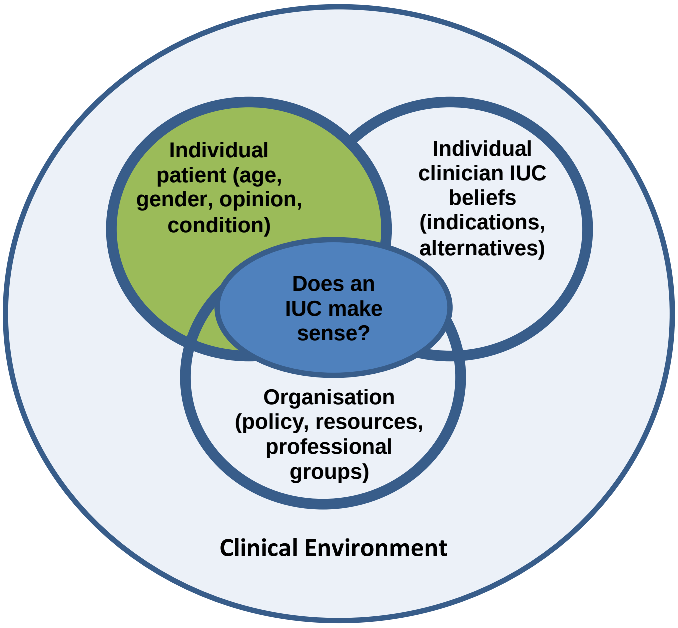


Figure 6. Influences on placing an IUC highlighting individual patient influences

The key individual patient factors that influence clinicians' decision making were identified as age, gender and patient opinion. These are factors not directly related to the indication for an IUC (e.g. need to monitor urine output due to acute kidney injury), but that nevertheless promote or inhibit the decision to place a catheter.

Patients age, gender and opinion were all topics that were alluded to in the RTA interviews, however substantially more detail was provided by the semi-structured interviews.

5.6.1 Age

All clinicians who were asked in the semi-structured interview whether or not age influenced decisions to place an IUC stated that it did.

There was a general reluctance to catheterise younger patients in ED and MAU (not relevant to OPM&S) because it was believed that younger patients objected more than older patients to being catheterised and that catheterising a younger person was not normal.

> "Oh yeah definitely, people don't like putting catheters in younger people even if they're really, really sick and shocked, people don't jump to putting a catheter in. Well, I mean a catheter in a young person….there's a massive perception that catheters are for old ladies isn't there. Catheters are for old ladies, they're not for old men or young men. Whereas putting them in little old ladies is normal, or rather putting them in little old men is normal for doctors as the nurses don't tend to put in male catheters, they're not usually trained to do that, it's just female catheters. It's completely normal, but I think it's when it's younger men it's odd." D29 SS ED Junior physician

This opinion was particularly strong with relation to young patients with diabetic ketoacidosis (DKA). It was recognised that this group of patients were often reluctant to get the emergency treatment that they needed and clinicians did not want to discourage them by placing IUC.

> "The ones where I definitely won't do it, I would never do it in a young DKA." I mean I can certainly appreciate why those people would not want to present to hospital early with diabetes if every time a young doctor was going to slip a catheter into them for no good reason, so I just say point blank do not insert a catheter until they've seen a senior doctor." D6 SS MAU Consultant physician

This was a situation where the clinician's desire to get information on the patient's response to treatment by using an IUC is overridden by the perceived greater risk of the patient not returning next time they need assistance. Furthermore, some clinicians felt uncomfortable with the act of placing an IUC with younger patients. This quote from a junior physician in ED recalls an experience which appeared to resonate with him.

> "You know, there was a guy up on the wards and he was really sick, we thought he had cutaneous anthrax or a septic joint we weren't really sure, but he was really, really, really unwell and there were massive lines going in and ITU were down there and no-one had put a catheter in this guy and he was shocked and he hadn't pu'd. It was an odd experience putting a catheter in a 26 year old guy. It was awkward for him and it was awkward for me. I was like why, I've never been awkward putting a catheter in, but I'd never put one in a 26 year old guy before. That's why it's awkward." D29 SS ED Junior physician

The fact that no-one had catheterised this patient suggests that it was not just the interviewee who was reluctant to catheterise the patient.

On the other side of the age spectrum, catheterising older patients is far more routine and everyday work. Older people were seen as more likely to receive a catheter because they are more likely to be frail and immobile.

> “The elderly sticks out a mile. So yes I think more elderly patient is much more likely to get a catheter, but I think that’s the nature of the type of conditions they’re likely to have and the type of patients they are holistically. A younger patient is more likely to be fitter and more able to get up and get out to the loo than an elderly infirm patient.” D13 SS ED Consultant physician

This was a commonly expressed view in ED and MAU. It was notable that age was the influencing factor, not assessment of mobility or frailty. It was assumed that patients who were older were likely to have issues with mobility and frailty. However, the view that older patients needed to be protected against the risks of IUCs was also expressed.

> “If it’s an elderly patient do you really want to be subjecting them to an invasive procedure? I used to work on the elderly care wards and I used to be very catheter happy, but you don’t really want to be putting catheter into some of those patients we can be a bit more gentle with them.” D17 SS MAU registrar

A picture was painted of a situation where older people were seen as needing IUCs because of their frailty, but were also at greater risk from adverse effects for this very reason.

5.6.2 Gender

Interviewees were also asked whether gender might influence the likelihood of receiving a catheter. Most clinicians admitted that it probably did, but they appeared less concerned about of gender differences compared to age differences. The overall view was that men might be less likely to get a catheter because a physician has to the job of placing the catheter in many clinical environments, there are more alternatives to managing UI such as condom catheters and it is easier for men to pass urine when less mobile. Women might be more likely to get a catheter because most nurses can carry out the task and there are fewer alternatives to managing UI.

The problem of male catheterisation being predominantly a physician’s role in many areas was a cause of irritation, confusion and sometimes conflict between the professions.

Several nurses expressed the view that male patients were less likely to be catheterised because a physician had to do the job and would therefore try to avoid the extra work.

> "I think there is definitely a difference in attitudes towards the catheterisation of patients depending on male or female. If I as a nurse identified a male patient I thought needed a catheter there seems to be a lot more questioning around it especially because it then requires the doctor to put it in. There's always more reticence to catheterise the males, they'll say oh just try him again with a bottle." D8 SS OPM&S Staff nurse

Many physicians agreed with this assessment of attempts to avoid extra tasks.

> "Yes, definitely, well that's any job that the doctor has to do, they'll say does this job really need to be done because I've got 5 million other things to do and you've got to prioritise. And with female catheters, if the nurses think they need one then they'll just bosh one in and sometimes they won't ask you, whereas with male if they're not trained then they have to ask you to do it and if you're being particularly cantankerous then you'll think up 10 reasons why they don't need one." D29 SS ED Junior physician

This frank observation highlights that justification provided for catheterisation is often inherently contestable and can be argued either way. This variation between the genders could be reduced if more nurses were trained to catheterise men. Both nurses and physicians expressed frustration that this was not the case.

> "I've never understood that about male and female catheters. I've put a handful of female catheters in, yet I've put hundreds of male catheters in, yet I would class a female catheter as more difficult and yet it's the other way round for nurses". D26 SS ED Consultant physcian

> "Erm, when we trained as nurses, I don't ever remember doing any training to catheterise a woman I think we just picked it up on the ward and you're free to go off and try it and do whatever, but of course catheterising a man is completely different. Since I've been catheterising I've been trying to get on a catheterisation course and that would be much easier if I could do it, but I can't and that's a bit of an issue." D10 SS ED Staff nurse

This raises a question on whether training more staff to perform male catheterisations would increase the number of IUCs placed. Moreover, would the requirement of a training course for female catheterisation reduce the number of female catheterisations?

5.6.3 Patient and carer opinion

During the RTA interviews, clinicians were asked if the patient had expressed an opinion on being catheterised (unless it was clearly not relevant due to the patient's poor condition). Patient opinions about IUCs were also discussed more generally in the semi-structured interviews. Most frequently in the RTA interviews the clinician had made the decision, but not yet discussed it with the patient.

Patient opinion was reported to cover a spectrum from requesting IUCs to be inserted, through resigned acceptance to absolute refusal. For more medically leaning indications, in particular monitoring urine output, there was no intentional element of shared decision making. Patients tended to be informed why they needed a catheter and the decision was only discussed if they objected. Some clinicians reported having conversations about the risks of not having an IUC placed,

> "Yes you do, patients say no and it isn't my job to bully somebody into it, my job is to give them the information and explain why I would want to do something and why it would be in their best interests. Some people change their minds and some people are quite clear that something like a catheter is something they wouldn't want and I need to respect that but I then have to make sure I'm monitoring it in some sort of an alternative way." D22 SS ED Consultant physician

Understandably, those patients in substantial discomfort with acute urinary retention were usually relieved to be receiving an IUC, as in the case below.

> "I asked him to get undressed and explained what I was going to do and he was quite pleased I was going to put a catheter in." D13 RTA ED Consultant physician

Some clinicians predicted their patient's opinion on receiving an IUC or made assumptions about the patient's views,

> "I don't think he's actually been told he's having one, but he did try to go to the toilet and only managed a dribble, so I think that he's uncomfortable with it so I think he'll think it's fair enough." D21 RTA MAU Registrar

Clinicians reported that opinions expressed by patients or their family in favour of IUCs to manage UI were fairly common (particularly in MAU and OPM&S). Reasons for patients or families wanting an ICU placed appeared to centre round ease of management of UI and promoting patient dignity. In this case, the clinicians reported either try to dissuade the patient or family, or come to an agreement that a catheter should be placed after a full discussion on the risks and benefits of use. The impression given was that clinicians appear to discuss the risks and benefits of IUCs with their patients most fully if the IUC is for managing UI or if the patient initially declines an IUC being placed for a different indication.

> “There’s one example I can think of where we had a lady of a different culture who wanted a catheter put in because she was only in her 60s and basically the stroke had made her bed bound and she felt undignified trying to use a bed pan or a hoist over a bed pan, so her and her family were very persuasive and wanted a catheter put in and the doctor said, fine just put a catheter in, and I was resistant to doing that, because while I appreciated the dignity aspect of being trapped in a bed and bedpans are horrible, but the risks of having a urinary catheter purely for that sort of reason were not justified. It stayed in until she was a lot more mobile because she would have big dramatic outbursts at the mention of the catheter coming out and the family were very persuasive and there were lots of them.” D8 SS OPM&S Staff nurse

These scenarios provide some of the few examples of shared decision making in IUC placement. This was particularly the case if the decision was also influenced by the needs of the patient post discharge.

> “I remember one time when it really got to being a contentious issue, we kept saying no, no, no, no, but she was desperate to go home and the family were desperate to get her home and she was really quite cognitively impaired, it was one of those difficult things and I think on balance the decision was to put one in because she could go home and still maintain her pressure integrity, you know wound integrity and skin integrity. But that’s less than ideal, I think if that does happen everyone does need to be counselled about the risks and the benefits and be aware that they could get a worsened infection and that could be fatal.” D11 SS OPM&S Consultant physician

However, several clinicians stated that if they were a patient they would not want a catheter unless absolutely necessary.

> "Erm I haven't really come across anyone who's been so anti a catheter, apart from patients, and that's it isn't it, patients don't want them. I wouldn't have a catheter, if I was a DKA or septic I wouldn't have a catheter, I'm probably not allowed to say that, but you know what I mean you wouldn't would you, not unless I was sick." D26 SS ED Consultant physician

> "Not very nice having people poking about in your nether regions. I think nurses do at times forget that there's a patient on the end of it, just poking around saying I'm not quite sure if that's in the right place, because you hear all sorts of things behind curtains don't you I don't know is that the right one, I don't know and it's just horrible. Yes it's not very nice and it's uncomfortable." D25 SS OPM&S Sister

How much of an influence patient opinion had on the initial decision that an IUC was required appeared to depend on the indication. In time-sensitive decisions made by clinicians to manage acutely ill patients, the only input patients had was to consent to the ICU being placed, with a small minority of patients objecting to the procedure. Moving to decisions for UI management, the pendulum swung to clinicians more frequently objecting and patients more frequently requesting placement.

5.7 Theme 4 - Organisational Factors

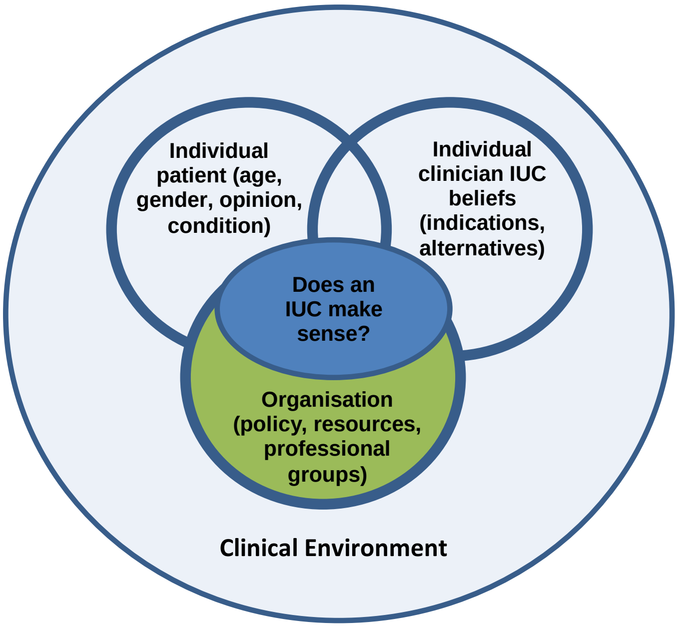


Figure 7. Influences on placing an IUC highlighting Organisational Influences

This theme explores the organisational elements which influence either all clinicians or groups of clinicians (e.g. professional group or by clinical area) (Figure 7.). They are factors which influence the overall culture of care and practice, which in turn impacts on individual decisions to place IUCs. The key organisational factors that came from the data collected were resource availability (including workload), professional differences and the impact (and lack of impact) of policies and guidelines.

The impact of resources, in particular bladder scanners and pads, was highlighted in the patient-specific decision making in the RTA interviews. However, workload and the differences between professional groups were only discussed in the semi-structured interviews.

5.7.1 Resources

Within the organisational theme, the sub-theme most commonly raised by clinicians was resources, with the fey factors of staff availability and workload, pads and bladder scanners.

- **Staff availability and workload**

Staff availability, competing priorities and high workloads were frequently mentioned as influencing factors, impacting in particular on the decision to catheterise to manage UI and for output monitoring. Physicians tended to acknowledge that IUCs were used to reduce workloads for nursing staff, with most accepting this as an unfortunate, but pragmatic option. Unsurprisingly, the indication most frequently linked to staff availability and workload was the management of UI or what was regularly referred to as “nursing care” or “nursing issues.” An ED physician commented that IUCs are seen to reduce workload, a point of view that was widely accepted.

> “The difficulty we have is that we have wards that are being staffed by less people that they were and are being stretched due to the severity of the morbidity their having to deal with and I can understand the rationale that a catheter would make their life much easier, and make the patient’s life much easier so that they don’t feel like they’re troubling somebody or in urine.” D22 SS ED Consultant physician

One junior physician described how he’d experienced the situation, explaining how he saw the realities of ward life.

> “That’s usually because the nursing staff are really, really stressed and obviously whoever is constantly pressing the buzzer and calling for the commode. It’s a difficult one, you know, because if the nurses are constantly having to look after her because she constantly has to be on the commode and other people aren’t

> being looked after then sometimes that is an indication I suppose. But it’s not nice, you don’t want to do that. I think there’s a lot of us saying can we manage, can we manage, can we manage and it’s manic and you see them tearing their hair out and eventually just go OK fair enough.” D29 SS ED Junior physician

However, in some clinical areas it was felt that staff should be able to manage without a catheter to manage either UI, monitor output or cope with the need for patients with poor mobility to urinate frequently and lack of staff or high workload was not accepted as an appropriate indication. In the following quote, a junior physician recalled what he had experience on an elderly care ward where the senior consultant physician was “very anti-catheter”

> “Oh, no, no she wouldn’t allow that. Nurses must manage. No, that would never happen. The sisters on there would know they would get it in the neck in the morning. So if the junior nursing staff ask for one, well, no, it’s not happening. So they soon learn not to bother asking.” D29 SS ED Junior physician

It is notable that not one nurse stated that low staff availability and high workload were valid reasons for placing an IUC. A few nurses stated that the use of IUCs did not reduce nursing workload, as described by this sister,

> “So I don’t know whether there still is that misconception that it’s more convenient for the nursing staff to have patients catheterised. Whereas in actual fact it’s not, it’s nothing to do, it’s not more or less convenient. You’re caring for your patient and your checking their skin integrity and doing all the same things, it doesn’t make any difference to the level of care that the patient needs.” D25 SS OPM&S Sister

The implication here is that staff availability and workload factors would not influence a nurse’s decision to place an IUC or speak to a physician colleague about the need for one. This is something explicitly disputed by many clinicians (both nurses and physicians) who expressed the view that high workload was used as an excuse for placing an IUC for ease of nursing care.

> “Catheters go in for ease of nursing care, from my point of view it’s laziness” D2 SS ED Staff nurse

It is likely that it is not professionally acceptable among nurses to state that high workload is an acceptable reason for placing an IUC. Interestingly, physicians were willing to acknowledge the role their workload can play in IUC decisions. Most IUC related comments on staff levels and workload are linked to nursing. However, physicians, particularly junior physicians who often have the responsibility for placing catheters also commented on IUC use and their workload. Some physicians observed that they and others will try to avoid the job of placing an IUC is possible either by not placing one or persuading a colleague to place one

> "I've seen terse conversations between junior doctors over whose responsibility it is to catheterise, because in inverted commas they're too busy to do it themselves." D12 SS ED Consultant physician

Others have observed that they will leave an IUC in situ to avoid having to replace it later in a shift, particularly when on-call at night.

> "You tend to leave it in, because obviously you're on-call and you've popped something in, to take it out again seems fairly non-sensical, because it can only add to your work load later if you've popped it in, take it out and they then go into retention later in the shift. So what tends to happen is you document how much came out and say, this will need to be reviewed to see whether it's actually needed or not" D30 SS OPM&S Junior physician

UI and AUR are not the only indications for an IUC decision that can be potentially affected by staff availability and workload. The decision to place an IUC to measure urine output can also be influenced. Some clinicians felt that it was not feasible to measure output at normal staff levels without an IUC in situ, illustrated by this comment by a consultant physician,

> "In the critically ill, I'm more likely to catheterise than not, I don't really think, well you could manage them if you really had the number of staff to do it and were really adamant that you were really going to measure very drop of urine they produce, but the practicalities of that?" D12 SS ED Consultant physician

The impact of staff availability and workload clearly has an impact on IUC decision-making. The level of impact varies between clinical areas and is influenced by senior clinicians and their stance on IUC use. Nurses in particular are unlikely to acknowledge the use of IUCs to help with workload within their own area, but might admit they are used for that reason elsewhere. It is difficult to assess how much of an unstated role workload has when patients are catheterised for UI, with dignity, comfort and skin protection given as the palatable justification.

- **Pads**

The availability of pads to manage UI had a direct influence on whether some clinicians believed that patients could be managed without an IUC. Pad availability varied between clinical areas. The ED and to a lesser extent MAU did not have a full range of pads (and associated products such as net knickers and skin care products) available as standard. A staff nurse from ED explained the problem,

> “We don’t have the full pads here, you know the pads with the straps or belts, we don’t get those. We did get them once, but we used too many of them, if we have them we use them. So we just get the insert pads and the sheet pads, you know the pads that go on the bed. . So that’s a bit a of a problem. We do get bags of net knickers in, but again we use them really quickly, I opened a bag of 100 last week and they’ve gone already so we use them really quickly.” D10 SS ED Staff nurse

Some staff in ED were unaware that insert pads were available in the department, believing that only “inco pads” (flat absorbent sheets to protect bedding) were available.

> “In terms of pads, we don’t usually have pads underneath apart from inco pads.” D12 SS ED consultant physician

The view given below from a sister in OPM&S is more typical outside of ED and MAU.

> “If a patient is constantly wet and they’ve just got a leaking bladder well you need to consider, we’ve got pads for that which are very absorbent and if we are doing our regular checks and if we are doing what we are supposed to be doing and we have the time to provide that level of care then that shouldn’t be a problem.” D19 SS OPM&S sister

Comments like these provided some background context to comments made in ED about patients needing IUCs to manage UI for their own comfort and dignity. Without suitable products, it would seem likely that more patients would receive IUCs in ED compared to elsewhere.

- **Bladder scanners**

The use of a bladder scanner to assess the quantity of urine in a patient's bladder has been demonstrated to reduce unnecessary IUC use for AUR (Palese 2010), but, in some wards, scanners are kept under lock and key due to their scarcity. The code for the padlock to be able to access a scanner from another ward is highly prized information.

> "You have to go up to *[ward name]* ward and when it's not too busy I'll go up and get it myself, but when it's crazy, I can't just go up and get one. They do need one down here because we're constantly asking for bladder scans and it can avoid putting one in. But if there isn't one then there's no alternative. There's not many in the trust at all and they go missing, the *[ward name]* one is chained to the drug cupboard table with a code, but I know the code." D29 SS ED Junior physician

Some OPM&S staff appeared to have more access to scanners than ED/MAU staff and clinicians confirmed that they used the scanners for objective information to help inform their decision. A junior physician stated,

> "Bladder scanners are easier to get hold of so you're not just going on your clinical decision, so you can make a more objective, you know you've got numbers and you can wait for a longer time, whereas here you have to make a decision quite quickly and you just have to go for it and not mess around, if you think they're going to need a catheter then just put one in and get them up to the wards." D29 SS ED junior physician

However, even on OPM&S, the availability of scanners did not seem to be an organisational priority. The comment below was made with apparent matter of fact acceptance.

> "Our bladder scanner's been broken for a while" D8 RTA OPM&S Staff nurse

Again, it seems likely that this resource issue had an impact on IUC use.

5.7.2 Professional variation

The differences between the two professions that participated in this study are discussed in this section. This is because it is the differences which tend to reveal semi-hidden, half-acknowledged truths about influences on catheter use. However, it should be noted that many clinicians, whilst accepting some disagreement takes place, stated that they have many constructive and useful exchanges on the subject with their nursing or physician colleagues.

Both nurses and physicians recounted experiences of disagreeing with member of the other professional group. The differences reported tended to take place more in OPM&S or on other wards rather than ED and MAU.

- **Nurses talking about physicians**

The two key points raised by nurses were firstly, that some physicians believe nurses use IUCs for convenience of care and secondly, differences in opinion on what is in the best interests of the patient.

One sister recalled an occasion when a physician had, in her opinion, created problems by informing a patient's family that IUCs are sometimes placed for nursing convenience, a view that she dismissed as untrue.

> "Very interestingly, I'm just thinking about a complaint I answered a good year, maybe year and half ago, it was on *[name of ward]* and it was a complaint that went backwards and forwards between a family and myself for a number of months and their main issue was that their mother had been catheterised, which they felt wasn't indicated, however, she had been in a degree of urinary retention and she was at an exceedingly high risk of skin breakdown. Erm, they had issues over whether she was able to give consent and actually the assessment was made and she was able to do that and that was fine. But the doctors who spoke to them did give some indication that sometimes catheters are used for nursing convenience. The person who said that then caused an untold amount of damage which I then had to undo." D25 SS OPM&S Sister

Given the view that some physicians appear to hold the view that IUCs are used for nursing convenience, then it is perhaps unsurprising that they resist nurses suggestions that an IUC is required. One staff nurse stated,

> "I mean that's one of the fights we have with the doctors, because they don't feel it's a proper clinical need why they should have it, but for their own comfort we feel it's quite required, but I'd say that was probably the only reason." D14 SS OPM&S Staff nurse

Another staff nurse in OPM&S noted that different physicians had different approaches to dealing with requests from nurses.

> “Yes, you get some who say yes if you think it’s appropriate then we trust your judgment go for it, you know give it a few days to clear up, pop some cream on as well, and we can take it out. And some are like, no, they don’t feel it’s necessary to have one.” D8 SS OPM&S Staff nurse

She went on to say that the nursing staff learnt which physician to speak to in order to achieve the outcome that they were seeking.

Some nurses also considered physician decisions to place IUCs to not always be in the best interests of the patient, either because it is unnecessary,

> “The suggestion by a couple of doctors that I’ve spoken to who’ve wanted someone catheterised for input output and actually we can do that anyway, we can measure that without having to put a catheter in, but them not seeing that there are alternatives.” D25 SS OPM&S Sister

Or because of the potential risk to that particular patient.

> “One of the disagreements I would see is if the patient is confused so perhaps needs one for medical reasons but is confused and keeps pulling it out and the doctors will tell you to put it back in, put it back in. But as a nurse, that’s not the best thing for the patients, you know they’d be whipping it out and whipping it out with the balloon inflated and sometimes that will cause them more upset to have it and I’d be the first one to come forward and say you know actually this isn’t working.” D10 SS ED Staff nurse

It appears that nurses often used their experience of spending time with and closely observing individual patients and their needs to inform their beliefs about the appropriateness of IUCs. At times some nurses felt their opinions were disregarded by physicians and that physicians made assumptions about nurses’ reasons for wanting IUCs. They developed strategies for trying to ensure their views were taken into consideration.

- **Physicians talking about nurses**

Junior and mid-level physicians reported disagreeing with nursing staff more frequently than senior physicians. This may well be because nurses speak to junior rather than senior physicians with requests for IUCs to be placed. The disagreements were caused by the junior physicians' beliefs that nurses unnecessarily ask for IUCs to be placed for managing UI, illustrated by the following quote.

> "[disagreements with nurses] Yes, definitely had them, have them all the time. The ones I can remember are where a nurse wants a catheter for nursing issues and a doctor saying no they don't need one, the pressure areas look fine, they're not in retention we can manage with pads and things like that, they don't need a catheter." D29 SS ED Junior physician

Some physicians acknowledged that there were grey areas of decision making and nurses and physicians often took different sides in discussing the pros and cons of an IUC in different circumstances.

> "Erm, I'd say I've probably disagreed with nursing staff over wanting a catheter. They'll always be conflict, there's been a handful of times where I've said no I'm not going to put a catheter in and I was right and there's been a handful of times were they've said you probably should I think they're in retention and I've said no we'll leave it for a bit and see what happens and then they have been in retention and we've ended up putting one in." D30 SS OPM&S Junior physician

However, despite occasionally heated debate on the need for an IUC, many physicians also reported that they found nursing input useful in IUC decision making and welcomed nursing staff raising the subject. The key cause of friction between the two professions appears to be that many physicians believe that when a patient is incontinence of urine and creating an increased workload the nurses will want an unnecessary IUC to be placed. Some nurses state that this is true in some clinical areas (not their own), others deny that IUCs are time saving devices.

5.7.3 Organisational policies and guidelines

The lack of reference to any organisational policies and guidelines directly regarding the use of IUCs was noticeable. The Trust IUC policy, which contains a list of justifiable indications, was not mentioned by any of the clinicians interviewed. When asked in the semi-structured about the policy only one clinician, a staff nurse who had undertaken a student project on the use of IUCs, was familiar with it. The policy did not appear to have direct influence on IUC use.

Conversely, two key current policies or guidelines not directly related to IUCs were mentioned a number of times. These were the Surviving Sepsis campaign and associated guidance and recent initiatives on preventing and reporting pressure ulcers. As discussed under the section above on monitoring urine output, the Surviving Sepsis guidance advises close monitoring of output for severe sepsis or septic shock and this advice can be misused resulting in potentially unnecessary use of IUCs.

Several clinicians spoke of the recent introduction of local and national initiatives to prevent pressure ulcers, linking them to the need to protect skin. Although pressure ulcer prevention literature does not usually directly mention the use of IUCs, it does highlight the need to protect the skin from urine.

The training received by junior doctors was highlighted as potentially influencing the placement of IUCs.

> “Putting a catheter in is part of junior doctors ABCDEs” D21 SS MAU Registrar

It was acknowledged, particularly by junior physicians who were on rotation and had recently worked in different areas within the hospital, that the physicians in OPM&S were generally more against IUCs for UI that in the ED or MAU.

5.8 Theme 5 - Making sense of the decision

The final theme explores how clinicians made sense of the decision to place an IUC. It became apparent during data analysis and interpretation that the clinicians constructed an explanation that made sense for each decision in the specific circumstances. This process of sensemaking was described as “efforts to create order” (Weick 1993) and “the enlargement of small cues. It is a search for contexts within which small details fit together and make sense” (Weick 1995, p133).

Weick’s work on sensemaking is described in greater detail in the Literature Review Chapter and the Discussion Chapter. It appears to provide a useful framework for understanding clinician’s decision making processes. This section draws attention to how clinicians took cues from the themes previously described to make plausible decisions. The model proposed in this chapter, Weick’s theory and links to quality improvement are discussed in greater depth in the following chapter.

The processes and cues involved in sensemaking appear to vary widely between different areas, different clinicians and different indications. In some cases, where the use of an IUC was routine there appeared to be little if any conscious deliberation with no alternatives were considered. In a minority of decisions, all of which were found in OPM&S, there was a conscious weighing up of the pros and cons of the use of an IUC, however alternatives were still rarely contemplated. It was acknowledged by one ED consultant physician that the decision to place an IUC should not be routine.

> “There is no one size fits all and each case needs to be judged on its merits.” D22 SS ED Consultant physician

However, this did not seem to always be the case. Two physicians in ED acknowledged that they gave very little thought to the decision to place an IUC. They stated that their decision making processes around placing IUCs are automatic and sub-conscious. One commented,

> “I really don’t think about the decision at all. I mean I don’t think twice about putting, I mean I obviously do think because I make the decision to put a catheter in a patient, but I think it’s subconscious thinking.” D26 SS ED Consultant physician

In reality, most of the decisions fell on a continuum between routine, sub-conscious decisions to carefully considered decisions. However, for all the catheters placed, clinicians used cues from the themes described above to make sense of the decision to place a catheter in complex environments. The cues used were frequently equivocal (Is the patient in retention? Is their mobility poor? Is their skin vulnerable? Are there enough staff?) , and therefore the decision to place an IUC was contestable (as demonstrated by the numerous spectrums of belief discovered).

This theme explores the frequently used justifications that clinicians used to make their decisions plausible. It is divided into two sub-themes; avoiding contingencies and making life easier. The data from the RTA interviews proved to be important in bringing attention to these sensemaking activities. It is unlikely that they would have been found using the semi-structured data alone.

5.8.1 Avoiding contingency

Many clinicians stated that IUCs were used to avoid adverse events. The contingent events that clinicians were trying to avoid would result in negative consequences most commonly for patients, but with a sizeable minority the consequences would be for the clinician.

If there was a high degree of uncertainty about the patient and their condition, an IUC provided reassurance that information on urine output would be easily available. Urine output both provided information on current status and acted as a trigger to prompt further action if required. Examples of this are given below.

> “I think it’s easier to stick a tube in and leave it in because you never know what’s going to happen.” D21 RTA MAU Registrar

> “What happens if that conveen does come off and that precious urine output is lost?” D12 SS ED Consultant physician

> “When people are very ill and we don’t know why. We just cover all areas really.” D10 RTA ED Staff nurse

Other clinicians were unsure if their patient was in retention and were reluctant to wait to catheterise because of concerns that the retention might be missed in another clinical area.

> “They’re going to disappear off to MAU and they may not be seen for 12 hours and if they’re, are they in retention, aren’t they in retention I’m not quite sure, they

> might be left for 12 hours, no-one will see them and they'll have a bladder the size of the planet and be really uncomfortable and it's really cruel." D29 SS ED Junior physician

Another potential adverse event that some clinicians cited as influencing their decision was a deterioration in skin condition.

> "She was at an exceedingly high risk of skin breakdown" D25 RTA OPM&S Sister

One factor that appears to influence junior physicians and registrars is the need to avoid making a mistake by not placing an IUC. It was seen as being less risky to make the decision to place an unnecessary IUC than to not place an IUC which might have been beneficial. The phrase "err on the side of caution" was used several times to mean if there was doubt about the decision to place an IUC, it was considered prudent to place one. This was particularly seen to be the case in ED/MAU.

> "Well it's always easy to say well they should have had a catheter, it should have gone in on MAU, so if there's a need there then we would always put one in." D17 SS MAU Registrar

> "I don't think many people would criticise somebody ……. if you're on nights for example and put a catheter in, well it can always be taken out, but if someone was in retention or had an acute kidney injury and you didn't put a catheter in, well it's an easier thing to criticise I think for not doing it.It's easier to justify putting one in than not putting one in." D17 SS MAU Registrar

> "I suppose if it was the wrong decision you're not going to get massively in trouble, but you're going to look silly if it was the wrong decision. Down here you err on the side of caution *[by placing an IUC]*." D29 SS ED Junior physician

When it became apparent that this was a view expressed by several junior and mid-level physicians, the topic was raised with senior physicians to see if it was an influence that they recognised. The consultants stated that they would not criticise a junior colleague for making the decision to place or not place an IUC.

> "I think to put one because otherwise you'll get in trouble then we are potentially engendering the wrong atmosphere to work in and I would hope that no-one would get into trouble for not putting a catheter in or putting one in." D22 SS ED Consultant physician

> "I wouldn't criticise somebody for being overzealous as it were because the retrospective scope is an easy tool to use." D13 SS ED Consultant physician

It seems that there was a difference in the perception of junior and senior physicians of how much the potential for being judged for making an error influences the decision.

The desire to avoid contingent events, in particular harm being caused to a patient or making an error, appeared to sway clinicians to make the decision to catheterise in a variety of circumstances. This desire was particularly noticeable in junior and mid-level physicians. These desires appeared to outweigh the potential harms caused by IUCs in many cases.

5.8.2 Making life easier

The justifications provided by clinicians for their decisions often included an explanation of how an IUC would make the patient's situation easier. Less commonly (and more frequently in the semi-structured interviews), clinicians described how an IUC made their life easier.

Patients were seen to be having a hard enough time without the added burden of having to mobilise to a toilet, use a bedpan or endure frequent pad changes. Unsurprisingly, this view was expressed most often by clinicians in ED and MAU where patients are more likely to be newly ill or recently deteriorated and therefore need assistance with adapting to their circumstances. It was seen as a kindness to relieve patients from the task of managing their urination. Examples of clinicians making sense of an IUC in this way are given below.

> "The catheters also useful if they've got poor mobility and their life's pretty grim I would put a catheter in that situation." D17 SS MAU Registrar

> "So they may get a catheter just because they're crook, they're breathless, can't get up to get to the commode or whatever, and we've given them a diuretic and maybe it's best that we stick a catheter in." D26 SS ED Consultant physician

> "Yes, I think it's kinder isn't it and if a catheter's going to help them then it seems sensible to put a catheter in. And discharge with a leg bag and to the district nurse if that's how we're going to manage it. I think that's sensible." D17 SS MAU registrar

Older patients who were perceived to be frail or have poor mobility were seen to be particularly vulnerable to having a tough time in hospital and therefore needed assistance to make life easier. Some clinicians said that they understood that patients did not want to keep disturbing staff by requesting assistance to go to the toilet and taking away that anxiety would make the patient's life easier.

> "I can understand the rationale that a catheter would make their life much easier, and make the patient's life much easier so that they don't feel like they're troubling somebody or in urine." D22 SS ED Consultant physician

However, one clinician noted that there was a fine line in whose life was being made easier; the patient or the clinician.

> "I think it they often are pragmatic decisions, you know you've got this lady, they're off legs, they've broken they're hip or whatever, they're a bit icky, they're got a chest infection or whatever, so let's put a catheter in because it's easier. And maybe there's not any more thought than that around it. So it doesn't matter, but it's easy for doctors isn't it, you know it can be written on a chart and it looks really neat and you know that they're producing" D26 SS ED Consultant physician

This highlights a grey area of potential conflict of interests. Making the decision to place an IUC to manage a patient's urinary incontinence might make things more comfortable for the patient in some circumstances, but it is almost certainly also reducing the clinical workload. Even if reducing workload is not the only influencing factor, it might well add weight to the use of an IUC making sense. This also brings attention to times when the reasons given as justification for using an IUC are not necessarily the whole picture.

5.9 Summary

These results demonstrate the breadth of influences on the decision to place an IUC in acute medical care. In many cases the choice to place an IUC might initially seem straightforward and the justification given by a clinician for individual decisions might seem clear-cut. However, in reality, a complex array of influences and motivations are hidden by simplistic explanations. This study establishes why the clinicians made the decision, the key decision influences and explores how clinicians arrived at their decisions.

Five key themes were found. A conceptual model of the influences on IUC placement has been developed to reflect how clinicians explain influences on their decisions (Figure 4).

The first theme and the outer layer of the model is Clinical Environment. The other four themes are influenced by where the event is taking place. Clinicians' beliefs on IUC indications, alternatives and risks will vary; patient age and opinion will vary; organisational policy, practice and resources will vary. The factors that influence placing an IUC in ED are likely to be very different to the factors in OPM&S. The decision making process varies from a routine part of a treatment plan to a carefully thought through, individual decision made in conjunction with the patient, with more routine decisions being made in the ED and, to a lesser extent, in the MAU.

Perhaps the key finding from the second theme, Individual Clinician's IUC beliefs, was the number and breadth of spectrums of belief surrounding IUC use. Different clinicians have different beliefs on what justifies the use of an IUC. Furthermore, they have widely varying perceptions on IUC associated risk and the relevance of IUC-alternatives. People were very happy to talk about their views which on the whole they hold securely, with little uncertainty expressed.

The third theme highlights the influence that individual patients have on the decision. Old age, and the accompanying assumption of frailty, are the dominant factor within this theme. Catheterising older people is seen as more acceptable to both staff and patients. Gender also has a role to play due to the differences the in professional training.

Within the Organisational Factors theme, the availability of resources is found to be influential, in particular staff availability and workload. One interesting point to note is that although the assumption that IUCs are used for nursing convenience appears to have some foundation, the use of IUCs for physician convenience also needs to be acknowledged. Additionally, the conflict between competing clinical goals and associated guidance is revealed to play a role in IUC use.

Clinicians use elements of these themes to help to make sense of the IUC decision. The cues identified as important and the determining factors vary between decisions depending on where and why they are being made, and who the decision is being made by. The sensemaking process provides two common explanations for placing an IUC; it makes life easier or avoids a contingency. Weick's (1995) sensemaking frame work appears to provide a useful guidance to how this process works and will form a key section of the Discussion Chapter.

It seems that clinical reasoning when making the decision to place an IUC varies widely. Spectrums of belief and different clinical focuses mean that the care that patients receive is likely to be inconsistent. These findings make two key contributions; firstly, by informing the debate on when the benefits of placing an IUC outweigh the risks by better understanding situations that lead clinicians to make the decision and secondly, by assisting the development of effective strategies to minimise the placement of unnecessary IUCs. This is discussed in depth in the next section.

Chapter 6

Discussion

6.1 Introduction

The literature review found that the evidence on the efficacy of interventions to avoid the initial placement of IUCs in acute care was limited and that there was not a systematic review of interventions aimed at minimising initial use. A systematic review was undertaken to fill this gap and the findings addressed the first objective of this research (to evaluate attempts to minimise the initial placement of IUCs in acute care) and informed the qualitative study that addressed the other objectives.

The literature review also established that little was known about why clinicians in acute medical care decide that an IUC is appropriate. Without this knowledge the impact of interventions to optimise IUC use will be limited. In order to address that gap in knowledge, this final chapter takes the diverse range of factors identified in the previous chapter and examines them in the wider context of existing IUC and QI literature.

This chapter focuses on the individual objectives of the study to build a picture of how and why clinicians make the decision to place IUCs. It establishes when IUCs appear to be used unnecessarily by analysing variations in belief, inconsistencies in practice and the current body of IUC literature. Finally, the implications for future research and clinical practice are identified and discussed.

It has become apparent that the decision to place an IUC in acute medical care is often equivocal and an argument can usually be made for or against use. However, this does not imply that both decision pathways are of equal benefit to individual patients or the wider population. This equivicolity is discussed in more detail in the decision making section of this chapter.

The data collected indicates that it is unlikely that IUCs are being placed at an optimal level. Most clinicians reported sub-optimal decisions were sometimes made, occasionally their own, but more frequently their colleagues in other clinical areas. Some decisions were made with no conscious thought for the risks and benefits, particularly in the ED. Furthermore, in all clinical areas, numerous spectrums of belief were identified, including wide variation in views on the risks that IUCs pose. It seems unlikely that decisions made using these ranges of beliefs can all be optimal.

This chapter reports on what this study has found, how it expands on what is already known and asks what else we need to know to better tackle sub-optimal IUC use. Finally, it will summarise the limitations of the study.

In reaching the conclusions presented in this chapter, the principle of probable truth and the quality evaluation criteria of Interpretive Authority employed by interpretive description were kept in mind. It is recognised that “all knowledge is perspectival” (Thorne 2008, p225) and attempts have been made to reassure the reader that the interpretations presented are trustworthy by linking them directly to the data and explaining limitations to analysis where appropriate.

6.2 What do we know from attempts to reduce the placement of IUCs in acute care?

The systematic review described in Chapter 3 demonstrated that there is little evidence to support or rule out different interventions to reduce the number of IUCs being placed in acute care. However, what that review identified was the lack of consensus on when an IUC should be used and that a broad indication (for example, to monitor urine output in an unwell patient) is open to clinician interpretation. It was made clear that changing clinicians’ attitudes, beliefs and behaviours around the decision to place an IUC is not straight forward and that interventions designed to influence clinicians making this decision would benefit from understanding the local practice of catheter use and beliefs on the appropriate indications for placement.

The findings from the systematic review highlight the fundamental question that needs to be answered in order to optimise the use of IUCs: When do the benefits of using an IUC outweigh the risks? To begin to answer this question, a better understanding of clinicians’ current beliefs is required and this is addressed in the following sections.

6.3 Why do clinicians place IUCs in acute care?

This section considers the four key indications given by clinicians as reasons for making the decision to place an IUC (acute urinary retention, monitoring urine output, skin protection and urinary incontinence, including comfort/dignity). It combines the findings, with the literature review to establish clinicians’ beliefs about individual indicators, how those beliefs compare to the literature, inconsistencies in use and areas where IUCs are potentially overused. It then looks at the challenges for optimising use for each indication and establishes gaps in current knowledge that need to be addressed. Combined indications are further discussed in the sensemaking section.

6.3.1 **Acute Urinary Retention**: **Why do clinicians feel so “twitched” to catheterise?**

The use of IUCs to relieve AUR is commonplace in acute medical care, and in this study it was the most common reason for IUC placement in OPM&S. Indeed, AUR was one of only two indications that were unanimously accepted to provide justification for the use of an IUC in acute care by the guidelines summarised in the Literature Review (the other was monitoring urine output). Despite this, clinicians expressed considerable uncertainty on the point when an IUC becomes necessary to relieve AUR. They were unsure about the volume of urine that should be in the bladder and how much difference the presence or absence of symptoms such as lower abdominal discomfort made.

Current guidelines are not helpful in this matter and there does not appear to be an accepted definition of AUR beyond an inability to spontaneously void. One example of current advice is NICE clinical guideline 97 “The management of lower urinary tract symptoms in men,” which states “Immediately catheterise men with acute retention” without any guidance on how to define acute retention. It might be clear that a man coming to an emergency department, who has not passed urine for over 12 hours, has a palpable bladder and is in distress should be immediately catheterised, but in-patients are catheterised if they have not passed urine, but are not in distress and do not have a palpable bladder.

One recent study (Johansson et al. 2013) used a literature review and expert consensus to develop evidence based guidelines to identify and prevent UR. They concluded that a patient who is unable to void and has a residual volume of urine of over 400mls should be treated with IC. They arrived at this figure based on the normal adult bladder volume of 400-600mls. The use of an IUC was only recommended with a residual urine volume of greater than 1000ml.

The key reason that clinicians are “very twitched to get a catheter in” (D11 OPM&S Consultant physician) is that “It is a disaster if it’s missed” (D12 ED Consultant physician). Horror stories of the consequences of missing AUR are imprinted on the minds of many clinicians. This might also account for some of the reluctance to use IC for relieving AUR. If the underlying causes of retention cannot be dealt with quickly, the patient might well need to be catheterised on a regular basis. Clinicians appeared to believe that the need for repeat catheterisations, in particular the potential for harm caused by missed catheterisations, posed a greater risk than leaving an IUC in situ.

Generally, AUR was not believed to be a single event that could be relieved by the use of IC, rather it was seen to be something that would take at least several days to address. However, according to the Johansson et al. (2013) guidelines, IC should be used followed by a schedule of bladder scanning (one to four hourly depending on the case) to monitor the volume of urine in the bladder. In order to carry out a schedule of bladder scanning, bladder scanners would have to be easily available. This was not the case in the clinical environments included in this study.

In a survey of 6074 men catheterised for painful AUR (with varied triggers, e.g. postoperative, high alcohol intake or UTI) based in several countries, Fitzpatrick et al. (2012) found that 89.8% of the men were initially treated with an IUC and only 1.8% with IC. This suggests that although IC to relieve AUR might be preferable, it is not common practice.

They also found that catheterisation for longer than three days was associated with a significantly higher rate of adverse events when compared to three days or less. They concluded, “considering the fact that longer catheter duration significantly increases the risk of complications such as urinary tract infections, urine leak and catheter obstructions, all efforts should be made to try to minimise the duration of catheterisation and so reduce comorbidity and healthcare costs” (Fitzpatrick et al. 2012).

The findings suggest that IUCs are often left in situ considerable longer than 3 days after being placed to treat AUR. The waiting time for a trial without catheter (TWOC) as an out-patient was estimated to be between 2 and 6 weeks. However, time to TWOC might well be shorter for in-patients. However, several clinicians commented on the excessive length of time that it could take to remove IUCs, and the associated potential for delay in patient discharge.

It appears that three key challenges would need to be addressed to reduce the use of IUCs to treat AUR. Firstly, clarification of appropriate bladder volume thresholds would be useful to reassure clinicians. For example, the clinician who catheterises a patient with a residual of only 100mls might have been reassured by a schedule which stated that patient should have a bladder scan within the next four hours (as suggested by the Johansson et al. 2013 bladder scanning schedule). Secondly, the resources to assist with the management of AUR without IUCs would need to be available, in particular bladder scanners. Finally, consideration could be given to the introduction of the use of IC and a bladder scanning schedule in patients with a residual volume of less than 1000ml. This final point would however require substantial change in cultural norms surrounding the use of IC. It might be more beneficial to focus on having a timescale of less than three days to remove an IUC.

6.3.2 Monitoring urine output: Is every drop “precious”?

Monitoring urine output was the second most frequently given reason for placing an IUC and took place predominantly in ED and MAU. It is the only other indication where guidelines generally agree that an IUC is appropriate in some circumstances. One exception was the NICE Clinical Guideline 50 which stated that urine output should not be a core physiological marker. The guidelines that did agree it was appropriate provided a variety of descriptions of when monitoring using an IUC was necessary, for example critically ill compared to acutely ill.

The results highlighted two questions; when is it necessary to know a patient’s urine output and could a method that avoided the placement of an IUC be used? Several physicians described their decisions to place an IUC for monitoring urine to be knee-jerk, routine or default responses. Placing an IUC for severe sepsis was described as part of a care pathway and a decision that required no attention. However not placing an IUC with a patient with severe sepsis required the effort of active decision making.
Recent initiatives to improve the treatment of severe sepsis and septic shock, including Surviving Sepsis Guidelines 2012 (Surviving Sepsis 2012) appeared to have had an impact on clinicians in the ED and were linked by several clinicians to the routine, unthinking use of IUCs. As one clinician highlighted, thought was not always given to differentiating between sepsis and severe sepsis, and, if severe sepsis is diagnosed, whether the patient needs an IUC to monitor output or whether they could reliably use another method of measurement. One potentially confusing aspect of assessing septic patients is that one of the criteria for diagnosing severe sepsis is a urine output of less than 0.5ml/hr per kilo of weight for over two hours despite fluid resuscitation. Therefore, in order to make that assessment and differentiate between sepsis and severe sepsis the urine output needs to be closely monitored and might well prompt a clinician to place an IUC for diagnostic purposes. Interestingly, the sepsis guidelines make no mention of the use of an IUC.

Garcia et al. (2007) added to confusion over when an IUC should be used to measure output by questioning the accuracy of using IUCs to measure output. They found a mean residual volume of over 100ml in the bladders of patients with IUCs in situ. This study is thought-provoking given clinicians’ descriptions about not wanting to miss “precious urine output” (D12 SS ED Consultant physician). It might be that clinicians are putting faith in inaccurate representations of urine production. This is further compounded by evidence that urine output is an imperfect marker of renal performance. Prowle et al. (2011) noted that “Consensus definitions of AKI [acute kidney injury] have incorporated urine output criteria alongside bio-chemical markers of renal excretory function. Unfortunately, this step has occurred despite the lack of any prospective data associating the magnitude and duration of oliguria with subsequent changes in serum biochemistry.” They conducted an observational study of 239 patients admitted to intensive care units in 6 countries to document urine output and daily serum creatinine and found that oliguria was significantly associated with the occurrence of a new creatine-defined AKI, however most (90%) of episodes of oliguria were not followed by renal injury. The study questioned the usefulness of oliguria as a marker for renal injury.

It appears that the faith clinicians put in how much urine there is in a collection bag might be misplaced because it might not be an accurate representation of urine production and, if it is, it might not be a useful indicator of AKI. Alternatives to using an IUC, such as pad weighing for incontinent patients or measuring urine from a bottle or bed pan, were generally not considered to be accurate or timely enough for most clinicians. However, it was also noted that when an IUC is placed to measure the hourly output of urine the measurements are often not taken and the input/output chart not completed.

One alternative that was not discussed with clinicians was the use of bladder scanners to assess the volume of urine in the bladder. Recent studies have demonstrated that bladder scanners can achieve a high level of accuracy, with Al-Shaikh et al. (2009) finding a mean difference of only 12.9ml between measurements with a scanner and the amount of urine drained from the bladders by catheter in 101 patients. An hourly assessment using a bladder scanner might also tackle the physicians’ desire to have neat numbers written on a chart.

There are several questions raised here:

- When is it beneficial to patient outcomes to know the hourly urine output?
- Do IUCs (used with urometers) accurately represent urine production?
- How can clinicians be assisted to differentiate between when hourly output monitoring is required and when it is not and avoid routine use?
- Can bladder scanners be used instead of IUCs to assess hourly urine production?

6.3.3 Skin integrity or pressure damage?

Opinions on the use of IUCs to maintain skin integrity and prevent damage were strongly held, but diverse. The spectrum of belief ranged from using IUCs to protect acutely ill, but normally continent patients from skin damage through to not using IUCs to manage or prevent skin breakdown under any circumstances. IUC guidelines are similarly divided on the validity of skin protection as a reason for IUC use.

The language used when discussing skin integrity is interesting to note. Most commonly skin related problems were consistently described in terms of “pressure” damage. Not one of the interviewees referred to moisture lesions, incontinence associated dermatitis or any other similar description. Frequently, “protecting pressure areas” or a similar phrase was used to indicate preventing urinary incontinence related damage.

The Safety Thermometer, that includes recommendations to minimise several healthcare associated harms, including CAUTI, is currently recommending that healthcare providers focus on pressure ulcer prevalence as “nationally pressure ulcers represent the highest burden of harm and they are well understood by the front line” (Harm Free Care 2012). Posters showing the incidence of pressure ulcers are clearly displayed on ward walls (along with the number of falls, staff sickness rates and other indicators) and pressure ulcer related literature for patients is available in many wards. There is a clear focus on the unacceptability of pressure ulcers. Clarifying the language used to describe UI skin damage and differentiating between the causes of pressure damage and the causes of urine related damage could be important if attempts were made to change the practice of using IUCs to prevent skin damage.

Inevitably, skin protection and urinary incontinence were linked in the results. If a patient is continent of urine, it would be sensible to question why they need to be catheterised to protect their skin. However, there were occasions in the ED when it was either unknown whether a patient was continent or it was known that they had previously been continent but they were still given an IUC to prevent skin damage (D2 and D5). In the semi-structured interviews, some ED clinicians made arguments for the legitimacy of this view, combining the potential for skin damage with protecting patient’s dignity in case of UI. This contrasts to the OPM&S wards where it was reported that nursing staff only considered catheterisation in the presence of significant skin damage.

Although it is known that UI disrupts the skin barrier, evidence on the relationship between UI and skin vulnerability is limited (Ersser et al. 2005). In a systematic review of interventions preventing and treating incontinence associated dermatitis, it was found that skin care regime including cleansing, moisturising and protection should be used (Beeckman 2010).

Some physicians see the indication of skin protection, even in the presence of existing damage, as an excuse that nurses use to catheterise and reduce their workload. This is something that some nurses agreed with and others did not. It is easy to see how the assumption can be made that IUCs usually reduce nursing workload. If an IUC is in situ and the patient is not faecally incontinent, the patient is likely to need less nursing time for hygiene needs compared to a patient with UI who is being managed with pads and needs regular care to optimise skin protection. This will be discussed further in the next section.

No evidence was found that recommended the prophylactic use of IUCs to prevent skin breakdown where no damage currently exists. It seems likely that using the potential for skin breakdown as a reason for catheterising an incontinent patient is rarely justifiable. Using an IUC to prevent skin breakdown (or pressure related damage) in a normally continent patient seems illogical and, as such, it is possible that it was given as a professionally justifiable reason for IUC placement rather than representing the true rationale behind the decision.

The use of IUCs to manage skin damage should be restricted to when there is no other viable alternative. Preventing the use of an IUC until it has been documented that a set number of days have been spent trying other methods of managing the skin health could be beneficial. Alternatively, it could be decided that only a tissue viability nurse specialist can make the decision that an IUC should be placed for this reason.

6.3.4 Urinary Incontinence: Are catheters the champions of dignity?

With the exception of managing patient comfort in end of life care, the use of IUCs to manage UI in acute care is not widely supported in guidelines and other literature. Where it is discussed in the guidelines, it is often stated only intractable or unmanageable UI should be controlled with an IUC. Overuse of devices for this reason has been the source of controversy and conflict which is demonstrated in the findings of this study, with some physicians believing that nurses want IUCs placed to manage UI thus reducing the impact on workload. Only one decision (D17) in this study was made for an IUC to be placed purely to manage UI, however it was a factor in several other decisions.

The first key point to note from the results is that the patients who clinicians felt would benefit from having an IUC placed to manage their urine output were not generally incontinent of urine. Instead, they were acutely ill patients whose mobility was decreased and had lost the ability to be independent with their toileting needs. The IUC's were being placed to help them adapt to a situation that it was assumed would be temporary. The impact of decreased mobility as both an IUC related risk factor and a reason for placing an IUC was noted in the literature review.

What is not known is the number of IUCs placed for any reason that become long term devices in order to manage UI. When asked when they anticipated that an IUC would be removed (when it had been placed for monitoring output, AUR or managing skin integrity), the comments made by many clinicians were revealing. Many anticipated that it was likely to be removed when the patient was able to look after themselves or could get out to the toilet.

The decision to place an IUC to manage UI (whether as a single or combined indication) was strongly influenced by a desire to support the patient's dignity. Maintaining patient dignity has been high on the healthcare agenda for many years. Last year the Department of Health issued a policy, "Treating patients and service users with respect, dignity and compassion" (Treating patients and services users with respect and compassion 2013) that promoted compassionate care and "Putting people first in decisions about care."

The importance of patient dignity was mentioned by clinicians several times in relation to the use of IUCs to manage UI. A qualitative study on the nature of nature of patient dignity in acute care settings concluded that dignity included assisting patients to feel comfortable and in control. It is easy to see how clinicians assumed that patients would not feel comfortable or in control having their UI or potential UI managed by the use of pads and would be more relaxed with a short-term IUC in place. It is likely that this view is intensified by frequent newspaper headlines reporting cases such as, "The unit was understaffed, resulting in one patient waiting for 45 minutes for assistance to use the toilet and another left so long they wet the bed" (The Guardian 2012). However, as was noted in the literature review, IUCs can often be the cause of embarrassment and distress for patients.

Not surprisingly, this was also the only indication where patient or family opinion appeared to play a significant role. A survey of patients' opinions on short-term IUCs found that they did not believe catheters to be overused and 68% would prefer an IUC to be placed rather than have to use a bedside commode (Greer et al. 2011). Decision 17, where an IUC was placed to manage UI, was strongly influenced by the patient who had experienced UI issues for some time, had been refused an IUC by his GP and strongly expressed his views to the physician who made the decision in the MAU. Patient opinion is undoubtedly influential in making the decision for this reason and not enough is known about the preferences and knowledge levels of patients in acute care with UI, particularly those whose UI is newly acquired and associated with their admission.

However, the use IUCs to manage urine output is not generally considered a legitimate indication for use. Therefore, UI was combined with skin protection, output monitoring, avoidance of falls, allowing patients to rest without repeated pad changes or patient comfort/dignity in order to provide a professionally justifiable indication.

Again, there was a spectrum of views, with a difference in opinion found between ED/MAU and OPM&S, with OPM&S reporting more attempts to manage UI without the use of an IUC. It appeared that many clinicians in ED/MAU believed in circumstances where the patient was not going to be able to be easily assisted in toileting they would be better off with an IUC. However, across almost all the departments there were some occasions where it was considered in the patient's best interest to manage UI using an IUC. One exception to the acceptance of IUCs in some circumstances was identified as an elderly care ward where the senior consultant would not allow nurses to use to manage UI, with a junior doctor noting that the nurses, "soon learn not to bother asking" (D29 ED Junior physician).

It is difficult to differentiate between when clinicians are acting purely in the best interests of the patient and when ease of management becomes a significant decision altering factor. It is interesting to note that each department or ward believed that IUCs were more frequently used to manage UI in areas other than their own. These assumptions had an impact on IUC use in ED, as IUCs were placed in in the assumption that the patient would be getting one at some point so they might as well have one now.

Lack of resources was another factor that influenced the decision to place an IUC. Staff availability to manage without an IUC was the key point raised and is discussed in greater detail later in this chapter. A resource issue raised in ED was the lack of a full range of pads and "net knickers" to keep pads securely in place which led to concern that patients would be wet and adding to the perceived benefits of an IUC.

The importance of tackling any identified IUC overuse for the management of continence is amplified by the high prevalence of patients who have a degree of UI in acute care. In the Royal College of Physicians National Audit of Continence Care (2010) it was reported that 35% of patients aged 65 and over in acute care had been identified to have urge incontinence and 24% stress incontinence. Furthermore, 35% of patients aged 65 and over in acute care were identified to have urinary frequency (>8 in 24hours). With this in mind, the potential impact on nursing workload is significant.

Given the prevalence and frequency of episodes of UI in acute care, it seems likely that managing UI without the use of IUCs would have an impact on nursing workload. This is acknowledged (and sometimes derided as laziness) by many clinicians, but the impact was denied by some nurses. However, the use of IUCs for this reason varies between environments and if avoidance is prioritised it seems that the devices can be largely avoided.

Practice in areas where the use of IUCs to manage UI is particularly low should be closely examined to understand the practical and cultural factors that contribute. How is patient dignity maintained? How is workload managed? Is skin integrity at risk? How is toileting organised? Are patients exhausted by repeated pad changes? How are patients kept safe from falls? These are the concerns that clinicians in other areas have that appear to influence their decision making and therefore need to be addressed.

The management of UI in acute care is a complex, emotive issue. Whether patient dignity is protected or harmed by the use of an IUC open to debate; some patients refuse to have an IUC for any reason and others become very anxious at the thought of not having one in situ.

Clinicians appear to be influenced by patients' stated or perceived desires, therefore the other key area where further understanding is required is patient opinion, experience and education with respect to methods of managing UI in acute care. Once these areas are better understood, an informed debate on whether the benefits of placing an IUC to manage UI in acute medical care ever outweigh the risks can take place.

6.4 What are the cross-theme factors that promote or inhibit the decision to place an IUC?

Away from the immediate, individual clinical factors such as quantity of urine in the bladder or lactate level, what makes a clinician more or less likely to decide an IUC would be a good idea? Some influencing factors extend across all indications and are deeply ingrained in the practice of IUC use. These factors have been raised in the previous section, but will be considered in more detail here.

At this point, it is worth noting that neither the Trust IUC policy nor any other IUC guideline was mentioned by any of the clinicians interviewed. This is in line with other findings on the lack of influence of evidence based guidelines. In their ethnographic study of knowledge in primary care, Gabbay and le May (2004) reported that, “We found that the individual practitioners did not go through the steps that are traditionally associated with the linear-rational model of evidence based health care - not once in the whole time we were observing them. Neither while we observed them did they read the many clinical guidelines available to them in paper form or electronically.” In this study, the only guidelines that clinicians referred to were those regarding the treatment of sepsis and prevention of pressure ulcers.

6.4.1 Clinical Environment

The difference between IUC decision making in ED (and to a lesser extent MAU) and OPM&S was one of the most striking findings of this study and the most significant influence across the range on indications. None of the interview data indicated that clinicians in MOPRS appear more likely to use an IUC than staff in ED, for any reason.

Clinicians were aware of this difference and, junior physicians who moved between the areas during their training appeared to adapt themselves to the environment that they were in. The key reason for the disparity in practice was identified as time. Clinicians reported that in the ED that there was no time to think about the decision, instead there was a great deal of pressure to decide if an IUC is needed and move the patient on. This pressure to get patients through the system was palpable within the department, with the nurse-in-charge providing frequent updates provided to clinicians on any patients who were close to breaching the four hour target. This pressure has been noted elsewhere and in a qualitative study (Flowerdew et al. 2011) set in the UK, the number one ranked stress factors for clinicians in ED was the Department of Health four hour treatment target.

Another key factor was uncertainty. Clinicians wanted to cover all bases and gather as much information as possible whilst either the diagnosis or prognosis were uncertain. Placing an IUC assisted with information gathering. The routine nature of the decision to place an IUC in some situations in ED has already been noted, most commonly for sepsis. As one MAU registrar observed, placing an IUC in ED is part of junior physicians ABCDE routine.

Finally, the ED was seen as a place of transiency, where patients move in and out quickly, sometimes being temporarily taken out for tests before returning to the department. As one senior physician noted, the patients were not on beds, they were on trolleys which were designed for mobility and not necessarily comfort. This means that clinicians may be unaware of their patients' functional abilities, might find it more difficult to address UI with the use of pads and might find the use of trolley-side commodes inconvenient. Lack of resources compounded the pressures faced by the ED. Both lack of continence management resources and lack of bladder scanners promoted the decision to place and IUC.

The unique culture of emergency departments within healthcare had been the subject of many studies considering diverse aspects such as teamwork, emotional burn-out and patient satisfaction. What is generally agreed is that, “With an uncontrollable patient volume, mixed acuity, brief patient encounters and the everyday distractions of a large ED, the environment is often described as organised chaos” (Kovacs and Croskerry 1999).

More specifically, studies of the use of IUCs have observed the practice of overuse in emergency departments, with Scott et al. (2013) reporting that three million IUCs are placed annually in emergency departments in the USA, accounting for the majority of IUC placements in the non-surgical inpatient population. Studies have found a practice of IUC use in EDs, Krein et al. (2013) observed “it is emergency department staff who place them out of habit and convenience, and because they are busy, regardless of whether the patient really needs an indwelling catheter.”

The practice of IUC use in MAU appears to lie between that of the ED and OPM&S. MAU still has time pressures and uncertainty, but to a lesser extent than the ED. One registrar on MAU made a comment which captures the attitude towards IUCs in the department, “To be fair, most of the time it's done in A&E, they already come with a catheter and we just kind of carry it on” (D22 MAU Registrar).

It is interesting to note that it could be assumed that the use of IUCs should have a greater impact on the nursing workload on a ward where a patient might stay for weeks than in the ED where the patient's stay is a matter of hours. Despite this, the decision in OPM&S that an IUC is required appears to be more thoughtful, with consideration more likely to be given to the advantages and disadvantages of the device and with a longer-term perspective. This brings into question the impact that nursing workload has as an influencing factor in OPM&S.

However, despite more thoughtful use in OPM&S, clinicians in the ED, particularly senior clinicians who had been in the department for many years had the view that IUCs were used more readily elsewhere in the hospital. One senior clinician said, "You know, if the patient…if I don't think the patient needs a catheter in my department then I don't put them in my department. And I wouldn't put one in just because it's more convenient on the ward" (D13 ED Consultant physician) indicating his belief that IUCs are misused on wards. As only OPM&S and cardiology wards were included in this study, this belief cannot be dismissed.

Another key difference between the areas was the assessment of risk, with the potential negative impact of IUCs seen as greater by OPM&S clinicians. When asked about risks ED clinicians, particularly senior clinicians, gave the impression, or stated outright, that they did not give much consideration to IUC risks. Studies have indicated that clinicians are more likely to be aware of risks when they can "tightly couple" the cause and effect (Dixon-Woods et al. 2009). The harms caused by IUCs are far more apparent in OPM&S wards than in the ED which helps to explain the lower assessment of risk.

This section highlights that, if it was decided to implement an initiative to optimise IUC use within the Trust, the ED would be a good place to start. Areas to be considered would be ED clinicians' beliefs about the use of IUCs elsewhere in the hospital and their own contribution to the rates of ICU use, their beliefs on the risks posed by IUC use, particularly non-infection related risks, the availability of resources to manage UI and assess retention, and interrupting the routine nature of IUC decision making.

6.4.2 Patient Age

Another factor that strongly influenced the decision to catheterise for all indications was the age of the patient. Clearly, this was not so relevant to the OPM&S environment where all the patients were 65 or over, however some OPM&S clinicians there did feel that the elderly needed more protection than younger patients and were keen to advocate for them.

There is a significant body of literature on ageism in healthcare and it was not a surprise that older patients are overwhelmingly considered more likely to receive an IUC. A literature review on ageism in healthcare commissioned by the Department of Health reported that, "'Whenever a clinical stone is turned over, ageism is revealed.' (Young 2006, Opinion) This may be an overly pessimistic view of the state of health care in the United Kingdom but there is evidence of direct and indirect age discrimination in the provision of some services, although in many cases the evidence is not clear cut. Different patterns of treatment for patients of different ages does not, in itself, necessarily imply discrimination on the basis of age." (Department of Health 2009)

The Royal College of Physicians Continence Audit (2010) found that 26% of patients with UI aged 65 and over had an IUC for the containment of UI, but only 10% of under 65s with UI had an IUC in situ. This is despite older people being identified as having a greater risk of developing a HCAI. In a retrospective study of the notes of over 60,000 patients, Avci et al. (2012) found that the incidence of HAIs per 1000 patient days was 2.49 in the elderly (65 or over) and 1.64 in the younger patients' group ($p<0.001$). Notably, they also found that the most common site of infection in the elderly patients was the urinary tract, whereas in non-elderly group this was the lower respiratory tract.

Do the elderly's increased levels of co-morbidities, pharmacological intake and levels of frailty somehow mean that an IUC will be beneficial to their care despite the increased risk of harm? Or are cultural norms regarding UI in the elderly and the acceptability of IUCs more likely to blame for the high rates of catheterisation? Certainly the clinicians interviewed in the ED thought that an older person was more likely to have an IUC placed and, although co-morbidities were mentioned, it was indicated that frailty was the key reason for this. In a general discussion with two junior physicians in the ED during the initial period of observation before data collection began, one observed that she would place an IUC to get a urine sample and would leave it in situ if the patient was old and appeared frail.

The strength of this cultural norm is emphasised by the often extreme reluctance of clinicians to place an IUC with a young patient. It is normal and nothing out of the ordinary for an older person to have an IUC placed, but it deviates from a routine process and requires far more careful consideration to catheterise a younger adult.

It was explained that avoiding catheterising the young is sometimes for good reason, for example not to discourage a young diabetic ketoacidosis patients from visiting hospital when they needed to. However, more often it appeared that the clinicians could empathise more with a patient of a similar age and felt uncomfortable, illustrated by a junior physician whose experience in a previous part of his rotation was vividly recalled, “It was an odd experience putting a catheter in a 26 year old guy. It was awkward for him and it was awkward for me. I was like why, I’ve never been awkward putting a catheter in, but I’d never put one in a 26 year old guy before. That’s why it’s awkward” (D29 ED Junior Physician).

Older patients received IUCs in ED because the assumption was made that they were frail, more likely to be incontinent and “it would be more pleasant in a way for the patient to have a catheter in to facilitate their nursing care” (D13 ED Consultant physician). This links back to the debate on patient comfort and dignity in the section above on urinary incontinence, but clinicians indicated that older patients were also more likely to receive an IUC for the other indications too.

Any attempt to tackle the higher incidence of IUCs among the elderly would be challenging. ED clinicians openly admit that they are more likely to catheterise older people, they see it as a pragmatic choice and a fact of clinical life.

6.4.3 Patient gender

It would be expected that gender would have some influence on IUC use due to the difference in physiology. Men can often use urine bottles more easily than women can use bedpans or female urinals, men have the option of sheath catheters and women are more likely to experience UI (Buckley et al 2010). However, men have a significantly higher incidence of acute urinary retention (Basson et al. 2013).

What was perhaps less expected was the impact of organisational issues on the decision. Nurses are not routinely trained to catheterise men and, several nurses reported frustration in the difficulty to obtain the training they required. Nurses had noticed that this acted as an inhibiting factor on the decision by physicians to catheterise men. One physician (D29) commented that he could think up ten different reasons why a man did not require an IUC if he wanted to avoid the task of placing the device himself.

The requirement for nurses to complete post-registration training course and demonstrate knowledge of male catheterisation (but not female) appears to be widely accepted in the UK and beyond, and these results echo those found by Cowey et al. (2012) in their study of the decision to catheterise stroke patients. Both nurses and physicians expressed frustration and confusion at this situation, which seems to result in a difference in care between the genders. However, looking at the situation from the view of minimising IUC use, the reluctance of physicians to catheterise and the subsequent reduced number of male catheterisations raises the question should all catheterisations should be performed by physicians and thus reduce the number of female patients receiving an IUC?

6.5 How do clinicians reach the decision that an IUC is a good idea?

The factors discussed so far in this chapter illustrate how the decision to places an IUC can be complex, multifactorial and equivocal. Clinicians have to combine these factors to arrive at a decision whether or not to catheterise. It has been demonstrated that different clinicians, in different clinical areas make different decisions. This does not mean that they necessarily use dissimilar mechanisms to arrive at their decisions, but that they focus on different priorities and give varying weights to the influencing factors.

A summary of decision making theories and models was provided in the literature review. The purpose of looking at this work was to try to find a theory or model to assist in better describing, understanding and, potentially, changing the beliefs and subsequent behaviours of clinicians.

The literature review provided an overview of normative, prescriptive and descriptive theories. As this study aimed to describe decision making it was anticipated that the descriptive theories would be most useful in understanding how IUC decisions are made, and this has been found to be the case. Different decisions use different decision making processes, but there was one model that provided a valuable framework to understand how the clinicians made decisions across the different clinical areas, and that was Weick's (2005) Theory of Sensemaking. The way in which clinicians described their decision making was found to fit with the key characteristics of Sensemaking and is discussed below. Sensemaking is the attempt to make sense of events. It does not have a strict definition, but is described by a set of characteristics. Alternative theories and models also provided some useful insights which will be briefly reviewed at the end of this section.

Figure 4 demonstrates how the themes that have been discussed interact and come together in the process of making sense of the decision that an IUC is required. This section discusses how Sensemaking can help describe the clinicians' decision making and looks in detail about two frequently used approaches that clinicians use to make sense of the decision, "avoiding contingencies" and "making life easier."

Weick (1995, p61) stated,

> "Sensemaking is about accounts that are socially acceptable and credible……It would be nice if these accounts were also accurate. But in an equivocal postmodern world infused with the politics of interpretation and conflicting interests and inhabited with people with multiple shifting identities, an obsession with accuracy seems fruitless and not of much practical help either."

Those trying to implement the use of evidence based practice might disagree with Weick, but if this is the reality of how the decision to place an IUC is made it is worth understanding in order to address overuse.

While sensemaking, people "read into things the meanings they wish to see, they vest objects, utterances, actions and so forth with subjective meaning which helps make their world intelligible to themselves" (Frost and Morgan 1983). For example, an expression of distress by a patient who is concerned that they will be incontinent of urine with can be given different meanings depending on how a clinician makes sense of a situation. It can be interpreted to help justify the use of an IUC or to help justify a conversation about the use of pads. Sensemaking is about presumptions and connecting the concrete (the patient is distressed) with the abstract (an IUC will makes things easier for them).

Sensemaking states that the act of deciding has to be considered not by itself but within the context of the circumstances that led to the action. This means asking how the situation came to be and what were the cues that informed the sensemaking process order to illuminate why the decision was made. The context of the decision to place an IUC has been found to be fundamental to the sensemaking process. The key characteristics of sensemaking (described in section 2.4.8) will be considered in more detail here, in Table 15.

Characteristic	IUC sensemaking
Identity Construction	One of the central characteristics of sensemaking is Identity Construction, meaning that how people see themselves in a context shapes how they interpret events and how they enact those interpretations. If a clinician sees him or herself a healer they will make sense of a situation in a different way than if they saw themselves as a carer. How a clinician constructs their identity will vary depending on the context they are in. If a clinician in ED constructs their identity to fit the need for order and efficiency in a chaotic environment, then they might want to use of an IUC to control an unruly aspect of that environment (for example, the potential for urinary incontinence).
Retrospection	Retrospection allows for sensemaking and will impact on what people notice. Sensemaking can take place retrospectively and will do so until there is a feeling of order and clarity around an event. The process of explaining why they made the decision to place an IUC will often be part of that retrospective sensemaking process and the decision will make sense when it served the purpose of achieving a goal. As the goals between different clinical areas vary, so will the retrospective sensemaking.
Enactive of sensible environments	As people talk and create narratives it helps them to understand what they think and do. They are both creating and making sense of their environment in a circular pattern. As clinicians share experiences and beliefs on IUC use with each other, they are both making sense of their own practice and contributing to the development of new practice. This plays a key role in the development of ‘communities of practice’ (Brown 2007).
Social context	Another characteristic of sensemaking that impacts on all clinicians, but perhaps particularly junior staff is the social context. Sensemaking requires people to justify their actions retrospectively and in that sense it is an individual and a group activity. For example, when sensemaking a junior physician will be conscious of explaining their decision to a superior which impacts on the situation the sensemaking is taking place in and direct the focus of their attention. Again, this will vary between OPM&S and ED/MAU, because the seniors create a different social context within their department.

Ongoing	Sensemaking does not have a beginning or a past tense. It is about an activity or a process to create meaning rather than an outcome. The creation of meaning does not happen at a specific point, but is on-going (Rutledge 2009). Clinicians' beliefs and opinions on the use of IUCs are updated and progress because of new experiences and knowledge.
Focus in contextual cues	People focus on the cues that they think are important within the context they are in. Small cues can be enlarged to help makes sense of situations. Identifying the different patterns of cue usage can help to understand the decision. In the case of this study, different clinical environments emphasize different sources of cues and discount others. For example, OPM&S might consider social circumstances as a source of cues whereas ED might pay less attention to that source. Or, where a patient in the ED has restricted mobility and might need to go to have a CT scan in the next couple of hours. The patients' diagnosis might not indicate the need for a catheter, but the clinicians picks up on two cues; potential for urinary incontinence and the need to be quickly moved to and from another department for a test. The environment tells the clinician or sensemaker where to look for clues. This explains why junior physicians make different decisions when they move from one environment to another.
Plausibility rather than accuracy	Plausibility, rather than accuracy (Bansler & Havn 2006) is what drives sensemaking. What makes sense and is plausible is not necessarily accurate. Furthermore, what is plausible for one group might make no sense to another. Making sense of complex, uncertain situations and coming to a decision that is good enough and can be justified can be particularly important in time sensitive situations. A plausible story allows progress. Achieving accuracy is difficult because in order to manage the complexity, the cues are filtered and bracketed, plus current cues are combined with previous cues to build a more coherent picture. The goal, the only realistic possibility is to make sense of the situation, not necessarily be accurate. In the case of the use of IUCs, it is difficult to assess whether what is considered plausible is also accurate due to the lack of evidence on when the benefits outweigh the risks. However, it is possible to look

	at the individual cues used are combined to create a plausible decision and address those separately. For example, should the lack of pads or lack of bladder scanner influence the decision to place an IUC? The answer is likely to be no and therefore the decision might be inaccurate.

Table 15. IUC sensemaking

Two key processes in which clinicians make sense of the situation in order to arrive at the decision to place an IUC were identified; avoiding contingencies and making life easier. These two processes were found across the range of IUC indications.

6.5.1 Avoiding contingency

This process was used by clinicians to avoid potential adverse events for both patients and clinicians themselves. Clinicians picked up cues from situations that there was the potential for things to go wrong; skin could breakdown, there could be a lack of information, the kidneys or bladder could be damaged, the patient might become exhausted, the patient's slot at the CT scanner could be missed, not catheterising might be seen as an omission by a senior or a family might make a complaint. It was expressed by clinicians using terms such as "because you never know what's going to happen" (D21 MAU registrar), "We just cover all areas really,"(D10 ED Staff nurse), "So we didn't miss something," (D8 OPM&S Staff nurse) and "It's easier to justify putting one in than not putting one in" (D17 MAU registrar).

No formal assessment of risk of these potential events was identified, instead these cues were the focus of attention and given enough weight to influence the IUC decision.

Whether the clinician focused on a particular contingency cue appeared to be influenced by the cultural norms of the clinical environment, patient factors and the individual clinician's beliefs. For example, one junior doctor recounted a formative experience that impacted on the cues he focused on,

> "The one that sticks in my mind is that one we put a conveen on and we should have put a catheter in instead and he was actually severely unwell he was just hiding it well, he was like 50 and morbidly obese and he'd hidden his UTI quite impressively, but because he was so massive he was quite difficult to examine. I think that was my first year of being a doctor and I should have… you know he hadn't pu'd in ages and I hadn't gone back to re-review and re-review to see

> whether he had or not and he just got left in a corner. It will make you err on the side of caution. In an acute setting and they're sick and they haven't pu'd, then now it makes me think right, I'm not having that happen again. It could be a UTI and that pus needs to be drained. I mean the guy ended up dying, it was a massive cardiac arrest on MAU about an hour after I left the building." (D29 ED Junior physician)

Evidence of contingency avoidance and how it can impact on improving the quality of care can be found elsewhere in healthcare literature. Salem-Schatz et al. (1990) undertook a qualitative study in the USA to understand physicians' decision making when ordering blood transfusions. In the same way that junior physicians focus on cues from senior colleagues in order to make sense of the decision to place an IUC, Salem-Schatz et al. found that resident's (equivalent to registrar in the UK) decisions were strongly influenced by their seniors, with 61% who were interviewed admitting to ordering a transfusion they deemed unnecessary at least once per month. The decisions made sense because they prevented an adverse reaction from a senior colleague.

Butler et al.'s (2012) work in antibiotic use has demonstrated that physicians will make decisions to avoid adverse reactions from patients. They stated that irrational prescribing behaviour can be accounted for by physicians' attempts to avoid straining the relationship with the patient. This is echoed in the influence that patients and their families place on clinicians to make the decision to place an IUC.

In line with the results of this study, Harrod et al.'s (2013) work on exploring why clinicians do not consistently implement IUC related initiatives found that IUCs are used to avoid negative events. It was found that IUCs are used to reduce the potential for falls and to reduce the chances of nurses neglecting aspects of patients' care due to UI related workload.

This way of sensemaking was seen across different indications and in different clinical environments. For example, clinicians in OPM&S spoke about the potential negative consequences of refusing a patient's request to go home with an IUC; family might not be able to cope, the patient might not be able to stay at home, the lack of IUC might lead to the patient moving to a nursing home.

The sensemaking characteristics discussed above are apparent in this process. The harms that the clinicians focused on varied between environments. The decision that the clinician reaches is made plausible by protecting themselves or their patient from potential harm, their identiy as an efficient and safe practitioner is maintained.

6.5.2 Making Life Easier

The second pattern of sensemaking has been described as making life easier. This can mean easier for the patient or for the clinician. It is this process that seems to lie behind the combined indication decisions that were noted several times, where, for example, clinicians stated that knowing urine output would be useful, skin might be at risk of breakdown and the patient was likely to be incontinent of urine because they will be having IV diuretics. Taken individually, the indications might not be strong enough to warrant an IUC, but combine them and an IUC makes sense because it will temporarily make life easier.

The use of IUCs for managing UI, whether it is presented in terms of patient comfort and dignity, protecting skin or for managing staff workload is particularly well described by the making life easier process. However, the decision to use an IUC for other indications can also be described by this process, for example, catheterising a patient to monitor urine output when hourly monitoring is not required and another method could be used, but would require more effort or catheterising a patient for AUR if they only have 200ml of urine in their bladder in order to avoid re-scanning later in a shift.

Placing an IUC in order to assist with staff workload is contentious, but should not be ignored for that reason. A survey conducted by Rothfield and Stickley (2010) following the implementation of an initiative to reduce IUC use asked nurses how they would rate the effect of the “No Foley” programme in terms of the difficulty of their job and 45% said it made it worse, 25% better and 30% gave no feedback or said it had no effect. However, when asked what the effect on their job satisfaction was, 52% said it was better and only 5% said it was worse. Interestingly, when this work was included in a literature review of IUC reduction programmes authored by physicians associated with the Michigan group, the nurse satisfaction results were given, but not the difficulty of job results (Meddings 2013). It appears that there can be a head in the sand approach to the impact that IUCs can have on workload and, in turn, how that can influence decision making.

The findings suggested that workload reduction was a factor in Making Life Easier sensemaking in some cases. Certainly the use of alternatives such as IC was not considered and when asked why the clinicians stated that, although the alternative might be desirable for some reasons, the impact on workload would be too great for it to make sense. Harrod et al. (2013) who explored the barriers to implementing IUC reduction initiatives in Michigan found that nurse use IUCs as a tool to reduce their workload and some believed that it was a legitimate use of an IUC when a patients with UI prevent staff from getting on with the rest of their work. It seems clear that the use and reduction in use of IUCs does have an impact on nursing workload (and to a lesser extent the workload of physicians). Therefore, it is likely that acknowledging and addressing that impact would assist in the effectiveness and longevity of initiatives to change IUC behaviour.

The issue of the use of IUCs to improve patient comfort is complex. References to patient comfort in the literature are usually linked to end of life care where IUC use for this reason is customarily deemed as acceptable. That was found to be the case on an OPM&S ward, “If a patient goes end of life and they’ve got a catheter in then we don’t take it out because it’s one less aspect of comfort for the individual to have to deal with” (D25 OPM&S sister). However, it is not clear why it is acceptable at the end of life and not for acute illness.

Little consultation appeared to take place with patients about whether they would be more comfortable with an IUC in situ. Patient opinion appeared to be considered only at the extremes, for example a patient refusing an IUC for any reason or a patient strongly requesting one to manage UI. More frequently it was not discussed with the patient before consent was requested. When I asked what a patient’s opinion was, “I don’t think he’s actually been told he’s having one” (D22 MAU Registrar) was a typical response. This was also found in the Cowey et al. (2012) study (a mixed methods study based in acute stroke units), where it was concluded, “Only a few respondents mentioned patient involvement in the decision to catheterize and this was mainly in terms of capacity to consent.”

It is easy to be suspicious of clinicians’ use of IUCs to make patients comfortable when overwhelmingly they would do everything possible to avoid having an IUC placed if they were a patient.

Unpicking why this justification makes sense to clinicians, it emerges that is linked to both managing workload and keeping a degree of control over unruly environments. As noted in the results, the uncertain nature of ED and MAU makes this sensemaking process more prevalent. Patients who are newly ill and have not adapted to their change in functional ability are more likely to be managed in this way. Unsurprisingly, the age of the patient is also highly likely to impact on this process. The difficulty lies in determining when it is legitimate to make life easier by using an IUC. The decisions are plausible, but are they in the patients’ best interests?

This section has explained how the theory of sensemaking provides a useful tool for understanding the decision to place an IUC. How the context of decisions impacts on both how clinicians construct their identity and why they focus on particular cues in order to make sense of a situation and arrive at a plausible, socially acceptable decision.

6.5.3 Other decision making theories and models

Although sensemaking provided the most useful framework for describing and enhancing understanding of IUC decision making, the other theories and models discussed in the literature review also helped to identify valuable insights.

It has been discussed that some of the decisions made in the ED were routine and had so little conscious thought behind them that clinicians did not realise that they are making a decision. This is defined by system 1 thinking from Dual Process Theory, and as was described in the literature review, a shift to system 2 thinking requires effort on the part of the decision maker (Evans and Frankish 2009). Work on the use of heuristics to simplify and guide decisions is also useful in understanding the processes used, in particular for decisions for urine output monitoring, where rules of thumb such as “if the lactate is over 4 we need a catheter” were used. Such heuristics can lead to the type of “fast and frugal” (Gigerenzer 1996) decision making that is required in the ED, but as Kahneman 2011 highlights, this type of decision making is also prone to bias leading to inaccuracy.

In addition to being routine, these decisions were often low priorities compared to the other decision making processes at work, for example fluid resuscitation or drug therapy decisions. Despite efforts from healthcare providers, IUC decision making is often not high in the agenda of individual clinicians. Krein (2013) described the situation found in Michigan hospitals, "In some hospitals, physicians really don't pay that much attention to it because they have other things on their minds, and at some hospitals, there were physicians who thought there was no reason to pay attention to this. There was general disinterest." This study did not find disinterest in IUCs, but often they were not given a high or even moderate level of attention by busy clinicians.

The most well-known NDM model, the recognition primed decision (RPD) model, is described in the literature review and has been used to better understand clinical decision making in many clinical environments. Certainly the development of NDM as an alternative to the normative and prescriptive theories that went before provided a more realistic description of real world decisions. This study would agree that decision makers do not consider two or more solutions and options are not compared and formerly evaluated. However, the circular model depicted by the RPD model did not seem to fit the processes used for this decision.

NDM states that the decision maker recognises the situation, makes the decision to place an IUC and then uses mental simulation to evaluate that decision before deciding whether to go ahead, using a mixture of intuition (pattern recognition) and analysis. This analysis and evaluation of the decision was not evident in this study. Rather clinicians were making sense of various cues in their environment to arrive at the decision. Once the decision had been reached, it was not evaluated or analysed. There was no evidence of hypothetico-deductive processes.

Simon's (1956) theory of satisficing, where decision makers do not seek maximum utility but aim for a solution that is good enough, was a useful concept. For example, a consultant physician in OPM&S commented that, "Ideally, of course, everybody should be having intermittent catheterisation not an indwelling catheter, but there's no way we would be able to do that" (D11).

One limitation of all of the models was the lack of acknowledgment of the influence of emotion on the decisions. Stress induced by time pressure and uncertainty are considered by both NDM and sensemaking, but emotion is a relatively unexplored aspect of sensemaking and tends to be ignored (Maitlis et al. 2013). Comments made by clinicians suggested that mood and emotion play a role in IUC decision making, for example one clinicians stated that if he was, "feeling particularly cantankerous" (D29 ED Junior physician) that it might impact on his decision making. It is possible that these aspects are less explored because it is considered that they would be difficult to describe, measure or change, and therefore do not warrant significant attention.

6.6 How can the practice of IUC use be influenced and the quality of care improved? Implications for research and clinical practice

6.6.1 Introduction

This section will identify the current knowledge gaps that need to be addressed in order to accurately assess when the benefits of IUC use outweigh the harms (implications for research). It will then discuss areas of current practice that are likely to cause unnecessary use and how they could be addressed (implications for clinical practice).

When considering how the practice of IUC could be changed, the systematic review and qualitative study have established three important points:

- The clinical benefits of using an IUC in different circumstances are unclear and it has been noted that there are spectrums of belief held by clinicians, a striking example provided by the variation in opinion on when an IUC is required for skin protection. It seems logical that where these spectrums exist, there is room for improving the use of IUCs. If clinicians at the low-use end of a spectrum are providing high quality care without the use of an IUC then can this practice be adopted elsewhere?

- The accuracy of individual decisions is difficult to assess in an equivocal and value-laden environment. Even when an indication appears to be clear-cut, for example using an IUC to monitor output in a patient with septic shock, it has been established that the information provided by the IUC may be inaccurate and therefore the decision to catheterise is not the right one.

- Sensemaking provides a useful framework for describing how clinicians make plausible decisions using cues that are clinicians take from the context they are working in. Assessing the accuracy of these cues might provide a pragmatic solution to assessing the accuracy of decisions.

6.6.2 Implications for Research

Tackling the knowledge gaps in when an IUC is required and when an alternative device can be used or an alternative action taken provide the foundation to addressing IUC use. The key questions raised by this study are:

- When is it beneficial to patient outcomes to know the hourly urine output? Do IUCs (used with urometers) accurately represent urine production?
- How can clinicians be assisted to differentiate between when hourly output monitoring is required and when it is not and avoid routine use?
- Can bladder scanners be used instead of IUCs to assess hourly urine production?
- At what point does it become necessary to relieve AUR? Is this accurately assessed?
- What can be done to prevent AUR being triggered in acute care?
- What role can IC play in managing AUR and avoiding IUC?
- Are there any circumstances when IUCs should be placed to manage skin damage?
- How can UI be better assessed and managed in acute care?
- How can the workload from patients with untreatable UI be managed? What are the short and long term financial implications of avoiding IUCs?

- What are patients’ views on IUCs in acute medical care?
- Are there any circumstances when the benefits to patient comfort provided by an IUC outweigh the risks?

With these questions in mind, the quote from NHS England (NHS CQUIN Guidance 2013) in the Introduction Chapter stating that the reduction of IUCs could be problematic because, “there will be genuine clinical need for both the catheter and the antibiotics in an unknown proportion of patients” is understandable.

Currently, even measuring levels of unnecessary IUCs is difficult. Assessments of levels of inappropriate IUC use reported in the literature have been carried out by assessing patient notes and judging the appropriateness of the device from clinician’s notes (Fernandez-ruiz et al. 2013, Tiwari et al. 2011, Bhatia et al. 2010). It is difficult to see how an accurate assessment can be made using this approach. Furthermore, this surface level of assessment of the accuracy of decisions and subsequent condemnation of decisions considered to be inaccurate without considering the complexities and context of the decision would lead to clinicians adjusting their notes to make the indication professionally plausible.

6.6.3 Implications for Clinical Practice

Even with substantial knowledge gaps, there are some areas of current clinical practice that could be addressed in order to optimise IUC use. The findings of the qualitative study show three key areas where practice could be addressed; beliefs about the appropriate use of IUCs, beliefs about the risks posed by IUCs and organisational beliefs. However, as identified in the literature review, changing clinician behaviours is complex and the implementation of interventions to influence practice is not straightforward. This section summarises the key areas of practice and clinical belief that have been highlighted by this work as likely to lead to sub-optimal care. It then highlights factors that could impact on the efficacy of any interventions to change practice.

Beliefs about the appropriate use of IUCs that could be challenged without the need for further research tend to lie at the extreme end of a spectrum of beliefs. For example, the use of an IUC to protect skin that is currently intact, to monitor urine in a patient who has the cognitive and functional capability to monitor their own output and the use of an IUC to relieve suspected AUR in patients who are not symptomatic and have not had their bladder scanned. Although there are gaps in knowledge surrounding these indications, expert consensus would be unlikely to accept these examples as providing justification for IUC use. Clear, precise guidance on when an IUC is appropriate and when it is not, might assist in limiting decisions made at the end of the spectrums. However, as Shimoni et al. (2012) found in their study of an intervention to restrict justifiable indications, changing clinician behaviour is likely to be challenging.

Another set of beliefs that could be addressed are those surrounding the risks associated with IUCs. Although the literature is clear that IUCs are associated with a wide number of risks, some clinicians reported that they believe IUCs are relatively risk free with little acknowledgement of non-infection IUC related risks. These beliefs are particularly significant when a clinician is making the decision to place an IUC to avoid contingencies.

There are also areas where beliefs about the organisation could be challenged more broadly in order to reduce what appears to be unnecessary IUC use, in particular, the beliefs of senior clinicians in the ED and MAU. For example:

- that IUCs are used routinely elsewhere in the hospital
- that if there is the potential for UI an IUC should be placed
- that IUCs should be used routinely in some circumstances
- that junior clinicians do not feel under pressure to place IUCs
- that older people are more likely to benefit from an IUC
- resources are not available to manage UI

These organisational beliefs are not directly related to one indication, but are woven through all indications and act as cues to make the use of an IUC more plausible.

The beliefs described above are often deeply entrenched and it is likely that clinician behaviour would be difficult to change. As was noted in the literature review, introducing new evidence based guidelines (assuming that the strong evidence was available at some point in the future) would be unlikely to change practice without addressing barriers. It was proposed that barriers are not straightforward hurdles to get over, but are meticulously constructed strategies to restrict the impact of evidence on practice (Crawford et al. 2002).

Any successful initiative would have to fundamentally change the clinicians' sensemaking processes. The clinicians would have to stop seeing IUCs as tools to "avoid contingencies" or to "make life easier." Without this shift in beliefs, any change in behaviour would be sub-optimal and short-lived.

The literature review drew on work from several studies to present a table of Potential EBP Barriers (Table 4). This table has been used as a framework to identify the sensemaking cues identified in the findings of this study that might need to be addressed in order to effectively change IUC decision making, shown below in Table 16.

	Factor	Sensemaking Cues	Notes
External	Organisational Constraints	• Time constraints • Fear of complaint from seniors • Lack of resources • Workload impact • Conflicting organisational goals	• Relevant across all indications • Highly influential
	Patient Factors	• Patient Age • Patient comfort • Carer preferences • Subjective judgement of patient's cognitive and functional abilities • Patient's social circumstances	• Particularly influential for managing UI
	Guidelines	• Not currently used	• Not influential
	Social/Professional influences	• Usual routines • Clinical training • Opinion leaders • Local leadership • Team norms • Professional norms	• Relevant across all indications • Highly influential
Internal	Knowledge	• Clinical uncertainty • Condition specific heuristics	• Uncertainty for AUR • Heuristics used particularly for monitoring urine output
	Beliefs	• Outcome expectancies • Interpretation of probabilities	• Beliefs regarding risk of IUC and the benefits of IUC across all indications
	Attitude/goals	• Intrinsic motivation • Goal priorities	• Conflicting goals for patient and for clinician
	Emotion	• Stress • Cognitive overload • Anticipated regret	• Fear of causing harm by incompetence • Stress cause by time and uncertainty
	Skills	• Competence to undertake alternative • Interpersonal skills	• Uncertainty around the use of ICs • Lack of communications skills to discuss UI with patients

Table 16. Sensemaking cues

Whatever the outcome of investigations into the empirical benefits versus harms of IUC, the above cues would need to be addressed. For example, the focus on infection as the main IUC related harm and lack of attention given to other harms, such as trauma, increased length of stay, discomfort, increased risk of delirium, means that a clinicians in ED might believe that an IUC is lower risk because they anticipate that it will only be required for 48 hours. The plausibility of this story needs to be interrupted.

6.7 Limitations of the study

Using interpretive description to provide a logical framework, this study has answered the research question, met its objectives and provided clinically relevant findings. However, inevitably, this study has some limitations.

The methodology chosen for the study has been developed fairly recently and is still evolving. Furthermore, interpretive description does not provide specific guidance on methods to use and this study could be criticised for not using stringently defined method of analysis. However, well-supported analytical tools from a variety of methodological sources (in particular constant comparison and the use of memos) were used with good effect. It is recognised that if grounded theory or an ethonographic approach had been used, different results might have been found.

Although the combination of RTA and semi-structured interviews worked well, a key limitation of the study was the reliance on interviews and self-reported data. Inevitably, clinicians would be likely to provide a professionally acceptable version of events despite attempts being reassured that their actions and comments were not being judged as right or wrong. Clinicians might be willing to say that workload or fear of making a mistake had an impact on their decision-making, but might be less willing to say that tiredness or laziness, for example, influenced their actions. However, it is difficult to see how observational data would have revealed any more about decision making. Furthermore, due to restrictions on access to the participating clinicians, is was not possible to undertake respondent validation to check for any errors in interpretation.

The sample was selected to provide a broad range of cases, but not all indications were covered, the key missing area was end-of-life care. Although data collection sessions were undertaken during the night and at weekends, the data was predominantly collected from Monday to Friday during normal working hours. The mix of staff varies between days and nights and weekdays and weekends, for example whether or not a consultant physician is available. This might have had an impact on the findings.

In hindsight it might have been useful to get healthcare support workers opinions on catheter use because of links to work load. The influence of healthcare assistants on the decision to place an IUC is not explored in the literature.

Finally, the data collection and analysis were undertaken by one novice researcher. The study was a substantial learning curve, for example learning how to approach busy clinicians and grappling with over 100,000 words of data. Furthermore, the data was collected at one site and, although the setting has been described in order for the relevance and usefulness of the themes described to extend beyond the boundaries of time and place, the findings are not generalizable in any statistical sense.

6.8 Summary

There was a lack of understanding of why and how clinicians came to the decision that a patient in acute medical care would benefit from an IUC. The work in this thesis has investigated the efficacy of interventions to minimise IUC placement, the factors that promote or inhibit the decision to place an IUC, examined how clinicians reach the decision that an IUC is needed and has used the findings to identify how the practice of IUC use could be influenced and the quality of care improved.

It can be concluded that clinicians use sensemaking processes and a range of cues to understand situations and make the decision that IUCs are needed. Spectrums of belief and variations in clinical practice indicate that IUC use is suboptimal and that far more needs to be known about when the benefits of IUCs outweigh the harms.

This work has important clinical relevance. Considerable resources have been put into reducing IUC use globally. These attempts have met with mixed success, and in some cases, healthcare organisations such as NHS England appear to have found the task too onerous due to the uncertainty on when an IUC is required. These findings can inform the development (in particular the pre-initiative assessment phase) of such initiatives. For example, many guidelines and initiatives to optimise IUC use instruct clinicians to “consider all other options before placing a urethral catheter”. However, it is evident from the results of this study that QIPs to change patterns of IUC use that do not make attempts to understand clinicians’ underlying beliefs are unlikely to have a sustained impact. Furthermore, as it has been established that not enough is known about when IUCs should be used, it is clear that a better understanding of clinicians’ current beliefs and decision making processes can help to guide the direction of future research and to inform the development of an improved evidence base.

Many of the issues discussed here are relevant to other areas of healthcare; ageism, gender bias, conflicting policies, training of clinicians and resources to name a few. Moreover, the inherently contestable and equivocal nature of the decision to place an IUC is also found throughout healthcare. Clinicians have to make sense of the clinical situations that they find themselves in with conflicting goals, uncertainty, limited resources and ambiguous values. This work highlights the importance of pre-initiative assessments to understand the challenges that clinicians face and understand how they reach plausible solutions to ambiguous problems.

Appendices

Appendix A

Interventions to minimise the initial use of indwelling urinary catheters in acute care: A systematic review

(Published in International Journal of Nursing Studies 2014)

Abstract

Background: Indwelling urinary catheters (IUC) are the primary cause of urinary tract infection in acute care. Current research aimed at reducing the use of IUCs in acute care has focused on the prompt removal of catheters already placed. This paper evaluates attempts to minimise the initial placement of IUCs.

Objectives: To evaluate systematically the evidence of the effectiveness of interventions to minimise the initial placement of IUCs in adults in acute care.

Design: Studies incorporating an intervention to reduce the initial placement of IUCs in an acute care environment in patients aged 18 and over that reported on the incidence of IUC placement were included in the review. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist has been used as a tool to guide the structure of the review.

Data Sources: MEDLINE, CINAHL, EMBASE, National Health Service Centre for Review and Dissemination and Cochrane Library.

Review Methods: A systematic review to identify and synthesise research reporting on the impact on interventions to minimise the use of IUCs in acute care published up to July 2011.

Results: 2689 studies were scanned for eligibility. Only eight studies were found that reported any change (increase or decrease) in the level of initial placement of IUCs as a result of an intervention in acute care. Of the eight, six were uncontrolled. Seven demonstrated a reduction in the initial use of IUCs post-intervention. There was insufficient evidence to support or rule out the effectiveness of interventions due to the small number of studies, limitations in study design and variation in clinical environments,. Notably, each study provided a list of indications considered to provide justification for placing an IUC and there was substantial variation between the indication lists.

Conclusions: More work is needed to establish when the initial placement of an IUC is appropriate in order to better understand when IUCs are overused and inform the development of methodologically robust research on the potential of interventions to minimise the initial placement of IUCs.

What is already known about this topic?

- **There are risks associated with the use of indwelling urinary catheters (IUCs), in particular they are the cause of 80% of urinary tract infections in acute care.**
- **Over-use of IUCs within acute care has been identified as a problem. Interventions to reduce the duration of use of IUCs (e.g. reminder systems) have been found to be effective.**

What this paper adds

- **This is the first review to systematically evaluate the evidence on interventions to minimise the initial placement of IUCs.**
- **There is no robust evidence for any particular intervention to reduce the initial placement of IUC.**
- **There is a lack of agreement regarding indications for appropriate use of IUCs in acute care.**

Key Words: Catheter-associated urinary tract infection, inappropriate use, infection prevention, systematic review, urinary catheterisation.

1.0 Introduction

Alongside other healthcare associated infections, the profile of catheter associated urinary tract infections (CAUTIs) has risen in recent years. Catheter insertion accounts for around 16% of all healthcare associated infections in the UK (National Audit Office, 2009). Over one hundred million urinary catheters are used annually around the world (Nasr, 2010) and up to 25% of patients in general hospitals have an indwelling urinary catheter (IUC) inserted at some point during their stay (Hooton et al. 2010). The financial burden to healthcare is difficult to establish, but it has been estimated that the cost of CAUTI to the UK National Health Service could be as much as £99 million per year (Davenport and Keeley, 2005) at an estimated cost per CAUTI episode of £1968 (Ward et al.., 2010).

Furthermore, the potential harm caused by IUCs to individuals can be substantial. Urinary tract infections (UTI) are estimated to cause one death per 1000 episodes of catheterisation (Gokula, 2004). CAUTIs are a leading cause of secondary nosocomial bloodstream infections, with around

17% of hospital-acquired bacteraemias being traced to a urinary source (Weinstein et al.., 1997). Furthermore, CAUTIs contribute to the excessive use of antimicrobial agents with the potential to lead to antimicrobial resistance. Of particular concern is the rise in antimicrobial-resistant gram negative organisms (Nicolle, 2005). Additionally, the Royal College of Nursing (2008) warns of other risks associated with routine catheterisation such as reduced patient interaction from the reduced need to change pads and assist with toileting, potentially increasing the risk of pressure ulcers.

There has been a recent shift towards viewing CAUTIs as preventable adverse incidents. In 2008, the Centers for Medicare and Medicaid Services in the USA announced that they would no longer continue to compensate hospitals for the costs of hospital acquired UTIs as they perceived them to be reasonably preventable (U.S.A. Department of Health and Human Services, 2008). In the UK, the Department of Health has the reduction of CAUTIs as one of its key patient safety goals, aiming to halve the number of hospital associated CAUTIs in two years (Patient Safety First, 2011).

Although the need to minimise use of IUCs is widely accepted, there is a significant body of literature reporting that IUCs continue to be overused in acute care (Gokula et al.., 2007, Tiwari et al.., 2011). Overuse occurs when a device is in place without an appropriate indication. There are two ways of reducing IUC use: firstly by minimising the initial placement of IUCs, secondly by reducing the duration of each catheterisation. The majority of research aimed at minimising IUC use has focused on limiting the duration of catheterisation and there is evidence that interventions in this area can achieve positive outcomes. A systematic review and meta-analysis of the efficacy of reminder systems to prompt the removal of unnecessary IUCs to reduce CAUTI concluded that reminders can be effective in reducing the rate of CAUTI (Meddings et al.., 2010). Reducing the initial placement of IUCs has received less attention and, as yet, there are no published systematic reviews of the efficacy of interventions aimed at minimising initial placement. This review aims to address this knowledge gap.

2.0 Method

2.1 Aim

This review sought to answer the question, “What evidence is there for the effectiveness of interventions to minimise the initial use of IUCs in acute care?”

2.2 Design

A systematic review was undertaken in order to accurately identify, evaluate and summarise the findings of all relevant studies. To aid the complete and transparent reporting of this systematic review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist has been used as a tool to guide the structure of the review.

2.2.1 Tools

Three tools were used to assist in evaluating and summarising the eligible studies. The results from the use of the tools are provided in the appendices. The first tool was the Cochrane Effective Practice and Organisation of Care (EPOC) Group data extraction checklist (2002). It provides a well- established tool for obtaining data from multiple study designs (Centre of Reviews and Dissemination, 2009) and it broadly follows the PICOS (population, intervention, comparison, outcome, study design) format appropriate to this review. The second tool was the Cochrane Collaboration’s tool for assessing risk of bias (2011), designed to detect selection, performance, attrition, detection and reporting bias. Finally, the Standards for Quality Improvement Reporting Excellence checklist for quality improvement reporting (SQUIRE) was chosen as it provides a framework for assessing the standards of reporting in variety of study designs.

2.3 Search Strategy

A comprehensive search strategy was used on electronic databases (MEDLINE, CINAHL, EMBASE, National Health Service Centre for Review and Dissemination, Cochrane Library) from inception of the databases to July 2011. Additionally, the reference lists of all studies included and the reference lists of infection control guidelines were consulted. Keywords used to search the databases were combinations of “ur* catheter*” and “urinary tract infection.” A combination of

Medical Subject Headings (MeSH) and text words were used to search Medline. The MeSH subject headings were “urinary catheterization/utilization” and “urinary tract infection/prevention and control.”

To be included in the review studies had to incorporate two elements; firstly, an intervention to reduce the initial placement of IUCs in an acute care environment in patients aged 18 and over and, secondly, they had to report on the incidence of IUC placement pre and post intervention.

It was correctly anticipated that a small number of studies would be eligible for this review. It was therefore decided to include uncontrolled studies. Papers not written in the English language were excluded. In order to assess eligibility, the titles of the studies found were initially scanned with full text retrieved for any studies that potentially met the stated criteria.

3. Results

3.1 Study Selection

A flow chart of the selection of eligible studies is given in Figure 1.

The titles of studies initially identified (N=2689) were scanned for eligibility. 2567 of these were excluded because they did not meet the inclusion criteria for this review. The full text of the remaining 122 studies was assessed, 59 were rejected as the study was not related to the overuse of IUCs, four were rejected as they were not in acute care and 51 were rejected because, although related to the overuse of IUCs, the incidence of placement of IUCs was not provided as an outcome. Only eight studies reported on the impact of an intervention to reduce the use of IUCs in acute care and its impact on the incidence of IUC placement.

Commonly, studies excluded for not reporting on the incidence of IUCs pre and post intervention either reported catheter days for the patient population or frequency of CAUTI per 1000 catheter days, thus making the studies ineligible for this review. This is discussed in section 5.2.

3.2 Study Characteristics

An alphabetical overview of the eligible studies is provided in Table 1. Relative risk relating to IUC use was calculated by dividing the post-intervention number by the pre-intervention number to provide a simple overview of the results of the studies.

3.2.1 Study Design

All but two of the eight studies had an uncontrolled before-after intervention design. Danchaivijitr et al., (1992) conducted a randomised controlled experiment, with cluster randomisation at ward level. Stephan et al.., (2006) carried out a controlled before and after study, with orthopaedic surgery patients assigned to the intervention groups and abdominal surgery patients acting as the control.

Five of the studies (Topal et al., 2005, Slappendel and Weber 1999, Patrizzi et al.., 2009, Voss, 2009 and Stephan et al.., 2006) could be categorised as local quality improvement projects (QIP) rather than formal research studies. Distinguishing between research and QIPs is not always clear cut and there is often overlap between the methods used. Cosco et al.., (2007) established three criteria to help to differentiate: the study's purpose, the degree of generalizability possible and the risks associated with the study. The impact that this variation has on this review and expanding the knowledge base surrounding IUC use is considered in the discussion section.

3.2.2 Sample Size

Total sample size in terms of number of patients was given in all of the studies and ranged from 182 (Voss, 2009) to 16,959 (Danchaivijitr et al.., 1992). The duration of data collection, including follow-up period, varied from eight weeks (Voss, 2009) to two years (Topal et al.., 2005, Stephan et al.., 2006).

3.2.3 Setting

All but one study took place at a single hospital site. Danchaivijitr et al.. (1992) collected data from 13 randomly selected hospitals in Thailand and was one of only two studies not set in the USA, the other, Slappendel and Weber (1999), was conducted in the Netherlands. Three of the studies took place in an emergency department (Fakih et al.., 2010, Gokula et al.., 2007, Patrizzi et al.., 2009), two in surgical units (Stephan et al.., 2006, Slappendel and Weber, 1999), two within medical wards (Topal et al.., 2005, Voss, 2009) and one both medical and surgical wards (Danchaivijitr et al.., 1992).

3.2.4 Intervention

The EPOC Data Extraction form (Appendix 1) was used to evaluate and summarise the interventions. All but one ((Danchaivijitr et al.., 1992) of the eight studies used multifaceted interventions that included two or more methods (see section 3.4 for further detail) aimed at implementing a reduction in the initial placement of IUCs in the defined setting by changing clinical practice.

3.2.5 Outcome Measurement

All studies reported the number of initial IUC placements post-intervention compared to the pre-intervention figure. The baseline and post-intervention data were collected from patients notes (either paper or electronic) or from hospital billing data.

3.3 Quality Appraisal

3.3.1 Methodological Quality

Six of the studies had an uncontrolled before and after design which can provide a pragmatic option for individual settings to gauge the impact of the introduction of quality improvement policy. However, due to their intrinsically weak methodological nature, the use of uncontrolled studies is not recommended to assess the efficacy of interventions (Eccles et al.., 2003).

The risk of bias was assessed using the Cochrane Collaboration tool. The study undertaken by Danchaivijitr et al.. (1992) was the only randomised controlled experiment, with cluster randomisation taking place at ward level. The method of allocation and concealment of allocation were not fully reported, therefore the risk of bias is unclear. The only controlled before and after study (Stephan et al..,2006) did not state how allocation of control and intervention groups took place. In all studies, data was collected from a set number of consecutive patients or from all patients within a set time frame.

With the exception of Danchaivijitr et al.. (1992), all of the studies had an element of clinician education within their interventions. Therefore, performance bias might have been a significant source of bias in these seven studies. None of the studies stated whether the clinicians were aware of the data collection periods or if the aims of the studies were made explicit. However, particularly for the quality improvement projects, the nature of the interventions suggests that clinicians would be aware of the objectives and that the use of IUCs would be monitored, thus increasing the risk of bias.

As data was collected from standard medical records (computer or paper based) or hospital billing records in all of the studies there is arguably little room for confusion as to whether or not an IUC has been placed. However, knowledge that the intervention had taken place could have influenced measurement since in all studies it appears that the researchers who were implementing the interventions were also involved in collecting the data and assessing the outcome and were therefore not blinded. Fakih et al.., 2010 and Voss, 2009 both identified the risk of bias caused by missing/inaccurate data due to retrospective data gathering from notes as a limitation. This was a potential risk for all of the studies.

Three of the studies in this review identified potential sources of bias within their own studies not specifically included in the risk of bias tool. Potential confounders identified included variation in commitment to infection control by physicians and variation in clinicians' skills (Stephan et al.., 2006), variation in physician preference regarding the use of protocols (Voss, 2009), the presence of a senior clinician on ward rounds (Voss, 2009), variations in unit based culture (Gokula et al.., 2007, Stephan et al.., 2006 and Voss, 2009) and the potential for pre and post intervention populations to have varying demographic and clinical factors (Gokula et al.., 2007).

3.3.2 Reporting Quality

Using the SQUIRE guidelines reveals that the reporting standard of the eight studies was variable, since none reported fully on more than half the relevant criteria. The local background to the studies was poorly reported. Only two of the studies reported on the local nature and severity of the problem being addressed, both of which were QI studies (Slappendel and Weber, 1999 and Patrizzi et al.., 2009). There is a lack of detail on why the interventions were chosen and why the authors believed the interventions worked or did not work. There were few reports of attempts to understand which elements of multi-component interventions worked and at which level.

3.4 Intervention characteristics

The most common form of intervention was education, with all except two studies (Danchaivijitr et al.., 1992, Slappendel and Weber, 1999) including some kind of clinician education. There was a wide variation of methods used within this category from one-to-one nurse education by a clinical nurse specialist, to changes in protocols and guidelines.

The other methods of change used were the introduction of bladder scanners (Patrizzi et al.., 2009, Slappendel and Weber, 1999, Topal et al.., 2005), the introduction or adaptation of IUC guidelines (Gokula et al. 2007, Slappendel and Weber 1999, Stephan et al. 2006, Voss,2009), indication checklist reminders (Danchaivijitr et al.., 1992, Fakih et al.., 2010, Gokula et al.., 2007, Patrizzi et al.., 2009), removal of IUC kits from bedsides (Patrizzi et al.., 2009), feedback on IUC usage (Patrizzi et al.., 2009) and introduction of physician’s IUC “champion” (Fakih et al.., 2010).

All but one of the studies (Danchaivijitr et al.., 1992) had multi-component interventions. Although none of the studies directly compared efficacy of different components of interventions or combinations of components of interventions, some studies noted the importance of combining different mechanisms. Topal et al.. (2005) identified the importance of merging increased awareness of the risks of catheterisation with directives to avoid unnecessary use in order to achieve cultural change. According to Patrizzi et al.. (2009), practice change was dependent upon addressing a combination of educational, behavioural and cultural factors. Gokula et al.. (2007) believe that combining education and reminder methods was vital to their success, commenting that Danchaivijitr et al.'s (1992) use of reminders alone reduced the recorded inappropriate use of catheters, but not the number of catheters used. Fakih et al.. (2010) commented on the importance of the designated change leader in enforcing compliance with the education and reminder system aspects of the intervention. Stephan et al.. (2006) noted, that "feedback of performance and results" was only made available after the intervention but that this might have been critical in ensuring a sustained effect.

Most interventions were aimed at changing the behaviour of both physicians and nurses. However, in 2 (Danchaivijitr et al.., 1992 and Fakih et al.., 2010) the intervention was aimed at physicians only. Despite the focus on physicians, both of these studies commented upon the influence of nurses over the decision to catheterise. Fakih et al.. (2010) commented that in order to address inappropriate IUC use, indications must be used by both emergency physicians and nurses. The intervention in Patrizzi et al.'s (2009) study was designed by and aimed predominately at nurses. However, collaboration and communication with physician colleagues was noted as important to support the change in practice.

Several of the studies discussed the importance of addressing individual clinicians' beliefs, cultural norms and organisational barriers in changing practice. Topal et al.. (2005, p.126) stated, "The power of collaboration among physicians and nurses played a vital role in our success. We recognised that the 40-year culture of indwelling catheter use was an interdisciplinary norm and that the norm was likely motivated differently for doctors and nurses." Patrizzi et al.. (2009, p.539) observed that "Collaboration, communication and teamwork between the two units were major factors in the projects success" and with reference to the routine placement of IUCs, "This almost ritualistic behaviour was difficult to change because of it enculturation into standard ED nursing practice." Fakih et al.. (2010, p.339) reported that, "Recognising the factors that lead nursing to inappropriate placement of IUCs may help us target the noncompliance with UC indications."

Whichever method of implementation was used, all of the studies used a checklist of accepted indications for placing an IUC as part of their intervention, either during education sessions, as part of new guidelines or in the form of a reminder checklist. A summary of the indication criteria used by each study is provided in Table 2. The method of compiling a list of acceptable criteria varied between the studies. Topal et al.. (2005) and Patrizzi et al.. (2009) used existing guidelines. Voss

(2009), Gokula et al.. (2007), Fakih et al.. (2010) and Stephan et al.. (2006) developed the lists locally. Danchaivijitr et al.. (1992) and Slappendel and Weber (1999) did not state the method of development.

There was substantial variation between the lists of indications that each study considered to be appropriate reasons to place an IUC. The levels of acceptance and adoption of the indication checklists also varied widely. Topal et al.. (2005) found that 14.8% of placements post-intervention did not meet the stated criteria and Voss (2009) reported that the appropriate use of IUCs fell from 57.1% to 53.8% with the introduction of the indications. Gokula et al.. (2007) found that appropriateness of use increased from 37% at baseline to 51% following the intervention. However only 12% of IUCs placed had a completed indication sheet and 60% of clinicians stated that they would not wish to routinely use the indication sheet. Danchaivijitr et al.. (1992) reported that on 96.5% of IUC placements prescribers used the indication sheet and that overall it was seen as highly accepted. It was found that the indication sheet reduced catheter use recorded as inappropriate (27% down to 14.3%) but not the actual number of catheters used, which rose slightly. Fakih et al.. (2010) noted that over half of the IUCs were placed without physicians orders and of that number around half did not fit any of the indications. The authors of that study believed that this might reflect a difference in what physicians and nurses judged appropriate indications for IUC use.

4.0 Review of evidence

The Forest Plot in Figure 2 provides a summary of the impact of the interventions. Seven out of the eigth studies demonstrated a reduction in the initial use of IUCs post-intervention. Overall, it can tentatively be proposed that interventions aimed at reducing the number of IUCs being placed in acute care are likely to have a positive effect. However, caution should be used when interpreting the results from non-RCT studies and studies using a pre-test, post-test design are inherently biased in favour of the intervention. Two of the studies (Gokula et al.., 2007, Partizzi et al.., 2009) reported the post-intervention number of IUCs placed reduced to a quarter or less of the base level. Three of the other studies (Slappendel and Weber, 1999, Topal et al.., 2005, Voss, 2009) reported reductions to around half of the pre-intervention level. Fakih et al.. (2010) and Stephan et al.. (2006) reported less substantial falls in use. It is worth noting that the two controlled studies (Danchaivijitr et al.., 1992 and Stephan et al.., 2006) included in this review had the least positive results, with an increase in IUC use in Danchaivijitr et al.'s (1992) study.

It is difficult to draw any conclusions about the efficacy of individual methods of intervention. Examining the efficacy of the interventions is made complex by the range of methods used, different clinical environments and the variation in study design. Although all but one of the studies reported a reduction the initial placement of IUCs, the uncontrolled pre and post-test design of 6 of the studies is weak and the efficacy of the intervention is therefore unknown. The only randomised controlled trial (Danchaivijitr et al.., 1992) was poorly reported. Furthermore, any impact interventions have on practice might be short lived. Only two studies (Gokula et al.., 2007, Topal et al.., 2005) reported IUC use for more than a 6-month period.

5.1 Discussion

A number of key observations can be made from the findings.

Firstly, based on the evidence available, although it appears that the interventions implemented do improve clinical practice, it is impossible to draw any strong conclusions about the efficacy of individual interventions or combinations of interventions due to the study designs, the variation in clinical environments and the paucity of number of studies. Reviews of implementation strategies have consistently demonstrated considerable variation in the success of similar interventions (Eccles et al.., 2005) and this is echoed here. However, some broad observations can be made. Clinician education was the most common intervention component, with only two studies not including it (Danchaivijitr et al..,1992 and Slappendel and Weber, 1999. Danchaivijitr et al.'s (1992) intervention of using clinical reminders alone was not effective. However, the other studies that implemented interventions with two or more components saw positive results. This corresponds with the findings of systematic reviews of interventions to implement change in clinical practice that have reported multifaceted interventions to be more effective (Boaz et al.., 2011, Grol and Grimshaw, 2003).

Most of the studies combined a practical/resource based component (for example, the introduction of bladder scanners or indication checklists) with an educational component (Fakih et al..,2010, Gokula et al.., 2007, Patrizzi et al.., 2009, , Slappendel and Weber, 1999, Topal et al.., 2005). Of the three that did not (Danchaivijitr et al..,1992, Stephen et al.., 2006, Voss 2009), two (Danchaivijitr et al..,1992, Stephen et al.., 2006) had the least positive results. However, these were also the only two studies that used controls, therefore it is difficult to draw any conclusions about the benefits of combining these two components.

The need to change the culture surrounding the initial placement of IUCs was considered an important factor by many of the studies. Two key issues were highlighted; firstly the importance of collaboration and communication between colleagues (Fakih et al.., 2010, Topal et al..,2005 and Patrizzi et al.., 2009) and, secondly, the need to address ritualized practice (Patrizzi et al.., 2005, Topal et al.., 2005 and Stephan et al.., 2006). There is little literature addressing the culture of IUC use in acute care and this is an important area for further research.

Secondly, when exploring the eligible studies, it is important to note their initial purpose. The majority of the studies included in this review were categorised as local quality improvement projects, thus providing further confirmation that such studies have the potential to provide a significant contribution towards efforts to improve patient experience and outcomes (Sales 2009). However, this also highlights the importance of achieving a high level of methodological and reporting quality in local QIPs as well as formal research studies. Despite their local nature, small-scale projects have the potential to generate understanding that can help develop knowledge that can be applied further afield (Harvey and Wensing, 2003). Combining more formal research studies and local projects brings both the benefits and challenges of different experiences in diverse contexts, using varying methodologies and reporting standards. Additionally, the QIPs are likely to inflate any intervention effects and their combined use as evidence must therefore be treated with caution. There was little variation between the methodological quality and reporting standards of the studies identified as quality improvement projects and those identified as research. This is partly due to the limited methodology and reporting standards of the research in this area.

Given the increasing pressure to minimise the use of IUCs, future local quality improvement projects should seek to articulate a clear description of aims, context and intervention. The use of a tool such as SQUIRE to improve reporting standards might improve the transferability of the knowledge gained from these studies to other locations. There is a particular lack of reporting on the specific local problem of the overuse of IUCs in all of the studies and without this information it is difficult to understand how any intervention works. Calls for the high quality and consistent reporting of interventions to improve healthcare have been increasing in recent years (Michie et al.., 2009). The need for a standardised, comprehensive approach to reporting is clear. Where systematic reviews of interventions have found improvements in healthcare outcomes there is often little explanation of which mechanisms result in the change and how the processes are taking place (Michie, 2009). None of the studies in this review referred to a theoretical model or previous diagnostic work to discover barriers to change or address cultural norms and individual beliefs regarding the use of IUCs when designing interventions. Eccles et al. (2005) note the importance of working with theories to understand both the processes that underlie clinical practices and how change in care practices can be effected. They note that the lack of theoretical framework to guide the selection of implementation methods may limit the success of projects.

Finally, this review highlights the wide variation in the content and reported acceptability of the ‘indications for catheter placement’ lists used in reviewed studies. In turn, these disparities highlight the complexity of defining IUC overuse and raise questions regarding the evaluation and measurement of overuse. It might be expected that variation would occur between studies with medical or surgical settings, but even within these two groups there is little consensus on what is an acceptable indication for IUC use. Even with similar indications, there is variation in detail. For example, when using an IUC to manage urinary incontinence where skin integrity is at risk the statements vary: Gokula et al.. (2007) state “Urinary incontinence posing a risk to the patient (e.g. major skin breakdown or protection of nearby operative site)”, Patrizzi et al.. (2009) state “Incontinence with skin breakdown, ” Voss (2009) states “Wound care management with incontinence” and Topal et al.. (2005) state “Urinary incontinence with open sacral or perineal wounds.”

All of these indications are open to interpretation by the clinician and would potentially lead to inconsistent use of the indication guidelines within individual settings, inhibiting the wider standardisation of IUC use indication checklists. For example, there is variation between the studies in the definition of urine output monitoring. Topal et al.. (2005) state “Urinary output monitoring if patient was unable to collect,” Gokula et al.. (2007) state “A need to measure output accurately in an uncooperative patient (e.g. intoxication)” and Danchaivijitr et al.. (1992) “Recording hourly urine output.” Again, these statements are open to clinician interpretation.

Furthermore, there is debate over the appropriateness of using a urinary catheter to monitor urine output. On one side of the argument, NICE Clinical Guideline 50 “Acutely ill patients in hospital,” (2007) states that, due to the need for catheterisation for reliable measurement, urine output should not be a core physiological parameter to assess acutely ill patients. However, the widely used Centers for Disease Control and Prevention Guideline for Prevention of Catheter-associated Urinary Tract Infections (Gould et al.., 2009) gives measurement of urinary output in critically ill patients as an example of an “Appropriate Indication for Indwelling Urethral Catheter Use.”

5.2 Limitations

This review sought to assess the body of evidence for the efficacy of interventions to minimise the initial use of IUCs in acute care. Findings were limited by quality issues (both methodological and reporting quality) and the heterogeneous characteristics of the studies included. Furthermore, the impact of the interventions varies enormously as would be expected when comparing, for example, an intervention introducing the routine use of bladder scanners with an intervention to introduce the use of an indication sheet. The search terms and eligibility criteria used by this review did not specify clinical area and allowed this heterogeneity.

There were few studies eligible for this review. The main reason many studies were excluded was that they did not report the impact of an intervention on the level of initial IUC placement. Instead, many studies reported change in rates of CAUTI. The focus on reducing CAUTI rates rather than the overall use of IUCs might explain why the reduction in initial placement has received less attention than the prompt removal of IUCs already in situ. Fakih et al.. (2011) used a simulation model to compare 100 hypothetical interventions to reduce the rate of CAUTI, analysing the impact on the frequently used CAUTI rate (CAUTI per 1000 catheter days) and their proposed “population CAUTI rate” (CAUTIs per 10,000 patient days). They concluded that, when evaluating the effect of a CAUTI reducing intervention, the measure should include the risk to all patients receiving care in the hospital. The adoption of this approach might lead to a greater focus on the initial inappropriate use of catheters rather than reducing infection rates in those patients who are catheterised.

The lack of clarity on when the benefits of using an IUC outweigh the risks makes evaluating the overuse of IUCs difficult. What is considered an acceptable justification for placing an IUC in one setting might not in another which complicates comparisons between studies.

Finally, only one reviewer completed data extraction and assessed the quality of the research studies found.

5.3 Implications for policy, practice and research

This is the first systematic review of evidence on an important clinical quality issue. The evidence found is not robust enough to determine the effectiveness of any intervention to minimise the overuse of IUCs or make any recommendation for QIP strategies.

However, this work does highlight that quality improvement interventions designed to minimise the initial placement of IUCs would benefit from work to understand pre-intervention the local culture of use and the causes of overuse. Additionally, it has been made clear that, if a list of indicators for appropriate IUC initial placement is used to guide practice, it should be unambiguous and appropriate to the setting. Currently the evidence is weak, but it might also be beneficial to combine both an educational component and a practical/resource based component within the intervention.

There are deep-rooted questions that need to be answered before the efficacy of interventions can be maximised. There is a need for greater understanding of when the placement of an IUC is necessary, what constitutes IUC overuse and the eventual development a set of consistent, evidence based, setting-appropriate, clinician-friendly indicators for the initial placement of an IUC. To inform this work, it would be beneficial to explore how and why clinicians make decisions in a real world context.

6.0 Conclusion

Understanding of interventions to reduce the initial placement of IUCs is poor. Furthermore, there is a lack of consensus as to when the initial placement of an IUC is appropriate. More work is needed to establish what the appropriate indications for IUC placement are in order to clarify the definition of IUC overuse and develop robust research on the potential of interventions to reduce overuse.

Appendix 1 EPOC Data Extraction Form

	Topal et al.., 2005 USA	**Voss, 2009 USA**	**Slappendel and Weber, 1999 Netherlands**	**Stephan et al.., 2006 USA**	**Danchaivijitr et al.., 1992 Thailand**	**Patrizzi et al.., 2009 USA**	**Gokula et al.., 2007 USA**	**Fakih et al.., 2010 USA**
Inclusion criteria								
Study Design	Uncontrolled before and after	Uncontrolled before and after	Uncontrolled before and after	Controlled before and after	Cluster RCT	Uncontrolled before and after	Uncontrolled before and after	Uncontrolled before and after
Methodological Inclusion Criteria	Done	Done	Done	Done	Done	Done	Done	Done
Interventions								
Type of intervention	Changes in physical structure, facilities and equipment (Provision of Handheld bladder scanners) Nurse and Physician Education – method unclear	Distribution of Educational material (new IUC guidelines) Educational meetings (to introduce new guidelines) Local Consensus process (designing new guidelines)	Changes in physical structure, facilities and equipment (Bladder Scanner made available) Distribution of educational material (new IUC guidelines)	Distribution of Educational material (new IUC guidelines) Local Consensus process (designing new guidelines)	Reminders (IUC indication checklist)	Changes in physical structure, facilities and equipment (Catheter insertion kits removed from bedside and bladder scanners made available) Educational meetings (appropriate IUC use) Reminders (IUC indication checklist)	Educational meetings (appropriate IUC use) Reminders (IUC indication checklist)	Reminders (IUC indication checklist Distribution of Educational material (new IUC guidelines) Educational meetings (to introduce new guidelines)
Controls	No intervention control group	No intervention control group	No intervention control group	Standard practice control group	Standard practice control group	No intervention control group	No intervention control group	No intervention control group
Type of Targeted Behaviour								
	Procedures	Procedures	Procedures	Procedures	Procedures	Procedures	Procedures	Procedures
Participants								
Profession	Physicians and nurses	Physicians and nurses	Not clear	Physicians and nurses	Physicians	Nurses	Physicians and nurses	Physicians
Level of Training	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Clinical Speciality	Medical							
Age	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Time since graduation	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Characteristics of Participating Patients								
Setting	Teaching Hospital	Community hospital	Orthopaedic Hospital	Teaching Hospital	13 hospitals	Teaching Hospital	Teaching Hospital	Teaching Hospital
Reimbursement System	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Location of Care	In patient Care	In patient Care	In patient Care	In patient Care	In patient Care	In patient Care	Emergency Dept	Emergency Dept
Academic Status	Teaching Hospital	Not clear	Not clear	Teaching Hospital	Not Clear	Teaching Hospital	Teaching Hospital	Teaching Hospital
Country	USA	USA	Netherlands	USA	Thailand	USA	USA	USA
Proportion of eligible providers	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear
Methods								

	Topal et al.., 2005 USA	**Voss, 2009 USA**	**Slappendel and Weber, 1999 Netherlands**	**Stephan et al.., 2006 USA**	**Danchaivijitr et al.., 1992 Thailand**	**Patrizzi et al.., 2009 USA**	**Gokula et al.., 2007 USA**	**Fakih et al.., 2010 USA**
Unit of Allocation	n/a	n/a	n/a	Clinical Unit	wards	n/a	n/a	n/a
Unit of Analysis	Practice	Practice	Practice	Practice	Practice	Practice	Practice	Practice
Power Calculation	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done
Quality Criteria	See Appendix 2	See Appendix 2	See Appendix 2	See Appendix 2	See Appendix 2	See Appendix 2	See Appendix 2	See Appendix 2
Prospective Identification by investigators of barriers to change	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done
Intervention								
Characteristics of Intervention								
Nature of Desired Change	Initiation of new management	Initiation of new management	Initiation of new management	Initiation of new management	Initiation of new management	Initiation of new management	Initiation of new management	Initiation of new management
Format	Not Clear	Paper Interpersonal	Paper	Paper	Paper	Interpersonal Paper	Interpersonal Paper	Interpersonal Paper
Source	Local Clinicians	Local Clinicians	Local Clinicians	Local Clinicians	Local Clinicians	Local Clinicians	Local Clinicians	Local Clinicians
Based on Clinical Practice guidelines	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear
Guidelines developed through formal consensus process	Not Clear	Done	Not Clear	Done	Not Clear	Not Clear	Not Clear	Not Clear
Recipient	Group	Group	Group	Group	Group	Group	Group	Group
Deliverer	Local Expert	Local Expert	Local Expert	Local Expert	Research Worker	Local Expert	Not clear	Local Expert
Timing	Bladder scanners – on-going Education - unclear	New guidelines – one month before data collection Educational meetings – one month before data collection	Bladder scanners introduced– not clear	Distribution of Educational material (new IUC guidelines) – one month before data collection	Indication sheet available before every prescription to use a IUC	Catheter insertion kits removed from bedside and bladder scanners made available – not clear appropriate IUC use education – 2 months before end of data collection IUC indication checklist issued – one month before end of data collection	Educational meetings (appropriate IUC use) – 1 – 6 weeks before data collection Reminders (IUC indication checklist) – introduced 1- 6 weeks before data collection	Reminders (IUC indication checklist) – 1-9 months before data collection Distribution of Educational material (new IUC guidelines) 1-9 months before data collection Educational meetings (to introduce new guidelines) 1-9 months before data collection
Setting of intervention	In practice setting	In practice setting	In practice setting	In practice setting	In practice setting	In practice setting	In practice setting	In practice setting

	Topal et al.., 2005 USA	**Voss, 2009 USA**	**Slappendel and Weber, 1999 Netherlands**	**Stephan et al.., 2006 USA**	**Danchaivijitr et al.., 1992 Thailand**	**Patrizzi et al.., 2009 USA**	**Gokula et al.., 2007 USA**	**Fakih et al.., 2010 USA**
Source of Funding	Not stated	Not stated	Not stated	Yes	Not stated	Not stated	Not stated	Yes
Ethical approval	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated
Total Sample size	1777	182	4116	539	16959	807	181488	2462
Outcomes								
Description of main outcome measure	Process measure	Process measure	Process measure	Process measure	Process measure	Process measure	Process measure	Process measure
Length of time outcomes were measured after initiation of intervention	6 months	One month	Not clear	4 months	Not clear	One month	2 years	15 day s over a 9 month period
Length of post-intervention follow-up period	Done	Not done	Not done	Done	Not Done	Not done	Not Done	Not Done
Identify a possible ceiling effect	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear	Not clear
Results								
Baseline and Post-intervention	Device use fell from 1164/883 (19.7%) to 81/894 (9%)	Device use fell from 32/97 (33%) to 13/85 (15.3)%	Device use fell from 602/1920 (31%) to 349/2196 (16%)	Device use fell from 99/280 (35.3%) to 79/259 (30.5%)	Device use increased from 698/8573 (8.1%) to 370/4305 (8.6%)	Device use fell from 11/149 (7.38%) to 3/163 (1.84%) of patients admitted	Device use fell from 2108 of 88616 (2.38%) to 406 0f 89895 (0.45%) of visitors to ED	Device use fell from 212 of 1421 (14.9%) to 110 of 1041 (10.6%) of patients admitted from ED
Relative Ratio for device use	RR 0.46	RR 0.46	RR 0.52	RR 0.86	RR 1.06	RR 0.25	RR 0.19	RR 0.71

Appendix 2

The Cochrane Collaboration’s tool for assessing risk of bias

Domain	**Topal et al.., 2005**	**Voss 2009**	**Slappendel and Weber 1999**	**Stephan et al.., 2006**	**Danchaivijitr, 1992**	**Patrizzi et al.., 2009**	**Gokula et al.., 2007**	**Fakih et al.., 2010**
Selection bias								
Random sequence generation	**N/A**	**N/A**	**N/A**	**N/A**	**Unclear risk**	**N/A**	**N/A**	**N/A**
Allocation concealment	**N/A**	**N/A**	**N/A**	**Unclear Risk**	**Unclear Risk**	**N/A**	**N/A**	**N/A**
Performance bias								
Blinding of participants and personnel	**High risk**	**High risk**	**High risk**	**High risk**	**Unclear**	**High risk**	**High risk**	**High risk**
Detection bias								
Blinding of outcome assessment	**Unclear**	**Unclear**	**Unclear**	**Unclear**	**Unclear**	**Unclear**	**Unclear**	**Unclear**
Attrition bias								
Incomplete outcome data	**Low risk**	**Low risk**	**Unclear**	**Low risk**	**Unclear**	**Unclear**	**Unclear**	**Low risk**
Reporting bias								
Selective reporting	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Other bias								
Other sources of bias	N/S	Personal preferences regarding use of protocols, presence of geriatrician on daily rounds, unit-based culture to adopting change.	N/S	Variations in pysicians’ skills or individuals commitment to infection prevention	N/S	N/S	Populations with different demographics and different proportions of diagnoses	N/S

Appendix 3 SQUIRE

	Topal et al.., 2005	Voss 2009	Slappendel and Weber 1999	Stephan et al.., 2006	Danchaivijitr, 1992	Patrizzi et al.., 2009	Gokula et al.., 2007	Fakih et al.., 2010
Title and abstract *Did you provide clear and accurate information for finding, indexing, and scanning your paper?*								
1. Title								
a. Indicates the article concerns the improvement of quality	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
b. States the specific aim of the intervention	Yes	No	Part	Yes	Yes	Yes	Yes	Part
c. Specifies the study method used	No	No	No	Yes	No	No	No	No
2. Abstract								
a.Summarizes precisely all key information from various sections of the text using the abstract format of the intended publication	Part	Part	Part	Yes	No	No	Yes	Yes
Introduction *Why did you start?*								
3. Background Knowledge								
Provides a brief, non-selective summary of current knowledge of the care problem being addressed, and characteristics of organizations in which it occurs	Yes	Yes	No	Part	Part	Yes	Yes	Part
4. Local problem								
Describes the nature and severity of the specific local problem or system dysfunction that was addressed	No	No	Yes	No	No	Yes	No	No
5. Intended improvement								
a. Describes the specific aim	No	Yes	No	Yes	Yes	No	Yes	Yes
b. Specifies who and what triggered the decision to make changes and why now	No	Part	Yes	Part	No	Yes	Part	Part
6. Study question								
States precisely the primary improvement-related question and any secondary questions that the study of the intervention was designed to answer	No	Part	Part	Part	No	Part	Part	Part
Methods *What did you do?*								
7. Ethical issues								
Describes ethical aspects of implementing and studying the improvement, such as privacy concerns, protection of participants’ physical well-being, and potential author conflicts of interest, and how ethical concerns were addressed	No	No	No	No	No	No	No	No
8. Setting								
Specifies how elements of the local care environment considered most likely to influence	No	No	Part	No	No	Yes	No	Part

	Topal et al.., 2005	**Voss 2009**	**Slappendel and Weber 1999**	**Stephan et al.., 2006**	**Danchaivijitr, 1992**	**Patrizzi et al.., 2009**	**Gokula et al.., 2007**	**Fakih et al.., 2010**
change/improvement in the involved site or sites were identified and characterized								
9. Planning the intervention								
a. Describes the intervention and its component parts in sufficient detail that others could reproduce it	Part	Part	Part	Yes	Part	Part	Yes	Part
b. Indicates main factors that contributed to choice of the specific intervention	No	Part	Part	No	Part	Yes	Part	Part
c. Outlines initial plans for how the intervention was to be implemented:	Part	Part	Part	Part	Part	Part	Part	Part
10. Planning the study of the intervention								
a. Outlines plans for assessing how well the intervention was implemented	No	No	Part	No	Part	Part	Part	Part
b. Describes mechanisms by which intervention components were expected to cause changes, and plans for testing whether those mechanisms were effective	No	No	Part	No	No	Yes	No	No
c. Identifies the study design chosen for measuring impact of the intervention on primary and secondary outcomes, if applicable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
d. Explains plans for implementing essential aspects of the chosen study design, as described in publication guidelines for specific designs, if applicable	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
e. Describes aspects of the study design that specifically concerned internal validity (integrity of the data) and external validity (generalizability)	No	No	No	Part	Part	No	No	No
11. Methods of evaluation								
a. Describes instruments and procedures (qualitative, quantitative, or mixed) used to assess a) the effectiveness of implementation, b) the contributions of intervention components and context factors to effectiveness of the intervention, and c) primary and secondary outcomes	Part	Part	Part	Part	Part	Part	Yes	Yes
b. Reports efforts to validate and test reliability of assessment instruments	No	No	No	No	Part	No	Yes	No
c. Explains methods used to assure data quality and adequacy (for example, blinding; repeating measurements and data extraction; training in data collection; collection of sufficient baseline measurements)	No	No	No	No	Part	No	Yes	No
12. Analysis								

	Topal et al.., 2005	**Voss 2009**	**Slappendel and Weber 1999**	**Stephan et al.., 2006**	**Danchaivijitr, 1992**	**Patrizzi et al.., 2009**	**Gokula et al.., 2007**	**Fakih et al.., 2010**
a. Provides details of qualitative and quantitative (statistical) methods used to draw inferences from the data	Yes	Yes	No	Yes	Yes	No	Yes	Yes
b. Aligns unit of analysis with level at which the intervention was implemented, if applicable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
c. Specifies degree of variability expected in implementation, change expected in primary outcome (effect size), and ability of study design (including size) to detect such effects	No	No	No	No	No	No	No	No
d. Describes analytic methods used to demonstrate effects of time as a variable (for example, statistical process control)	No	No	No	No	No	No	No	No
Results *What did you find?*								
13. Outcomes								
a) Nature of setting and improvement intervention								
i. Characterizes relevant elements of setting or settings, and structures and patterns of care that provided context for the intervention	Part	Part	Part	Part	Part	Yes	Part	Part
ii. Explains the actual course of the intervention, preferably using a time-line diagram or flow chart	Part	Part	Part	Part	No	Part	Part	Part
iii. Documents degree of success in implementing intervention components	Part	No	Part	Yes	Part	Part	Yes	Yes
iv. Describes how and why the initial plan evolved, and the most important lessons learned from that evolution, particularly the effects of internal feedback from tests of change (reflexiveness)	Part	Part	No	Part	Part	Yes	Yes	Yes
b) Changes in processes of care and patient outcomes associated with the intervention								
i. Presents data on changes observed in the care delivery process	Part	No	No	Part	Part	No	Part	Part
ii. Presents data on changes observed in measures of patient outcome	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
iii. Considers benefits, harms, unexpected results, problems, failures	Part	Part	No	Part	Part	Part	Part	Part
iv. Presents evidence regarding the strength of association between observed changes/improvements and intervention components/context factors	Part	Part	Part	Part	Part	Part	Part	Part
v. Includes summary of missing data for intervention and outcomes	No	No	No	No	No	No	No	No

	Topal et al.., 2005	**Voss 2009**	**Slappendel and Weber 1999**	**Stephan et al.., 2006**	**Danchaivijitr, 1992**	**Patrizzi et al.., 2009**	**Gokula et al.., 2007**	**Fakih et al.., 2010**
Discussion *What do the findings mean?*								
14. Summary								
a. Summarizes the most important successes and difficulties in implementing intervention components, and main changes observed in care delivery and clinical outcomes	Yes	Yes	Part	Yes	Yes	Yes	Yes	Yes
b. Highlights the study's particular strengths	Part	Part	No	Yes	No	Yes	Part	Part
15. Relation to other evidence								
Compares and contrasts study results with relevant findings of others, drawing on broad review of the literature; use of a summary table may be helpful in building on existing evidence	No	Yes	Yes	Part	No	No	No	No
16. Limitations								
a. Considers possible sources of confounding, bias, or imprecision in design, measurement, and analysis that might have affected study outcomes (internal validity)	No	Yes	No	Yes	No	No	Yes	Yes
b. Explores factors that could affect generalizability (external validity), for example: representativeness of participants; effectiveness of implementation; dose-response effects; features of local care setting	No	Yes	No	Yes	Part	No	Yes	Yes
c. Addresses likelihood that observed gains may weaken over time, and describes plans, if any, for monitoring and maintaining improvement; explicitly states if such planning was not done	No	Yes	No	Yes	No	No	Part	No
d. Reviews efforts made to minimize and adjust for study limitations	No	Part	No	Part	No	No	Part	Part
e. Assesses the effect of study limitations on interpretation and application of results	No	Part	No	Part	No	No	Part	Part
17. Interpretation								
a. Explores possible reasons for differences between observed and expected outcomes	No	No	No	Part	No	No	Part	Part
b. Draws inferences consistent with the strength of the data about causal mechanisms and size of observed changes, paying particular attention to components of the intervention and context factors that helped determine the intervention's effectiveness (or lack thereof), and types of settings in which this intervention is most likely to be effective	Part	Part	Part	Part	Part	Part	Part	Part
c. Suggests steps that might be modified to improve future performance	No	No	No	No	No	No	Yes	No

	Topal et al.., 2005	**Voss 2009**	**Slappendel and Weber 1999**	**Stephan et al.., 2006**	**Danchaivijitr, 1992**	**Patrizzi et al.., 2009**	**Gokula et al.., 2007**	**Fakih et al.., 2010**
d. Reviews issues of opportunity cost and actual financial cost of the intervention	Part	Part	No	No	No	No	No	No
18. Conclusions								
a. Considers overall practical usefulness of the intervention	Yes	Yes	Yes	Yes	Part	Yes	Yes	yes
b. Suggests implications of this report for further studies of improvement interventions	No	No	No	No	No	No	Part	No
Other information *Were other factors relevant to conduct and interpretation of the study?*								
19. Funding								
Describes funding sources, if any, and role of funding organization in design, implementation, interpretation, and publication of study	No	No	No	Yes	No	No	No	Yes

Appendix B

Clinician Information Sheet

Participant Information Sheet

Minimising the initial placement of indwelling urinary catheters in acute medical care: an analysis of decision making and the potential for change.

Invitation to participate in study

I would like to invite you to take part in my PhD research study. Before you decide I would like you to understand why the research is being done and what it would involve for you.

What is the purpose of the study?

There has been little research about how clinicians make the decision to place an indwelling urinary catheter (IUC) in acute care. It is hoped that this study will help provide an understanding of what influences this decision. It will also help to show if there is any potential to reduce the number of IUCs being placed and, if so, how that might best be achieved.

Why have I been invited?

You have been invited to take part in this study because the care that you provide involves the decision whether or not to use an IUC.

Do I have to take part?

No. You can choose whether or not to take part in the study. If you decide to take part you are still free to stop the interview at any time without having to provide a reason.

What will happen to me if I take part?

If you decide to take part there are two sections to the study. Firstly, data collection periods will take place at set times in your department/ward. During those periods, I will ask you to let me know if you make the decision to place an indwelling urinary catheter (IUC) with any patient over the age of 18. Then, if it is convenient for you, within three hours of the decision taking place we will arrange to meet in a quiet area and I will ask you to talk through the decision process with me. This is called Retrospective Think Aloud method. I will take notes and the conversation will be digitally recorded. Secondly, if you have taken part in the first section of the study, I ask you to meet me at a later, convenient date to undertake a semi-structured interview to discuss your views and experiences of making the decision to use an IUC. This interview is not looking for right or wrong answers, but seeking opinions. It is anticipated that this interview will last around half an hour. Again, the interview will be digitally recorded and notes will be taken.

What are the possible disadvantages and risks of taking part?

I do not anticipate that there will be any risks to you in taking part in the study. I will make all efforts to minimise any interruption to your working day and, even if you have agreed to participate in the study, you are under no obligation to meet to describe your decision making if it is inconvenient or for any other reason.

Will an information I give be kept confidential?

If you consent to take part your name will not be recorded and any when transcripts of digital recordings are made, participants will be anonymous. All data collected will be encrypted and stored securely and cannot be accessed by any third parties.

What happens if I don’t want to carry on with the study?

You are free to withdraw from the research at any time without giving a reason.

What if there is a problem?

If you have a concern or a complaint about this study you should contact Martina Prude, Head of the Governance Office, at the Research Governance Office (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 can provide you with details of the University of Southampton Complaints Procedure

What happens to the results of the research study?

The results from this study will be used for my PhD and a written report will be provided to the hospital. The report will also be provided to any participant who requests a copy.

Who is organising and funding the research?

This research is being undertaken as part of a PhD study at the Faculty of Health Sciences, University of Southampton.

Who has reviewed the study?

This study has been reviewed by the East Midlands Research Ethics Proportionate Review Sub-Committee.

The researcher is based at the Faculty of Heath Sciences, University of Southampton.

Contact details are:

Catherine Murphy

Building 45, Highfield Campus

University of Southampton
SO17 1BJ

cm5e08@soton.ac.uk

THANK YOU FOR TAKING THE TIME TO READ THIS INFORMATION SHEET

Appendix C

Clinician Consent Form

CLINICIAN CONSENT FORM

Study title: Minimising the initial placement of indwelling urinary catheters in acute medical care: an analysis of decision making and the potential for change.

Researcher name: Catherine Murphy
Ethics reference:

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (14.03.12 V 1.0.) and have had the opportunity to ask questions about the study ☐

I agree to take part in think aloud sessions for this research project and agree for my data to be used for the purpose of this study ☐

I agree to take part in a semi-structured interview for this research project and my data to be used for the purpose of this study ☐

I agree to be digitally recorded during the think aloud session ☐

I agree to be digitally recorded during the interview ☐

I understand my participation is voluntary and I may withdraw at any time without consequence ☐

Name of participant (print name)…………………………………………………

Signature of participant……………………………………………………………..

Name of Researcher (print name) …………………………………………………

Signature of Researcher…………………………………………………………..

Date…………………………………………………………………………………

Appendix D

Substantial Ethics Approval

NHS
Health Research Authority

NRES Committee East Midlands - Nottingham 2
The Old Chapel
Royal Standard Place
Nottingham
NG1 6FS

Tel: 0115 8839697

22 July 2013

Mrs Catherine Murphy
Postgraduate Research Office, Building 45,
University Road, Highfield, Southampton
SO17 1BJ

Dear Mrs Murphy,

Study title:	**The initial placement of indwelling urinary catheters in acute medical care: an analysis of decision making.**
REC reference:	**12/EM/0259**
Amendment date:	**04 July 2013**
IRAS project ID:	**85031**

The above amendment was reviewed at the meeting of the Sub-Committee held on 22 July 2013.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

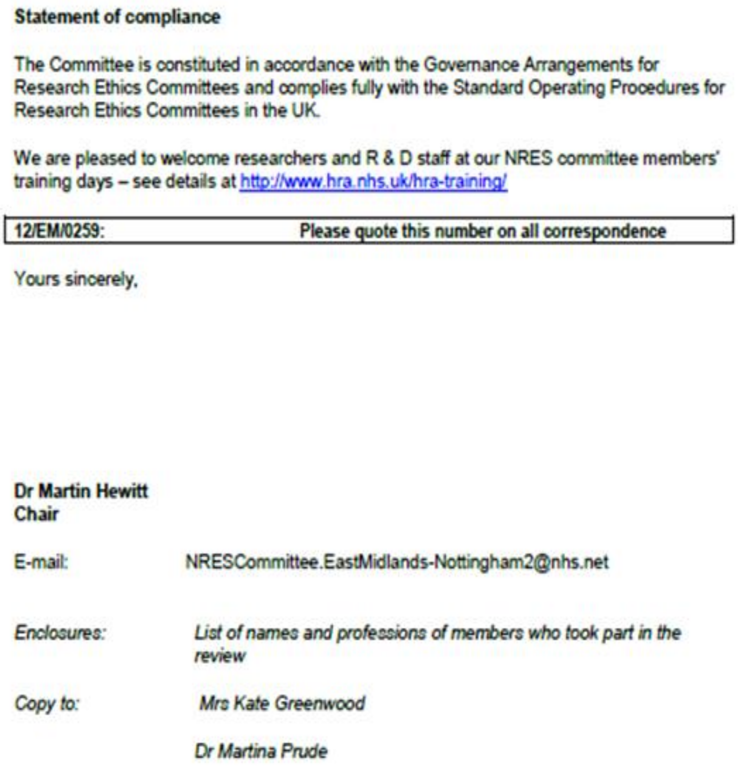
Document	Version	Date
Notice of Substantial Amendment (non-CTIMPs)		04 July 2013

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.



Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

12/EM/0259:	Please quote this number on all correspondence

Yours sincerely,

Dr Martin Hewitt
Chair

E-mail: NRESCommittee.EastMidlands-Nottingham2@nhs.net

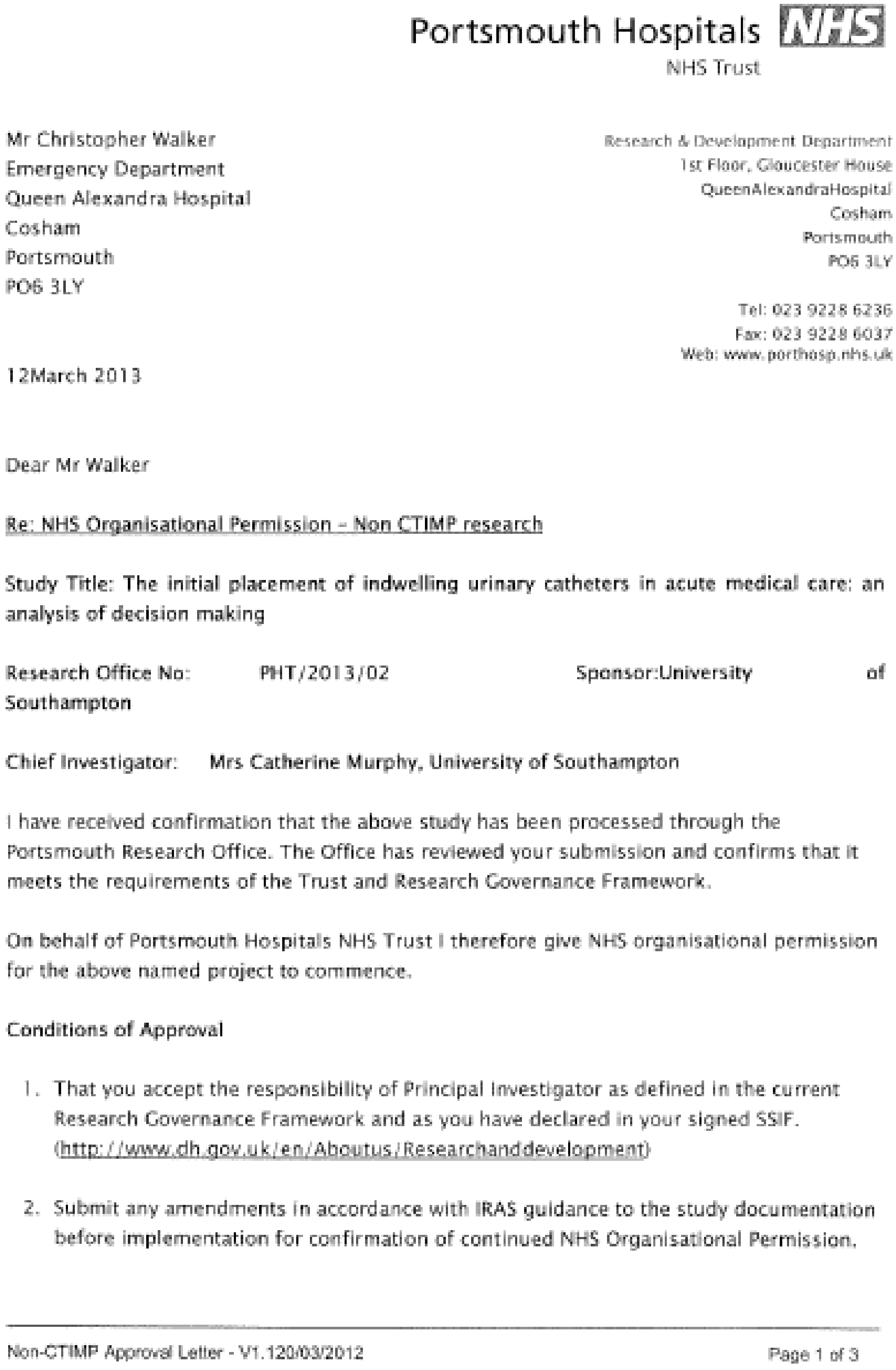
Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Mrs Kate Greenwood*

Dr Martina Prude

Appendix E

NHS Ethics Approval



Portsmouth Hospitals NHS
NHS Trust

Mr Christopher Walker
Emergency Department
Queen Alexandra Hospital
Cosham
Portsmouth
PO6 3LY

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12March 2013

Dear Mr Walker

Re: NHS Organisational Permission – Non CTIMP research

Study Title: The initial placement of indwelling urinary catheters in acute medical care: an analysis of decision making

Research Office No: PHT/2013/02 **Sponsor:University of Southampton**

Chief Investigator: **Mrs Catherine Murphy, University of Southampton**

I have received confirmation that the above study has been processed through the Portsmouth Research Office. The Office has reviewed your submission and confirms that it meets the requirements of the Trust and Research Governance Framework.

On behalf of Portsmouth Hospitals NHS Trust I therefore give NHS organisational permission for the above named project to commence.

Conditions of Approval

1. That you accept the responsibility of Principal Investigator as defined in the current Research Governance Framework and as you have declared in your signed SSIF. (http://www.dh.gov.uk/en/Aboutus/Researchanddevelopment)

2. Submit any amendments in accordance with IRAS guidance to the study documentation before implementation for confirmation of continued NHS Organisational Permission.

3. Ensure all study personnel, not employed by Portsmouth Hospitals NHS Trust, hold either honorary research contracts/ letters of access with this Trust, before they have access to any facilities, patients, staff, their data, tissue or organs.

4. Submit copies of Serious Adverse Events involving subjects from this Trust to both the Research Office and the Sponsor within 24 hours of notification of the event.

5. Complete R&D Research Governance interim and final reports as requested.

6. Maintain an Investigator Site File (ISF) within your department containing essential study documentation for the governance and management of your study. Your ISF must be available at all times for monitoring purposes and you must inform the Research Office of the ISF location at commencement of the project by completing the attached form and returning by post or e-mail to: research.office@porthosp.nhs.uk .

7. Enter recruitment data onto the Portsmouth Hospitals EDGE database in accordance with local research governance. If you do not have access to EDGE, please contact the Research Office; access and training will be arranged.

8. You will use the enclosed stickers in accordance with the guidance included with this letter.

9. Agree to conduct this research project in accordance with the conditions of this approval

Additional Conditions of Approval

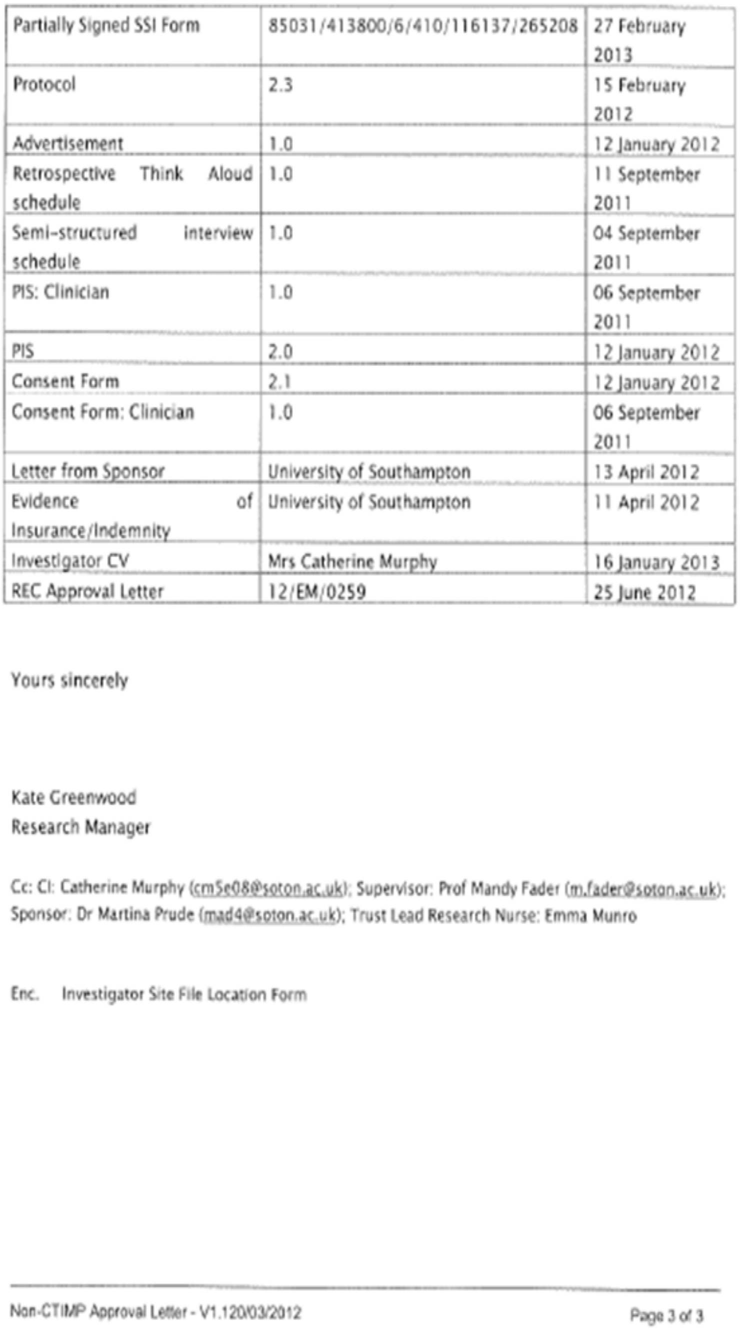
10. **Recruitment cannot take place within the Queen Alexandra Medical Assessment Unit until Dr Michael Bacon, CD of MAU, provides his authorisation.**

Please ensure we are copied in to all correspondence and reporting requirements of the National Research Ethics Service (NRES). This includes annual reports submitted by Chief Investigator and the end of study declaration. We should also be informed of any publications or conference presentations resulting from this research.

Should you find yourself unsure of any of the above requirements please do not hesitate to contact the Research Office for support.

Documents submitted are detailed below.

Document Name	Version	Date
RECApplication Form	85031/335957/1/518	11 June 2012



Partially Signed SSI Form	85031/413800/6/410/116137/265208	27 February 2013
Protocol	2.3	15 February 2012
Advertisement	1.0	12 January 2012
Retrospective Think Aloud schedule	1.0	11 September 2011
Semi-structured interview schedule	1.0	04 September 2011
PIS: Clinician	1.0	06 September 2011
PIS	2.0	12 January 2012
Consent Form	2.1	12 January 2012
Consent Form: Clinician	1.0	06 September 2011
Letter from Sponsor	University of Southampton	13 April 2012
Evidence of Insurance/Indemnity	University of Southampton	11 April 2012
Investigator CV	Mrs Catherine Murphy	16 January 2013
REC Approval Letter	12/EM/0259	25 June 2012

Yours sincerely

Kate Greenwood
Research Manager

Cc: CI: Catherine Murphy (cm5e08@soton.ac.uk); Supervisor: Prof Mandy Fader (m.fader@soton.ac.uk); Sponsor: Dr Martina Prude (mad4@soton.ac.uk); Trust Lead Research Nurse: Emma Munro

Enc. Investigator Site File Location Form

Appendix F

Clinician Information Poster

UNIVERSITY OF
Southampton

Portsmouth Hospitals NHS
NHS Trust

How and Why do clinicians make the decision to place an indwelling urinary catheter?

There has been little research on how and why clinicians make the decision to place an indwelling urinary catheter (IUC) in acute care. It is hoped that this study will help provide an understanding of what influences this decision.

This study will take place in acute areas of this hospital over the coming weeks and wil be in the form of semi-structured interviews with participating clinicians. If you are likely to make the decision to place an IUC during that time, please take an information sheet and a consent form from the envelope next to this poster. If, once you have read the information sheet, you are happy to participate in this study please complete the consent form and return it to the envelope.

If you have any questions please contact me at cm5e08@soton.ac.uk
Thank you for your anticipated participation.
Catherine Murphy, Faculty of Health Sciences, University of Southampton

Ethics Reference: 12/EM/0259 v 1.0 12.11.12

Appendix G

Retrospection Think Aloud Schedule

Retrospective Think Aloud (RTA) Schedule

- Provide information on the nature of the RTA session and seek participant's consent.
    - Explain purpose of session – to collect data on the participant's decision making and reasoning processes.
    - Briefly introduce myself
    - Confirming participant will be anonymous in written reports
    - Explain the interview will be digitally recorded and written notes might be taken
    - Ensuring the participant knows that he/she can stop the session at any point without need for explanation
    - Ensure the participant fully understands and gives consent

- Introductory remarks (after consent)

    - Thank participant

    - Explain RTA process

        - Ask the participant to verbalise their thought processes during decision making episode.

        - Ask the participant to start at the beginning of the clinical episode that led directly to the decision being made and finish once the decision is made, providing step by step thought processes

        - Ask the participant not to explain the thought process or elaborate with any additional information, explain that there will be the opportunity to do this at the semi-structured interview

        - Encourage the participant to include all thoughts having an impact on the decision.

- Start the process

- Once the clinician has described their thought processes, use probe questions to elicit the following information if not provided

    - The reason for the IUC placement
    - Information sources
    - Other participants in the process (eg patient, clinician, carer)
    - Alternatives considered
    - When do they anticipate the device being removed?

- Ending the session
    - Offer the participant the chance to ask any questions
    - Ask the participant's permission to contact them to arrange a semi-structured interview.
    - Thank the participant for their time

Appendix H

Semi-structured Interview Schedule

Semi-structured interview schedule

- Provide information on the nature of the interview and seek interviewee's consent.
  - Explain purpose of interview – to enquire about interviewee's decision making and reasoning
  - Briefly introduce myself and my interest in the topic
  - Confirming participant will be anonymous in written reports
  - How long interview is likely to be
  - Explain the interview will be digitally recorded and written notes might be taken
  - Ensuring the interviewee knows that he/she can stop the interview at any point without need for explanation
  - Ensure the interviewee fully understands and gives consent

- Introductory remarks (after consent)
  - Thank participant
  - Explain that I am looking for opinions and personal experience, rather than right or wrong answers

- Initial questions
  - How long have you worked in the department?
  - What other clinical experience have you had?

- Topic Areas
  - Exploration of the decision to use an IUC – how often, for what reason, any particular patient group
  - Which decisions are easy and which are more complex?
  - What influences the decision?
  - Do they encounter views different to their own?
  - What information would be helpful to make the decision?
  - What resources would make the decision easier?
  - Is there a particularly difficult decision that they can talk through?
  - Do you reflect on whether you have made the correct decision?

- Ending the Interview
  - Offer the interviewee the chance to add anything further or make comment
  - Offer to provide details of the conclusions of the study
  - Thank the interviewee for their time

Appendix I

Presentations and Awards from this work

Awards

- International Continence Society Conservative Management Best Abstract Award (Rio de Janeiro) 2014
- BMJ/IHI Travel Award (Paris) 2014
- Faculty of Health Sciences, University of Southampton Postgraduate Research Conference Best Oral Presentation 2013
- Association of Continence Advisors Best Oral Presentation (Brighton) 2012
- Association of Continence Advisors Best Abstract (Brighton) 2012
- International Continence Society Travel Award (Beijing) 2012

Recent Conference Oral and Poster Presentations

- Association of Continence Advisors (Oral Presentation, Birmingham) 2014
- UK Continence Society (Oral Presentation, London) 2014
- RCN (Symposium member- Oral presentation, Glasgow) 2014
- Imeche (Oral Presentation, London) 2013
- Infection Prevention Society (Poster Presentation, London) 2013
- Faculty of Health Sciences, University of Southampton Postgraduate Research Conference 2013
- UK Continence Society (Poster, Liverpool) 2012
- Association of Continence Advisors National Conference (Oral Presentation, Brighton) 2012
- International Continence Society (Poster Presentation, Beijing) 2012

Forthcoming Presentations

- International Continence Society (Oral Presentation, Rio de Janeiro) Oct 2014
- Infection Prevention Society (Invited Speaker, Glasgow) Sept 2014

Appendix J

Overview of Decisions

D	**Indication**	**Primary reason for admission**	**Where**	**Who**	**Semi ?**	**Pt Age**	**Pt sex**
1	• Output monitoring • Getting sample	Severe Sepsis	MAU	Consultant physician	no	60s	F
2	• Output monitoring • Skin integrity • Comfort/dignity	Acute COPD	ED	Nurse Practitioner	Yes	70s	F
3	Output monitoring	Peri-arrest	ED	Nurse Consultant	Yes	80s	M
4	• Output monitoring • Comfort/dignity	Pulmonary oedema	MAU	Registrar	Yes	70s	F
5	• Output monitoring • Skin integrity	Overdose	ED	Registrar	no	60s	F
6	Retention	MS/constipation	MAU	Consultant physician	Yes	50s	F
7	Output monitoring	?Meningitis	MAU	Registrar	no	20s	F
8	Output monitoring	Stroke	OPM	Staff Nurse	Yes	80s	F
9	Output monitoring Continence	Heart failure	Cardiology	Registrar	Yes	70s	M
10	Retention	Retention	ED	Staff nurse	yes	60s	M
11	Retention	Prostate cancer - clots	OPM	Consultant physician	Yes	70s	M
12	• Output monitoring • Comfort/dignity	?	ED	Consultant Physician	Yes	70s	M
13	Retention	Retention/RTA	ED	Consultant Physician	yes	60s	M
14	Retention	?	OPM	Staff Nurse	Yes	70s	F
15	Output	Renal Failure	MAU	Staff nurse	no	90s	M
16	Comfort	Heart failure	ED	Registrar	No	70s	F
17	Patient request for incontinence	?	MAU	Registrar	yes	70s	M
18	Output	Heart failure	Cardiology	Registrar	No	70s	M
19	Retention	Chronic kidney injury	OPM	Sister	No	70s	M
20	Output Retention	Sepsis Acute renal failure	OPM	Registrar	No	80s	M
21	Output Retention	MI	MAU	Registrar	Yes	70s	M
22	Retention	Renal failure	ED	Consultant Physician	Yes	60s	M
23	Output	Severe sepsis	ED	Consultant Physician	No	60s	F
24	Output	Septic shock	ED	Consultant Physician	no	80s	M
25	Retention	Stroke	OPM	Senior sister	Yes	70s	M
26	Output Pre-op	Fractured NOF/chest infection	ED	Consultant Physician	Yes	80s	F
27	Output	UTI Head injury	ED	Registrar	No	90s	F
28	Retention	Urinary sepsis	OPM	Registrar	No	70s	m
29	Output	Pulmonary Oedema	ED	Junior doctor	Yes	70s	m
30	Retention	Urinary sepsis	OPM	Junior doctor	Yes	70s	m

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