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UNIVERSITY OF SOUTHAMPTON

**THE CHANGE FROM MANUAL TO COMPUTERISED
CARE PLANNING AT A DISTRICT GENERAL HOSPITAL**

(Between 1988 and 1992)

CHARLEEN NEWTON

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF SOCIAL WORK STUDIES

DOCTOR OF PHILOSOPHY

**A STUDY OF THE CHANGE FROM MANUAL TO COMPUTERISED NURSING CARE
PLANS
IN A DISTRICT GENERAL HOSPITAL**

By Charleen Newton

The hospital in which this study takes place was the first in the country to install a fully integrated Hospital Information System. As part of this system, computerised care plans were introduced to sixteen wards over a period of nine months. This research describes the system, the care planning system and the process of the change to computerised care planning. It looks at nurses attitudes to the Nursing Process, and to the new care planning system before, three months and one year after implementation of the new system. The quality of manual and computer care planning is compared in the same time periods using an existing quality assurance instrument and a new audit tool, developed in response to the quality aspects of an automated system.

The aim of the research was to record a contemporary professional and social phenomenon; to establish feedback systems in order to incorporate modifications to the system as required; to involve and support the nurses during the change by seeking and acting upon their opinions and to develop criteria for evaluation.

All data were analysed in each time period in a framework of personal and organisational change theories. The data obtained were also used as a basis for modifications which started three months after implementation on the first three wards and which culminated in a major project to convert the whole system to standard based care plans.

Results showed that in general understanding of the Nursing Process was inadequate and that nurses held ambivalent attitudes towards it, and towards the proposed computer care plans. Three months after the new care plans were introduced, attitudes had changed significantly to negative, but after they had been using the new care plans, attitudes, although still negative, showed a significant shift towards the positive pole. Conversely the overall quality of care planning improved significantly on the wards for which comparisons were possible.

Results provide practical recommendations for implementation of future computerised care planning systems.

ACKNOWLEDGEMENTS

I should like to thank the Winchester Health Authority and The Royal Hampshire County Hospital for making it possible for me to carry out this research. I should also like to acknowledge the cooperation of all the nurses involved, the sharing of their expertise in helping me to write the care plans and their response to questionnaires and interviews. I am grateful for the support given to me by the University and by members of the Research and Development department and library at the hospital.

CHAPTER 1

INTRODUCTION

In April 1989, automated nurse care planning was introduced on three wards at The Royal Hampshire County Hospital, Winchester. By November of the same year, sixteen wards were using the new system. The care plans, based on Roper Logan and Tierney's model of nursing, are part of the Hospital Information System established as a component of Wessex Regional Information Systems Plan (RISP)

The introduction of Information Technology in the Health Service represents a major change for everyone involved. The change from manual to computerised nursing care planning documentation, which is the subject of this research, is one aspect of this process. In this study, it is described, not only in the context of Information Technology but also in relation to the professional, practical and ethical issues associated with the Nursing Process, which is defined and described later in this chapter.

Abbott (1989) attributes the need for development of Information Technology in the Health Service to complexities of the requirements on the service. These arise from the original ideal that every individual has a right to health care at any time, whatever the nature of the health problem. It is perpetuated by medical advances and patient pressures. In turn these complexities increase the need for vast amounts of information and a comprehensive system to manage them efficiently. In addition, the Körner reports on minimum data sets have had a major impact on development of information systems to support management and decision making.

Barber (1989) describes the early work on Regional Computer Systems in Manchester, Birmingham, South Western Region and London as the foundation for present implementation of Patient Administration Systems (PAS) developed to handle the Körner requirements. For many nurses at the Royal Hampshire County Hospital, the first introduction to computers and information technology came when it became mandatory to provide specific information about each patient following the Körner reports in 1987. For this reason, a brief outline of these reports will be included in this introduction.

AIMS OF THE STUDY

There are two main aims for this study. The first is to observe, monitor and describe the change. The objectives set to achieve this aim are to establish feedback of information from nurses, so that modifications could be incorporated as problems occurred; to seek and record the nurses' attitudes and to develop criteria to evaluate the way in which nurses use the new care plans. I think that all of these are necessary to provide information for those involved and anyone contemplating such a change in the future.

The second is to demonstrate to the nurses that their attitudes are important and their participation in the change is valued. I hope that by doing so, smooth adaptation to the new system will be facilitated. My objectives are to involve the nurses in writing the care plans, to recognise and make full use of their professional knowledge and experience, to seek their approval for the finished care plans before entering them on the computer, to encourage suggestions, to involve them in the evaluation and to be available for support whenever required.

The decision to install an integrated Hospital Information System was made by Wessex Regional Health Authority, in order to improve the quality and reliability of the information produced and ultimately achieve some congruity throughout the region. The same outcomes may be expected in the hospital as a result of computerising nurse care planning, an operational function included in the system. Although this was not the *purpose* of my research, it is my intention to achieve an improvement in the quality of nursing information as part of the proactive process.

THE SETTING FOR THE STUDY

The Royal Hampshire County Hospital is a 455 bed district general hospital which in 1986 became a pilot site for the implementation of an operational Hospital Information System (HIS) as part of the Regional Information Systems Project (RISP). In the same year it was also selected as one of six pilot sites for the Resource Management initiative. The hospital has eight clinical directorates, five of which are of concern to this study: medicine, with six wards; surgery, with three wards and a day unit; special surgery with two wards; gynaecology and paediatrics, two wards; and orthopaedics and trauma, two wards. With the exception of the day unit, which uses a different type of documentation, computerised care planning has been established in all these areas.

In a wider context, the introduction of the Hospital Information System took place in a climate of unrest for nurses, coinciding with the new regrading structure for salary scales which came into operation in the autumn of 1988. Nurses held a general belief that regrading would be based on personal worth, experience and qualifications whereas in reality the grades were based on strict criteria relating to current roles. The outcome was that regrading appeared to be concerned only with the degrees of responsibility within the post held, rather than individual skills. Nurses involved in this study, that is Sisters, Staff Nurses and Enrolled Nurses, were now divided into two or even three grades for category, which resulted in a general feeling of discontent and of being undervalued. Appeals were launched and the appeal process has continued till the present day.

BIOGRAPHICAL DETAILS

I started working in the Research and Development department, previously Nursing Special Projects, in 1985, after five years as a ward sister at the hospital. My role included responsibility for maintaining and monitoring use of the Nursing Process. My interest and belief in the principles of this method of organisation had developed over the previous five years in my own area of practice and while studying for the Diploma of Nursing (1985). This also helped to increase my knowledge of, and interest in, different models of nursing.

My role in the process of implementation of computerised care plans was concerned with decision making related to terminology, choice of nursing model, categorisation of care plans, selection of and access to care planning pathways. All technological aspects were at that time the responsibility of the contracted consultant team in conjunction with specified users, but writing the care plans, and typing them onto the system was also my responsibility.

BACKGROUND TO THE STUDY

The first introduction to computers and information technology for nurses at the Royal Hampshire County Hospital in 1987, related to provision of Körner information. In 1980 Mrs Edith Körner, former Vice Chairman of the South Western Regional Health Authority was appointed to head the newly formed National Health Service (NHS) and Department of Health and Social Security (DHSS) Steering group on health services Information Systems, following the 1979 Royal Commission report. This operational audit, which was the largest of its kind in recent years, had demonstrated the inadequacy, inaccuracy and irrelevance of information available to the NHS decision makers. Up till this time the framework for creating information systems had no uniformity, so that systems were not only incompatible, but also each contained similar information intended for different destinations. It is the first report of the steering group, "Hospital Facilities" which is the main concern of my work (HMSO 1982). This report recommended the collection of a minimum data set to be contained in one patient information system, for all patients on any one ward, specifying the length of stay on ward and the length of time in care of each consultant episode. (Windsor, 1986) A brief description of these reports is included in the Appendix for this chapter.

Implementation of Körner recommendations provided the first introduction to computers for many nurses. Collecting this information for the DHSS became mandatory in April 1987 although in Winchester it commenced well ahead of schedule in January of that year. In preparation for this date a programme for installation of Merlin Health net terminals on the wards started early in 1986 as part of the District Information System (DIS). Health net is a British telecom communication and information system which is able to transmit forms, letters and memos to other areas using the telephone network. Each terminal consists of a keyboard, screen, a microprocessor, a printer and a modem. Appropriate forms were designed by the District Information Team for input of the data by nurses, doctors and ward clerks, and stored in files on each Health net terminal. Implementation of the Hospital Information System (HIS) has now superseded the previous system for handling of Körner data, and will be outlined later in this chapter.

EDUCATION AND TRAINING FOR KÖRNER IMPLEMENTATION

I have included education for Körner implementation as a basis for nurses' early experience of computers. This was organised by the Körner Implementation Officer for all grades of staff. Seminars with video material were held at varying intervals throughout 1986 and 1987. Although compulsory attendance at these seminars was the aim, inevitably some members of staff were unable to attend for a variety of reasons. At the same time practical training was carried out by members

of the Nursing Special Project group for nurses and midwives. This took place on a fairly informal basis as time and work load allowed. Consequently, once again some members of staff received little or no practical training, leaving them at a disadvantage when they were expected to enter data in the course of their work. "Round the clock support" was available for several weeks after installation and implementation, and support on an "as required" basis remained available while the Health Nets were in active use on the wards.

REGIONAL INFORMATION SYSTEMS PLAN. (RISP)

RISP was a policy on information and information systems drawn up in consultation with representatives from District Health authorities and approved in 1984, to comply with the Körner recommendations. The aim was to provide improved information to meet the increasing demands for services, thus enabling more cost effective clinical and managerial decisions. The regionally coordinated plan for designing and implementing computer based information systems in the Wessex region, was planned as a data base management system with 5 core systems. Further information is included in the Appendix. This study is concerned only with the core system related to Hospital Services, which comprises four functional components, one of which Patient Care includes the Nurse Care Planning system. Implementation of HIS and training will be described in Chapter 3 as part of the implementation process.

THE STUDY IN THE CONTEXT OF THE NURSING PROCESS.

The Nursing Process was formally adopted by the General Nursing Council for England and Wales in 1977 as a framework for patient care and curriculum planning but development started in the United States of America in the 1950s. Hall, (1955) in an address at New Jersey referred to by Yura and Walsh (1978), based her whole presentation on the assumption that nursing is a process, asserting that nursing "with" the patient is indication of high quality nursing. More evidence of a major change of thinking at this time concerned the change from task orientated, to patient centred nursing care, described by Abdellah (1960). At the same time Orlando (1961) introduced the term "Nursing Process" to describe the development of nursing organisation to meet the changing needs in education and practice to provide a professional, disciplined framework for nursing to replace the intuitive approach. Chin and Jacobs (1983) believe the Nursing Process was introduced to encourage nurses to reconsider the use of the medical model in their attempts to redefine nursing, by providing a problem solving process framework to look at nursing as a deliberate, thoughtful and self correcting activity. Although my own belief is that the Nursing Process would convey a clearer meaning if it were known as the process of nursing, throughout this work I have used the title with capital letters as it commonly appears in nursing literature.

CARE PLANNING USING THE NURSING PROCESS

Nursing care which is planned for each patient is written in a nursing care plan, based on the philosophy of individual care inherent in the Nursing Process. A nursing care plan is a practical tool which helps nurses to document the assessment, planning, implementation and evaluation of

their care. The written documentation is only part of the Nursing Process, described by Kratz, (1979:3) as

"A problem solving approach, involving interaction with the patient, making decisions and carrying out nursing care based on assessment of individual patient situation and evaluating the effectiveness of nursing actions."

Similarly the Royal College of Nursing definition (1986:7) states that it is:

"A logical, systematic approach to nursing, involving individual nurse/patient interaction. This provides information to help identify the patient's needs or problems, to enable goals to be set, care planned, implemented and evaluated."

Yura and Walsh, (1978:52) describe the Nursing Process as a decision making and problem solving process which requires nursing knowledge, and involves

"Seeking, selecting and processing information, judging the information, designating priorities about the information, being aware of alternative courses of action and choosing them, as well as implementing a formulated plan of action."

They also describe the whole process of nursing as a sub system of the Health Care System and propose systems theory as a useful structure for the study of nursing, as it provides a decision making process, a self correcting process for assessing, planning, implementing and evaluating an action plan. They describe nurses and patients as interacting parts with different behavioural systems within nursing, and the feedback component of the system is reflected in the evaluation stage. A later definition by the same authors (1988:1) states:

"The nursing process is an orderly, systematic manner of determining the client's health status, specifying problems defined as alteration in human need fulfilment, making plans to solve them, initiating and implementing the plan, and evaluating the extent to which the plan was effective in promoting optimum wellness and resolving the problems identified."

Based on the premise that the Nursing Process is

"the core and essence of nursing..central to all nursing actions." (Yura and Walsh, 1988:1)

McCormick, (1986) asserts that computer documentation of the components of direct nursing care in most nursing information systems is based on the Nursing Process as defined by Yura and Walsh.

Ryan, (1973) also describes the Nursing Process as the application of systems theory to the planning of nursing care. She argues that it provides a conceptual means of integrating the assessment,

planning and evaluation stages of the process to make nursing intervention a "rationally coordinated and measurable product" She describes a nursing care plan as an open system:

"an information receiving, processing, sending and evaluating centre initiated by the professional nurse." (in Marriner, 1983:297-301)

However, Henderson (1982) analyses these different interpretations of the Nursing Process, questioning the title on semantic grounds, asserting that emphasis on "Nursing" assumes that it is only nurses who use a problem solving process, whereas it is an analytical process that should be used by all health care workers whatever intervention is employed. Moreover, she asserts that emphasis on the definite article disclaims the subjective or intuitive part of nursing which is founded on experience, logic and expert opinion and is not necessarily part of the problem solving process.

The Nursing Process is usually described for convenience in four separate stages, although in practice the stages are inter related and continuous rather than linear. The stages are defined as assessment, planning, implementation and evaluation. (Kratz 1979; Hunt, Marks-Maran, 1980; WHO, (1980); Marriner, (1983); Roper, Logan and Tierney (1985) and others) McFarlane and Castledine, (1982) include data collection prior to assessing as an additional separate stage.

The descriptions of stages of assessment, (including data collection), planning, implementation and evaluation below are from contributors to the course book "A Systematic Approach to Nursing Care" published by the Open University, 1984 and which provides the core of Nursing Process education for qualified nurses at the hospital.

Assessment is the first stage during which the nurse patient relationship starts to develop. It consists of collecting and reviewing information, and identifying patient problems amenable to nursing intervention, according to the principles of the model of nursing used. (Tierney, 1984:27-56)

Planning is the second stage in which goals are negotiated with the patient and nursing actions are selected to meet the goals for problems. Goals are written in specific, realistic, measurable and observable terms and may be short term or long term. They should state a time in which they may be achieved. Nursing actions must include a date and a signature and make clear the method and frequency of the selected intervention and the patient or nurse's role in the action. (Bond, 1984:57-82).

Implementation describes the performance of the nursing actions based on the model of nursing used, including maintaining, limiting and terminating the nurse patient relationship. (Binnie and Roberts, 1984:83-110)

Evaluation is carried out in two stages: formative evaluation is an ongoing process where each nursing action is judged as it is carried out, or immediately after, for example the effects of a position change to relieve pain. Summative evaluation takes place at a time when it has been professionally decided to evaluate and consists of selecting criteria for evaluation, observation of

outcomes, comparison of actual outcomes with the goals set, judging the extent to which goals have been achieved and modification of the plan of care if needed. (Lowe, 1984:111-28)

Using a Nursing Model

A nursing model provides the theoretical framework within which care planning takes place. It is a conceptual image of nursing which provides directions to achieve the goals: a representation of the reality of nursing in ideal terms.

Johnson's 1975 definition of a nursing model is now widely accepted:

"A systematically constructed, scientifically based and logically related set of concepts, which identify the essential components of nursing practice together with the theoretical base for these concepts and the values required in their use by the practitioner." (Riehl & Roy, 1980:6)

There is sometimes confusion regarding the difference between the Nursing Process and a nursing model, and a definition proposed by Walsh, (1989:22) clarifies the issue:

"A model tells us what the nursing care should be like, the Nursing Process describes how it should be organised"

The Nursing Process must be used in conjunction with a nursing model, to direct nurses' thoughts and provide a baseline for assessment, planning and evaluation.

USING THE NURSING PROCESS AT THE ROYAL HAMPSHIRE COUNTY HOSPITAL

Nursing Process documentation was introduced at the Royal Hampshire County Hospital in 1980 following a series of seminars and workshops for nurses. A Nursing Process sister was appointed in 1984, the documentation was revised in 1985 and later the same year the Open University Course "A systematic Approach to Nursing Care" was established. This course is concerned with the practice and principles of the Nursing Process and takes place twice yearly for interested qualified nurses. In the past five years, although individual skills and interest in the Nursing Process and models of nursing have developed and primary nursing has been introduced on a few wards, no major changes related specifically to care planning have taken place until the implementation of the computer care plans.

The Roper, Logan and Tierney model of nursing

The nursing model on which care planning is based is the Roper, Logan and Tierney model first published 1980 and revised in 1985. The authors did not intend their model to be primarily a theoretical construction but saw it as an intermediate stage in theory development and as such it does

not reflect a single theoretical base. Analysis of the main components suggest that the model draws on systems, development and human needs theories.

Nursing, according to this model, may be necessary when an individual cannot perform one or more activities effectively. They describe the nurse's role as helping patients with problems in activities of living, by preventing, solving, alleviating or coping with the difficulties.

Problems are attributed to changes in environment, routine, dependence/independence, ways of performing an activity of living, or discomfort associated with it. Two components of nursing are proposed. The activity of living component is nurse initiated and is an essential feature of the model. The prescriptive component of nursing is derived from the care prescribed by doctors or other health professionals. Both components may include preventative or educative nursing care. (Roper, Logan and Tierney, 1985: 4,63,65) The underlying assumptions of the model are included in the Appendix.

The manual or paper system of care planning at the hospital

From June 1985, the manual or paper system of care planning used documentation nominally based on the nursing model described above. Examples may be seen in the Appendix.

All documents were of A 4 size specified for use with the longer side of paper horizontal. Documents were stored in rigid plastic folders in specially designed stands holding a maximum of thirty folders. Wards were allowed to decide where these were stored and most chose to keep assessment forms and progress notes in the folders in the office or at the nursing station with the care plans on clip boards at the end of beds. However this varied not only between different wards but also on the same ward at different times on a trial and error basis.

Documentation consisted of six different forms on which to record the patient assessment, problem list, care plan, progress notes and peri-operative care. All forms provided space to record name, age, consultant, ward and unit number.

Assessment forms There were two assessment forms, one a double fold form for patients whose stay exceeded 72 hours and the other a single sheet printed on green paper for shorter stay patients. The front of the first page of the longer stay form provided a pro forma for demographic and biographic information and space to include a statement of the patient's own perception of the current situation. The reverse side provided category headings for assessing individuality based on activities of living, although these did not follow exactly those proposed by Roper, Logan and Tierney. A small space was reserved for a key point summary and the signature of the nurse carrying out the assessment. The second page formed the beginning of the progress notes (described below) so that admission assessment and the initial relevant nursing details were always kept together. The short stay form consisted of the same format for biographic information as the other assessment, on one side, with progress notes on the reverse.

The problem list was a blank form, headed and lined, always kept with the care plans. On this the problems were described and numbered so that on the care plan they need be identified by number only.

The care plans consisted of single sheets printed on both sides with columns for writing the date, goals, nursing actions, evaluation and signatures of nurses who planned or evaluated the care. Space was also provided for entering the date on which the care plan was to be reviewed. In addition a therapy sheet for use by physiotherapists, speech, occupational or stoma therapists followed the format of the nurse care plans and was printed on yellow paper for easy identification.

Continuation progress notes were printed on pink paper, with space for date, nurse signature and nursing notes. Almost invariably progress notes were kept in the office or at the nurses' station. Progress notes were intended for recording day to day progress which did not logically fit into a care plan, such as attendance at other hospitals, consultations from visiting consultants or untoward incidents. The forms also included space to record observations and investigations.

Peri-operative form is an additional form for use on surgical wards designed to record the care given immediately before and after operation. It takes the form of a "tick list" with all nursing actions and goals pre written and spaces for observations and recording by ward and theatre staff. This form was not automated at the original implementation by request of ward and theatre staff, but computerisation is under consideration at present.

Use of the documentation varied in small ways from ward to ward depending on organisation of the care and the following description represents a general picture only. All wards carry out some form of patient allocation, at least during the early shift and some wards were experimenting with a change to primary nursing. On admission, a nurse would be allocated to carry out the assessment interview and record it on the appropriate form. Some nurses preferred to write as the information was collected and some preferred to retain most of the information until after the interview. Ideally, the same nurse would then identify the patient's problems from the assessment information and start planning the individual care with the patient. On a daily basis, the nurse allocated to a patient would consult the care plan at the beginning of the shift or at the first meeting with the patient during the shift. If the planned care needed evaluating, the same nurse wrote the evaluation, usually at the bedside and entered any alterations necessary to the care plan.

There are three shift periods in the 24 hour nursing day, commonly termed "early, late and night". These vary slightly during the day between the wards but the night shift parameters remain constant at 2045 to 0745 hours. A system of internal rotation, where nurses rotate on a regular basis between day and night duty, is in operation for all permanent staff excluding the senior staff nurses (now entitled junior sisters) and ward sisters.

All nurses on the early shift receive the handover report from the nurse who has been in charge during the night, who, when the manual system was in use, usually read from each patient's individual progress notes.

The afternoon handover report was different, although it varied between wards and at different times on the same ward. Usually, each nurse took a turn to report individually on the patients she had been allocated during the morning, to all the late shift nurses, using the care plans. Alternatively on some occasions, individual nurses would report to the nurse in charge, who would give the handover report to the oncoming shift from her notes. The evening handover was the reverse of the morning one.

OPERATIONAL DEFINITION OF TERMS USED IN THE STUDY

NURSE is defined as an Enrolled Nurse or Registered General Nurse employed on a permanent contract. For convenience nurses will be referred to in the feminine gender.

NURSING PROCESS is the logical, systematic, problem solving approach to nursing care as described above.

CARE PLANNING refers to all stages of the Nursing Process and includes assessment, problem identification, goal setting, planning the nursing actions, carrying out the care and reporting on general progress in progress notes.

NURSING CARE PLAN or CARE PLAN is only that part of care planning which involves statement of problems, goals, nursing actions and evaluation.

PATIENT Describes the person who is receiving the care. Nurses do not necessarily agree on the term "patient", but it is a universally understood term and that is the reason for its use in this work.

OUTLINE SUMMARY OF CONTENTS

Chapter 2 is a review of relevant literature concerning major studies related to the Nursing Process, Information Technology, with special focus on nursing systems with nursing care plans, and models of change. Studies concerned with nurses attitudes towards the Nursing Process and towards computers, will be examined for comparison with those carried out in this study. Similarly studies describing implementation of the Nursing Process will be explored to identify approximation with implementation of the computer care plans. Descriptions of other nursing systems will provide a base for comparison with the subject of this study. The main focus of the literature review will be on British literature but will also include international work where relevant.

Chapter 3 describes the integrated hospital information system and the process of implementation at this Hospital. In order to set the scene, the membership of the care planning committee will be defined and the decision making processes associated with the terminology and design of the care planning system outlined. The plan of approach will be explained, the final care plan pathways described and the principles of the care plans content expounded.

Chapter 4 describes the research methodology chronologically. The rationale for research design

and data collection methods will be explained; and the process of data collection will be described, including that which was subsequently rejected. Information collection for construction of the care plans will be described and presented chronologically without discussion. Data collection will be related to the written content of the care plans, nurses attitudes and monitoring and evaluation of the computer care plans. Response rates in attitude surveys and data analysis will be reported in this chapter and limitations will be discussed.

Chapters 5 to 11 are concerned with data presentation. Descriptive and inferential statistics are used to present data from all sections of the study. Chapters 5, 6 and 7 present data associated with the first and second attitude studies, including additional comments from the respondents. Attitudes to the computer care plans before implementation will be discussed in relation to attitudes towards the Nursing Process and towards computer care plans twelve weeks after implementation. Professional, practical, ethical and technological issues will be identified, analyzed and discussed.

In Chapter 8 attitudes derived from interviews will be described, using verbatim reports where applicable.

Chapter 9 presents data obtained from examining the quality aspect of care planning before and after implementation.

Chapter 10 presents the results of the computer satisfaction questionnaire sent to all qualified nurses one year after implementation of the care plans and includes additional comments.

Chapter 11 is concerned with monitoring the way in which the computer care plans are used after nurses have used them for approximately eighteen months.

Chapters 12 and 13 draw together all the results and reflect the broad conclusions deduced. Descriptive and inferential statistics will be used to establish relationships between different components of data collection. The results will be discussed in the context of change in three time periods, that is prior to using the care plans, three months after starting to use them and again after a year or more.

Chapter 14 examines the aims of the research and evaluates the extent to which they have been achieved. It will explore the findings in relation to existing research on the subject and identify any wider issues arising from this. The limitations of the research will be defined and the lessons that have been learned will be discussed. This chapter will make recommendations for improvements to the present system, for modifications in future similar implementations, and for further research studies. The action which has already been taken as a result of the findings will also be described.

CHAPTER 2.

A REVIEW OF THE RELEVANT LITERATURE

In this research study, the change to computerised care planning is being examined, not only in the context of information technology, but also in relation to professional, ethical and practical issues associated with the Nursing Process. Nursing care plans are the working tools of the Nursing Process, the means by which the stages are documented and communicated. Computerised care plans represent a change in the method of recording the process, and their use may be influenced by the same factors and attitudes influencing care planning by whatever means. The change affects personal, organisational and process aspects of nursing. The literature review, therefore, focuses on major studies relating to the Nursing Process, Nursing Information Systems in general and computerised nurse care planning in particular. I have also included literature related to change. Although, by virtue of its definition, I like to think of the Nursing Process in terms of the process of nursing, I have referred to it in the conventional manner with the use of upper case letters throughout this work.

LITERATURE RELATED TO THE NURSING PROCESS

A literature search in this subject produced in excess of a thousand references. I have, therefore focused on major works related to the development and implementation of the Nursing Process, and the attitudes of nurses, to provide a background for my research. The development and implementation of computer care plans represents a major change in the mode of recording assessment, planning and evaluation of nursing care, applying the theory to a computer system while retaining the ideology of individual nursing care in practice. The review is largely concerned with nursing in the United Kingdom (UK) but the United States of America (USA), Australia and Europe are also included.

DEVELOPMENT AND IMPLEMENTATION

Definitions of the term "Nursing Process" by Kratz (1979), Yura and Walsh (1978) and the Royal College of Nursing (1986) are included in Chapter 1.

A study by The World Health Organisation (WHO) working group, Europe division, 1980, affirmed the importance of the subject as an area for professional consideration. The group examined the use of nursing records and discussed their role in developing and providing care based on the principles of the Nursing Process, as described in Chapter 1. At this time, documentation of the Nursing Process was in an early stage in most hospitals in the UK and Europe with the exception of Denmark who had been using a form of care planning since 1968. Individual members from the participating countries reported that there was a general lack of appropriate documentation systems

and on the whole nursing notes were non specific and subjective. The group concluded that systematic documentation used to record the problem solving approach to nursing produced patient information for epidemiological and research purposes in relation to nursing. It recognised the use of a logical recording system as an essential component of accountability and responsibility and acknowledged the implications for education and management. The group recommended that systematic documentation should be introduced as part of current nursing practice and education, to facilitate individual care, develop new knowledge, validate existing beliefs, emphasise accountability and act as a source of legal protection for practitioners and public. They recommended that the change required careful education in the philosophy and practice of the Nursing Process. Friend and Hayward (1986) cite this report, and the resulting establishment of W.H.O Participating Centres, as one of the major influences in identifying the Nursing Process as a priority area for study and research. (WHO, 1980)

Two major analytical literature reviews have contributed to an overall view of the introduction and implementation of the Nursing Process in the UK and USA. A research study by De La Cuesta (1983) analyzed the development of the Nursing Process in sociological terms. She carried out a content analysis of USA and UK literature, combined with interviews and observations in British and American hospitals to examine the practical contribution the Nursing Process has made to nursing.

De la Cuesta interviewed twenty nine nurses in one UK hospital to study the implementation of the Nursing Process from a practitioner view point. She also interviewed twenty two US nurses from six education centres and six hospitals to study the genesis of the Nursing Process and the context in which it developed; to assess the extent to which theory was translated into practice and to identify barriers to implementation. De la Cuesta traces the development of the Nursing Process from inception as primarily a teaching tool through to use in clinical practice in USA. The study established that in these early days most practising nurses learned about the Nursing Process from in service training, the nursing press and from students educated in the new ideas. Sociological analysis showed that development took place during a period of great social change in American society, such as tertiary education, the women's liberation movement, increased medical knowledge and an increase in public expectations of the health services. At the same time, discontent associated with the lack of professional status of nursing, the quality of care provided within the current framework of task allocation, led to the quest for autonomy and knowledge based practice.

The study revealed that a similar climate of discontent existed in nursing in the UK at this time, principally related to the task orientated approach to care, the lack of individually planned care, the superficial nurse/patient relationship and low job satisfaction among nurses. Analysis of the literature indicated that current American trends were incorporated in the theory of the Nursing Process when it was introduced in the UK in the mid to late seventies.

In its transition from the USA the Nursing Process was adapted to the needs of nursing in the UK, omitting some components and placing less emphasis on others. Although at that time it was considered as a method of improving care, De la Cuesta considered that autonomy and

accountability were not seen as concepts of the process in the UK and decision making skills and patient participation were not priorities. Observations showed that in neither country was the Nursing Process being implemented as suggested by theory, and similarities in practice existed. Nurses were writing comprehensive patient histories (assessments) but using them as information for reference rather than as a basis for assessing the needs for nursing care. Care plans were often not written and when they were, were not used. References to physical care predominated, usually related to medical diagnosis. Often nurses felt that care plans were superfluous and bureaucratic, that the care was done regardless of the care plan. Observations showed that there was no increase in patient participation or nurse patient interaction when the Nursing Process was used and that evaluation of care was poor. (De la Cuesta. C. 1983)

Walton (1986) compiled a comprehensive review and analysis of British and North American Nursing Process literature from 1973-1983 and relates the Nursing Process to developments in medicine and social work. She identifies the issues arising from the introduction of the Nursing Process in the context of nursing and health care developments. The literature review was a result of bibliographies compiled by the Department of Health and Social Services, The Royal College of Nursing and the Department of Nursing of Manchester University, in addition to an extensive manual search.

Her study identified four levels of interpretation of the Nursing Process: a recording system; a system of work organisation; a tool for education and practice to encourage individualised patient care; and finally an ideology. Walton argues that much of the aggravation about the Nursing Process has focused on the documentation because this has been over emphasised in the literature to the detriment of the underlying principles. She claims that differences of opinion, often semantic, in presentation of the Nursing Process in the literature have contributed to the general confusion. Issues arising from this confusion were identified in the literature as relating to the dichotomy about patient problems or needs; to the question of whether all patients had problems, to the responsibility for writing nursing records and where they should be stored, and whether standard care plans were appropriate. The issue of whether documentation should be multi disciplinary, (this remains an issue) was also identified.

Walton discovered from the literature that the difference between the ideal and the reality of nursing care on the wards was a source of stress for learners and the increased involvement with patients was the cause of stress for all grades of staff. For qualified staff another source of stress was identified as the increased responsibility and accountability while the change itself was seen as stressful where it was construed as criticism of the old ways of nursing.

This work examined literature relating to the implementation of the Nursing Process in different areas, showing that the main difficulties arose in acute areas such as surgery, theatres and intensive care where there could be rapid changes in patient condition, rapid turnover of patients and use of technical equipment. Kratz (1982) reporting at a King's fund centre conference, associated these difficulties with excessive paper work and the stress of change in general. Standard care plans had been found useful in some of these areas. Fewer difficulties were reported in long stay areas while

in the community and midwifery, the increased autonomy meant that the principles of individual care had been practised before the introduction of the Nursing Process. Walton concluded that in general implementation had been carried out with a "top down" coercive approach and missed out the preparation and involvement of the users. She suggests that implementation needs to be assessed as a basis for further change. (Walton, I. 1986)

An evaluative study carried out by the Nursing Process Evaluation Working Group, Kings College University of London, (1986) examined implications of implementation of the Nursing Process in the UK. The literature review produced mainly advocacy, prescriptive and descriptive literature but very rarely evidence of evaluative studies. An applied research design used both quantitative and qualitative methods to collect information from a variety of sources to provide an illuminative description of the way in which the Nursing Process has affected the education and practice of nursing. In the course of the work, the group interviewed a wide range of nurses from a broad cross section of nursing, most with first hand experience of the implementation of the Nursing Process. As a frame of reference for the work the definition of the Nursing Process as "a planned systematic approach to the care of the individual patient" was used.

The working party studied four main areas related to implementation; the way in which the four stages of the Nursing Process were being carried out, the personnel responsible for introduction, attitudes of doctors, patients and nurses, the documents and finally research issues. It found evidence that nurses lacked understanding of assessment which resulted in collection of inappropriate information with risk of duplication. The designs of assessment forms did not necessarily provide guidelines about the type of information required; some were based on specific nursing models but others on an ad hoc composition of other forms. The study revealed that nurses had difficulty in finding appropriate words to describe patient problems and often set broad, unrealistic goals which raised patient expectations. Interviews with nurses showed that they thought their difficulties were caused by staff shortages though this was not endorsed by relevant literature. The working group observed that evaluation was seldom achieved effectively and inferred that the problems were caused by lack of knowledge of the type of data required; unrealistic goal setting and the difficulty of distinguishing the effects of nursing care in a multi disciplinary care team.

From a study of the literature, the working party concluded that introduction of any change required a collective and coordinated effort but observations demonstrated that in practice one enthusiastic individual or section of management was usually responsible for introducing the Nursing Process in most areas studied.

The study revealed evidence that patients expectations are raised by the interest shown at the assessment stage but not fulfilled in the reality of nursing care. Doctors made negative comments about the Nursing Process and viewed it as a threat because nurses are taking on a wider responsibility. In addition, the literature showed that there is a difference between how doctors and nurses see the nurse's role and the doctors consider that the Nursing Process encouraged an ill defined status for nurses. Nurses themselves questioned the practicalities of the Nursing Process

and whether it benefited the patients, complaining that documentation was cumbersome and took time away from patients.

The group considered the purpose, content, format and retention of related documentation. The purpose of documentation as described by the DHSS is to demonstrate that each patient receives a high standard of individual nursing care, to record changes and to maintain continuity of communication by means of a professional document. This was found to be widely misinterpreted by nurses. The working group ascertained that a dichotomy existed among nurses concerning whether nursing care was generated from patient needs or problems. This led to creation of unspecific goals and vague care plans. The group also found evidence that a variety of documents existed and were used in a variety of different ways to report on patient care. The group concluded that nursing documents are part of the patient's health records and should be retained in accordance with local Health Authority policy. This research was inconclusive about whether patient care was improved by use of the Nursing Process but found some evidence of increased patient and family participation in care. It concluded that research had shown that pre existing problems had been highlighted by the introduction of the Nursing Process. The problems identified included attitudes toward the purpose and value of nursing records, the responsibility for writing them, the provision of continuing education about the Nursing Process and shortage of staff to carry it out. Implementation had been more successful in those areas in which a well planned education programme and supportive management were established, but the study found few health authorities which had addressed this situation before introduction of the Nursing Process. The working group suggested the need for further research at national, local, ward and individual level in the areas of management, change, education, practice and quality of care. It recommended a systematic and coordinated approach to research related to the Nursing Process. (Friend, P and Hayward, J. 1986)

Individual works relating to implementation or development of the Nursing Process include a descriptive study on design and introduction of nursing care plans by Barnett (1982) A development group led by the researcher designed the care plans based on the work of Hunt (1978) and Hunt and Marks-Maran (1980). Prior to their trial on two wards, the findings from Pembrey's (1980) work on the role of the ward sister were used as a basis for organisation of individual patient care. Non participant observation was used to study the nursing care on the two wards before and after introduction of the care plans and attitude questionnaires were used to measure the nurses attitudes to the care plans and associated re organisation of nursing care. Observations revealed that the surgical ward experienced more difficulty with the change to a different model of organisation and writing care plans, especially for short stay patients. Pre written care plans were introduced to address this, but the trial indicated that they were seldom referred to and patients did not receive the care as planned. In contrast the medical ward needed very little reorganisation and reported that the care plans enhanced practice, although not easy to write.

Barnett concluded that one reason for the difference in the two wards was that the surgical ward had more nursing actions to include in the care plans which necessitated more frequent updating. This ward stopped using the care plans when the trial finished. Results of the observation showed that duplication of instructions occurred less frequently after introduction of care plans, but care was still

not carried out as written despite verbal reports to the contrary. The attitude questionnaire produced a 78% response from the medical ward and a 36% response from the surgical ward. Results indicated more positive attitudes from the medical ward concerning usefulness of the care plans and time involved in their completion. This ward continued to use them when the trial was completed. No firm conclusion was reached as to whether the introduction of care plans and the necessary reorganisation of nursing care resulted in more effective individual patient care. (Barnett, D. 1982)

Lauri (1982) states the case for action research to develop the Nursing Process in which the researcher works together with the nurses to develop and seek opportunities for using the Nursing Process model of care. She proposes that knowledge of the Nursing Process and the opportunity to apply it, are essential pre-requisites for the success to this approach. (Lauri, S. 1982)

NURSES ATTITUDES TOWARDS THE NURSING PROCESS

Bowman, Thompson and Sutton (1983) based their study on a sample of 115 full time qualified nurses from three nursing units all at different stages in their use of the Nursing Process. Two units had introduced the Nursing Process in an unstructured fashion while the third had adopted a process of continuous in service education comprising workshops, lectures and seminars. An attitude questionnaire with an equal number of positive and negative statements was completed by the respondents, producing an overall response rate of 64%. Results were analyzed in terms of status of respondent and unit. There was no statistically significant difference between the attitudes of charge nurses, staff nurses and enrolled nurses in each of the three units, although the attitudes of charge nurses was more positive than those of staff nurses who in turn were more positive than the enrolled nurses. Attitude scores demonstrated overall positive attitudes ranging from mildly to strongly positive attitudes towards the Nursing Process. There was a statistically significant difference in the scores between the three units, with the unit who had experienced a structured approach to introduction of the Nursing Process having a significantly higher mean average score than the other two. The results strongly indicated that structured training improved the nurses attitudes towards the Nursing Process but acknowledges that other variants such as the difference in length of time that the units had been using the Nursing Process and even the difference in meaning conveyed by the term "Nursing Process" may have influenced the results.

Bowman, Thompson and Sutton (1986) carried out further work to assess the influence of a positive environment on attitudes of student nurses towards the Nursing Process. They used four wards at a teaching hospital in which the students received structured patient centred teaching by specified qualified staff, using the Nursing Process documentation as a teaching tool. The hospital had been using the Nursing Process for seven years at the time of the study. The sample consisted of forty first year students on their first ward and thirty third year students, who were asked to complete the questionnaire, used in the previous study, on arrival on the ward and again at the end of their placement. There was an average 95% response rate. Results showed a tendency for attitudes to become more favourable over the time spent on the wards but only the increase in positive attitudes of the first year students was statistically significant. (Bowman G. et al 1986)

Bush (1985), in a survey of Health Visitors attitudes towards the Nursing Process, produced results which echoed Bowman's findings. Bush used a free response interview to interview twelve health visitors in her own district who were not using the Nursing Process but had received brief education on the subject as a baseline. She used a six question questionnaire for another twelve health visitors in a different district who were already using the Nursing Process to compare their attitudes before and after its introduction. Responses from the group with no practical experience revealed overall positive feelings towards the Nursing Process but a fear of resistance. All thought that the mode of introduction and type of education received was of foremost importance. The group with practical experience showed six direct changes of opinion in the before and after questions with an overall 2.5% increase in positive attitudes after the introduction of the Nursing Process. Questions relating to the pre implementation preparation showed that the initial training programme had been good but more follow up was required. (Bush, R. 1985)

Carlson (1986) initiated a study to investigate why nursing care plans were not being formulated within 24 hours of a patient's admission at a university medical centre, Illinois USA. Her hypothesis that a positive attitude to nursing care plans would have a direct relationship to the writing of care plans was not supported by the results of the study. Attitude was chosen as the independent variable and the actual number of care plans written was the dependent variable. Attitude was measured using a questionnaire devised by Yurchuck and distributed to 464 nurses, with a 58% response rate. Using the attitude score and the care plan audit score from each of the twenty one units, results showed no statistically significant correlation between the two variables. (Carlson, L.B. 1985)

NURSING INFORMATION SYSTEMS

Literature relating to information technology has been confined to that concerned with Nursing Information systems. The major focus is on nursing care plans included in these systems. Studies concerning attitudes of nurses to computers are also included.

Jacox and Meyer-Petrucci (1988) claim that although there has been a considerable growth in literature which discusses what is happening with computers in nursing, research into nursing informatics is less well developed.

Staggers (1988), in a study of the documented benefits of computer applications for nurses, concurs with this finding. Her search included public data bases, nursing and hospital indices, the National Library of Medicine, National Technical Information Services, the National Center for Health Services Research, computer conference reference listings, bibliographies from books and articles and listings of dissertations. As a result of this review she found only five empirical studies relating to work activities and service benefits. She cites work by Barrett et al (1975), Schmitz et al, (1976), Tolburt and Pertuz (1977), Birckhead (1978), Blackmon et al (1982). She summarised the results from all these studies, finding that the most common consequences of computerisation were that nurses spent less time on clerical tasks, telephone calls and change of shift reports but used the extra time available in professional development activities rather than direct patient care. Perceived changes in accuracy and quality of documentation were not supported by empirical data. None of

the studies reported by Staggers differentiated between the different functions of the computer systems so the results cannot be considered specifically concerned with nursing care plans. (Staggers, N.1988)

EARLY NURSING INFORMATION SYSTEMS IN THE UK

Scholes, Bryant and Barber (1983) edited an international review of some of the earlier computer systems and their impact on nursing. This includes reviews and discussion of computer applications for nursing records, measurement of nursing care, patient monitoring, drug management, community nursing, nurse education, computer assisted learning, planning nursing services, resource management, management sciences and research. I have concentrated on applications related to nursing practice.

Ashton (1983) reviewed the Exeter system developed on the ICL mainframe computers before the introduction of Patient Administration Systems (PAS). She acknowledged the early work done by King's College University Hospital as the basis for these systems. The system includes nurse care planning, reporting, drug information, prescribing and administration, and patient monitoring. Nursing information is available on screen on ward terminals for authorised users, and also on printouts for all staff. Ashton concludes that although nurse recording takes longer on computer, the records were more accurate and comprehensive, included fewer non approved abbreviations, were more legible and consistent and the nurse writing the record could be identified.

These findings are similar to those of Griffiths (1983) and Prendergast and Inns (1984) described below. They are also affirmed by the results of Kjerulff's (1988) literature review on Nursing information systems in the U.S.A.

Head (1983) discusses care planning using the Exeter system in the days before the Nursing Process was widely accepted. The system was designed to plan care as task orientated nursing orders. She suggests that the implementation of the Nursing Process represented as radical a change for nurses as the change to computerised nursing orders from written records.

Jarvis (1983) also describes the Exeter system in relation to nurse managers, identifying the ways in which nursing records are used to monitor and improve standards of nursing care and also to establish staffing levels. A similar system is described by Griffiths (1983) at the Queen Elizabeth Hospital Birmingham. This is a real time system linked to a Univac 418 -111 mainframe, with terminals on each ward and printers in the medical records department. The system includes nursing orders, information (related to drugs, pathology, psychiatry, laboratory tests, nursing procedures) and patient administration procedures.

Griffiths identifies the main benefit of the system as legible, up to date nursing care plans replacing the lists and books previously used. In addition she claims that the care plans are a useful teaching tool which also facilitates measurement of the effectiveness of teaching. (Scholes, M et al. 1983)

CURRENT NURSING SYSTEMS IN THE UK

Sixteen nursing information systems in use or planned for future use in the United Kingdom have been presented by Greenhalgh (1989). The information included in this collection has been provided by vendors and by personnel at the hospitals where they have been implemented and is purely descriptive. Only one of these, HC 4000 (and the additional later version, HC 7000) developed by TDS Healthcare Systems Corporation, is part of a totally Integrated Hospital Information System. Five of the systems, (HC4000/7000, Excelcare, Sasha, Grasp and Ansos II) were developed in the USA and the remaining eleven, (Criteria for Care, FIP, Crestbond, SENS, Merit, NICS Nurse Manager, I-Care (ICL), Oxford Nurse Management System, Penfro and Teamwork) were developed in the UK. (According to the vendors, ICL I-Care is known as "Nurse Manager" but to avoid confusion, I shall continue to refer to it as "I-Care" as in Greenhalgh's text.) Five of these Nursing Information Systems include nurse care planning, and these are identified in this section. They are HC4000/7000, Sasha, FIPS, Excelcare and ICL I-Care. (Greenhalgh & Co Ltd, 1989)

Hoy (1989) in a report, described by the author as a "review" rather than an "evaluation", of the professional issues associated with computer assisted care planning, discusses six care planning systems in use in the United Kingdom. Three of these, Excelcare, HC4000 and ICL are also included in Greenhalgh's work, above. He views computer care planning as a challenge for the clinical nurse in using and documenting a systematic approach to care, and as a valuable resource for managers. Hoy identifies three problem areas associated with computer care plans. These include problems of devising the best methods of using the computer for documentation, of developing or adapting the technology to suit the methods and introducing the change to nurses. He discusses the effects of computer care planning on patient care, management of resources, work patterns, personal and professional freedom and access to information and technology. The report is a result of visiting the sites where the systems are being used and speaking to project nurses and some clinical nurses using the systems. The evidence is therefore largely anecdotal, although based on empirical findings where possible.

Hoy examined the care plans in the light of the advantages and disadvantages of the use of the Nursing Process outlined by Tierney (1987) He found that only one district made use of portable terminals which facilitated patient involvement in care planning. In other places, involvement of the patient meant that information had to be collected and then transferred to the computer, duplicating the work or excluding the patient. Computer care planning has the potential for addressing the need for explicit documentation but this is not necessarily welcomed by nurses, so that short cuts are taken and explicit documentation may not be produced. The report looked at the possibility of mechanistic behaviour as a result of using computer care plans but considered the high involvement of nurses made designers sensitive to this risk. Many users, however, expressed fears that nurses would lose the faculty of thinking if care plans were made too explicit or comprehensive menu systems were used. All six systems reviewed based their care plans on the Roper, Logan and Tierney model of nursing, but two also included physiological systems or clinical speciality as an option. All systems made use of personal identification and passwords to identify the user and maintain professional accountability and this is shown as the major security feature. Other security

strategies include careful siting of terminals and the facility to blank the screen if a user has left the terminal with information still on screen. Hoy found little evidence of structured evaluation being carried out for any of these systems. He considered that the systems reviewed had limited value in resource management mainly because workload estimation methods required improvements, but tentatively inferred that they could contribute to "more effective clinical utilisation of resources". He concludes that as there is no uniform approach to care planning at present, none of the systems can be seen as a ready made solution for users in other areas but will need to be modified to suit local needs. (Hoy, D. 1989)

Greenhalgh describes the systems in terms of background, purpose, functions, future plans, links with other systems and computer environment. All systems use the keyboard for data entry but HC4000/7000 has an additional facility for light pen selection of pre written items. Three systems use a real time method of data entry, (HC4000/7000, Excelcare and Sasha), that is, data may be entered at any time as appropriate, and FIPS employs the batch time entry method, where data are entered at predetermined times. Data entry methods were not specified for I-Care. Graphics facilities are integral to Sasha, while FIPS has access to graphics by download to another computer system and HC4000 by use of Lotus 123 graphics package, available with the system. Graphics are planned for I-Care.

Facilities vary between the five systems; all produce information associated with estimation of nurse workload. Three systems are also used to produce nursing duty rosters and information for the payroll, (FIPS, I-Care, and Sasha). Only I-Care has developed a method of identifying necessary skill mix as part of the system.

Patient acuity information (that is information concerning the level of nursing care required for each patient) is commonly obtained by categorising the patients in dependency levels and applying pre determined times to the units of nursing care they require. One system, Sasha, offered an alternative means of establishing this by pre written care plans. I-Care has a system of patient dependency based on 4 mandatory assessment entries. Not all descriptions include information about all functions. Standards for patient care are integral to the Excelcare system and I-Care produces standard based care plans. Only HC 4000/7000, as an integrated system, includes patient allergies, medication recording, medical orders, test results, investigations, appointments and transfers between wards. All five systems include user defined components. With the exception of HC 4000/7000 all systems have plans for the future to include further facilities or make links with other systems.

Care planning components are described in both Greenhalgh's collection and Hoy's review. Greenhalgh includes descriptions of Sasha and FIPS, not included in Hoy's work because the care planning components were not completed at the time of his review. Sasha is in use at 160 sites in the USA but has only recently been introduced in this country in one hospital. Care planning includes a pre determined list of patient problems, initiated by the user, from which appropriate problems can be selected for an individual patient. This selection generates a list of goals, also pre-determined by the user, which, when selected by the nurse, in turn generates a list of pre

determined nursing interventions for selection. Additional goals or interventions can be added. Each intervention identifies the frequency, time of day or shift in which the intervention is to be performed and the minimum grade of nurse required to carry it out. It also includes a user determined standard time attached, in order to calculate nursing hours required. Alternatively, a care plan may be generated from medical diagnosis. Patient outcomes related to specific goals are recorded as "achieved" or "not achieved" and other evaluation is recorded on the printout. The system can also produce standard care plans for patients with common problems, which does not involve nurse selection.

FIPS is in use on 133 wards at 21 hospitals in the UK but care planning is still being developed as the present care planning component is not based on the problem solving approach of the Nursing Process. Plans consist of a list of activities identified following patient assessment but include no statement of expected patient outcomes. They are intended to be used as profiles for manual care planning and variations which occur are not entered in the system. A new system is being planned to conform with the principles of a problem solving approach.

Excelcare, ICL and HC4000 are described by both authors. Excelcare is in use on 19 wards at 4 sites in the UK, 27 sites in the USA, 3 sites in Australia and one in Singapore. Originally developed in the USA, Excelcare is in use in this country at Huddersfield Royal Infirmary, Weymouth and District General Hospital and Orsett Hospital, Basildon. It is marketed in the UK by Price Waterhouse who also provide training. The system runs on ward based micro computers and care planning is linked with workload estimation facilities. The system is based on Units of Care which contain process and outcome standards describing the nursing care required for patient problems and needs. These support care planning, implementation and evaluation. The nurse grade and amount of time required for the standards in the units of care provide information for calculating workload, staffing levels and costing. The care plans are made up by selecting appropriate units of care (pre determined by the users). These generate a list of observations and interventions but if individual care is required this can be "customised". Printed care plans can be produced daily, each time a patient is assessed, or on demand. Care plans are modified, augmented or inactivated each shift and at the same time nurses enter the grade of staff who have given the care.

Sale et al (1988) describe the project in Weymouth as an evaluation study, started in 1987 by the Weymouth project team and funded by Wessex Regional Health Authority. The team studied the process and effects of implementation of the system on two wards at the Hospital working with the hypothesis that use of the Excelcare system would allow quality of care to be measured against pre set standards; identify clinical factors causing increased length of stay; help care planning; improve nurse to nurse communication; calculate workload by numbers and skill mix; predict staffing needs; improve education and orientation of new staff. (Sale, D et al 1988)

I-Care, developed by ICL has been piloted in one hospital in the UK. The ICL Care Planning and Dependency System, allows assessment, goal setting, care planning and evaluation of outcomes based on activities of living and includes a workload estimation facility. This system is designed to interface with other ICL systems and nurse rostering systems. When an activity is selected a list

of probable problems is generated for selection. On selection of a problem, goals and activities related to the problem are produced. In addition, free text can be used to describe individual problems. The printouts are used to manually record the care, but when problems are resolved they may be evaluated in the system by text such as "achieved" or "not achieved". This system includes a workload estimation facility and is designed to interface with other ICL systems and nurse rostering systems. An assessment facility is described in this care planning component, in which information relating to all activities of living may be recorded as a yes/no response to pre-set information and supplemented with free text if necessary.

Palmer (1988) describes this system and explores the benefits and problems in introducing computers in the clinical area. She describes the development of the system at St Thomas' Hospital, London, consisting of a nursing history, nursing assessment based on activities of living, a care plan or summary outline of care which includes progress, expected outcomes and review dates. The care planned for individual problems may be entered via the free text facility under the headings of Problems/Needs, Aim of care/Expected outcome, Actions/Care required and Actual outcomes. Dates must be included for reviewing and completing all nursing actions. Also included in this package are core care plans addressing common problems, which are user definable at ward level and intended for use as part of an individual care plan. Help screens have been developed to provide guidelines for care planning, standards, computer based training and research. Palmer reports positive and constructive comments at the first demonstration which have been upheld by active participation from the nurses in the pilot study. Palmer anticipates savings in cost and time by using the new care plans, which she sees as "a useful tool to assist the quality of nursing care by means of monitoring the expected outcome against the actual outcome". This has always been the principle of evaluation of care in the systematic approach of the Nursing Process. (Palmer, B.1988)

HC4000/7000 was developed in 1973 in the USA and is in use in 98 hospitals there. In the UK it has been in use at one hospital since 1987, the Royal Hampshire County Hospital, Winchester, and was installed at a further two between late 1990 and 1992. The care planning component includes an assessment facility which forms the basis of the nursing record. This includes reason for admission, medications, allergies, information, clinical observations, and assessment of abilities in activities of living or by other criteria decided by whichever nursing model is used. In this section pre-determined phrases are included for selection, which may be modified by free text entries. If desired the whole assessment may be entered by free text. Care plans may be compiled or modified at any time. All pre written text is user defined and consists of lists of most common problems, goals and nursing actions. These may be categorised by specialty or by activity of living and care plans may use a combination of these options, including the facility for free text entry. There is a choice of goals and actions which include specific times or frequencies and goals which leave this to professional discretion. All goals require addition of a goal date at which the nurse expects the goal to be achieved. If a student makes a care plan, there is a facility for counter-signing by a qualified nurse. Goals and actions may be eradicated when no longer relevant and although retained on the system, no longer appear on the care plan. Plans may be printed at any time and evaluation is carried out on the terminal, by use of phrases such as "goal achieved" "goal not achieved" or free text.

CANIS, CNIS and CNCS are included only in Hoy's review. CANIS, (Computer Assisted Nursing Information System) introduced in 1976 before the formal adoption of the Nursing Process at Ninewells Hospital, Dundee, has since been developed from a task orientated system to the present system based on the Nursing Process. It uses an activities of living approach, has extensive menus and a facility for free text entries. It has been developed exclusively by nurses, and is also used by Crosshouse Hospital, Kilmarnock. This system is described by Henney and Bosworth, (1977) Henney (1981, 1985), Henney et al (1982), Harrow,(1988).

Henney describes the early development of the care planning system and workload calculation. Harrow describes the most recent version, its development, software and hardware and progress of the users. She identifies problems in understanding the principles of the Nursing Process which underlie problems in use of the computer care plans. She claims that use of the care plans has improved the quality of patient care by providing more accurate information, has improved communication between nurses and increased the time spent with patients. She does not explain the methods by which these claims can be upheld. (Henney, c.1985)

The Clinical Nursing Computer System (CNCS) in use at the Elizabeth Garrett Anderson Hospital, London, is linked to the Patient Administration System (PAS), the district network and laboratories. It is also used at the Royal National Throat, Nose and Ear Hospital. The care planning system is also based on activities of living, including assessment, problem identification, goal setting, nursing actions, evaluation and progress reporting. Woods (1989) expresses the objective of CNCS as an improvement in nursing care. She describes the development and design of the system as "ward led" and cites the major advantage as a reduction in time taken to complete paper work to allow more time for patient contact. This is facilitated by portable computers which allows all recording to be done at the bedside, and also by the interface with the PAS, allowing rapid transfer of biographical information and eliminating the need for admission books and discharge letters. Interface with the Bedstate system has removed the need for completion of bedstate forms representing a considerable reduction of time spent on clerical tasks. Woods identifies problem areas, such as storage of equipment, extra training needs caused by rapid staff turnover, and anxieties about confidentiality. She acknowledges that both advantages and disadvantages are of necessity described subjectively pending the results of a current comparative research study and claims that the future success of the system is dependent on nurses attitudes and financial resources. (Woods, K. 1989)

CNIS has been in use at Llanelli since 1987 and has been evaluated by the project leader, (Unpublished). Hoy identifies the extensive help facility, which explains the rationale of care for common problems, as a major feature of this system.

NURSING INFORMATION SYSTEMS IN THE USA

Scholes et al include descriptions of two systems in the U.S.A. Gebhardt, 1983, describes the development of the Brigham and Women's Hospital Computer system on IBM mainframe. The system includes admission, discharge and transfer of patients (ADT), Management Information programmes and patient care plans. Care planning options include standard care plans for specific medical conditions and instructions to construct individual care plans. Data entries can be made by light pen selection and by keyboard.

The second of these systems is the Technicon Data Systems (TDS) MATRIX Medical Information System, introduced in the El Camino Hospital, California in 1972 and two different aspects are described in studies by Hughes and Cook. It has been extensively documented in the U.S.A. and is currently in use at ninety eight sites in the U.S.A and at three in England (one of which is the subject of my research) with a further two in different stages of installation. This system will be described fully in Chapter 3.

Cook (1983) describes the pharmacy, laboratory and nurse care planning components of this system. She claims that after introduction of this system, the percentage of patients for whom care plans had been constructed increased from 25 - 30% to 85 - 90%.

Hughes (1983) describes the care planning component of the TDS system which is based on the definition of the Nursing Process as defined by Yura and Walsh (1973)

"An orderly, systematic way of determining the client's problems, making plans to solve them, initiating the plan or assigning others to implement it, and evaluating the extent to which the plan was effective in resolving the problems identified."

She describes the original purpose of this system as supporting financial data processing requirements which has developed into a system supporting professional care. (Scholes M, Bryant Y, and Barber B. 1983)

Werley and Grier (1981) also include comprehensive descriptions of The Technicon Data Systems (TDS) MATRIX Medical Information System by Hughes and Cook & Meyers.

Considerable research has been carried out on this system at El Camino. Two studies are reported in an annotated bibliography by Amidjaya (1981). The HEW report (1976) also cited by Staggers (1988) showed that the installation of this hospital system at El Camino Hospital reduced drug errors to less than 1% while the National Center for Health Service Research revealed that nurses spent less time on clerical duties but did not necessarily use this time on direct patient care. This study also reported that nurses attitudes towards the system became more favourable over a period of time. (in Werley, H.H., & Grier, M.R., Eds. 1981)

Prendergast and Inns (1981) describe the SPECTRA Medical information system, a real time hospital wide communications network that connects all nursing areas to a central patient data base. The system allows entry, storage and retrieval of patient data from admission to discharge, linking nursing units, pharmacy, laboratory and X ray. Functions include ADT, medical orders, scheduling and charting of medications, nursing care plans, investigations, staffing requirements, dietary information, interface to the finance system and remote terminal capabilities. Data entry may be effected by use of light pen selection or keyboard. The authors describe the benefits of the system in terms of quality. Its use is seen to result in fewer medication errors, reduction in patient waiting time, rapidity of orders, increased availability of reports, quick and accurate nursing records. They refer to the study by Barrett et al (1976) which identifies the economical benefits of the system as a reduction in forms and equipment costs. (in Werley, H.H., & Grier, M.R., Eds. 1981)

Saba (1985) described the historical perspectives of computer technology as applied to nursing in the USA, identifying 25 major conferences from 1973 to 1984 as contributory factors in development. She discusses the development of nursing computer systems as a response to nursing needs in practice, staff establishments, patient dependency and workload, education and research. She lists, with brief descriptions, the existing Nursing Information Systems in the U.S.A. at that time.

The Burroughs Medical Data Hospital Information System is described as having a patient care database of 200 clinical symptoms needing nursing action as a base for care planning. It includes nursing diagnosis, discharge summary, standard and problem orientated care plans.

The Shared Medical Systems Hospital Information System (SMSHIS) lists standards based on medical diagnosis on which care plans can be developed. The system integrates clinical data with staffing levels, finance and patient acuity and also includes medications and quality assurance programmes. The National Cash Register Mednet links nursing documentation to accounts, making use of portable terminals in the nursing unit. It records vital signs, medication, Nursing Process documentation and also has a temperature probe and blood pressure cuff. Information from 12 patients is held before being transferred onto a main frame.

Other systems included in work by Saba and McCormick are the IBM Health Care Support Patient Care System, developed at the State University of New York; the PROMIS system; the SPECTRA 1000 HIS and MATRIX MIS Technicon Data Systems, all described individually by other authors and included in this chapter. (Saba, V and McCormick, K. 1985).

Hospital systems were introduced in the USA from the early 1960's. One early system PROMIS, used at the Hospital Unit at the Medical Centre, Vermont from 1970 till 1982 when lack of funding caused it to be discontinued, is described by McNeill (1979) and Saba (1985). Implementation started on a 20 bedded unit in 1970 and in 1974 was expanded so that it could be used in the whole institution. The content was updated and definitions of terminology established before it was introduced to a 19 bed unit in the same medical centre. This system is based on the problem orientated record devised by Dr Lawrence Weed. Its functions include formulating of a problem list

from the data entered, producing the initial plans for each problem and recording progress notes related to each patient problem. Data entry is by touch sensitive screen terminals or by keyboard and the user is guided through the problem solving process by following on screen instructions which include references and explanations. It is an integrated system with data retrieval access from any terminal in the hospital. Access is restricted to promote confidentiality and entry is by professional classification, name and three number code. (In Saba,V and McCormick, K. 1985).

Tranbarger (1988) presents a case study of development and implementation of a Local Area Network Nursing Information System at the Mose H Cone Memorial Hospital, North Carolina. He recounts the involvement of nurses in decision making, identification of current practice, establishing system criteria and initiating software development. The stages of implementation are described and evaluation mentioned, but no criteria for evaluation are included. Order entry, results reporting, electronic mail and admission, discharge and transfer functions were the initial applications implemented in stages of one unit at a time. (in Ball, H et al, 1988)

Hudgings (1988) describes the Nursing Support System (NSS), developed in 1986 in Nashville, Tennessee. She identifies the framework and functions of the system, lists the design specifications and anticipates improvements in practice as a result of using the system. She identifies five steps of the Nursing Process (assessment, diagnosis, planning, intervention and evaluation) as the foundation of a systematic approach to manage nursing information and thus as a design for a computerised system. The nursing care plan and the nursing care and patient data components of the system are being developed in this framework. The care planning component includes a nursing database consisting of nursing diagnoses approved by the North American Nursing Diagnosis Association. Each nursing diagnosis is accompanied by patient assessment factors, expected patient outcomes, nursing interventions and evaluation criteria. Nurses select the patient assessment factors and lists of possible nursing diagnosis, outcomes and interventions are generated for selection. Evaluation is carried out by a tracking method based on time frames established for reviewing care. Benefits are anticipated as improvements in nursing care planning and decision support, increased nursing care knowledge base, time saving in care plan writing, improved quality of care and professional practice. (Hudgings, C.1988)

Murphy (1988) examines the development of nursing diagnosis based standard care plans as part of an Integrated Hospital System in Milwaukee, Wisconsin. The validity of the standard care plan contents was tested by using them on a manual system to ease the transition to computer care plans. The system is supported by an IBM mainframe, with a network of 250 terminals and 75 on line printers, and interfaces with three other computer systems for laboratory processing, Patient Data Management and communications. She describes implementation of the care planning component, tracing the progression through stages of development of unit based standards, review and revision of current care planning documentation, critique of new protocols, writing the content for nursing diagnosis based standard care plans, and design, implementation and finally evaluation of the computer care plans. Care plans may be derived from nursing diagnosis, protocols, standards of nursing practice and physicians orders. A cost benefit analysis was unable to quantify potential time saving but a project being carried out to investigate the impact of the care plans is comparing the

quality of documentation before and after implementation in terms of number of diagnoses, interventions and expected outcomes recorded. The nurses' perceptions of the impact of computers are sought and factors facilitating or impeding the acceptance of the new system are being identified. (Murphy, J. 1988)

Research by Kjerulff (1988) examines the process of incorporating a Hospital Information System into nursing practice, using the theory of interactionism to evaluate the impact of several aspects of the system, including the effect on the Nursing Process. This longitudinal study, set in two American hospitals, is following the same nurses through the whole implementation process over a period of several years. The areas of study include perceptions of nurses, use and benefits of the system, changes in the ways nurses process information, changes in organisation structure and changes in the way nurses use the system as they become more familiar with it. She looks particularly at the impact of information systems on the Nursing Process. Kjerulff makes use of the four stages of innovation, described by Zaltman, Duncan and Holbeck (1973) in her analysis. Preliminary findings suggest there is disparity in the way in which nurses on different units use the system, in regard to care planning, discharge planning and ordering of medications and tests. (Kjerulff, K. 1988a and in Ball, H et al, 1988b.)

Mason (1988) carried out her evaluative study of the "Excelcare" system in three hospitals in the USA to determine the extent of time saving and improved quality of documentation. Overall this study showed that the mean time saved by a nurse per shift was one hour. This was broken down as follows: Documentation of observations took 2-4 minutes compared to 4-8 minutes to document manually; a care plan could be made in 45 seconds compared to 15 - 30 minutes for a manual plan; and the report session using the computer took 10 minutes compared to the former time of 30 - 60 minutes per shift. In addition it was shown that orientation of new nurses took five weeks instead of the original six weeks, using the new system. (Mason, E.J.1988)

Pulliam and Boettcher (1989) describe a process for introducing a computerised information system in long term care facilities. Their work was motivated by the use of innovation theory as a framework for evaluating computer systems, described by Kjerulff. (1988) The process they used consisted of six phases: initiation, orientation, assessment, selection, implementation and sustained implementation. The project evolved as a result of collaboration between staff in the long term care facility and a university nurse educator, who also acted as consultant. The aims of the project were to help nurses become aware of the potential of computers in practice; to ensure they were provided with the system best suited to their needs and to identify a logical process for introduction of the system.

In the initiation phase a project team and steering committee were established. During the orientation phase, other facilities were visited and computerised systems demonstrated; a literature review was carried out and financial support was arranged. Assessment to determine nursing needs, prepare functional specifications and examine software options constituted the third phase of the process. The selection phase followed, where vendors were identified, the final specification defined, and software was selected. During the implementation phase, the users were trained, problems identified

and modifications made as necessary. Training of new personnel carried on into the sustained implementation phase, during which the system was evaluated and updated. (Pulliam, L and Boettcher, E. 1989)

A small evaluative study was carried out by Norris et al (1990) to compare the quality of care plans using different methods of decision support. 143 nurses wrote care plans for hypothetical patients each using three different means of support. These were traditional, that is text books, nursing dictionary, or colleagues; secondly, a printout of a computerised protocol for care planning and finally the protocol as above with the addition of learning objectives, key bibliographic resources for specific case studies and access to the computer library. The results showed that the quality of those care plans written with computer support was superior, but took longer to compile. (Norris, J, Cuddigan J, Foyt M, et al. 1990)

NURSES ATTITUDES TO COMPUTER SYSTEMS

Although attitudes towards computers in nursing have been the subject of several studies, I was able to locate only two studies which identified attitudes and perceptions concerned with computerised nursing care plans. The longitudinal study by Kjerulff, which includes perceptions about care planning, has been discussed above.

Stronge and Brodt (1985) developed a 20 statement Likert type assessment tool to measure nurses' attitudes towards computerisation. They agreed on the definition of attitude as

" a learned predisposition to respond in a consistently favourable or unfavourable manner with response to a given object" (Fishbein, M, and Ajzen, I. 1975:6)

They started with a total of 66 statements related to issues identified from literature reviews. These are listed as job security, legal ramifications, quality of patient care, capabilities of the computer, willingness to use the computer and benefit to the institution. This original questionnaire was piloted in Davenport, Iowa using 60 nurses and producing an 80% response rate. The questionnaire was then tailored to 20 statements related to the above issues and included equal numbers of positively and negatively worded statements.

In a subsequent study by Stronge and Brodt (1986) the questionnaire was applied in a community hospital to a cross section of nurses of different educational levels and working in different specialities. Results demonstrated that nurses with a higher educational level and longer years in service held more favourable attitudes towards computers. The other significant finding from this study concerned the difference in attitudes between the specialties, with nurses in rehabilitation, paediatrics and nursing administration showing more positive attitudes than those in general medical or surgical units, possibly as a result of differences in job responsibility. (Stronge, J and Brodt, A. 1985, 1986)

Thomas (1988) developed a tool to measure the change in nurses attitudes over a period of time, using parallel forms of a questionnaire for the pre and post test studies. In this she differs from other studies described, which make use of the same questionnaires for comparison between groups or between the same respondents at different times. The definition of attitude by Fishbein and Ajzen, cited above, was agreed. Specifications to be measured were based on a literature review with the aim of developing exhaustive and exclusive classes for the subject areas. The topics were designated as "general, research, administration, practice and education". Each questionnaire, or "opinionnaire" contained different statements reflecting parallel topic areas. She claims that use of the same measure for pre and post testing over a short period of time, is unlikely to produce objective results. (Thomas, B. 1988)

Bongartz (1988:205) based her comparative study on Shaw and Wright's 1967 definition of an attitude as

"a relatively enduring system of evaluative, affective reactions based upon..evaluative concepts and beliefs."

She used the Stronge and Brodt tool to compare the attitudes and perceptions of two groups of nurses, those with computer experience and those with none, finding no significant difference between the groups. She used the questionnaire in two hospitals for a total of 1,209 nurses, resulting in an average 59% response. Each group showed favourable attitudes towards computers and an equal willingness to use them. They shared similar attitudes towards the legal aspects of computers in nursing and the benefits. On the whole the study showed that the non users were more positive about the capabilities of the computer in general and particularly about the effects on quality of patient care. The user group were more positive about job security, but the research demonstrated that nurses may not be using the computer to its full potential. (Bongartz, C. 1988)

Schwirian et al (1989) analyzed the multidimensional nature of Stronge and Brodt's attitude scale to compare the attitudes of students and qualified nurses. They were interested in three main factors related to students; the change in attitudes over a period of time, the relationship between attitudes and prior experience and attitudes to technology in general. Data were collected over a three year period. Qualified nurses were studied only in relation to their attitudes. Attitudes to technology were measured by the Science support scale, and prior experience was assessed using a questionnaire, both designed by Schwirian, (1968) Results showed that students with experience of using computers and education related to computers, had more positive attitudes but experienced no significant change over the three years. Their attitudes towards technology in general was mostly favourable. Qualified nurses also held positive attitudes on the whole but comments revealed different levels of commitment related to extra workload and confusion during periods when the computer system 'went down'. (Schwirian, P.M. et al, 1989)

Cheatwood and Martin (1988) used the Stronge and Brodt tool to measure the attitudes of second generation computer users. The aim of the study was to compare the attitudes towards a second generation system with results from previous studies; to compare the attitudes of nurses, before, and

three months following, implementation of a new system; and to compare attitudes of different groups of nurses by age, education levels and length of service in the hospital. Results of the study revealed that overall attitudes were more positive than those in Stronge's 1986 research, but attitudes were less positive in the follow up study three months after implementation. Differences in attitudes between the specialties occurred but followed a different pattern to those described by Stronge. As in previous research, higher educational levels were related to more favourable attitudes. (Cheatwood, L and Martin, P. 1988)

Although higher educational levels have been established as a factor predisposing to positive attitudes, Lange (1988) in a search of the literature related to the effect of specific computer educational strategies on attitudes towards computers found only two such studies. (Rosenberg et al, 1967 and Ball et al, 1985)

Lange used a quasi experimental approach to examine the relationships between computer anxiety, computer skill, use and interest in the computer, and the effects of an introductory computer course on these factors. Two comparison groups of graduate nursing students were used with pre and post test design; the treatment group took the introductory computer course designed to provide basic orientation to computers, and a control group. Both groups were similar in the extent of present computer experience but the treatment group had a slightly older average age. Three assessment instruments were used.

A 15 item Likert type computer anxiety scale designed by Feeg (1985) was used to measure anxiety; The Needs Assessment instrument modified from that developed by Ronald (1983) measured the respondents' interest in computers and a 7 item questionnaire was used for respondents to rate their perceived levels of skill in designated computer functions. Results showed no difference in levels of computer anxiety between the groups before or after the course and no significant decrease in the level of anxiety in the treatment group after the course. The treatment group exhibited a greater interest in computers than the control group at all stages, though to a lesser degree after the course. The use of computers was the same for both groups in the pre test but rose considerably for the treatment course immediately after the course. However no significant difference was shown 6 months later. In the area of nurses' perceptions of their own computer skills the greatest difference was demonstrated. Before the course both groups held similar perceptions, but the treatment group perceived their skills as significantly higher after the course and this perception remained 6 months later. (Lange, L.L. 1988)

Harris (1990) used a theoretical framework of symbolic interaction in her qualitative study, to examine staff nurses' attitudes to computerised care planning, elicited during semi structured interviews. She interviewed fifteen female staff nurses aged between twenty two and fifty years, working on a variety of wards. All but one of the nurses was employed at the same non profit making, private community hospital. Levels of computer and typing skills and general education, varied between the different nurses. Analysis was based on Glaser and Strauss's grounded theory method, of constant comparative analysis. Metaphors were used to represent meanings and behaviours as an interim stage of analysis between the comments of the nurses and the conceptual

significance of the comments. A major finding was that nurses considered that computerised care plans diminished their professionalism, expertise and autonomy, described in the study as "deprofessionalization, deexpertizing and deautonomizing". (Harris, B.L. 1990)

LITERATURE RELATED TO CHANGE

The literature in this section is concerned with change taking place at a personal, process and organisational level. Literature related to change in general, change in nursing and change to information technology has been reviewed.

Kelly (1955) proposed the Personal construct theory which postulates that

"a person's processes are psychologically channelized by the way in which he anticipates events."

Kelly believes that any personal change is accompanied by guilt about abandoning previous roles; threat of change in individual views of self, roles and responsibilities; and anxiety when confronted by different events. He theorizes that there are three corollaries concerned with change.

1 **Experience.** A person constructs change as events are repeated, and different aspects are seen. Learning occurs.

2 **Choice.** When two meanings can be construed, a person will choose the one which makes sense of the situation. This might mean that the person is more comfortable with the current situation, and does not want to change.

3 **Modulation.** A person has to be ready to accept that change will demand different behaviour and responses.

He asserts that a creativity cycle is essential for any change. He describes this as changing from tight to loose personal constructs, to allow ideas to float before forming a new tight construct.

Lewin (1952) presenting the Field Force change theory, focuses on the organisation. He proposes that it is easier to change the behaviour of a group than a separate individual. He bases this on the assumption that each individual behaves as nearly as possible like the rest of a group, because to do otherwise may result in being treated as an outcast. The total circumstances of the change must be examined, including the value systems of the groups and sub groups. He suggests that if resistance to change depends on the value of the group standard for the individual, then resistance will be diminished by diminishing the strength of the group standard, or by changing the level at which it is perceived by the individual as having social values. If the group standard is changed, the relationship between the standard and the individual is eliminated, so that change may be facilitated.

Lewin suggests that permanency must be an objective of the change process, otherwise the change occurs for a short while and then regresses to the former state. He proposes three stages for

successful change, founded on the supposition that an organisation usually functions as a system, in a stable way, with each department working interdependently, influenced by the needs and constraints of other departments. He describes the organisation in this condition as being like an ice cube, frozen and tangible, with a recognisable shape. He suggests that if one change occurs in even one department, it causes an imbalance, such as occurs when an ice cube thaws, becomes intangible and fluid, with no shape.

This is the stage of "unfreezing" where existing norms and values are altered, and it may cause emotional agitation, with a breakdown of current complacency. The ultimate level of change is reached when the whole institution assimilates the new norms, values and behaviours, and re-establishes a new state of equilibrium, resembling the "refreezing" of the fluid state into a recognisable, tangible, but new shape.

Lewin's three stages may be summarised thus:

- 1 Unfreezing the present level of organisation,
- 2 Moving to a new level of organisation in a "fluid" form, a state of being unsettled and unsure.
- 3 Refreezing at the new level, with the new norms and values established.

Kolb and Frohman (1970) use Lewin's model as a foundation for presenting a model of organisational change. They rename the unfreezing stage as the stage of "Scouting and Entry", where the change agents are collecting data and creating the climate and contract for change. The fluid form stage, described by Lewin is known as the "Diagnosis, Planning and Action stage", where technical analysis and design of the change takes place. The refreezing stage represents the authors' stage of "Evaluation and Termination" where the change process is absorbed into the organisation. They describe their strategy as an "Up and In" method, using small groups, direct contact with and participation from those involved in the change.

Kjerulff (1988c) proposed a theoretical framework for studying Nursing Information Systems. She makes use of the four stages of innovation, described by Zaltman, Duncan and Holbeck (1973) in her analysis. She claims that innovation such as the introduction of computer systems, requires the co-operation of many people, making big changes in the way work is performed. She considers that the process of innovation is long and seldom trouble free, before it is used as intended.

The stages of innovation are described as follows:

- 1 Initiation: Knowledge and Awareness substage.** This is when innovation is being considered but not yet adopted.
- 2 Attitude formation and decision stage.** The innovation is adopted but not implemented. Information gathering and training takes place, opinions are formed.

This is the stage when fears of looking foolish may exist, and attitudes formed in this stage may influence adaptation to the new system.

3 Implementation stage and Initial Implementation substage. Active and passive resistance may occur and problems surface. Negative attitudes become more negative and positive attitudes become strained as individuals try to cope with problems.

4 Continued Sustained Implementation substage. The innovation is consolidated, problems are addressed, some resisters adapt but individual pockets of resistance still hamper the system. resistance may be caused by perceived loss of status or control.

Kjerulff identifies individual and environmental characteristics which are relevant to adaptation to change. Individual characteristics include attitudes and knowledge about computers, fear of technology, beliefs about system, job satisfaction, age, education and experience. Environmental factors are listed as communication channels, type of ward, workload, support, characteristics of the system such as ease of function, and the timing of the implementation process.

She also identifies ways in which people respond to the innovation.

- 1 Negative towards system and slow to use it
- 2 Negative but use it competently
- 3 Positive towards system but slow to use it
- 4 Positive and use it competently. (Kjerulff, K.H. 1988)

Pearson and Vaughan (1984) writing about change in nursing, describe Lewin's theory of organisational change and apply it to change in hospitals. They also look at the ways in which change affects the individual and the feelings generated by change are compared to those experienced in the grieving process.

"We grieve for old patterns of behaviour and find new ways difficult to accept and initially more demanding to apply" (p154)

They quote Sullivan (1977:18-24)

"Nothing is exempt from change..change is innate and a normal and expected process in individuals, institutions, organisations and societies"

They suggest that control is critical in successful implementation of change, and propose five key points needed to establish control of the process:

- 1 A regular feed back system
- 2 A follow up assessment system to check understanding
- 3 A clear description of each participant's role
- 4 An early warning system to identify difficulties
- 5 A specific review date for evaluation

Fear, personal threat, lack of knowledge, conflicting beliefs and excessive demands on energy are identified as probable causes of resistance, which is not uncommon in response to any change. Resistance may be exhibited, according to the authors, in a number of ways, including the passive resistance of "lip service". It may also be shown by lethargy and apathy, by aggression towards the change agent, by attempts to destroy the new methods by persistent complaints or non compliance and by inconsistent behaviour in relation to the change, that is by sometimes employing new methods and sometimes reverting to former ways. Pearson and Vaughan also identify several possible obstacles to successful change, such as a large number of people involved, financial constraints, shortage of staff, the number of other people indirectly affected by the change and the hierarchical system of authority and management. (Pearson, A. and Vaughan, B. 1984)

Cope (1984) discussing change in Health Service Organisations, focuses mainly on the effects of change on the individual. He cites Lewin's earliest study of change (1946) where he recommends that small changes are easier to facilitate than big changes, arguing that major change is neither normal nor desirable. Cope postulates that change must be stimulated and it does not happen painlessly. He suggests that change can only be brought about by influence from other people, by the process of behaviour modification. He proposes several possible causes of resistance: the participants may not be convinced of the need for change; they may think that change will harm the present situation; they may feel anxious and think that extra work will be involved, and they may perceive it as a threat to traditional skills. (Cope, D. In Skevington, S. Editor. 1984)

Turrill (1986) writes about change in the National Health Service, from an organisational and individual stance. He looks realistically at change in an organisation, saying that it is always likely that it is the wrong time for change, that there is a lack of resources and that the change is seen as revolution rather than evolution. In view of this, the most important aim is to reconcile the needs of the organisation to those of the individual. Turrill describes two major models of change based on the nature of the organisation.

Bureaucratic organisations, such as hospitals, place a strong emphasis on structure and hierarchy. Written communication and certainty are valued, while subjective views and ambiguity are not tolerated. Decision making takes place at the top of the hierarchy and is passed down to the lower levels.

Collegiate organisations value individuals for their own competence, tolerate ambiguity and welcome change. Decisions are participative and ideas may be accepted from any member of the organisation. In this type of organisation, teams may be formed to deal with specific tasks and then be disbanded

when the task is completed. This is a strategy that may also be employed in bureaucratic hierarchies, in order to break down compartmentalisation.

Turrill lists many causes of stress in individuals, all directly or indirectly related to change. These include changes in policies and procedures; major reorganisations; changes in nature of work; changing priorities; sudden increase in work load; real or imaginary decrease in status; increase in activity or pace of work; conflicting demands and arbitrary decisions. The causes of stress may be reflected in the four phases of reaction to the change process, distinguished by Turrill, who also suggests means of coping with each of them.

The first stage is shock; the individual feels threatened and overwhelmed by the change, experiencing panic, anxiety and helplessness and may behave irrationally. Communication may break down during this phase. Turrill suggests that the people introducing change must involve the participants and be prepared to use their contributions.

The second phase is described as the defensive retreat, where the individual either denies the existence of change, becoming negative and withdrawn, or alternatively may become euphoric, displaying false optimism. Turrill advises that this stage must be tolerated, and individuals must be helped to keep their minds on reality.

Thirdly there is an acknowledgement of the change, where individuals possibly look back at the old ways longingly, and feel apathetic about the new. This is the time when the change facilitator needs to help participants to find ways of making their tasks easier so that they can succeed at what they are trying to achieve.

The final stage is described as that of adaptation, where individuals develop new personal resources to cope with the change and the change facilitator provides new opportunities for involvement. (Turrill, T. 1986)

Chin and Benne (1986) assert that there are two aspects to consider when dealing with changes concerning technology; knowledge of the new technology and the promise of increased efficiency, and knowledge of human problems such as resistance and anxiety. They outline two major change strategies, Empirical Rational and Normative Re-educative.

The empirical rational strategy makes the assumption that humans are rational and will follow rational self interest when made aware of it. If the change is described as beneficial to those whom it will affect it assumes that people will adopt change for their own good. It appeals to the need for research, education and new knowledge, or changes that are seen to benefit health.

The normative educative strategy makes the assumption that action and practice are supported by sociocultural norms and individual commitment to these norms, which in turn are supported by the value system of the individual. Change requires a change of values, skills and relationships as well as knowledge and information. This strategy is based on the belief that re-education is a normative

as well as cognitive change and that man must participate in his own re-education. The climate for this kind of change is illustrated by the therapeutic relationship, which is a major tool in expanding self awareness, self understanding and self control. In this type of relationship, the emphasis is on the collaborative aspect, where the individual is involved in working out solutions, but the therapist must be aware of how the individual sees the situation. Although the problems may be solved by the new technology, the solution may lie in the attitudes and values of the individual, who may need re education. The change agent, like the therapist, acts mutually with the person adapting to the change, as it occurs, and deeper problems and attitudes must be explored. Chin and Benne propose that an approach for implementing the normative educative change strategy uses experienced based learning and a problem solving approach. (Chin, R and Benne, K,D. in Bennis, W,G et al Editors. 1986)

Toffler (1983) conceptualises the impact of the changes in information channels on the organisation of society in general. In a broad analysis of modern society, he predicts that power will shift from those with specific and traditional knowledge to those with the experience of how to disseminate such information. He anticipates that the structure of society will become more integrated and coordinated, that the number of people involved in decision making will increase and that the nature of decisions will change and the number increase. In this age of information technology, issues concerning the control of information will increase in importance, and the variety and accessibility of information will generate a more democratic society. (Toffler, A. 1983)

Caputo's (1988) discourse on the management of information systems in Human Services is based on the three concepts of authority, decision load and information systems. He defines authority as the possession of a quality which demands obedience and trust, legitimised by validated knowledge and values, whose function is to control action and define facts and values. Decision load is defined as the extent of decision making required by individuals with varying degrees of authority, to manage an organisation. The concept of information systems is described as the information required to support the managerial and operational functions of the organisation and influence the structure of authority, the nature of the decisions and the number of decision makers. He examines the relationship between the two major principles of authority, knowledge and administration and argues that in human service organisations, conflicting elements of both are present, the conflict intensified by the introduction of information technology. He asserts that collection of information in human service organisations is often informal, rather than systematic and that decision making is almost entirely influenced by political or value laden factors. It is guided by ideologies and the introduction of computer technology emphasises the importance of rationality in decision making. The interdependence of the technological staff and the other departments is increased, with the reliance on the technical departments for information. Increased demand for accountability increases the importance of information as a resource and power shifts to those who have the technological knowledge to supply it. Caputo (p146) concludes that

"A world view of technical rationality currently pervades contemporary thought to the extent that, for many, it replaces alternative values, which in turn, might have nurtured other norms."

He acknowledges that technology exerts both positive and negative influences on human life, it is not intrinsically totalitarian or emancipating, but contains elements of both. He sees this as a challenge to clarify the political components of technology, authority and decision making which govern the human service organisations. (Caputo, R.K. 1988)

Poppel (1983) in a more practical undertaking, examined fifteen case studies in a study describing changes associated with information technology and produced a practical framework for initiating change. He concludes that user participation in the change increased acceptance of the new system. He argued that as the users had the knowledge of the manual system, they can suggest which data should be computerised, because they are the ones who will be experiencing the changes. The study also showed that by participating in the change, users demonstrated more realistic expectations and a greater understanding of the new system. (Poppel, H. in Salerno, L. Editor. 1983)

Blackler and Brown (1985) of the University of Lancaster, stress the need to ensure that technology is used to increase peoples' self determination at work, instead of merely attempting to engineer a smooth implementation process. As a result of twenty years of attempting to promote job redesign theory, they propose an approach suggested by organisational theory which states that organisations are social rather than rational and contain many different interest groups. They argue that psychosocial planning is necessary during the introduction of new technology and that evaluation should not only focus on predetermined objectives, but also on developing individual goals and the process of change.

They propose an approach which encompasses both planning for the introduction and the evaluation of change, in which the users are involved in both stages and the intelligibility and ideology of the system is of importance. They suggest that the reviews are continuous, and the effects on the quality of life and the employment opportunities of the users are monitored. Blackler and Brown discount the relevance of evaluation research for the study of new technology but acknowledge that the process approach to evaluation has fewer advocates and may be criticised for ignoring political aspects.

In this approach, which is influenced by action research, the importance of the relationship of the researcher to those being researched is dominant, and the ways in which both technical and social systems develop are examined. The role of the researcher is collaborative, and the focus is on the process, skills and motivations of the participants. No premature attempt is made to define the expected result. The authors acknowledge that the psychosocial aspects of change may appear intangible and irritating to those responsible for the installation of information technology. They suggest the focus should be on opportunities for development and well being rather than on the psychological *problems* associated with introduction. However, this highlights the fact that although the underlying ideology of job redesign theory is psychological fulfilment of employees, this is not always compatible with the economic aims of an organisation. (Blackler, F and Brown, C. 1985)

CHAPTER 3.

THE HOSPITAL INFORMATION SYSTEM AT THE ROYAL HAMPSHIRE COUNTY HOSPITAL

A modern automated information system is the result of applying systems theory to the computer, using hardware and software to process the information required to carry out the work of an organisation. It consists of a data base of information and computer programmes specifically written to process the data. (Saba and McCormick, 1986:105)

The first section of this chapter includes an outline of Systems theory; a general description of a Hospital Information System (HIS); a description of the Hospital Information System at the Royal Hampshire County Hospital; implementation of HIS and the training which took place. The second section describes the care planning system and theoretical foundation; the background to the care planning system; the process of introducing the care plans and the functions on the system.

SECTION 1

SYSTEMS THEORY AND HOSPITAL INFORMATION SYSTEMS

Hospital Information Systems as the name implies, are based on systems theory. Systems theory was introduced and developed as a framework for integrating and interpreting scientific knowledge during the 1930s and 1940s. It has been expanded into areas such as computer science, social sciences, medicine and nursing. Since the 1960s nurse theorists such as Johnson (1975), for example, have used the concept of systems theory to analyze nursing practice holistically to separate it from the medical model.

A system is described as an entity with structural and functional boundaries, operating within and influenced by the environment. It is constructed of inter-related elements and has five major components: input, processing, output, feedback and control. These may be seen to be applied to all computer systems. Input describes the start up procedure and the data that is entered; processing is the operational part of the computer which provides the output, the results of computer action. Feedback and control are inter-related elements allowing modifications, evaluation, monitoring, verifying data and regulating input and process. (Saba & McCormick, 1986:100 -115)

DESCRIPTION OF A HOSPITAL INFORMATION SYSTEM

A Hospital Information System is an operational system linking wards and departments in a hospital to provide an integrated network for communication related to operational functions. Peterson and Gerdin Jelger (1988) describe the development, features, functions and implementation of automated Hospital Information Systems. They attribute the development of these systems to increased need for information in health care, arising from a greater number of health care personnel, increased specialisation, medical technology and changes in organisation. The primary goal of any HIS is to provide information to patient care areas. Early systems had central computers with a network of terminals which were rarely customised to suit the needs of individual units and whose function was mainly to handle financial data, rather than planning or statistical analysis.

Development of present day modular systems to support the hospital's operational functions began in the 1970s. These systems provide information for day to day operations, financial operations and patient care. In order to do so they define the structure and content of documents in the system and can be modified by users to meet particular needs. Modules commonly included in any HIS are:

- The Patient Record
- Admission/Discharge/Transfer (ADT)
- Order entry and results
- Drug Profile
- Care Planning
- Personnel and Staff planning
- Finance

The patient record allows for input of data, results and diagnoses related to an individual patient. It manipulates, stores, retrieves and outputs information. The functions of this module are control of access to information, presentation of data, document and information handling, mailing, communication and help functions. Peterson and Gerdin Jelger (1986) claim that staff who use the system should usually be able to develop and define about 20% of the patient record with the rest being carried out by specialists. (Peterson H, and Gerdin Jelger, J. in Ball and Hannah et al, 1986:182-9)

The ADT module is concerned with basic patient details designed to locate the patient in the system and to provide financial and statistical information. "In patient" information may include waiting lists, pre admission data, admission and discharge, and diagnosis. The outpatient section may include appointments and registration of visits.

Order entry and results module is designed to handle the ordering of food, drugs, supplies,

laboratory tests and other diagnostic procedures. The system checks that results are signed and attached to patient record.

The drug profile provides drug information, a list of current medication for individual patients and facilities for ordering and recording administration of drugs.

Care planning provides functions which assist in selection of appropriate care plans and the means by which the care can be evaluated and manipulated for analysis.

Staff scheduling (which is not at present a component of the system at the Royal Hampshire County Hospital) allows for the definition of daily staff requirements and can be linked to the finance system.

A GENERAL DESCRIPTION OF HEALTH CARE 4000/7000(HC4000/7000) AT THE ROYAL HAMPSHIRE COUNTY HOSPITAL

The Technicon Data System Health Care 4000 (HC4000 converted to HC7000 in 1991) was selected as the system to be introduced at the hospital, as a pilot site for the Regional Information Technology Policy. The system was chosen because it was well established in the U.S.A and had been the subject of extensive research. (See chapter 2) It had been designed with the needs of doctors, nurses and other health care professionals in mind and is largely user defined. It can also interface with existing systems, such as laboratory and pharmacy systems. Having standard software throughout the Region aims to reduce the risk of incompatibilities or difficulties which may be experienced when using multiple systems. It also helps to facilitate user familiarity.

HC4000/7000 is distributed by TDS Healthcare Systems Corporation and originated in the USA. All wards and departments are linked to a central operational data base, located originally at Regional headquarters and now at Warwick. Hardware and software are described in Greenhalgh's comprehensive description of the system, (1990) and outlined in the previous chapter. The system operates using the IBM 370 instruction set and runs on OS/MVS VM or DOSVSE. The operating system is a stand alone system. In addition an independent system partition comprises the Input/Output Handler, the Terminal Handler, and the Data management system. An extra twelve address spaces are provided for related data bases created by the user. The system is based on an IBM mainframe, uses IBM personal computers, (PCs) for display terminals, with Technicon light pens and IBM System Network Architecture communication equipment. The system operates in real time which means that data may be entered and retrieved at any time using light pen selection or key board entry.

A multi tiered password system is used for security purposes. A Personal Identification Number

(PIN) issued to each member of staff when training is completed, allows the user access to the relevant parts of the system. For example, the sign on PIN, for a ward based nurse, directly accesses the list of patients on the ward on which she works. The user signs a document to agree that the number will remain confidential and will not be used by any other person. Each user then defines his or her own unique password for use in conjunction with the personal identification number to ensure extra security. This word is changed at regular intervals, the user being reminded when "signing on" that a new password is required. In this way, access to patient files is restricted.

The system consists of a Patient Administration System, (PAS); order entry; results reporting; clinical records including drug prescribing and administration; nursing records, nursing care plans and patient acuity, and links with the Resource Management System.

The structure of the system is outlined briefly below but specific care planning functions are described in detail later in this chapter. The system has the patient Master Record as the data base, with all individual patient information included in each patient record. This includes clinical information, medical orders, test results, nursing records, movements within the hospital or between consultants, appointments, admission, discharge and transfer. There are three major patient files in the system.

COMPONENTS OF HIS AT THE ROYAL HAMPSHIRE COUNTY HOSPITAL

Patient History File. On admission patients are registered in the PAS and all demographic data is stored in a patient history file which may be accessed via patient name or hospital number.

Patient directory includes names of all registered "in patients" during the period of their admission and for four weeks following discharge.

Patient master file comprises all the patient information related to a specific "in patient" episode, as soon as it is entered into the system, as described above.

Order entry includes pharmacy, supplies, pathology, physiotherapy, occupational and speech therapy, cardiology, dietetics and X-ray. Pathology and X-ray provide ordering and reporting facilities while pharmacy, supplies, the therapies, cardiology and nutrition provide only ordering facilities for ward staff. All orders are entered into the system by doctors or ward staff and may be accessed by nurses and the relevant departments such as pharmacy, laboratories and X-ray.

The medication screens consist of a predetermined list of drugs, presentations, frequencies and dosages, from which the doctors select in order to prescribe. There is a facility for new

prescriptions to be printed out on the ward automatically in the New Medical Orders. These include date and time of the order, initials of the doctor and details of the drugs required. This information is also automatically added to the patient master record. When a drug is administered, the nurse enters time of administration, site of injection, reasons for non administration, adverse reactions and any necessary comments.

The Acuity screens. The term "acuity" requires definition in this context. It is used to describe "acuteness" of a patient's condition based on the extent to which he or she requires nursing care, in order to estimate the nursing workload in any given area at any given time. Although not directly relevant to this research, acuity and care planning are inextricably linked so this part of the system will be described in more detail.

Acuity may be measured by slightly different methods but the aim is to establish the number of nurse minutes required by each patient during twenty four hours. This information may be used to estimate nurse hours needed for any period of time; it may be calculated to provide the number of "whole time equivalent" nurses needed during the chosen period; and may be prospective or retrospective.

The TDS acuity system attempts to provide projected information taking into account bed status and staff movements. The system provides three main methods to calculate workload estimation via patient acuity and users may define their own methods of carrying this out within the fixed parameters of the eight hour shift. These methods are by patient dependency, by task and by patient care area. The last is the system currently used by four wards at the Royal Hampshire County Hospital. Further details are included in the appendix for this chapter.

IMPLEMENTATION OF THE HOSPITAL INFORMATION SYSTEM

Peterson and Gerdin Jelger, 1988, identify issues which should be addressed before a new system is developed. These include control of access to the system, the way in which patients are to be identified, the routines for admission, discharge and transfer and the establishment of communication standards. They advocate that responsibilities for the staff involved in development must be clearly defined and extensive staff education and training programmes must be planned. They suggest that continuous review of the process and subsequent evaluation are essential to allow for modifications.

Implementation was managed by a contracted firm of management consultants, and began in January 1987. Three phases were planned: Patient Administration System (PAS), Nursing functions and Ward Order Communication, and finally, Outpatient management.

IMPLEMENTATION OF PHASE 1.

Phase 1, Patient administration, was designed between January and September of 1987, employing a standard project approach which provided an organisational framework for decision making and planning. The method involved the specification of all activities currently associated with patient administration. From the results of analysis of these activities, screens were designed to capture all the information required. Specific users were consulted at every stage but did not participate in the system design. Terminals were installed in every ward and department and the PAS system came into operation as scheduled, in September 1987.

Training for Phase 1

Training for this phase was managed by members of the consultancy firm. Additional trainers were selected from hospital staff on the basis of their interest, aptitude, availability and willingness to participate, and given two days intensive training prior to the start of the training programme. All staff were required to attend compulsory introductory sessions and other components relevant to their roles; a total of 962 staff were trained. The training programme consisted of:

- General introduction
- Patient master index
- Patient master index Supervisor course
- Waiting list
- In patient 1, 2 and 3.

Personal identification numbers with which to gain access to the system were issued only on completion of the relevant components and different grades of staff were allocated areas access as appropriate. (Training and allocation of PINs is now part of the orientation programme for new staff.) The components relevant to nursing staff in addition to the introduction were the 3 "In patient" courses. For the purpose of this research study, only the content of the General introduction training will be outlined because of the relevance to the use of computers in general. The course was designed to:

- Explain the concept of RISP
- Outline the Core Systems
- Explain Phase 1 of HIS
- Explain the Data Protection Act
- Familiarise users with personal computer, keyboard and light pen

During this 2 hour session the users were taught how to sign on and off the computer, locate a patient in the system and review a patient's history. All sessions included practical exercises and users were encouraged to take notes and ask questions. One of the trainers was appointed as a support person after implementation to supplement support given by the management consultants and the TDS team. This training programme provided the foundation for further development.

IMPLEMENTATION OF PHASE 2

Phase 2 concerned nursing functions and ward ordering communications, including ordering of investigations, prescription and administration of drugs, ward supplies, care planning and patient acuity measurements. The same approach was used for the design and specification of this phase, scheduled for implementation between September 1987 and March 1988. A design document of screen layouts was produced. From April 1988, the Hospital Information System team, headed by a senior nurse and supported by regular visits from TDS consultants, was inaugurated to direct the project in place of the external consultants. At the same time, project management was devolved from Region to District and then to the hospital, and the District Information Team became responsible for providing technical support services. The members of the HIS team were all trained by TDS to use Matrix coding, the technique for creating screens in this system, and to use Report Format Tables to create print out documents.

Implementation was staged, with the General Surgery Directorate chosen as the first area for implementation. The supplies system was implemented in October, 1988; pharmacy in January 1989 and pathology, radiology and nursing functions in April 1989. The other directorates followed in May, June, July, September, October and November 1989 in the order of Orthopaedics, Special Surgery, General Medicine and Obstetrics and Gynaecology. In May 1991, the system was converted to HC7000, with more extensive coding facilities and the ability to retain patient records for an unlimited period of time. At the same time the site of the mainframe was moved to Warwick. These changes have made minimal obvious difference to the users.

Training for Phase 2.

This was directly related to the parts of the system trainees would use. A computer based training package was designed, allowing trainees to work at their own pace and two rooms, each with twelve terminals were allocated for the purpose. One designated nurse from each unit was taken from the clinical area for a period of twelve weeks, (six weeks before and after implementation) to train nurses in the use of the new pathways. These nurses were prepared for this role by nurse members of the HIS project team, who provided 24 hour support to the wards during the implementation phase. The training for phase 2 was divided into five components, addressing:.

The purpose of HIS - a revision session
 Computer based training programme
 Hands on experience with "make believe" patients
 Paper management
 Multidisciplinary practice

On average, ward nurses had the equivalent of a full day's formal training with further individual tuition as required. This is also included in the orientation programme for new nurses. The computer based training programme is also used for students during training. Round the clock support from the HIS team continued for a week after each function on each ward "went live", then reduced to on site cover for about sixteen hours a day. The night time hours are covered by an on call system.

Phase 3 is not included in this work. It was implemented in the summer of 1992 and includes Outpatient, Accident and emergency and waiting lists.

SECTION 2

THEORETICAL FOUNDATION OF COMPUTER CARE PLANNING

Systems theory has been described at the beginning of this chapter in relation to computerised hospital information systems. Several authors also describe the Nursing Process in the context of this theory. (Yura and Walsh, 1978, Saba & McCormick, 1986:100 -115) This was discussed in Chapter 1. In conjunction with systems theory, Yura and Walsh argue that information and communication theories provide insight for the decision making and problem solving processes of the Nursing Process. Information theory is based on the premise that information is a foundation for choice. It focuses on inter-relating and interacting parts of a behavioural system. Communication theory also deals with the inter relationship between parts of a system. In Nursing Process terms, the assessment data is transmitted, interpreted and clarified before being used as a basis for a care plan. When the care plan is used it can be evaluated to provide feedback.

BACKGROUND AND DEVELOPMENT OF THE CARE PLANS

Decision making for Phase 2 of the HIS implementation was devolved from the Hospital Project Group to sub groups formed to address the issues related to specific functions. Communication between each group and sub group was two way, and each is described below.

NURSING COLLABORATIVE SUB GROUP.

This was chaired by the Director of Nursing Services and membership included nurses from the Royal Hampshire County Hospital and two collaborating districts, Swindon and Basingstoke; a nurse member of the Phase 1 HIS project team; representatives from the firm of management consultants and a consultant physician. All other nursing groups reported back to this group, which in turn presented the information to the Collaborative group.

NURSING PROJECT TEAM.

This team was responsible for the development and documentation of design of nursing functions in HIS. The group was chaired by a representative of the consultancy firm and all other members were nurses. Membership included a nurse from the Nursing Special Projects (now Research and Development) department; the Regional Nurse for RISP projects; and nurse representatives from Southampton, Basingstoke and Swindon.

NURSE USER GROUP.

This group was responsible for collecting information from the wards to report back to the Collaborative Sub Groups, liaising closely with the Project Team. The group discussed design issues, design assumptions, user issues and design of screens and reports. The group was chaired by the Senior Nurse, Special Projects. Members included eight nurse representatives from wards, departments, one from the Resource Management Initiative at this hospital and one nurse each from Swindon and Basingstoke.

CARE PLANNING GROUP.

This group was responsible for addressing in detail the methodology of approach to care planning, including terminology; for producing an overall design for care planning and for identifying the issues to be resolved by the User Group. The group liaised closely with the Project Team and reported direct to the Collaborative Sub Group. It was chaired by the nurse responsible for the implementation of care planning on the system (myself) and members included the Regional Nurse for RISP project; Senior Nurse from Special Projects; three nurse representatives and a nurse tutor from Winchester, four from Swindon and two from Basingstoke. The group was formed in September 1987 and met fortnightly until the end of November 1987. The group decided on the model of nursing to be used, with the proviso that individual wards could be provided with care plans written to comply with a different model if that had been agreed with the nurse manager and education department. No wards chose this option.

THE PROCESS OF INTRODUCING COMPUTERISED CARE PLANS.

Like the introduction of the Nursing Process in the early 1980s, the introduction of computer technology in hospitals was largely the result of bureaucratic decision making. The Nursing Process literature reviewed in a previous chapter illustrates the need for an educative and participative approach to the introduction of change.

Walton, (1986) attributed many of the problems associated with the Nursing Process to the fact that it had been implemented in most places using a "top down" coercive approach, missing out the preparation and involvement of individual users.

Friend and Hayward (1986) also observed that introduction of the Nursing Process had been carried out in general by management or one enthusiastic individual, concluding that introduction of any change requires a collective and co-coordinated effort. Implementation was seen to be more successful where a planned approach had been employed.

Each level and component of the change at the Royal Hampshire County Hospital has been managed by teams of individuals formed to deal with specific areas. My own role in the implementation was to plan and manage the change from written to computerised care planning, and is described below.

CHANGE THEORIES AND STRATEGIES EXAMINED

Several change theories and strategies were examined. Lewin (1952), Chin and Benne (1969), Mauksh and Miller (1980), Turrill, (1986) were all described in Chapter 2.

Handy, (1976) asserts that change is brought about by people who influence others by the type of power they exert. Power may be resource power which has the ability to grant rewards; positional power from the hierarchical position in the organisation; expert power which comes from acknowledged expertise in the area; charismatic power and negative power where sanctions or threats may be employed.

Mauksh and Miller describe coercion as a strategy in which those involved in the change are made to feel guilty if they don't conform. This strategy also uses tactics of persuasion and inducements based on loyalty and the value system of the group involved. They also describe a strategy of re-education to alter present behaviour and allow individuals to participate successfully in change.

I rejected the bureaucratic model of change at once, primarily because it did not match my personal values but also because the Nursing Process literature review had demonstrated this as an unsuitable approach. Based on Handy's theory, the absence of resource or hierarchical power would have been

another opposing factor, had I been in any doubt. Consequently, I adopted the collegiate model of change, proposed by Turrill (1986) which includes a "bottom up" approach, where individuals are valued for their competence and ambiguity or a change of values during the change process can be tolerated. I used tactics borrowed mainly from the educative-normative approach described by Chin and Benne, (1986) where re-education is seen as a normative and cognitive change, in which the individual is expected to participate, and values, skills and relationships alter as well as knowledge and information.

COLLECTING THE INFORMATION FOR WRITING CARE PLANS

Collection of clinical information related to care planning started in early 1988. At this time, fourteen wards were using the manual system of care planning. The two wards who were not at that time using care planning, gynaecology and the five day orthopaedic ward, were also included; the gynaecology ward elected to use core care plans until implementation. (Core care plans are pre written plans designed to address the core of nursing care which is likely to be the same for any patient with a specific condition or undergoing a specific procedure.) It was envisaged, that the information obtained for the computerised care plans could be used to write core care plans as an interim measure before the computer system was introduced. This was a matter of choice for the wards and as a result of this three more wards made use of core care plans for some areas of care. The method of collecting information was the same in principle for each ward, whether they chose to use core care plans as an interim measure or not. An example of a core care plan is included in the Appendix for this chapter.

Plan of approach

Writing the new care plans for the computer, and entering them on the system, was my responsibility, with the help of one other nurse in the department. Lauri, 1982, suggests that using action research to develop the Nursing Process, allows the researcher to work with the nurses to develop this approach to care. She stipulates that knowledge of the Nursing Process and the opportunity to apply it, are essential for the success to this approach. My responsibility was to apply the principles of the Nursing Process approach to an automated information system, and required knowledge of both of the Nursing Process and the system.

To help the nurses to acknowledge ownership of the new care plans, I worked with them, sharing clinical and professional knowledge while writing the care plans. To do this, I created a network of link nurses from each ward to liaise with the rest of the ward staff to provide information needed to write specialty care plans and to feed back information to them at all stages of this process. Each Ward Sister was approached for permission to liaise with one or more "link" nurses to help to write the care plans for the ward. The choice of these nurses was at the discretion of the Sister; some

elected to take on the role themselves, some approached the staff for volunteers, some selected nurses whom they considered would be suitable and some sisters asked for my opinions on the choice. If the decision was left to me, I contacted nurses who had completed the Open University "Systematic Approach to Nursing Care" and had therefore demonstrated an interest in the Nursing Process. All nurses approached were told that they had the right to decline, but none did so.

We then arranged meetings with each representative or group, to explain what was needed and to determine the way in which we would accomplish this. Each nurse or group decided on the way s/he or they wanted to work, the only essential requirement was that everything was communicated to the rest of the ward staff between meetings. Consequently the pattern of providing information varied marginally from ward to ward.

Some nurses chose an interview, during which they listed all the problems experienced by patients in their care and the nursing interventions required to provide nursing care. A similar method involved them writing down all the nursing information related to the problems and nursing actions before a meeting, in order to explain it more thoroughly. These interviews provided a chance for feedback, so that we could clarify issues, ensure the information was specific and make suggestions where necessary.

A method used by other nurses was to write specimen care plans of every problem likely to be encountered by patients on the ward and then submit them to us. This was also very helpful and points requiring clarification could be dealt with by telephone or at one of the arranged meetings.

As illustrated by Friend and Hayward's, study (1986) problems often experienced when care planning, included difficulties in choosing appropriate words to describe patient problems and writing specific, realistic goals. These issues were addressed during this phase and mutually acceptable problem and goal statements defined.

The next objective was to write the care plans in the format dictated by the computer pathways, providing a selection of appropriate problem, goal and action statements to support individual care planning. The other requirement was that each goal stated the criteria by which it could be evaluated and each nursing action included specific times and methods for carrying it out.

The next step was to return the care plans to the wards for approval. This provided an opportunity for all the ward nurses to examine and comment on the care plans and of necessity often involved several weeks when they travelled between our department and the ward, being revised and modified. The collection of information for care plans continued throughout 1988, in no particular sequence at first, until the decision was made about the sequence of implementation at the end of the year. Subsequently, modifications were made to our programme to ensure that care plans were

ready for the first wards to "go live" in April 1989 and work on the computer care plans continued to some extent until the last wards started using them in November 1989.

A major difficulty at this stage was that the system was not ready for the care plans, so that none of us were able to see them in action until the actual implementation. Modifications have taken place since implementation to meet any needs which were not identified at the start of the project.

THE CARE PLANNING FUNCTIONS

ADMISSION ASSESSMENT

Examples of assessment screens are included in the Appendix. The assessment forms the basis of the nursing record, and the design was defined by the users. Friend and Hayward's 1986 study of the Nursing Process found evidence that nurses lacked understanding of assessment and often collected inappropriate and information. The researchers believed that the designs of assessment forms did not always provide guidelines about the type of information required being based on a composition of other forms, rather than the structure of a nursing model.

The HC4000/7000 system allows assessment to be based on any nursing model and Roper, Logan and Tierney's Activities of Living model (1985) is used in this hospital. Access to the assessment pathways are via the master guide screen.

At the Royal Hampshire County Hospital, the adult and paediatric assessments use the same format, including observations, general information and individual assessment of activities of living based on the model of nursing. The adult document includes a record of temperature, pulse, respirations, blood pressure, weight, height, urinalysis. There is also space to record the date of the last menstrual period and whether the patient is pregnant. It includes details of home circumstances, information given to patient, family or others, the patient's own understanding of the current problem, admission diagnosis, previous medical history, allergies and a record of any medication the patient takes.

The paediatric assessment (for children up to 16 years) includes additional details of school, nursery or college; immunisations and childhood illnesses, which are specified in the section about previous medical history.

There is an index of the twelve Activities of Living (ALs) so that nurses are able to select which ones they wish to use or they may start at the beginning and work through them all. Each AL screen has predetermined statements related to the activity for selection by light pen, or nurses may use the free type facility to enter information. The Norton Scale was originally included for

assessment of pressure sore risk, but this has been replaced by the Waterlow Pressure Risk Assessment tool, with a guide for use of pressure relieving equipment. If a patient is expected to be in hospital for less than 72 hours, a full admission assessment may not always be necessary. In this case, assessment of most of the ALs may be omitted, but those that must be included are identified by the letters "SS" in the index to indicate that they are required for a "short stay" patient.

The Activity of Living pathways for paediatrics were designed specifically for children, so that the selectable pre determined statements relate to topics such as feeding formulae, potty training and comfort blankets.

The anaesthetic or Day surgery assessment includes all the general information and observations described above in the adult assessment, with the addition of sections devoted to prostheses, previous operations and anaesthetics, and information related to transport home. There is no assessment of the patient's activities of living in this pathway.

CARE PLANS

The structure and content of the care plans may be user defined and nurses have a choice between typing individually created free text care plans or selecting predetermined problems, goals and actions to create individual care plans. In addition, nurses may choose to use a combination of these two methods by adding free text to any predetermined problem, goal or action.

There are two categories of pre written care plans: Activity of Living (AL) or Specialty. The twelve Activities of Living (AL) each including a list of possible problems affecting that particular activity. The Specialty pathway presents a list of all the clinical specialties in the hospital, each one including a list of all the probable problems commonly encountered in the specialty. In these plans patient problems include nursing care initiated by medical or other prescription, as well as problems in activities of living caused specifically by the operation, treatment or illness. In this way, even though the care plan may be retrieved by using the medical diagnosis or illness, the problems reflect the effect of the diagnosis on the activities of living, where relevant, thus illustrating use of the nursing model as described in Chapter 1. Some plans are cross referenced or may be accessed via either pathway. For example, if a care plan is needed for a patient who has retention of urine after hip replacement surgery, a plan could be retrieved from the AL pathway by selecting the Activity of "Eliminating", and the care plan title "Retention of urine". Alternatively, the Specialty pathway for Orthopaedics may be used, selecting the care plan title "Total Hip Replacement" and the problem "Eliminating after operation" in which retention of urine is addressed.

Which ever method is chosen, each care plan consists of three major components: problem, goals and actions. The predetermined care plans consist of a selection of pre written statements. There

is an "additional information" facility on each care plan screen which allows the nurse to add to each problem, goal or action statement in order to make it more individual to the patient. In addition, the existence of blank goals and actions in each care plan allows nurses to create as many individual statements as desired. A facility to add a goal date to each goal determines the date at which the nurse expects to see movement towards the goal achievement.

For free text care plans, problem, goals and actions are headings on a blank screen, which has the same facility to add a goal date as the other screens.

Care plans, therefore, may be created by selection of predetermined statements by light pen, and individualised by typing in free text additions; they may include a combination of Activity of living, Specialty or free text problems. Examples of actual screens making up the care planning function pathways are included in the Appendix.

PROGRESS NOTES

Progress notes as described in Chapter 1 have been transferred to the HIS and fulfil the same function as before. This facility consists of a free text screen and may be printed out as desired. The information typed in progress notes usually includes a brief summary of assessment information, return from theatre, doctors visits, discharge information and any other which does not logically fit into the care plans. The term "progress notes" is not strictly accurate and there are plans to develop a patient diary, which will have a multidisciplinary input.

EVALUATION OF CARE

Care plans may be evaluated on screen at any time, and access is via the care planning guide screen described above. When a nurse selects the evaluation pathway, all the problems and the attached goals written for the patient are retrieved on screen. Selection of the appropriate goal initiates the jump to the evaluation screen. This includes space for free text comments in addition to five predetermined, selectable statements describing the reasons for the goal not being achieved, if this is the case. The completed evaluation is attached to the relevant goal and may be retrieved in the patient's care plan. A new goal date may also be entered on this screen.

There are various other modes of effecting evaluation if the goals have been achieved. There is a facility to complete an individual goal, action or whole problem (including goals and actions) when they are resolved, after which they are removed from the patient's current care plan but remain on the system for retrieval up to forty days after discharge if necessary. After this time all nursing care plans are "down loaded" on tape and retained for the statutory number of years, as were patient records on the manual system. The records may be retrieved at any time, but the process is not

immediate, taking approximately 24 hours to carry out.

All amendments to the care plans may be made at any time. The date and the initials of the nurse entering the care planning data are automatically attached to each entry, and a countersigning facility allows nurses to countersign entries made by student nurses. Care plans may be printed out at any time as desired. Errors may be erased from the current care plan, but are saved in the system and may be retrieved as described above.

SUMMARY

Computer care planning is the application of the Nursing Process to a computer system. At the Royal Hampshire County Hospital this has taken place as part of the integrated Hospital Information System, HC4000/7000. Systems theory has been discussed in relation to Computer Systems and the Nursing Process. Hospital information Systems in general and HIS at Winchester in particular have been described, including detailed descriptions of the nursing functions of patient acuity, assessment and care planning.

The implementation of HIS at Winchester started in early 1987 and took place in Phases; Phase 1 was implemented in September 1987, Phase 2 commenced in January 1989 and was completed in November of the same year and Phase 3 was activated in 1992. Phases 1 and 2 have been described in detail, including the decision making, training, personnel involved and the structure of committees formed to produce designs and make decisions.

The introduction of computer care planning was based on change theories and methodology described by Turrill (1986) and Chin & Benne (1969), using an action research approach. The care plans have been described using the four stages of the Nursing Process, from assessment to evaluation and finally to completion of the patient's problems.

CHAPTER 4.

METHODOLOGY: A CHRONOLOGICAL APPROACH.

This chapter describes the process of selecting a research design. It includes the plan of my research; discussion of classification of research strategies; major differences between strategies and the question of qualitative or quantitative research. It also identifies two models which may be used to select a strategy, one each from social and nursing research. (Yin, 1984; and Seaman and Verhonick, 1982.) These have been examined to determine the extent to which each applies to my research topic. The advantages and disadvantages of the selected design and data collection methods, including those subsequently rejected, are also included.

PLAN OF THE RESEARCH STUDY

This research describes the process of change from written to computerised patient care plans and the effect of the change on the attitudes of qualified nurses and on the way in which nurses use the new care plans. It also describes the Information Technology system in use at the hospital. The process of writing the new care plans and the way in which they were introduced on the wards, is outlined. It also examines the quality of the care plans without making the assumption that the quality of documentation is related to quality of nursing care.

The research started in autumn 1987 when the decision was made that I would be responsible for the organisation and composition of the new care plans. After submitting the research proposal to the Director of Nursing Services, the ethical implications were examined. As no direct patient involvement was planned, and the research would require no activity related to patient records that was not already an agreed part of my usual responsibilities, the ethical committee was not approached.

The next stage of the process was the literature review which focused on studies related to implementation of the Nursing Process, implementation of computerised nursing information systems, and attitudes towards both. Selection of a research strategy and methods of data collection was completed by spring 1988, by which time the first care plans were being designed and written, in liaison with specified nurses on each ward. My target population for this study included all permanently employed qualified nurses on the sixteen wards that would be using the computerised care plans.

Two components of data collection started in autumn 1988, when it was planned to distribute self recording diaries to a total of 55 volunteers on all the wards where the manual system of care planning was used. The purpose was to record time taken to complete care plans using this system as a basis for comparison with the computer system. This was discontinued after 23 diaries had been issued, for reasons described later in this chapter.

Concurrently, pre-implementation attitude questionnaires were distributed to all qualified nurses on the sixteen wards, one unit at a time, at monthly intervals, to determine attitudes to the Nursing Process and the proposed computer care plans. At this time there had been no clear decision about the order of implementation, so the order of distribution was pragmatic. The post implementation questionnaires were also distributed to wards in each of the first three units in turn, three months after nurses had started using computerised care plans.

Interviews with key informants from two wards were planned to take place during and after implementation. The first interviews started during implementation week in May 1989. Similarly, it was planned to examine the quality of patient care plans on this unit in approximately the same time periods. Paper documents were examined immediately before implementation and the quality of computer care plans three months after this date.

The final stage in collecting data related to perceptions about the care planning system was planned to start one year after implementation on each ward. This comprised computer satisfaction questionnaires, sent to nurses on each ward between April and November 1990.

A programme to monitor the way nurses use the new care plans was planned to start at the end of 1989, six months after implementation on the first group of wards. The tool used included criteria from the document section of the quality assurance tool already in use at the hospital. Results from these early studies have not been used in this research but provided material for development of the audit tool, currently in use. I developed this specifically for measuring the quality of the new care plans, based on the one suggested by Dixon et al (1990), for use in Medical Audit. This is described fully in Chapter 11. The final stage in the collection of quantitative data, consisted of carrying out a care planning audit on each ward between November 1990 and September 1991. This programme is now continuous and the information collected is communicated to the nurses and managers.

SELECTION OF A RESEARCH STRATEGY

Hakim asserts that selection of a research design requires enthusiasm, creativity, imagination and lateral thinking, and is primarily concerned with the aim, intention, purpose and plans of the proposed study. She classifies research strategies by using the terms theoretical and policy research, stating that the distinction between the two may be ill defined at times, but has implications for choice of strategy. She differentiates between the two by asserting that theoretical research, intended for a largely academic audience will be written in technical terms, may have no time limits and aims to produce small, statistically significant results, whereas the audience for policy research will be broader, so that the report must be written in plain English, must be completed within specified time limits and aims to demonstrate large differences or unusual patterns with practical significance. In addition, in policy research, informants are chosen because of their roles, rather than as private individuals. (Hakim, C. 1987)

Silverman believes that for some researchers the practical applicability exists only in order to compete for funds, and suggests that practical solutions which facilitate action for the client group should be the outcome of all social research. (Silverman, D. 1986)

In nursing research, strategies appear to be classified slightly differently, as "basic" to advance scientific knowledge, or "applied" in which results may be used in practice, according to the purpose. (Notter, 1979; Seaman and Verhonick, 1982:3-5). Treece and Treece, (1986:83) consider the nursing profession to be concerned with developing theory, rather than testing it, in contrast to most other disciplines. Aggleton and Chalmers (1986) continue this theme, asserting that nursing theory may be developed from natural and scientific theory using the inductive approach, to test its relevance for nursing. However they also argue that the deductive approach which values the uniqueness of nursing experience may be the basis of theory development. This echoes the opinion of Benoliel, (1977) who concludes that it is the investigations, creativity and imagination of the nurses themselves that will develop nursing knowledge, rather than theory testing.

Further distinctions may be made about whether the research is qualitative or quantitative before a strategy or methods may be decided. Quantitative research needs measurable, standardised data with composite presentation and possibly statistical analysis. (Walker, 1983; Treece et al, *ibid*)

Hakim uses the term qualitative research to apply to a specific design using depth interviews and group discussions with a small number of respondents to illustrate or explore attitudes and behaviour.

Silverman suggests that the two types of research need not be considered polar opposites and that qualitative research may be enhanced by the inclusion of quantitative data and vice versa. Similarly, Duffy (1985) recommends the use of both approaches in order to produce better nursing science, while Jick (1983) suggests that this combination may enrich any study.

Applying these definitions, my study may be described as policy or applied research, requiring both qualitative and quantitative data. Two models for selection of a research design were identified. Yin (1984) proposes a model using the following as criteria for selection: form of research question, degree of control researcher has over behavioural events and the contemporary or historical focus of the study. Each criterion is considered in relation to the experiment, survey, archival analysis, history and case study.

Seaman and Verhonick use the purpose of research as a criterion for selection of design and describe descriptive/exploratory, experimental, quasi-experimental, pre-experimental, survey and documentary historical research, each based on an appropriate purpose.

Hakim stresses the importance of making an informed choice from an objective analysis of principal features of the advantages and disadvantages of available designs within the constraints of resources.

Clark, (1987) in an unpublished lecture, asserts that a research strategy may not be clear at the outset but, based on the objectives of the research and how it is to be carried out, will evolve as the

study progresses. In his 1987 study of technical change, a longitudinal study involving following the same people over a period of time was envisaged, but constraints made modifications necessary so that several areas were studied at different stages. (Clark, McLoughlin, Rose and King, 1987:5)

Using Yin's model to analyze my proposal, it was possible to eliminate historical/archival designs at once as the focus is clearly contemporary; the minimal degree of control over behavioural events in the study eliminated any form of experiment and the choice between survey and case study remained. This was based solely on the form of the research question, which in this case emphatically asks "how" indicating the case study as the design of choice. However the dividing line between the case study and survey was not totally clear, so methods from both designs appear to be permissible.

The model for nursing research outlined by Seaman and Verhonick, using purpose of the research as a criterion for design selection, proved to be less helpful and so was discarded as a framework for selection.

Hakim believes the case study provides a detailed picture of a contemporary phenomenon as it happens and within a real life context, using multiple sources of data collection.

She considers it is the multiple sources of evidence which make the case study such a powerful design. Observer bias is a possible disadvantage in this design; other disadvantages include difficulties with reliability testing, replicability, conflicting data, estimating time tables and costs, and range of skills required to carry it out.

Seaman and Verhonick also identify the difficulties of generalising but this view is refuted by Stake, (1978) who asserts that case studies provide a natural basis for generalisation and Yin, goes on to differentiate between the statistical generalisation of surveys and the analytical generalisation of the case study, in which the researcher attempts to generalise a particular set of results to a broader theory, rather from one study to another.

Yin lists five components essential to the case study design as:

- The research question
- The proposition (if any)
- The unit(s) of analysis
- The logic linking data to the proposition
- The criteria for interpreting the findings.

Within this framework, my research question may be expressed thus:

"How will the change to computerised nurse care planning influence nurse's attitudes to individual patient care, the quality of care planning documentation, and the time taken to carry out care planning?"

The proposition is that the intervention of computer technology will influence these specified areas so that data collection must be related logically to attitudes, quality assurance and time recording before and after the intervention.

The unit of analysis may have been considered as the process of the change itself; however Yin warns against the use of an implementation process as a unit of analysis because the beginning and end of the process may be difficult to define. To avoid this, it seemed more appropriate to consider the unit of analysis as the qualified nurses on the wards which are involved in the change.

In addition Yin suggests that one rationale for choice of a single case study design is when there is a situation allowing the researcher to observe a phenomenon previously not possible in a particular setting, which applies to this implementation process. A variation is the embedded design, which allows for quantitative analysis of sub units within the main unit of analysis. If therefore, the nurses on the wards involved are considered as the main unit of analysis, the quantitative data from study of the documentation and the qualitative data from examining the process, may be seen as sub units, thus satisfying Yin's criteria for selection of this design. (Yin, 1984)

Within my main unit of analysis, I also designated two wards as a sub unit of analysis for interviews and quality of documentation before and after implementation, in addition to the data concerned with attitudes, perceptions and use of the computer from all wards involved.

One type of research not yet discussed is action research. Greenwood, (1984) postulates that nursing may be described as a social phenomenon and is distinguished from another social phenomena by its own concepts and techniques, so therefore should be researched as such. She suggests action research as the most appropriate choice of strategy for the following reasons:

It does not study factors in isolation but in the context which gives them meaning.

It is collaborative and participatory

It is self evaluative so that concerns of practitioners are immediately relevant to the research situation.

Results may be generalised to other unique situations.

Other nurse researchers support this approach. Lauri, (1982), states the case for action research to develop the Nursing Process in which the researcher works together with the nurses to develop and seek opportunities for using the Nursing Process model of care. She proposes that knowledge of the Nursing Process and the opportunity to apply it, are essential pre-requisites for the success of this approach.

Webb, (1989) describes a ward based project to develop nursing and managerial skills in which action research provides support for all the participants. She describes action research as a form of critical research, based on the philosophy that research is not an obscure activity carried out in isolation, but should involve the people in the area of study. She states that the purpose of action research is to provide a natural generalisation of the process being studied and believes that it is

those who wish to use the findings of a particular study who are responsible for the external validity and reliability. She argues that the emphasis is on the collection of diverse representations of the process and on the presentation of results in such a way that they are open to multiple interpretation.

Although not necessarily agreeing with all the assumptions on which Greenwood bases her rationale for action research, my study has been planned on a modified form of this approach.

DATA COLLECTION

Methods commonly used in case study designs include analysis of administrative records, documents, interviews, participant and non participant observation, physical artifacts and group discussions. (Yin, Treece, Hakim, Seaman et al). In addition, methods may be borrowed from other research designs so that data may be collected from multiple sources. In this study I planned to collect the data from administrative records, patient documents, self recording diaries, participant and non participant observation, interviews and questionnaires.

According to Schramm, (1971) to illuminate a set of decisions is a primary feature of the case study, and a major part of this study is descriptive, using the records and participant observation to illuminate the process of implementation of the hospital computer system.

Questionnaires were used to measure the attitudes of nurses to the principles and practice of the Nursing Process and towards computerisation of the relevant documents. Attitudes to the former (Bowman, 1983; Bush, 1985; Carlson, 1986) and to computers in general (Stronge and Brodt, 1985; Bongartz, 1988; Cheatwood and Martin, 1988; Lange, 1988, Schwirian et al, 1989) have been documented, but to date a literature search has not revealed specific studies concerning attitudes to computerised care plans.

Use of the questionnaire is traditionally a survey method, but the advantage in this study is to reach a larger audience than could be interviewed. Other advantages include all subjects having the opportunity to respond to the same questions, while anonymity and replication of a questionnaire will facilitate reliability and validity testing. Conversely response may be poor and misunderstandings cannot be corrected. The topic may be probed in more depth in subsequent interviews.

Attitudes were measured using a standard five point scale, developed by Likert in 1932. Reliability of the scale is good due to the large range of responses, but validity is difficult to check because of subjectivity. (Oppenheim, A.N. 1966)

A major part of this research concerns the process of writing the new care plans for the Hospital Information System. During this process, much information was collected from and fed back to nurses on the wards. This feedback system provided an integral framework in which to acknowledge the expertise of the clinical nurses and to modify the care plans as necessary. This was described in detail in the previous chapter.

ATTITUDE QUESTIONNAIRES

Before implementation.

Examples of the attitude questionnaires and the accompanying letter are included in the Appendix for Chapter 4. Questionnaires, to measure attitudes to the Nursing Process and the proposed computer care plans, were sent to a total of 182 qualified nurses, on each of the 16 wards which would be involved, between October 1988 and January 1990. In both questionnaires attitudes are measured on a five point scale from "strongly agree" through "agree" "undecided" "disagree" to "strongly disagree". Positive attitudes are represented by the higher score, so according to the way the statement is worded, strongly agree or strongly disagree would score five with the other scores in descending order. The Nursing Process questionnaire was based on Bowman, Thompson and Sutton's (1983) Likert type attitude scale, described in Chapter 2, and consisted of 20 statements.

The questionnaire concerned with the proposed computer care plans consisted of 22 attitude statements which broadly reflected the major issues identified by Stronge and Brodt (1985). These were: job related or professional issues, legal issues, quality of care, willingness to use computers and the perceived benefits to nurses. These were grouped for analysis under the headings of practical, professional, ethical and technological factors.

In each questionnaire an equal number of statements seen as positive and negative was included to reduce the risk of bias. The biographical data requested related to qualification (Registered or enrolled nurse), age group and gender.

The purpose of this initial component of the study was to compare attitudes to the Nursing Process and the proposed computerisation of care plans between wards and individual respondents, and to analyze the results by age groups, gender and qualification. Although data were analyzed in these categories, I realised that in proactive research, the information provided was of no practical interest. Before the computer satisfaction questionnaire was distributed, I omitted age and gender from the information required. An explanation of scoring in the Likert scale will be included in the chapter concerned with results.

Three months after implementation

Questionnaires about computer care plans were sent to a total of 97 qualified nurses on each of the first eight wards on which care plans had "gone live", three months after implementation. Implementation was staged at monthly intervals from April to June and from September to November 1989. The same attitude statements were included in this "follow up" questionnaire, with the wording modified to reflect the present. Two statements were added to the second questionnaire, to address issues that arose as a result of the new documentation, although they could not be included in any comparisons. These concerned the computer admission assessment and patient participation in the admission procedure. All respondents remained totally anonymous, and this, combined with a considerable turnover of staff after an average of nine months interval between the

study periods, made comparison between individual responses impossible. Ward responses from both studies were compared.

The process of data collection

Before distributing any questionnaires, Senior Nurse Managers for all units involved were informed of the nature and purpose of my research. Names of all nurses permanently employed in the hospital were obtained from the ward establishment forms, which provide the name, qualification and number of hours worked for each nurse on the ward. I then delivered the questionnaires myself, addressed individually to each qualified nurse listed on that ward. Each questionnaire included a letter explaining the research, how to fill in the questionnaire, and when it would be collected. A large envelope with the date of collection and all the nurses names listed on the outside was attached to the notice board (or some other place suggested by the nurse in charge) and nurses were asked to tick their names as they returned their completed questionnaires into this envelope. The date of collection was always arranged for the end of a week, with the time period allowed for completion of questionnaires about two - three weeks in every case to allow for people on sick leave, annual leave or nights off to respond.

On the collection date, I visited the ward and spoke to the nurse in charge before collecting the envelope; this had the effect of reminding anyone present who had not completed the questionnaire to do so, or offering to remind a colleague. In this case I left the big envelope with an amended collection date for a further two or three days, usually over the weekend. When the questionnaires had been analyzed, each ward and each nurse manager was sent a letter of thanks for participating and a brief report on the results obtained.

Response rates: Pre implementation study

Response from the first attitude study was 119 representing a response rate of 65.4%. Responses from four wards were less than 50%. Three of these have been included, but the fourth, with a response rate of 33% was omitted as another study was in progress on this ward which may have influenced the low response. The reason for low response rates from two of these wards may be that they were not using care plans at this time and may have felt the study was irrelevant. One ward had been encouraged to use care plans for a long period of time, but had not incorporated them into practice. The other had never been encouraged to use care plans because of the rapid patient turnover. The reason is less clear for the other two wards. Both were reasonably enthusiastic about care plans and were using them in practice. Neither ward was experiencing an unusually busy period and neither ward was overtly opposed to completing the questionnaires when approached. It may be that nurses considered them a low area of priority and my reminders were ineffectual.

Response rates: Post implementation study

There were 72 responses from the follow up study representing a response rate of 74.2%, with a minimum individual ward response of 50%. This was a higher response rate than that of the first

study, but did not involve so many wards. Of the eight wards participating in this, all but two produced a higher response rate than that of the pre-implementation study. Two of the wards with under 50% response in the pre-implementation questionnaire were included, one of which achieved 50% response in this phase.

SELF RECORDING DIARIES

An example of a self recording diary may be seen in the Appendix. Self recording by nurses over a period of fourteen days was planned in order to record the time taken to complete care plans and assessments, using both manual and automated care plans. This method was employed by Clark, (1987) in order to categorise tasks and the time taken to complete them. A possible weakness of this method may be that there is no control over the movements of the nurses so that there may be staff changes by the time the computer care plans are introduced. Also there is no guaranteed way of ensuring full compliance. (The response rate in Clark's study varied between 75%-100%). Self recording diaries were designed and letters explaining this project were distributed to all fourteen wards currently using the paper system of care planning. I approached each ward and asked for volunteers to carry out the self timing, because use of random sampling may possibly have produced names of nurses who were known by me to be apprehensive about care planning and who would be reluctant to participate. As a result twenty three volunteers from five wards were enlisted and instructed in the use of the diaries in October 1988. It was planned to include a further thirty two volunteers from the remaining nine wards. The volunteers all met the following criteria: they worked more than 30 hours per week, they were members of the permanent staff, had been employed a minimum of 8 weeks on the ward and were qualified nurses. Because of the shift patterns, it was expected that nurses would need to take considerably longer than fourteen days to complete their diaries in order to cover the whole 24 hour period each day.

This component of data collection was unsuccessful from the start. The response rate was very poor, with only eight of the original twenty three diaries returned in the first four weeks, not all of which had been completed correctly, rendering some information unsuitable. I decided that the nurses needed more support and frequent reminders to fill in the diaries, because the poor response did not appear to be due to lack of co-operation. However sudden illness intervened at this stage, necessitating my absence from the hospital at this crucial time, thus making it impossible for me to provide any personal support or reminders. For these reasons the self recording diaries were rejected as a method of data collection.

COMPUTER SATISFACTION QUESTIONNAIRES

Examples of computer satisfaction questionnaires are included in the Appendix. A total of 180 questionnaires was distributed to each group of wards in turn twelve months after they had started care planning on computer. Although 42 beds had been closed in the hospital in the intervening period, there was still the same number of wards and approximately the same number of qualified nurses to whom the questionnaires were distributed.

Responses obtained from them were intended to provide an indication of current feelings towards the care plans and how their use was affecting practice. Of the twelve questions, six referred to the nurses perceptions of the effect of computer care plans on workload, patient care, and nursing knowledge. Three questions related to ease of use of the technology concerned with care planning, and one to the quality of support available. A summative question asked whether nurses would miss the computer care planning system if it were discontinued. Each question allowed a choice of three responses, a negative, positive or neutral as applicable to the nature of the question. A final question asked nurses whether they relied on printouts or "on line" information for handover reports, and asked them to specify which printouts, if any, they used.

The process of data collection

The method of identifying the respondents and distributing these questionnaires was exactly the same as I used for the attitude questionnaires, and following the analysis, similar reports were sent to the wards and nurse managers.

Response rate

Response rate from these questionnaires was 137 out of the 180 distributed. This represents an average response rate of 76.1% with a range between 100%..53%, which is slightly higher than both of the attitude questionnaires. The ward omitted from the first attitude study because of a concurrent study, was omitted again for the same reason. The other three wards with low response rates in the pre-implementation study produced 87%, 80% and 73% response rates at this stage despite the fact that all wards at the time were short staffed and morale reported to be low. One reason may be that the questionnaire had fewer questions, was all directly related to current practice and the responses were simpler than the attitude scale, having a three item response instead of a five item response. Individual ward responses and specialty are included in the Appendix.

QUALITY AND USE OF COMPUTER CARE PLANS

From six months after introduction of the computer care plans on each ward, their use has been subjected to continuous monitoring in order to provide descriptive data to determine how the plans are being used. The development of an audit tool based on Dixon's model, (1990) was referred to above. An example of this audit tool may be seen in the Appendix. This comprised sixteen standard statements commensurate with the agreed hospital policy for care planning. Each statement includes an explanation of any possible exceptions allowed for the standard. In addition, the type of care plans used, specialty, activity of living, or free type, is recorded. The topics, about which the free type plans are written, are also recorded. As described in Chapter 1, progress notes are notes about the patient which cannot be logically included in the care plan. The topics included in this part of the care planning pathway and the number of screens used, are recorded, as well as the number of times these topics are repeated in the care plans. Reports are sent to the wards and Senior Nurse Managers for information.

The process of monitoring care plans.

Each member of hospital personnel is issued with a personal identification number (PIN) following the statutory computer training, as described in the previous chapter. This allows the user access to relevant areas only. In my case this includes nursing information throughout the hospital and systems analysis, facilitating the monitoring of all nursing assessments and care plans. The monitoring is done retrospectively so that a complete in-patient episode may be studied for each patient on the ward on the day selected. This has been a continuous process since commencing six months after the first three wards started using the care plans. A day is selected arbitrarily on which a patient list is printed out for a ward to be monitored. After a period of two to three weeks the care plans and assessments of all patients on the list, who have since been discharged, are examined against the criteria in the audit tool described above. Any patient who has not been discharged by the time the study is completed, is omitted from the study. For wards where the stay is usually longer than this, records may be examined during the admission.

The number of care planning standards which are achieved is calculated, and reasons are recorded for those not achieved and those achieved by means of an alternative method. For example, if nursing care has been evaluated by any other means than the evaluation pathway of the care plan. A report is then submitted to the Nurse Manager, Director of Nursing Services and ward staff, who are offered the opportunity to discuss any specific difficulties.

The data used in this research was collected from the audit studies carried out on each ward between November 1990 and September 1991.

COMPARATIVE STUDY OF QUALITY OF NURSING DOCUMENTATION

Data collected exclusively from two designated wards, referred to as D and F, consisted of quality indicators using the quality assurance instrument already in use at the hospital and information from focused interviews, using key informants. An example of the questionnaire used is included in the Appendix.

The wards used for the case study were both 28 bed wards of the same clinical specialty. Quality of nursing documentation was measured using the tool Quality Indicators for Client Care "QICC" (unpublished). This was modified from the Rush Medicus Instrument developed at Rush Presbyterian St Luke's Medical centre, Chicago in 1972, to meet the needs of the hospital, and is described further in Chapter 9, where the results are presented. The original tool had been extensively tested for reliability and content validity at Rush Presbyterian St Luke's Medical Centre and the Baptist Medical Centre in the USA and has been carried out on eleven wards at the Royal Hampshire County Hospital since its modification.

The questionnaire is based on the four stages of the Nursing Process and provides indicators for quality of care by addressing structured questions to patients, nurses, documents and non participant observation. In this study, only the document questions were used to obtain an indication of the

quality of the nursing care plans and assessments using both methods of recording. This makes no assumption that quality of documentation is related to quality of care.

The questions are based on objectives agreed by nurses, or on policies for each of the areas addressed by the questionnaire. Thus all the objectives are measured by expressing them in question form. In this study, as the purpose was to examine documentation only, no patients were approached for opinions of care, only the documents of those patients with assessments and care plans were included. For pragmatic reasons there was no attempt to select a typical time period to carry out the first study so therefore the selection of a time period for the follow up study was also arbitrary.

Process of collecting quality related data

Before starting this component of data collection, the Nurse Manager, Ward Sisters and relevant patients were approached for permission to examine the paper nursing documents, as it would have to done on the ward. A letter was given to all patients, explaining the purpose of the study and what it entailed. This was primarily so that all patients understand the purpose of the study and know why outsiders are wandering around the wards looking at care plans. The patients with care planning documents were then approached personally, to check that they had understood the letter and to ask permission to examine their nursing documents. Although most of the nurses were already familiar with the quality assurance studies, and would not be actively involved in this study, the purpose was explained and copies of the questions left on the ward for them to read.

The paper documents were examined on the ward, measuring them against the criteria in the QICC questionnaire. The computer documents were studied at the terminal in the same way, three months later. A computer analysis programme was already in operation for the quality assurance analysis, and this was fractionally modified to produce results for documents only. Reports were sent to both wards, the nurse manager and Director of nursing services.

Response rate for both phases of the quality study.

For the first period, eight of the thirteen patients on Ward D and nine of the fifteen on Ward F had care planning documents. All seventeen sets of documents were examined in this study. The total number of twenty eight patients on both wards represented only 50% of the total capacity of the wards, which was unusually low.

In the follow up study, three months later, ten out of the twenty two patients on Ward D and all twenty four patients on Ward F had care plans and assessments. All care plans and assessments were examined in ward D, while 50% of those on ward F were examined in order to study a similar number on each ward.

INTERVIEWS WITH KEY INFORMANTS

Focused interviews are suggested when the aim is to collect data about subjective feelings. (Treece, Seaman et al and Babbie). According to Denzin (1970), respondents may define their unique experience by raising unscheduled issues in this situation. Hypothesis testing and corroboration of partially established facts may also be the purpose of using the interview. (Yin, Seaman and Verhonick)

This method was used to obtain a more rounded view of nurses' attitudes, using key informants on the wards mentioned above. Yin warns of the danger of dependence on key informants but believes they are critical to success. He lists the skills necessary for this approach as listening and questioning skills, flexibility, specialist knowledge and relationship building. (Yin, 1986).

For key informants I aimed to select representatives of each tier of nursing staff from the two wards, eg Sister, senior staff nurse, staff nurse and enrolled nurse. This provided one ward sister, one senior staff nurse, one staff nurse and two enrolled nurses from Ward D and one sister, two staff nurses and one enrolled nurse from Ward F. The senior staff nurse on Ward F agreed to be a key informant but was unable to take part for personal reasons. I did not distinguish between the different grades in each tier.

The process of interviewing

Each nurse was approached and asked if she or he would be willing to be interviewed, and the purpose explained. Everyone approached agreed to participate. The nurses were interviewed for approximately one hour, (this time period was not agreed before the interview but appeared to be self limiting in each case) in a room away from the ward, and at times selected by themselves. Coffee or tea was always offered and usually accepted, and a token amount of "small talk" occurred before the interview started.

The categories of information of interest were: training, technical/practical aspects, care plan content, time taken for care plans, the effects on patients and practice, workload, attitudes and relationships among staff. At the start of each interview, the areas of interest were explained briefly to the nurse who was then asked to talk freely about his or her own experience of the introduction of computer care plans.

All nurses agreed to the use of a cassette recorder to record the interview and to return in three months for a follow up interview. I encouraged all the informants to talk freely with minimal guidance, and only if someone strayed totally from the subject, which was rare, I waited for a suitable pause and introduced an appropriate reminder. Only one informant talked for less than one hour in the first phase of interviews and one in the second phase. Each set of interviews took place within a period of about a week. I transcribed each interview completely as soon as possible, each transcription taking about two hours.

Response rate for interviews

All nine nurse attended interviews held during the implementation week. The post implementation interviews were less well attended for the following reasons. One informant had left the health district completely; one was doing post basic training and was no longer using computer care plans; one was absent on long term sick leave and one did not respond, despite encouragement. The five remaining informants were interviewed following the same pattern as before, after using the care plans for three months. With the exception of one informant in the first set of interviews, who needed encouragement to talk, an abundance of relevant information was produced from both sets of interviews.

ANALYSIS AND PRESENTATION OF DATA

Hakim (1987) purports that analysis and presentation of data from qualitative research varies greatly from that based on theoretical proposition to "essentially descriptive reports uncoloured by theory". Emphasis may be on the analysis of the data or on the researcher's own conclusions.

Yin (1984) specifically outlines two major strategies for case study analysis: the first, and preferred strategy according to Yin, relies on the research proposition which also provides the rationale for data collection and helps to focus attention on relevant data. The second strategy involves the development of a descriptive framework within which to organise the research study. In this strategy topics of interest related to the study are organised as a pattern for the analysis. Yin suggests the latter strategy is useful when the main purpose of research is descriptive.

My research question assumes the proposition that the intervention of computer technology *will* influence specified areas. Data collection therefore was related logically to attitudes, quality assurance and time recording, before and after the intervention, which provided the basis for analysis. In addition, the case description method of analysis suggested by Yin has also been employed, in which individual topics of interest related to nursing are identified and analyzed by use of different tools according to the method of data collection. In the main, analysis topics are analyzed in the categories of professional, practical, technological and ethical factors.

Within the use of a general strategy for analysis, Yin presents examples of dominant and lesser modes of case study analysis. Pattern matching logic is presented as one of the most desirable methods of analysis. This requires the prediction of dependent variables and may be used in descriptive research provided the variables are defined prior to data collection. Within the structure of my general proposition I defined three non equivalent dependent variables thus:

Nurses will take less time to "write" care plans after computerisation.

Nurses' attitudes will initially become more negative after using them for a short period, but after becoming accustomed to them will become more positive, as indicated in the change theory literature.

The quality of documentation will improve as measured by a quality assurance tool.

As described above, the method employed to measure time taken to write care plans was rejected early in the study for reasons already explained. This variable therefore could not be analyzed using this mode of analysis, but the topic has been included in analysis of nurses attitudes and perceptions related to timing of care planning activities.

The quality of documentation has been analyzed under the headings of the stages of the Nursing Process: assessment, planning and evaluation. Each section is analyzed independently, with the sum of all the individual responses expressed as a percentage of the total possible score in that section. An overall score may be obtained by the same method. Results from the pre implementation study are compared with those of the post implementation study, to compare the pattern predicted with that based on the findings.

My research uses two of the lesser modes of analysis described by Yin for the major part of the data; they are repeated observations and analysis of embedded units of analysis. The data obtained from the attitude component of the research, are a result of repeating the same questionnaire before and after the implementation of computer care plans on the wards. This allows comparison of attitudes and measurement of the shift towards the positive or negative poles. Results are categorised in terms of individual response, ward responses and overall hospital response to individual attitude statements. Individual responses are analyzed against age and qualification and ward response under the headings of professional, practical, ethical and technological factors.

Comparisons are made between attitudes towards the Nursing Process and the idea of computerised care plans, individually and collectively by ward, and between attitudes to computer care plans before and after implementation by ward.

Responses analyzed by age and qualification proved to be of interest only. No individual group emerged as consistently negative or positive in either component of the questionnaire, and because of the difficulty of isolating one particular group for further attention, it became obvious that the focus would need to remain on all respondents.

Analysis of the data collected from the focused interviews is based on topics perceived as relevant to nursing practice and directly concerned with the effects of implementation of the new care plans. These topics were identified as direct patient care, the time taken to carry out care planning, content of assessments and care plans, practical and technological difficulties, relationships among staff and training to use the system. Results are presented as a descriptive report, with analysis based on my own conclusions and on change theory.

The computer satisfaction questionnaire is analyzed in a descriptive framework which covers topics relevant to the use of computer care plans in nursing practice. The topics in question are direct patient care, use of technology, support for nurses using the system and method of retrieving

information for nurse to nurse reporting. Data are presented grouped in percentages and rank order.

Monitoring use of computer care plans provides data which may be analyzed in terms of quality of documentation measured against pre determined standards, and by grouping of the data by frequency and ranking. By doing so, a composite picture is obtained of the topics for which the free type facility in the care planning system is used.

Finally comparative analyses are carried out using different components of data collection, in order to obtain an overview of the whole situation. Results of the care planning audit are compared with results of previous quality exercises obtained from my own records; correlations are performed with audit results and computer satisfaction questionnaires, and staffing/workload levels obtained from administrative records.

SUMMARY OF THE DATA COLLECTION

The hospital wide database collected for this research consists of 119 pre-implementation attitude questionnaires; 72 post-implementation attitude questionnaires; and 137 computer satisfaction questionnaires one year after post-implementation.

Descriptive data is provided from all sixteen wards by describing the original process of writing care plans for computer and continuous monitoring of computerised care plans in use. The database provided by the sub units of this research consists of 17 sets of manually completed nursing documents examined using a quality assurance tool and 22 sets of automated nursing documents; and information from 9 key informants interviewed during implementation week and 5 key informants interviewed post implementation.

Data from the study of care planning documents from 16 wards over a period of ten months has been obtained from 225 using the newly developed audit tool. In order to develop this tool, 380 documents were examined using the original method of evaluation as a foundation for this research, but the results are not used in this work. This provides an indication of the quality of care planning at discrete intervals since implementation and the manner in which the system is being used.

CHAPTER 5.

THE ATTITUDE QUESTIONNAIRES: PRE IMPLEMENTATION STUDY

Questionnaires were used to measure nurses' attitudes to the principles and practice of the Nursing Process and towards computerisation of Nursing Process documents. Attitudes to the former (Barnett, 1982; Bowman, 1983; Bush, 1985; Carlson, 1986; Friend and Hayward, 1986) and to computers in general (Stronge and Brodt, 1985; Bongartz, 1988; Cheatwood and Martin, 1988; Lange, 1988, Schwirian et al, 1989) have been documented, but to date a literature search has not revealed specific studies concerning attitudes to computerised care plans.

AN OVERVIEW OF RESULTS

Analysis of the responses to individual statements produced some anomalies. The overall average attitude responses suggested that nurses agreed that the Nursing Process is flexible, a good framework for learning and helps to further nursing research. Responses to the computer questionnaire showed that they accepted that this would apply to computer care plans. They agreed that it improved nursing care by increasing awareness of patient needs and identifying priorities.

However, directly opposing responses suggested that nurses considered that the Nursing Process does not affect direct patient care at all but is merely an elaborate method of documentation, inferring that it is a time consuming paper exercise which needs more nurses to cope with all the writing involved.

Responses to other statements also suggested a certain ambivalence, implying that nurses were uncertain about the very definition and efficacy of the Nursing Process in practice and in relation to professional accountability. It may be inferred from these responses that in general there may be inadequate understanding of the principles of the Nursing Process defined also in Chapter 1 by Yura and Walsh, (1978:1) as

"the core and essence of nursing, central to all nursing actions, applicable in any setting, within any frame of reference, any concept, theory or philosophy.....it provides a base from which all systematic nursing actions can proceed"

More specifically, the average negative attitude that the Nursing Process *decreases* time spent with patient, negates any understanding of the process as defined below.

"A problem solving approach, *involving interaction* with the patient." (Kratz, C. 1979:3)

"A logical, systematic approach to nursing, *involving individual nurse/patient interaction*...." The Royal College of Nursing. (1986:7)

It was from this basis that comparisons were made. The questionnaire was carried out approximately six months prior to implementation to ascertain attitudes towards the *proposed* change. At this stage, nurses were starting to use the hospital computer system for patient administration, mainly for collection of Körner data. Although nurses were involved in supplying information for the care plans for their own areas of practice, none of us had seen even the format for the new plans and they were difficult to visualise and comprehend. Ambivalence about some aspects of computer care plans was to be expected and results of this questionnaire partially endorsed this.

Nurses remained positive about care plans as a useful learning experience which also helped to further research. However the negative feelings that the use of the Nursing Process required more nurses and took time away from patients had been carried over to computer care plans.

Responses also expressed the opinion that nurses considered that money spent on new technology would be better spent on increased staffing levels. This opinion suggests an insufficient knowledge of the Regional Information Systems Plan, Körner requirements and allocation of resources in the health service, but may indicate inadequate preparation of staff in the wider implications of information technology in health care.

THE QUESTIONNAIRES

Attitudes were measured using a standard five point scale, developed by Likert in 1932. In both questionnaires attitudes are measured on a five point scale from "strongly agree", through "agree" "undecided" "disagree" to "strongly disagree". A neutral point is calculated to represent an undecided attitude and in this case a 6% range either side of the neutral point has been allowed for this purpose.

Positive attitudes are represented by the higher score, so according to the way in which the statement is worded, strongly agree or strongly disagree would score five with the other scores in descending order. For example:

1. "Computer care plans will increase work load" (negative statement)
A "strongly agree" response will score 1 point
2. "Computer care plans will reduce paper work" (positive statement)
A "strongly agree" will score 5 points.

An equal number of statements seen as positive and negative were included in each set of questionnaires to avoid bias.

As all the wards had different numbers of respondents, and each questionnaire had a different number of statements there could be no universal attitude score per question or per ward. Therefore in order to simplify analysis, all results have been standardised and presented as percentages.

Attitudes may be interpreted thus:

Strongly positive	84-100%
Positive	67-83%
Undecided	54-66%
Negative	37-53%
Strongly negative	20-36%

The Nursing Process attitude questionnaire was based on Bowman, Thompson and Sutton's (1983) Likert type attitude scale, described in chapter 2, and consisted of the following 20 statements.

Attitude statements referring to the Nursing Process

- 1 Its use improves patient care
- 2 Using it means too much paper work
- 3 It is too time consuming
- 4 It increases awareness of patient's needs
- 5 It takes time away from patients
- 6 It may be used in any care setting
- 7 It is an elaborate system of recording care
- 8 It works well in practice
- 9 It has never been totally accepted by most nurses
- 10 It increases accountability
- 11 It is what happens between a nurse and patient
- 12 It is common sense so nurses do not need to write it down
- 13 It helps to identify priorities of care
- 14 It is good in theory but falls down in practice
- 15 It does not affect delivery of care, only recording it
- 16 It is a logical approach to total patient care
- 17 There are not enough nurses to write care plans properly
- 18 It is a good learning framework for students
- 19 It does not make any difference to the patient
- 20 Evaluation is useful for furthering nurse research

The questionnaire concerned with the proposed computer care plans consisted of 22 attitude statements which broadly reflected the major issues identified by Stronge and Brodt (1985). These were: job related issues, legal issues, quality of care, willingness to use computers and the perceived benefits to nurses. These were grouped for analysis under the headings of practical, professional, ethical and technological factors. The attitude statements are listed below.

Attitude statements related to proposed computer care plans

- 1 They will increase workload
- 2 They will improve communication between nurses
- 3 The cost of the system would be better used employing more nurses
- 4 They will allow more time with patients
- 5 Time spent on the computer is out of proportion to its benefits
- 6 Confidentiality will be a problem
- 7 They will offer a chance to improve patient care
- 8 "Queuing" for a terminal will be time wasting
- 9 They will be a useful learning experience for students
- 10 They will reduce paper work
- 11 Nurses should not be expected to learn computer skills
- 12 They will help to set standards of care
- 13 They will take away individuality of patient care
- 14 They will make the care plans more research based
- 15 They will make orientation of new staff more difficult
- 16 Light pen selection will save time in writing individual care plans
- 17 Care planning is not suitable for computer
- 18 They will help nurses overcome fear of new technology
- 19 They will expose nurses to increased litigation
- 20 They will increase knowledge base
- 21 They will take time away from patient care
- 22 They will increase accountability and professionalism

The biographical data requested in each questionnaire related to level of qualification (the terms "Registered or enrolled nurse" have been used rather than the current grading levels), age group and gender. The purpose of this was to compare the attitudes towards the Nursing Process and the proposed computerisation of care plans between wards and individual respondents, and to be able to analyze the results by age groups, gender and qualification, and in the context of other research. As there were a total of seven male respondents in the pre implementation study and only two in the post implementation study, the ratio of male to female was too small for useful comparison. I have reported these attitudes for interest only.

Although data were analysed by individual wards they have been presented as an aggregate of all wards. Individual results may be seen in the Appendix as specified at relevant points in the text.

The response from the original attitude study was 119 from the 182 questionnaires distributed, representing a response rate of 65.4%. and has been discussed in Chapter 4.

CALCULATING THE STANDARDISED ATTITUDE RESPONSES

Attitude scores from each respondent were recorded against each attitude statement. The total score is calculated for each question, for each respondent, and for the ward in total, using a matrix. The standardised score per question represents a percentage of the total maximum score possible per question, while the standardised score for each respondent represents a percentage of the maximum

possible pre respondent. When the total scores per question have been calculated for each ward, an average score per question or per hospital may be calculated. An example of this matrix for a medical ward is seen in Table 5.1, below. The statements are not included, but numbers refer to those listed above.

From this matrix it will be seen that individual attitudes may be identified. As the Nursing Process questionnaire and the computer care plan questionnaire were analysed together, individual attitudes to both may be compared. These comparisons will be included in a later chapter with individual comments from both phases of the study.

TABLE 5.1

WARD: WARD N		NURSING PROCESS						
		KEY FOR INDIVIDUAL SCORES						
Respondents	n = 6	Strongly positive		=5				
Questionnaires	n = 11	Positive		=4				
Response rate	55%	Undecided		=3				
		Negative		=2				
		Strongly negative		=1				
Respondents								
Statement number	1	2	3	4	5	6	Total score	% score
1	2	4	4	3	4	4	21	70
2	1	4	2	4	2	4	17	57
3	2	2	2	2	4	4	16	53
4	2	5	4	1	4	4	20	67
5	4	3	2	2	2	3	16	53
6	1	3	4	3	4	4	19	63
7	2	3	2	1	2	4	14	47
8	1	4	3	3	4	2	17	57
9	2	3	3	2	4	4	18	60
10	2	3	3	1	2	5	16	53
11	2	4	4	1	4	2	17	57
12	2	4	3	1	4	2	16	53
13	2	4	4	4	5	4	23	77
14	1	3	3	2	2	1	12	40
15	2	2	2	4	1	4	15	47
16	2	4	4	1	2	4	17	57
17	2	4	2	4	2	2	16	53
18	5	4	4	3	5	4	25	83
19	4	4	4	2	2	4	20	67
20	3	4	3	4	4	4	22	73
Total respondent	43	72	62	46	64	69	356	
Standard	43%	72%	62%	46%	64%	69%		59%

Please see Key for standardised scores on page 80.

ANALYSIS OF RESULTS

Results are presented under the headings of response to individual statements, comparison of attitudes, response according to age group, qualification and gender, and factor analysis. Individual ward results may be seen in the Appendix for Chapter 5.

ANALYSIS BY RESPONSE TO INDIVIDUAL STATEMENTS

The following tables illustrate the aggregate responses to each individual statement referring to the Nursing Process and Computer Care Plans.

TABLE 5.2
The Nursing Process

Positive attitude

1. Its use improves patient care
4. It increases awareness of patient needs
6. It can be used in any care setting
12. It is common sense so no need to write it all down
13. It helps to identify priorities for care
16. It is a logical approach to patient care
18. It is a good learning framework for students.
20. Evaluation helps to further nursing research.

NB Negatively worded statements (e.g number 12) needed a "disagree" response to attain a positive attitude score.

Undecided attitude

5. It takes time away from patients
8. It works well in practice
10. It increases accountability
11. It is what happens between nurse and patient
19. It makes no difference to the patient.

Negative attitude

2. Using it means too much paper work
3. It is too time consuming
7. It is an elaborate method of recording patient care.
9. It has never been totally accepted by most nurses.
14. It is good in theory but falls down in practice
15. It does not affect delivery of care, only recording.
17. There are not enough nurses to write care plans.

Overall average scores did not include any strongly negative or strongly positive attitudes to any statement, although individual respondents demonstrated responses within these ranges.

TABLE 5.3
Computer care plans.

Positive attitudes

- 9. Computer care plans will be useful learning experience
- 14. Computer care plans will be more research based
- 16. Light pen selection will save time

Undecided attitudes

- 6. Confidentiality will be a problem
- 10. Computer care plans will reduce paper work
- 11. Nurses should not be expected to learn computer skills
- 12. Computer care plans will help to set standards of care.
- 13. Computer care plans will take away individuality
- 17. Care plans will not transfer successfully to computer
- 18. Computer care plans will help overcome fear of new technology.
- 19. Computer care plans will expose nurses to litigation
- 20. Computer care plans will increase knowledge base.
- 22. Computer care plans will increase accountability and professionalism.

Negative attitudes

- 1. Computer care plans will increase work load
- 2. Computer care plans will improve communication
- 3. The cost of the system would be better used on employing more nurses.
- 4. Computer care plans will allow more time with patients
- 5. Time on computer will be out of proportion to benefits
- 7. Computer care plans will improve patient care
- 8. Queuing for terminals will be time wasting.
- 15. Computer care plans will make staff orientation difficult
- 21. Computer care plans take time away from patient care

NB negatively worded statements (numbers 1,3,5,8,15,21) needed an "agree" response to attain a negative attitude score.

ANALYSIS BY COMPARISON:
NURSING PROCESS AND PROPOSED COMPUTER CARE PLANS.

Nursing care plans have been described as the working tools of the Nursing Process. Computer care plans represent the application of technology to the elements of care planning based on the Nursing Process. It was for this reason a questionnaire related to the Nursing Process was included in this research to establish how fundamental attitudes towards the principles of the Nursing Process would relate to attitudes towards computer care plans.

No ward demonstrated an average attitude response which was strongly positive or strongly negative towards either the Nursing Process or introduction of computer care plans, and the number of wards which held ambivalent attitudes towards them was approximately the same. However four wards (26.6%) felt more negative about the proposed computer care plans than about the Nursing Process. The three wards with positive attitudes and one of the wards with an undecided attitude towards the Nursing Process, demonstrated negative attitudes towards the new care plans.

See Table 5.4 below

TABLE 5.4

FREQUENCY OF RESPONSES FROM ALL WARDS		
n = 15		
	Nursing process	Computer care plans
Strongly positive	0 wards	0 wards
Mildly positive	3 wards	0 wards
Undecided	11 wards	10 wards
Mildly negative	1 ward	5 wards
Strongly negative	0 wards	0 wards

The distribution of attitude scores throughout individual respondents was marginally different from that of the average ward responses. Of the thirty two respondents (26.8%) who held positive attitudes towards the Nursing Process, only eighteen (15.1%) transferred these to the proposed computer care plans. Of these, five felt undecided, six felt negative and three felt strongly negative about the care plans. These results show that on average nurses held more positive attitudes towards the use of the Nursing Process and implied principles of individual care, than towards computer care plans six months before implementation.

However the proportion of individual respondents (32 nurses, 26.9%) who demonstrated positive attitudes to the Nursing Process was small. A considerably greater proportion (87 nurses, 72%) were negative or equivocal about the Nursing Process. This tendency was reflected in attitudes towards computer care plans where only 18 nurses (15.1%) held positive views but 101 (84.9%) were uncertain or negative. However the differential between the attitude categories had increased from 55 (45.1%) to 83 (69.8%). See Table 5.5 below.

TABLE 5.5

FREQUENCY OF RESPONSES FROM ALL NURSES		
(n = 119)		
	Nursing process	Computer care plans
Strongly positive	2 nurses	0 nurses
Mildly positive	30 nurses	18 nurses
Undecided	47 nurses	52 nurses
Mildly negative	39 nurses	45 nurses
Strongly negative	1 nurse	4 nurses

Please see Figures 1 and 2 for proportional distribution of responses.

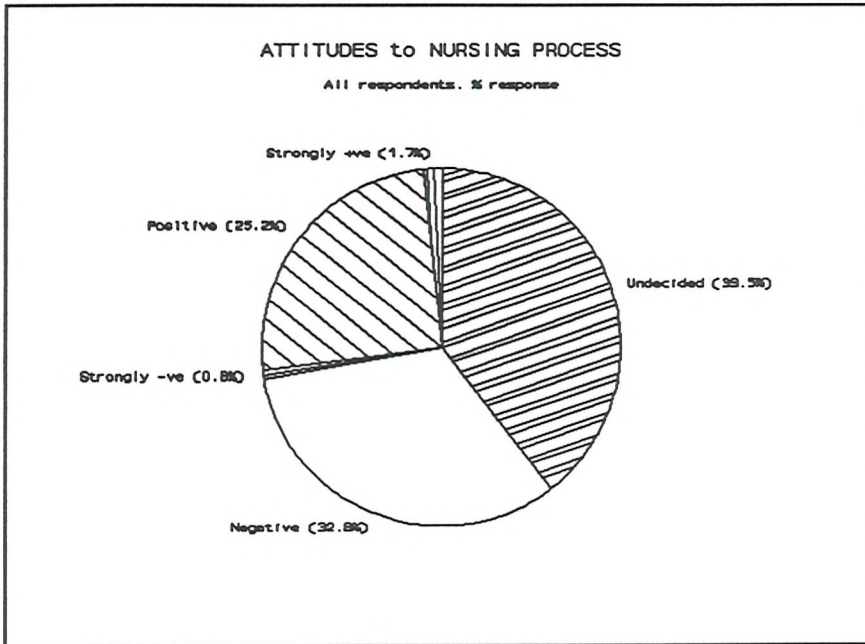


Figure 1 Proportional distribution of attitude responses to Nursing Process.

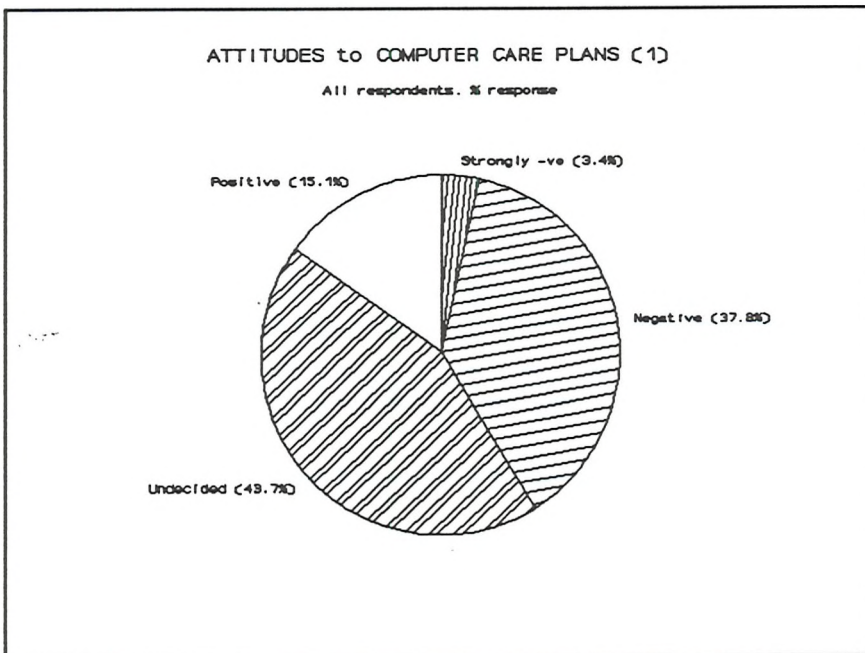


Figure 2 Proportional distribution of attitude responses to Computer Care Plans before implementation

As described earlier in this chapter, an average standardised attitude score for the hospital may be calculated. This resulted in a standardised score of 60.5% towards the Nursing Process and 55.9% towards the proposed computer care plans. Scores for individual wards may be seen in the Appendix. Both scores fall into the "undecided" range, but although there is a shift towards the positive pole for three wards, on average there is a 4.6% shift towards negative for attitudes to computer care plans. Statistical analysis showed that there was no association between results.

[Pearson's Product Moment Correlation Co-efficient was used with the Null Hypothesis: There will be no significant association between attitudes towards the Nursing Process and computer care plans. When $r = 0.14$ and $df = 13$, if $\alpha .05 = .5139$, r is not greater than .5139, so is not significant at any critical value, so the null hypothesis is not rejected. Conclusion: There is no correlation between the two variables.]

However from the results (see Appendix for individual wards) it was seen that nine wards had attitude scores for both elements with a difference of only 5 or less. I applied the same test to these nine wards only, using the same hypothesis and the results are as follows:

[When $r = 0.7563$ and $df = 7$, if $\alpha .05 = .6664$, is greater than .6664, so is significant at a critical value of 0.5. The null hypothesis is rejected. Conclusion: There is a significant association between the two variables.]

I am able to conclude that only for these nine wards, the nurses' attitudes towards the Nursing Process are associated with their attitudes towards computer care plans, prior to implementation.

These results indicate that only a small proportion of nurses held positive attitudes about the Nursing Process, and all that it implies, before the advent of care plans on the computer. The section on responses to individual statements above, helps to provide a clearer picture of attitudes. Figure 3 below compares the number of respondents who demonstrated each attitude response in the two elements of the questionnaire.

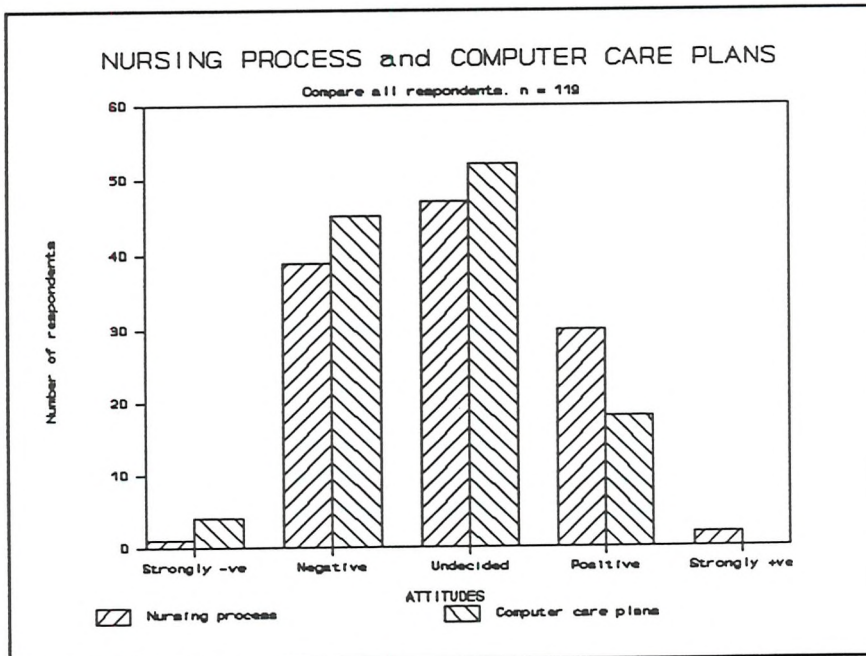


Figure 3. Comparison of number of respondents with each attitude score. Nursing Process and Computer Care Plans.

ANALYSIS BY AGE GROUP

The distribution of age groups among nursing staff varied from ward to ward, with 74.5% of nurses being in the two younger age groups. As the numbers are so small, especially in the two older age groups (36-45 and over 45 years) I have standardised the individual attitude scores and presented the results as averages per age group and also by the frequency of distribution of individual responses.

The number of nurses in each age group is as follows:

Under 25 years	42	36.8%
25 to 35 years	44	37.7%
36 to 45 years	19	16.7%
Over 45 years	10	8.8%

Average standardised responses per age group

Throughout the 15 wards average standardised scores demonstrated undecided attitudes towards the Nursing Process in the two younger groups (62% and 63%) and mildly negative in the two older age groups. (50% and 43%) The distribution of responses related to the proposed computer care plans was slightly different, the 25 - 35 group were undecided (58%) but the other three groups showed mildly negative attitudes. (53%, 42% and 40%)

TABLE 5.6

AVERAGE STANDARDISED ATTITUDE RESPONSES BY AGE GROUP				
	Under 25	25-35	36-45	Over 45
Nursing Process	62%	63%	50%	43%
Computer care plans	53%	58%	42%	40%

Comparison of frequency of responses

With the exception of the over 45 year age group, the number of respondents in each group with *positive* attitudes towards the Nursing Process was greater than those with negative attitudes. By contrast, with the exception of the 25 - 35 year group, the number of respondents in each group with *negative* attitudes towards computer care plans was greater than those with positive attitudes.

In the youngest age group, the shift towards negative attitudes to the computer care plans was from the base of positive and undecided Nursing Process attitudes. Of the thirty four nurses in these response categories, fifteen (44.1%) showed negative attitudes to the computer care plans.

In the 25 - 35 year age group of the sixteen nurses with positive attitudes to the Nursing Process, five (31.3%) were ambivalent about the care plans and two did not complete the questionnaire. There was no change in the number of negative attitudes in either questionnaire. The shift from

positive to negative attitudes was marginally different in the 36 - 45 group, where out of six nurses with positive attitudes to the Nursing Process, three (50%) assumed negative and one (16.6%) an undecided attitude towards the new care plans. In the oldest age group there was less difference between attitudes to both topics. There was no change in the number of positive attitudes but one nurse (20%) out of the five who were undecided about the Nursing Process was negative about the computer care plans.

A comparison of attitudes towards the Nursing Process and computer care plans is shown in Figures 4,5,6 and 7 below.

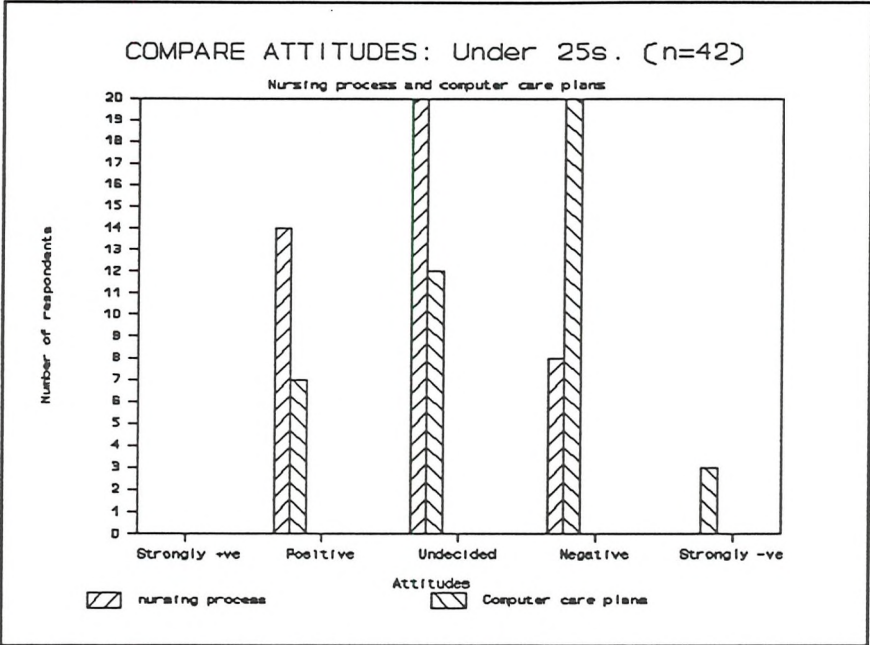


Figure 4 Comparisons in the under 25 year age group

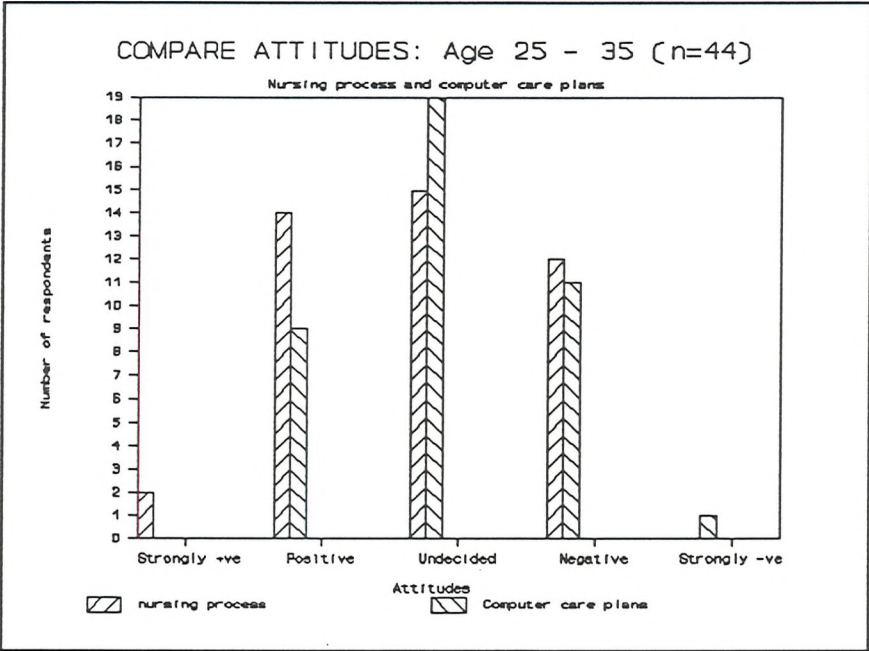


Figure 5 Comparison in the 25 - 35 year age group

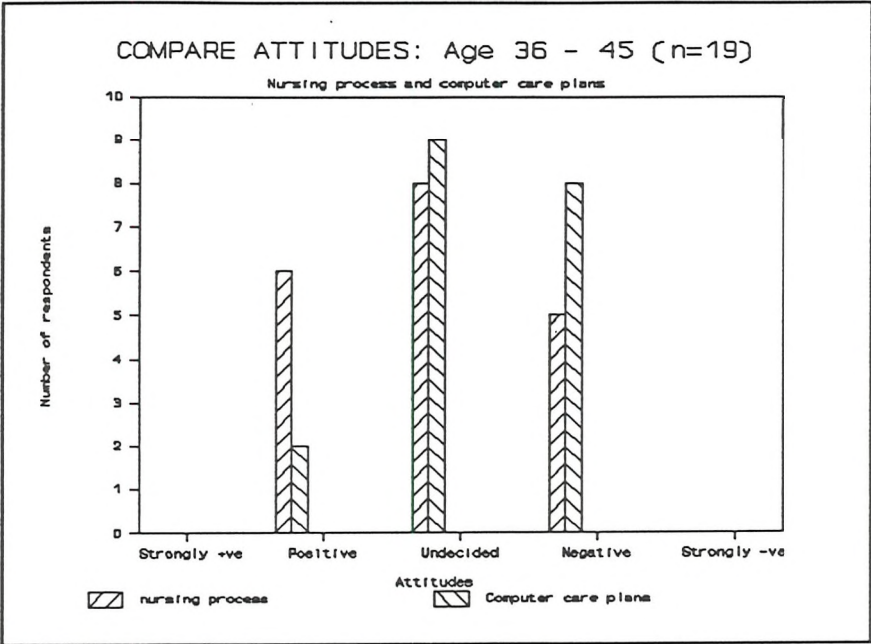


Figure 6 Comparison of the 36 - 45 year age group

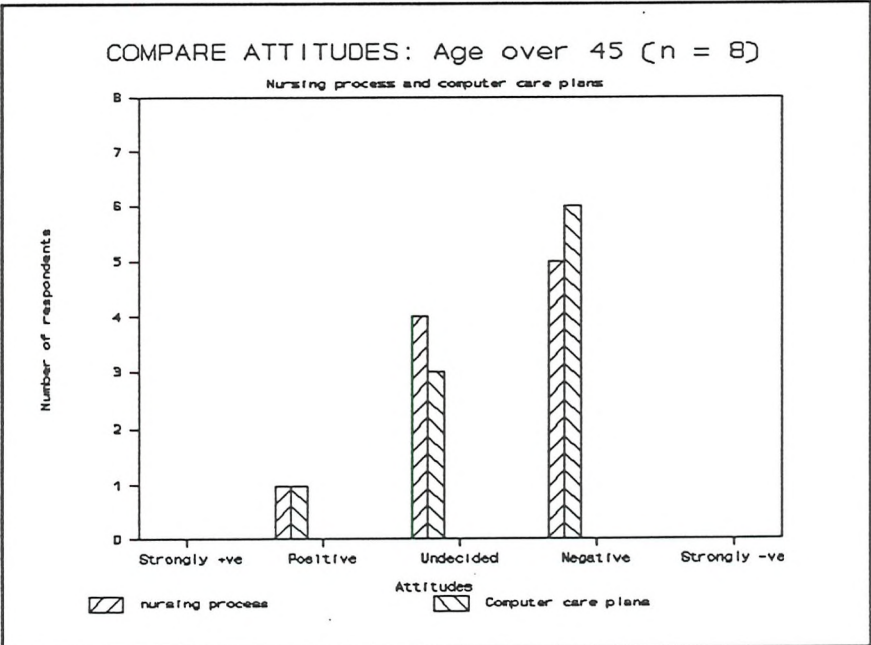


Figure 7 Comparison of the over 45 year age group

I compared the frequency for each attitude response for each age group, standardising the scores by using percentages as the numbers for each group varied. Actual results may be seen in the Appendix. Statistical tests showed there were no significant differences in attitudes between the age groups.

[The Chi square test was used with the Null Hypothesis: There will be no significant difference in attitudes to the Nursing Process\computer care plans between the age groups represented. For the Nursing Process: When $X^2 = 8.82$ and $df = 9.00$ at a critical value $.05 = 16.90$. For Computer care plans: $X^2 = 9.00$ and $df = 10.10$, at a critical value of $.05 = 16.90$, X^2 does not fall in the region of rejection for either element of the questionnaire, the null hypothesis is not rejected. Conclusion: there is no significant difference in attitudes towards the Nursing Process or computer care plans between the age groups.]

ANALYSIS BY QUALIFICATION

The number of nurses with each qualification (specified) is as follows:

Registered Nurses	82	71.7%
Enrolled Nurses	34	28.9%

Comparison of Average standardised responses

Registered nurses accounted for 69.5% of all respondents in this pre implementation study. The average attitude response throughout the hospital for both groups and the one nursery nurse towards both Nursing Process and the proposed computer care plans was undecided. Looking at the standardised scores for attitudes towards the Nursing Process, the registered nurses' score (63%) was towards the positive pole of the undecided score and the enrolled nurses' (58%), towards the negative pole. Both groups were towards the negative pole in attitudes towards the computer care plans. (RGN 55%, EN 57%)

TABLE 5.7

AVERAGE STANDARDISED ATTITUDE RESPONSES BY QUALIFICATION		
	Registered	Enrolled
Nursing Process	63%	58%
Computer care plans	55%	57%

Comparison of frequency of responses

There were marked differences in attitudes towards the Nursing Process between the two groups. 39% of registered nurses were positive about the Nursing Process, while only 25.6% were negative. In contrast, 20% of enrolled nurses were positive and twice as many (40%) were negative. Of the thirty three Registered nurses with positive attitudes towards the Nursing Process, only seventeen, (51.5%) carried these attitudes over to computer care plans, the remaining sixteen (48.5%) holding negative attitudes, 5 of these being strongly negative. The proportion of ambivalent attitudes (34.2%) was the same towards both Nursing Process and computer care plans.

The trend was repeated among the enrolled respondents, although the proportion of undecided responses was slightly higher in this group, at 40%. Of the seven enrolled nurses who demonstrated positive attitudes towards the Nursing Process, four (57.1%) transferred these attitudes to the computer care plans, one (14.3%) held a negative attitude towards the care plans, while the

remaining two (28.6%) did not respond to the computer questionnaire. The nurse who responded with a strongly negative attitude to the Nursing Process did not complete the computer questionnaire.

In order to compare attitudes of registered and enrolled nurses I used percentages. The actual frequencies are included in the Appendix. Statistical tests showed there was no significant difference in attitudes to either component of the questionnaire between the age groups.

[Chi squared analysis was used with the Null Hypotheses: There will be no significant difference in attitudes to the Nursing Process\ computer care plans between the different levels of qualification. Nursing Process: when $X^2 = 3.30$ and $df = 3.00$, Computer care plans: when $X^2 = 3.96$ and $df = 3.00$ at a critical value of $.05 = 7.81$, X^2 does not fall in the rejection region in either analytical test, the null hypothesis is not rejected. Conclusion: there is no significant difference in attitudes towards the Nursing Process or computer care plans between the two levels of qualification.]

For a comparison of attitudes, see Figures 8,9,10 and 11.

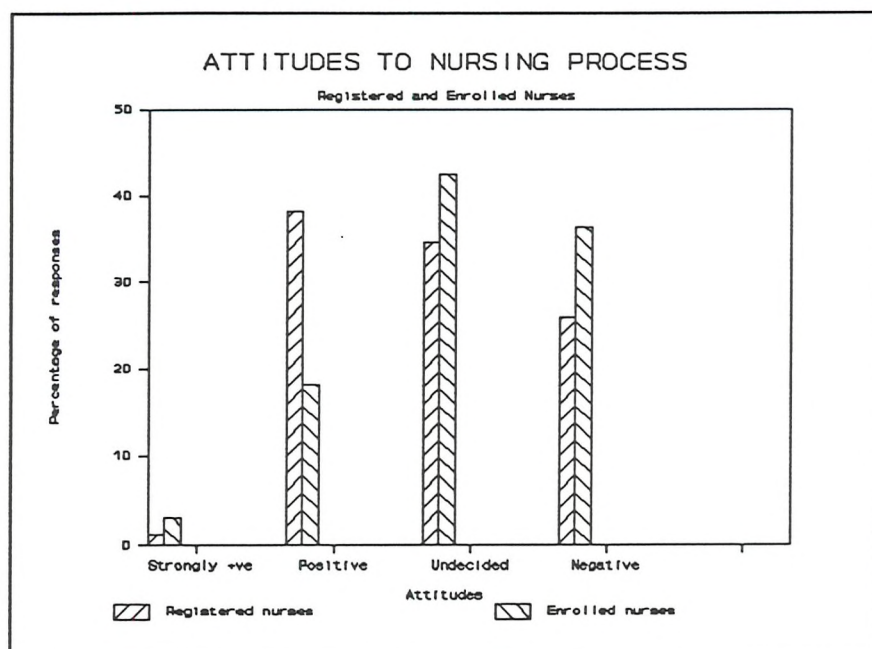


Figure 8 Comparison of attitudes to the Nursing Process: Registered and Enrolled Nurses

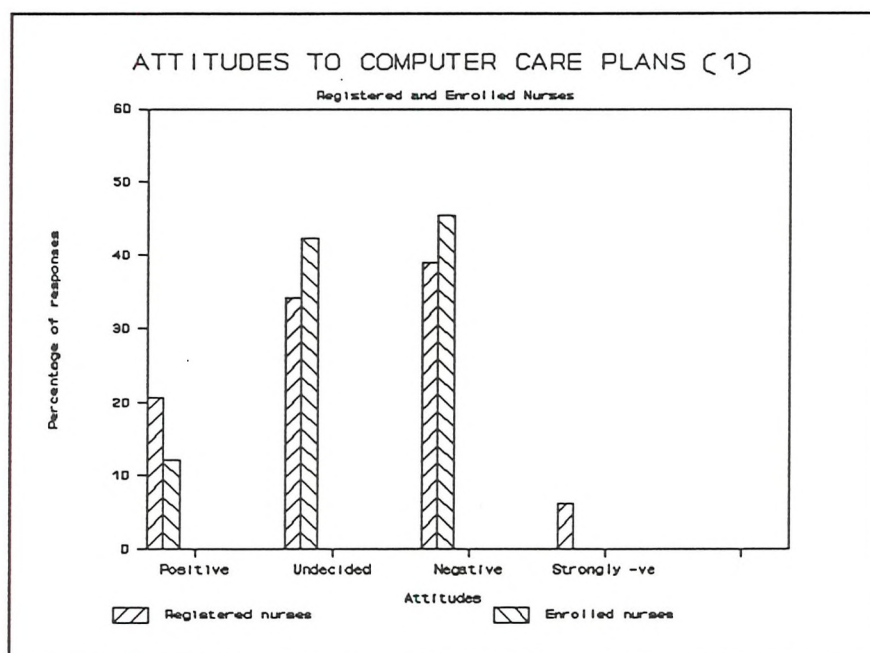


Figure 9 Comparison of attitudes towards Computer Care Plans: Registered and Enrolled Nurses.

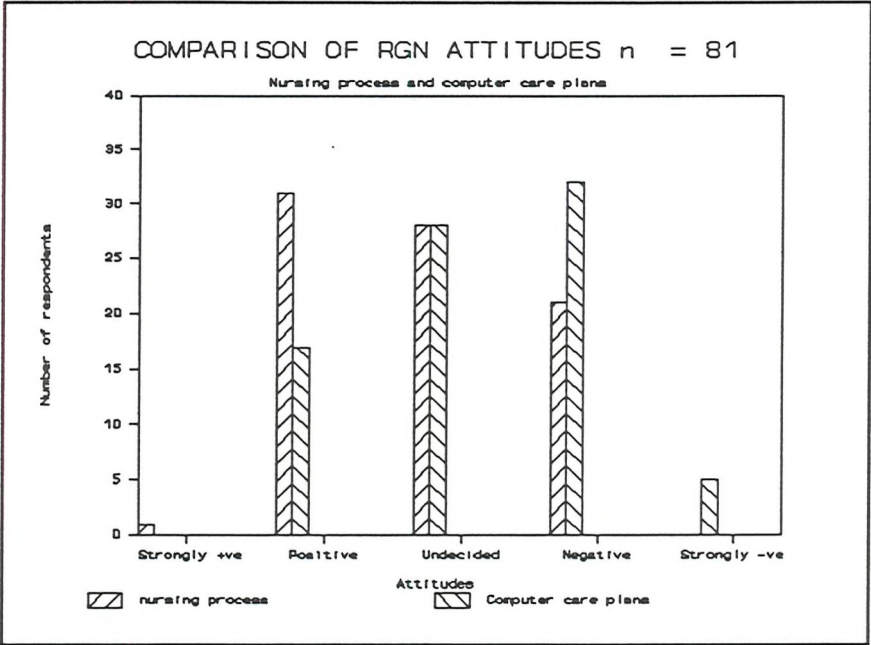


Figure 10 Comparison of attitudes of Registered Nurses to the Nursing Process and Computer Care Plans

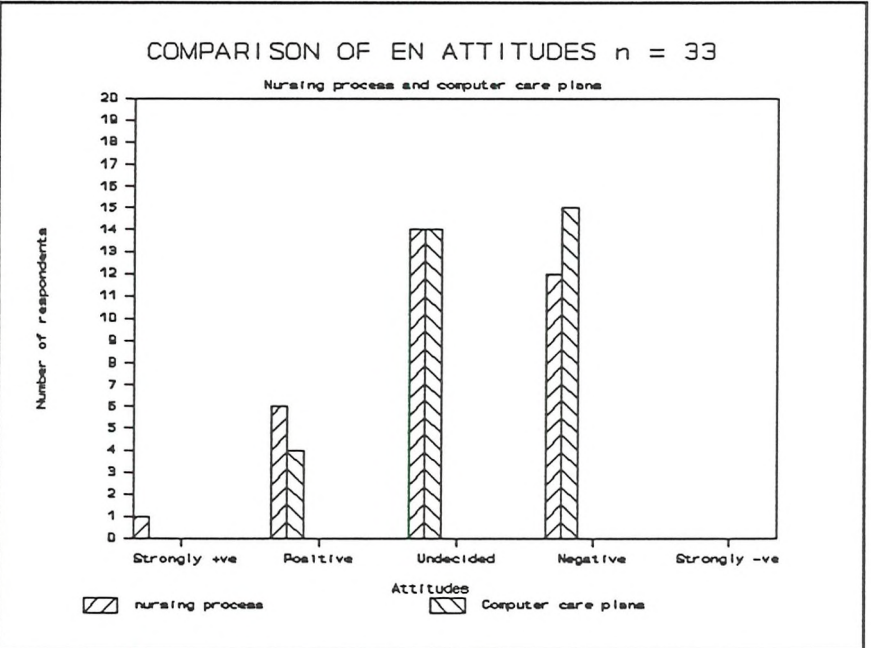


Figure 11 Comparison of attitudes of Enrolled Nurses to the Nursing Process and Computer Care Plans

**FACTOR ANALYSIS APPLIED TO INDIVIDUAL STATEMENTS RELATED TO
COMPUTER CARE PLANS**

The questions related to the proposed computer care plans have been grouped under professional, practical, ethical or technological factors as seen below.

TABLE 5.8
A. Questions reflecting professional factors

<p>Computer care plans:</p> <ul style="list-style-type: none">2. Improve communication9. Are a useful learning experience11.Should not be an expected part of nurses' work.12.Help to set standards of care14.Are more research based19.May expose nurses to more litigation20.Help to increase knowledge base22.Help to increase accountability and professionalism
--

B. Questions reflecting practical factors

<p>Computer care plans:</p> <ul style="list-style-type: none">1. Increase work load3. Increase need for more nurses5. Time spent on them is out of proportion to benefits8. Queuing to complete them is a problem10.Reduce paper work15.Make orientation of new staff more difficult
--

C. Questions reflecting ethical factors

<p>Computer care plans:</p> <ul style="list-style-type: none">4. Allow more time with patient6. Cause problems with confidentiality7. Take away individuality of care21.Take time away from the patients
--

D. Questions reflecting technological factors

Computer care plans:		
16.	Save time in care planning by use of light pen	
17.	Have not transferred successfully to computer	
18.	Help nurses to overcome fear of technology	

Overall there was no factor that nurses felt positive about at this time.
The average aggregate scores from all the wards are shown below.

TABLE 5.9

SUMMARY OF AVERAGE RESPONSES FROM ALL WARDS.		
Professional factors	Undecided	59.2%
Practical factors	Negative	49%
Ethical factors	Negative	52.4%
Technological factors	Undecided	62.6%

Table 5.10 shows the frequency of individual ward responses to each factor of analysis. Please see below.

TABLE 5.10

FREQUENCY OF INDIVIDUAL WARD RESPONSES			
	Positive	Negative	Undecided
Professional	3	3	9
Practical	0	12	3
Ethical	0	10	5
Technological	4	0	11

Figure 12 below, shows the frequency of attitudes from all the wards as an aggregate average.

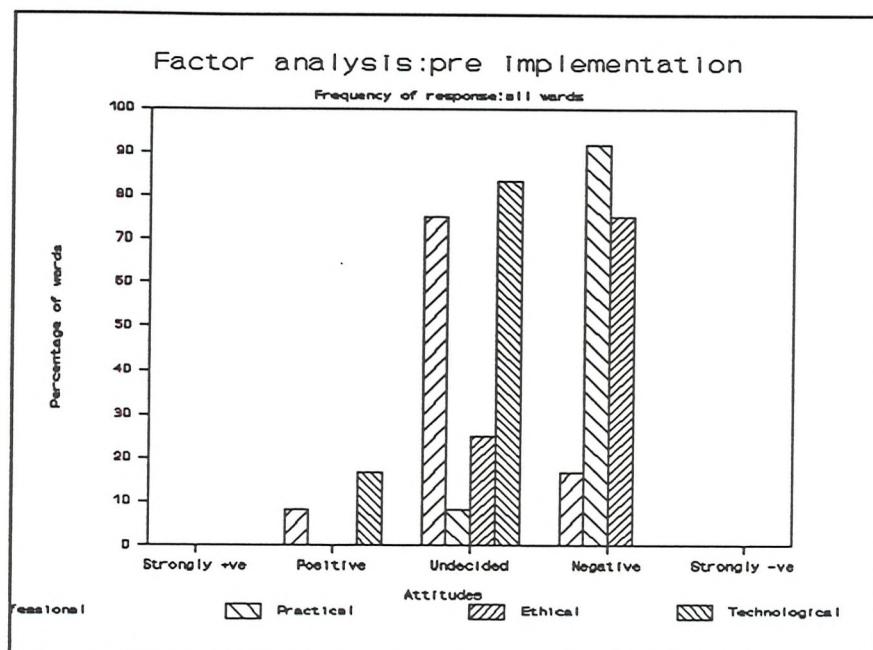


Figure 12 Frequency of attitudes towards each factor demonstrated by aggregate of all wards

SUMMARY OF RESULTS

The average attitude to both components of this questionnaire was "undecided". While this may be understandable in respect of proposed computer care plans, it is less easy to understand in connection with the principles of the Nursing Process. This had been established nationally for about nine years by the time of the questionnaire, so many of the respondents would have no experience of practice pre Nursing Process. This attitude will be discussed in relation to the Nursing Process literature in a final chapter.

The purpose of the Nursing Process questionnaire was to provide a baseline for analysis of attitudes towards computer care plans. Statistical analysis showed that there was a significant association between attitudes to the Nursing Process and those towards the proposed computer care plans for nine of the wards, but this could not be generalised to all fifteen wards.

Attitudes to individual statements were also analysed by the factors they represent, that is professional, ethical, practical and technological, aggregate responses showed that nurses were negative about the practical and ethical aspects of computer care planning, but remained undecided about professional and technological issues.

There were differences in average attitudes between the age groups. Of the respondents in the over 45 years age group, half were negative about the Nursing Process and more than half were negative about the proposed computer care plans. It could be argued that unless these nurses

had started their nursing careers relatively late in life, the Nursing Process had been introduced when their professional practice and expertise were well established. This group is also less likely to have experience of computers, so anxiety about the unknown may be responsible for negative attitudes. A third of respondents in each of the three younger age groups demonstrated positive attitudes towards the Nursing Process, but strangely, nearly half the respondents under 25 years old, whose practice would have been founded on the Nursing Process, were undecided about it. However, statistical analysis showed that these differences were not significant.

Analysis by qualification also demonstrated differences in attitude. A smaller percentage of enrolled nurses were positive about the Nursing Process. As fewer enrolled nurses have been trained in recent years, this indicates that there are fewer in the under 25 year age groups, so fewer that have used the Nursing Process from the start. There was a smaller variation in attitudes towards computer care plans. Once again, statistical analysis demonstrated that these differences are not significant.

Although it is possible to speculate about the reasons for the differences in attitude between the age groups and qualifications, it is more difficult to identify practical ways of addressing them. At this stage it seems that these results are of interest only.

All these results will be discussed in relation to results from other elements of the research, and in the context of change theories and relevant literature in the final chapters.

Further questionnaires, to determine attitudes three months after introduction of the new care plans, were distributed to the first eight wards on which they were introduced. This is the subject of the next chapter.

CHAPTER 6

THE ATTITUDE QUESTIONNAIRE: THREE MONTHS AFTER IMPLEMENTATION

Eight wards took part in the post implementation questionnaire. Implementation was staged, and took place with groups of wards at approximate monthly intervals. However in the summer of 1989, there was a two month break in the programme to avoid the most popular holiday months of July and August when staffing levels were likely to present problems. The eight wards selected for this part of the study were those that had started using the computerised care plans before the two months break and were selected on this basis only.

This questionnaire included the same twenty two attitude statements related to computer care plans, but phrased in the present, instead of the future tense, and an additional two statements for interest only. The Nursing Process questionnaire was not repeated. Questionnaires were distributed to ninety seven qualified nurses on the eight wards and there were seventy two responses representing a response rate of 74.2%.

This chapter is concerned with comparison of attitudes before and after implementation of computer care plans. It includes comparison of the aggregate pre and post implementation attitudes. The responses of individual nurses cannot be compared as the questionnaires were totally anonymous. Individual comments will be included in the following chapter.

OVERVIEW OF RESULTS

After they had been using the new care plans for twelve weeks, nurses remained positive about use of the light pen and became more positive about the need for nurses to develop computer skills. However they became less sure that the new care plans were more research based than the original individually written ones. In reality, twelve weeks after implementation, they were also doubtful about the care plans helping to reduce paper work. Attitudes stayed equivocal about aspects of confidentiality, standards of care, knowledge base and fear of technology but became more negative about queuing for terminals, individual care, accountability and risk of litigation. They also became negative about care plans transferring successfully to the computer. From the beginning negative attitudes had been demonstrated towards several aspects of computer care planning and these persisted twelve weeks later. These issues included work load, need for more staff, communication, time with patients, benefits of computers, learning opportunities and staff orientation.

Results of the Nursing Process component of the pre implementation questionnaire produced some anomalies which may be attributed to inadequate understanding of the principles of the Nursing Process. Some of these attitudes were transferred to computer care plans and have remained steadfast. Using the Nursing Process as a foundation may explain some of the attitudes to computer care plans before they were used. For example, the negative feelings that to carry out the Nursing

Process required more nurses and took time away from patient care, was transferred to the projected use of computer care plans. In the same way positive feelings that use of the Nursing Process aids research was also transferred to apply to computer care plans. However this cannot explain the attitudes displayed after twelve weeks of using the care plans. Nurses persisted in the attitude that using computer care plans would require more nurses and take time away from patient care, but did not still agree that use of the care plans would help research. This particular attitude is difficult to understand, as the care plans were written with full support of the relevant nursing staff and based on available current research findings and clinical norms. It is also difficult to concede the general attitude that use of the computer care plans will increase the risk of litigation, but at the same time will not increase accountability. The two coexist. It is easier to rationalise the negative attitudes towards work load, time management, staff orientation and inconvenience, such as queuing for terminals. Owen (1983) discusses the high degree of stress associated with changes in working practice, which in turn makes the work situation more exhausting. A major change such as this which demands high levels of energy may encourage negative attitudes. Other negative attitudes, for example towards the statement that computer care plans will improve patient care, may reveal suspicions that the introduction of new methods implies criticism of the established practice.

ANALYSIS OF RESULTS

As in the pre implementation study attitudes have been analysed, but not presented, in specialty groups but as an aggregate of all respondents. Results have been analysed by attitude scores towards individual statements, and by age group and qualification of the respondents. Statements have also been analysed by the factors of nursing which they reflect, that is professional, practical, ethical or technological aspects. Attitudes before and after the introduction of the care plans have been compared. Details of individual ward analysis may be seen in the Appendix for Chapter 6.

Guide to standardised scores seen in tables below.

Strongly positive	84-100%
Positive	67-83%
Undecided	54-66%
Negative	37-53%
Strongly negative	20-36%

ANALYSIS BY RESPONSE TO INDIVIDUAL STATEMENTS

Although I hoped there would be a shift towards positive attitudes towards the care plans, results demonstrated that the reverse was true. A comparison of aggregate attitude scores from these eight wards in pre and post implementation studies is included in this chapter, (see Table 6.1 below), as well as a comparison of aggregate responses from the eight wards and the fifteen wards taking part in the pre implementation study.

TABLE 6.1

COMPARISON OF ATTITUDES FROM ALL RESPONDENTS FROM THE 8 WARDS TAKING PART IN BOTH STUDIES			
Before implementation	n = 71	After implementation	n = 72
All statements refer to effects of computer care plans			
Statement	Before	After	Variance
Increase work load	50	37.3	-12.9
Improve communication	55.9	39.5	-16.4
Increase need for nurses	43.6	44.8	+1.2
Make more time for patients	53.4	37.1	-16.3
Time is disproportionate to benefits	53.7	40.6	-13.1
Reduce confidentiality	61.8	58.0	-3.8
Improve patient care	58.3	41.1	-17.2
Are a good learning tool	41.4	43.9	+2.5
Reduce paper work	72.2	57.3	-14.9
Cause queues at terminals	66.4	27.8	-38.6
Make nurses learn unnecessary skills	65.6	68.1	+2.5
Improve standards	58.6	56.5	-2.1
Take away individuality	54.6	44.2	-10.4
Are more research based	70.1	62.3	-7.8
Complicate staff orientation	50.7	41.1	-9.6
Light pen saves time	76.3	66.9	-9.4
Do not adapt to computer well	58.1	50.1	-8.0
Overcome technological fears	61.7	55.6	-6.1
Increase litigation risk	53.9	53.1	-0.8
Increase knowledge base	62.2	62.3	+0.1
Reduce time with patients	51.1	36.4	-14.7
Increase accountability	62.0	53.3	-8.7
TOTAL AVERAGE SCORE	57.0	49.0	-9

The negative shift in attitudes demonstrated by this table was shown to be statistically significant.

[A paired T Test was used with the Null hypothesis: after using the computer care plans for three months there would be no significant difference in nurses' attitudes. When $d = -152$ and mean $d = -6.92$, if $sd = 8.824$ and $t = -3.67$, Cut off point for rejection region at $\alpha 0.05 = 1.720$ and at $\alpha 0.01 = 2.079$. The test statistic (t) falls in the rejection region at both critical values and the null hypothesis is rejected. Conclusion: nurses' attitudes are significantly more negative after using computer care plans for three months, based on responses from the eight wards in both studies.]

To ascertain whether these eight wards were representative of all wards in the first study, the results were compared with the aggregate of all fifteen wards from the pre implementation phase. The

that the eight wards are reasonably representative. The rest of the analysis will be based on this premise, with the results from the eight wards in the second questionnaire compared to the total results from the first questionnaire.

TABLE 6.5

COMPARISON OF ATTITUDES TO COMPUTER CARE PLANS SUMMARY of frequency of attitude responses from all wards			
	Pre implement n = 15	Pre implement n = 8	Post implement n = 8
Strongly positive	0	0	0
Mildly positive	0	0	0
Undecided	10(66.6%)	6(75%)	2(25%)
Mildly negative	5 (33.3%)	2(25%)	5(62.5%)
Strongly negative	0	0	1(12.5%)

Table 6.6 compares responses from all respondents in the first questionnaire with all from the second questionnaire.

TABLE 6.6

COMPARISON OF ATTITUDES TO COMPUTER CARE PLANS SUMMARY of frequency of responses from all respondents		
	Pre implement n = 119	Post implement n = 72
Strongly positive	0 nurses	0 nurses
Mildly positive	18 nurses(15%)	6 nurses (8.3%)
Undecided	52 nurses(43.7%)	14 nurses(19.4%)
Mildly negative	45 nurses(37.8%)	36 nurses(50%)
Strongly negative	4 nurses (3.4%)	16 nurses(22.2%)

This shows that 31% of nurses have shifted attitudes from undecided or positive, to negative or strongly negative in the 12 weeks since the care plans were introduced

ANALYSIS BY AGE GROUP

The number of nurses in each age group is as follows:

Specified age group	65	
Under 25 years	22	33.8%
25 to 35 years	28	43.0%
36 to 45 years	13	20.0%
Over 45 years	3	4.6%

The under 25 group demonstrated negative attitudes to computer care plans in both phases of the attitude study. (52% and 54%) The 25-35 age group, who were undecided before implementation, (60%) responded with strongly negative (36%) attitudes 12 weeks later. The 36-45 age group were undecided before implementation (56%) but negative after 12 weeks of use. (42%) The over 45 group changed their attitudes from negative (52%) to undecided (65%) in the later study, but the latter group consisted of only two respondents compared with five in the original study. This was the only group demonstrating a shift towards positive in their attitudes towards the care plans.

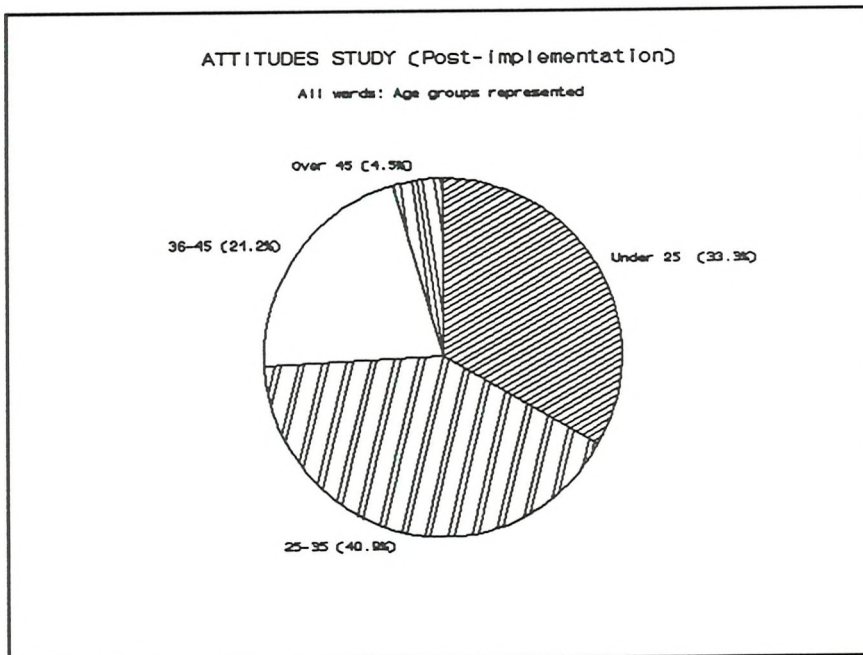


Figure 1 Proportional distribution of nurses in age groups

Figure 1 above shows the distribution of age groups in this phase of the study.

The table below compares the average attitude score from each age group in both phases of the study. Actual distribution of responses to each response category is included in the Appendix. Figures 2,3,4 and 5 show how the attitudes of each age group compared to the pre and post questionnaire.

TABLE 6.7

COMPARISON OF AGGREGATE % ATTITUDE SCORES. (8 WARDS INVOLVED IN BOTH STUDIES)			
	Before	After	Variation
Under 25 years	52	48	-4
25-35 years	60	36	-24
36-45 years	56	42	-14
Over 45 years	52	65	+13

In Chapter 5 it was established that there was no significant difference in attitudes between the age/qualification groups. In addition it has been established above that over all in these eight wards the attitudes have become significantly more negative over the period of three months, since starting to use the care plans. As it also seemed inappropriate to single out a specific age/qualification group for any practical purposes related to attitude, I decided not to apply any statistical tests to these results, or those from the respondents based on professional qualification.

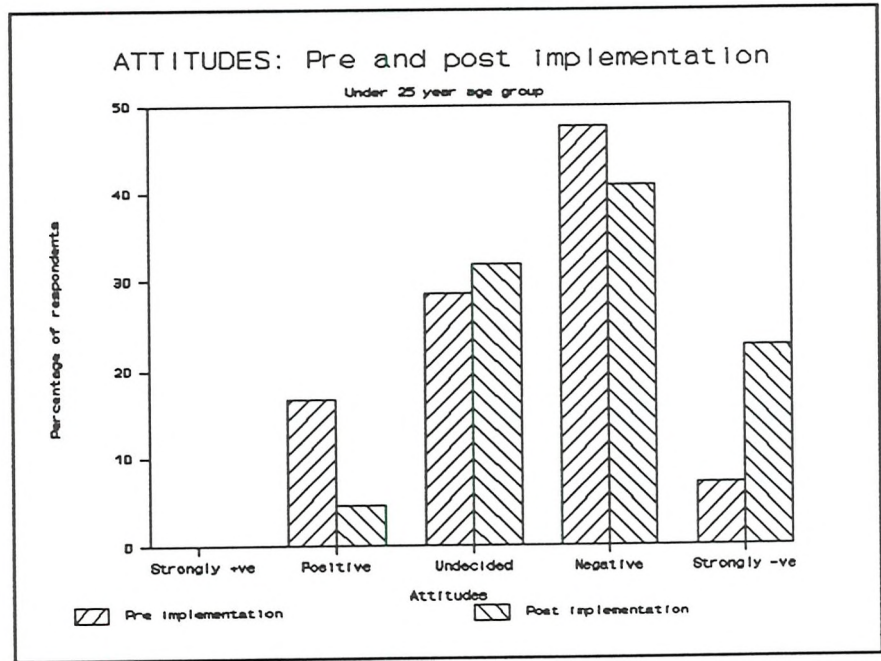


Figure 2 Comparison of attitudes for the under 25 year age group pre and post implementation

TABLE 6.8

COMPARISON OF AGGREGATE STANDARDISED ATTITUDE SCORES. WARDS INVOLVED IN BOTH STUDIES				
Registered nurses		Enrolled nurses		
Pre implementation n = 82		Pre implementation n = 35		
Post implementation n = 43		Post implementation n = 25		
	Before	After	Variation	
Registered nurses	58	42	-16	
Enrolled nurses	55	46	-9	

Figures 6 and 7 compare attitudes in pre and post implementation questionnaires
Figure 8 below, compares the attitudes of Registered and Enrolled nurses 3 months after computer care plans had been introduced.

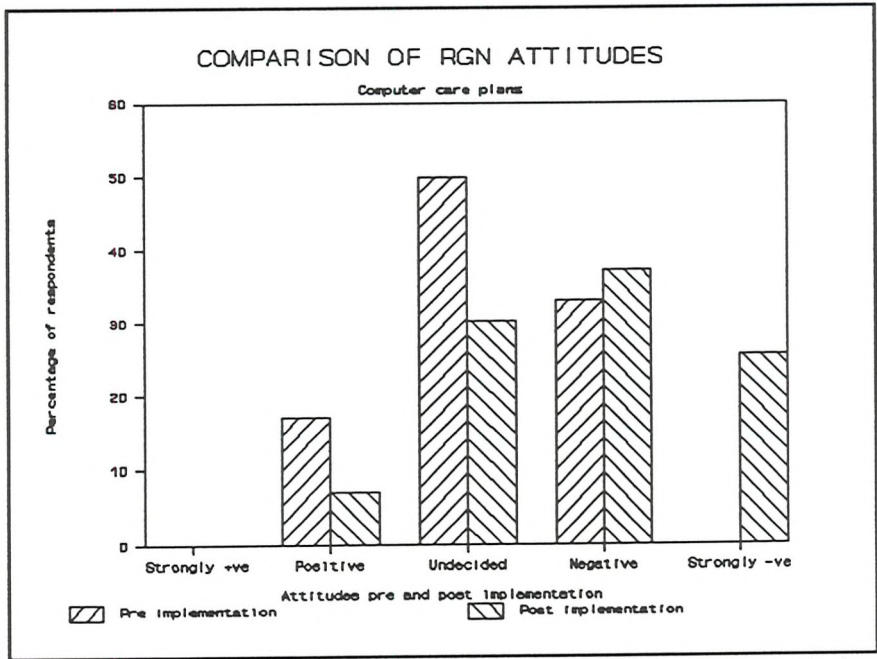


Figure 6 Comparison of attitudes for Registered nurses before and after implementation.

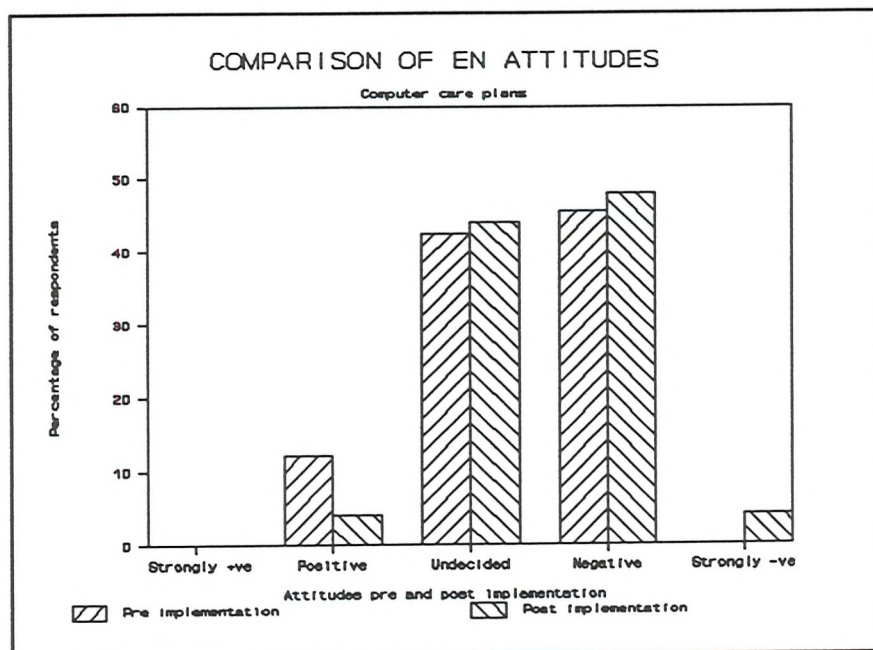


Figure 7 Comparison of attitudes for Enrolled nurses before and after implementation.

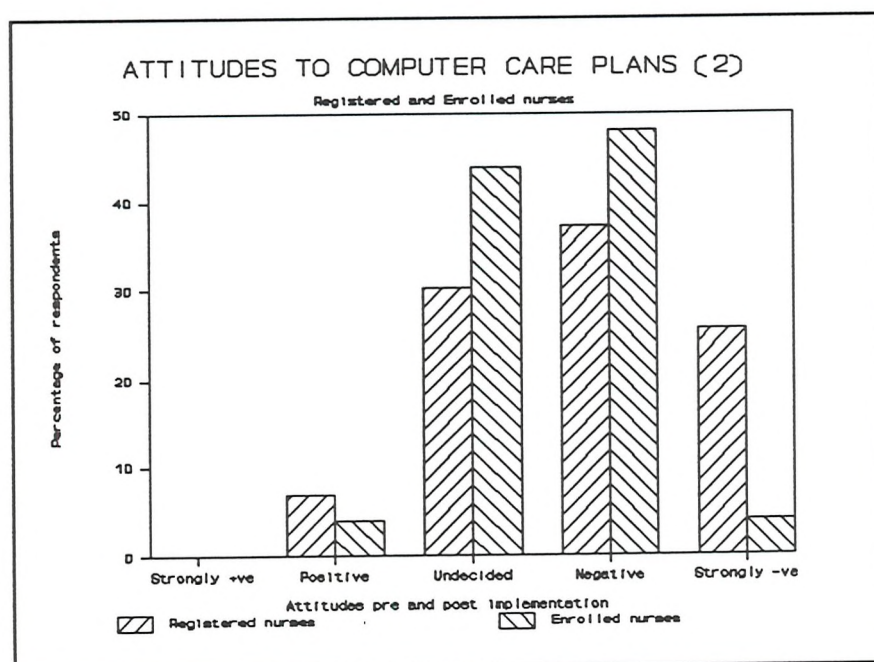


Figure 8. Comparison of attitudes of Registered and Enrolled Nurses 3 months after implementation.

ANALYSIS BY AGE GROUP

The number of nurses in each age group is as follows:

Specified age group	65	
Under 25 years	22	33.8%
25 to 35 years	28	43.0%
36 to 45 years	13	20.0%
Over 45 years	2	4.6%

The under 25 group demonstrated negative attitudes to computer care plans in both phases of the attitude study.(52% and 54%) The 25-35 age group, who were undecided before implementation, (60%) responded with strongly negative (36%) attitudes 12 weeks later. The 36-45 age group were undecided before implementation (56%) but negative after 12 weeks of use. (42%) The over 45 group changed their attitudes from negative (52%) to undecided (65%) in the later study, but the latter group consisted of only two respondents compared with ten in the original study. This was the only group demonstrating a shift towards positive in their attitudes towards the care plans.

In Chapter 5 it was established that there was no significant difference in attitudes between the age/qualification groups. In addition it has been established above that over all in these eight wards the attitudes have become significantly more negative over the period of three months, since starting to use the care plans. As it also seemed inappropriate to single out a specific age/qualification group for any practical purposes related to attitude, I decided not to apply any statistical tests to these results, or those from the respondents based on professional qualification.

The table below compares the average attitude score from each age group in both phases of the study. Actual distribution of responses to each response category is included in the Appendix. Figures 1,2,3 and 4 show how the attitudes of each age group compared to the pre and post questionnaire.

TABLE 6.7

COMPARISON OF AGGREGATE % ATTITUDE SCORES. (8 WARDS INVOLVED IN BOTH STUDIES)			
	Before	After	Variation
Under 25 years	52	48	-4
25-35 years	60	36	-24
36-45 years	56	42	-14
Over 45 years	52	65	+13

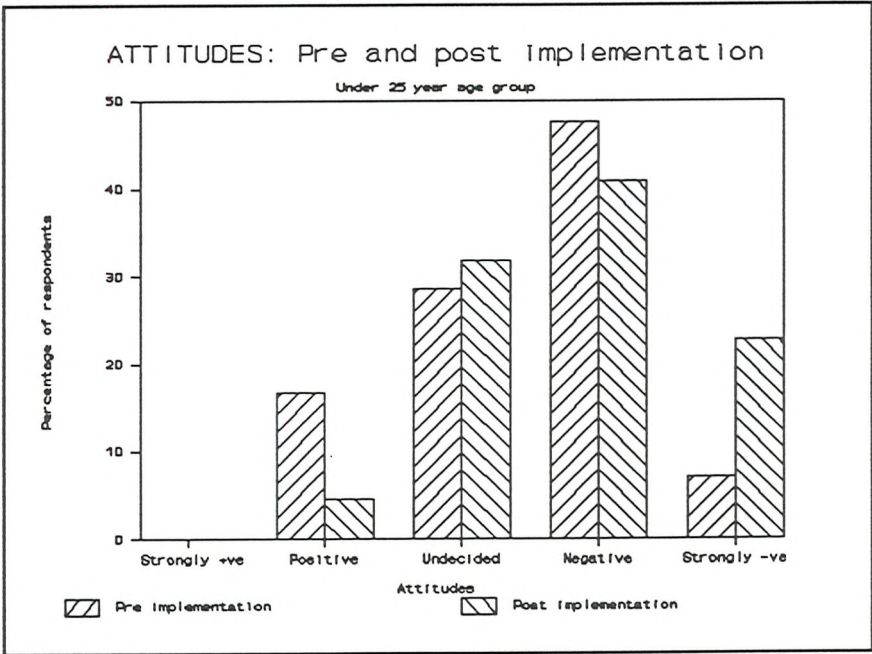


Figure 1 Comparison of attitudes for the under 25 year age group pre and post implementation

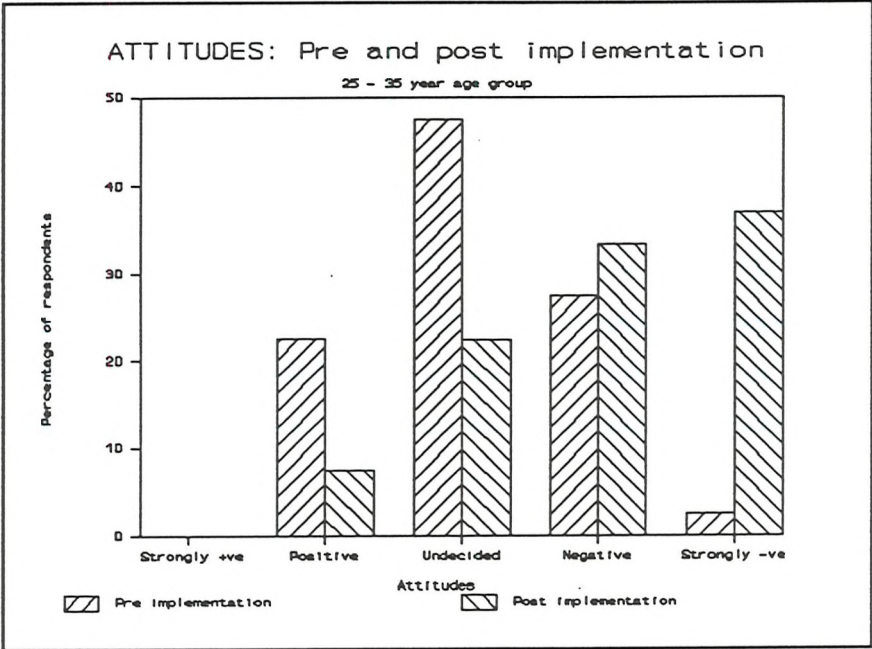


Figure 2 Comparison of attitudes for the 25 -35 year age group pre and post implementation

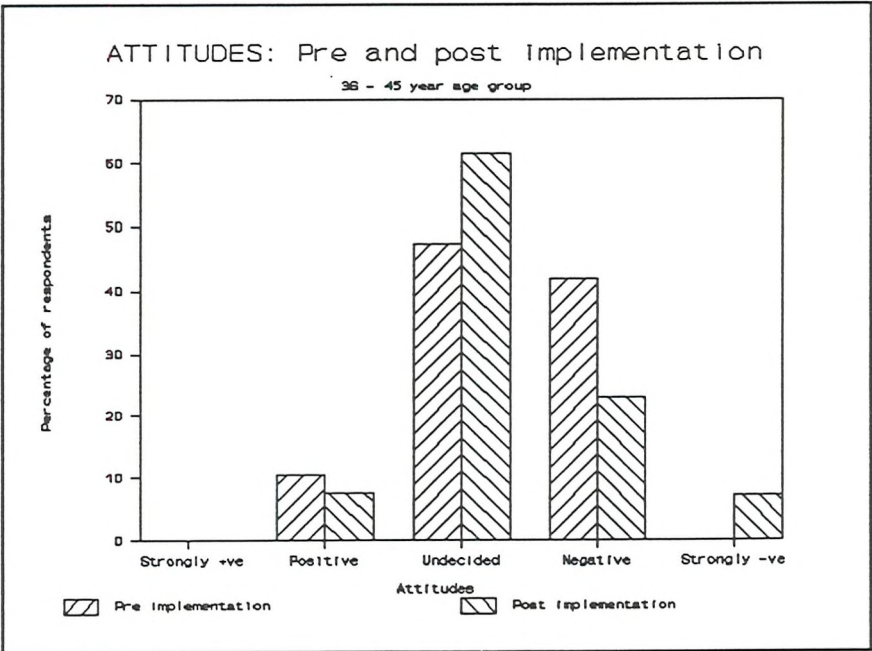


Figure 3 Comparison of attitudes for the 36 - 45 year group pre and post implementation

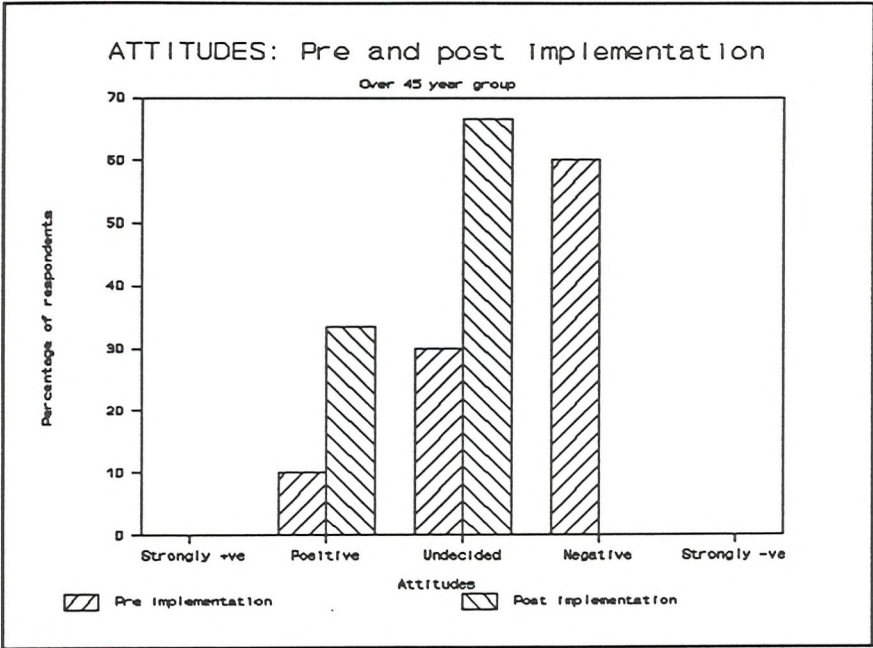


Figure 4 Comparison of attitudes for the over 45 year age group pre and post implementation

ANALYSIS BY QUALIFICATION

The number of nurses with each qualification is as follows:

Specified qualification	69	
Registered Nurses	43	62.3%
Enrolled Nurses	26	37.7%

Registered nurses represent 62.3% of respondents in the post implementation questionnaire compared to 69.5% of respondents in the original study. Both groups of respondents demonstrated undecided attitudes to computer care plans before starting to use them, which is understandable. Twelve weeks after implementation both groups had moved to explicit negative responses. (RGN 42%, EN 46%)

Table 6.8 shows how the aggregated average attitudes changed in each group of wards involved in the two questionnaires, after the nurses had been using the new care plans for 12 weeks. The actual distribution of responses to each attitude category is included in the Appendix.

TABLE 6.8

COMPARISON OF AGGREGATE STANDARDISED ATTITUDE SCORES. WARDS INVOLVED IN BOTH STUDIES			
Registered nurses		Enrolled nurses	
Pre implementation n = 82		Pre implementation n = 35	
Post implementation n = 43		Post implementation n = 25	
	Before	After	Variation
Registered nurses	58	42	-16
Enrolled nurses	55	46	-9

Figures 6 and 7 compare attitudes in pre and post implementation questionnaires
Figure 8 below, compares the attitudes of Registered and Enrolled nurses 3 months after computer care plans had been introduced.

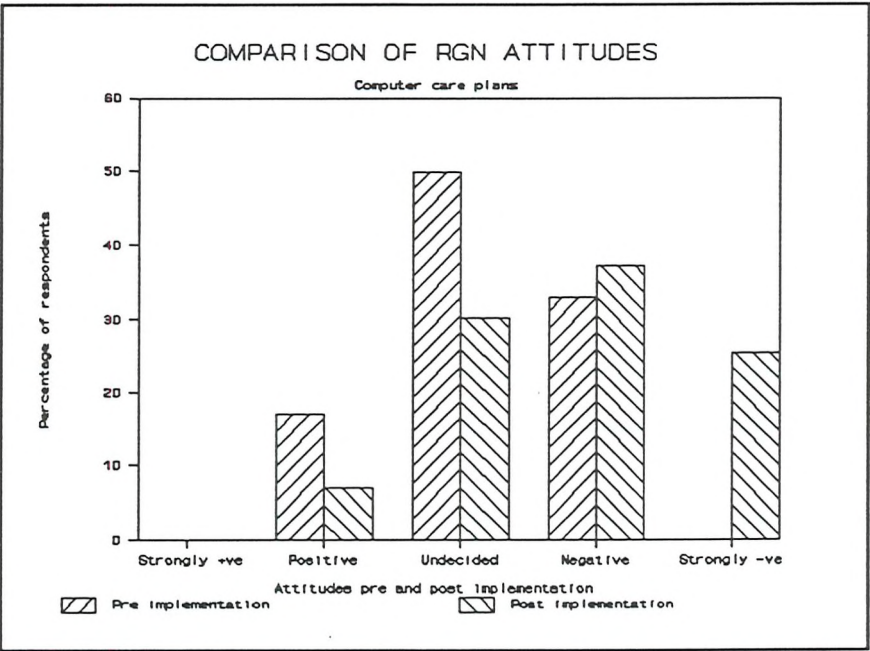


Figure 5 Comparison of attitudes for Registered nurses before and after implementation.

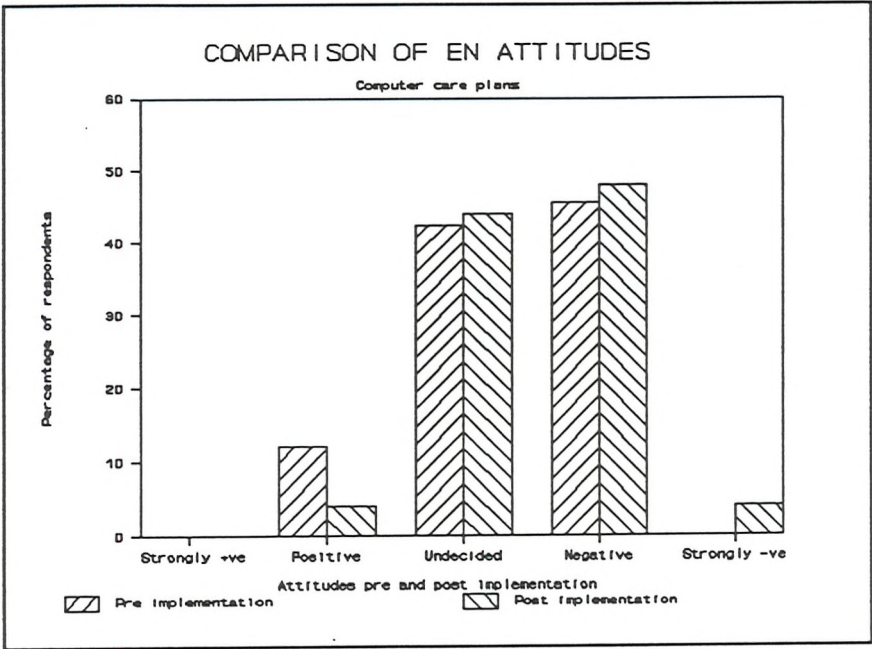


Figure 6 Comparison of attitudes for Enrolled nurses before and after implementation.

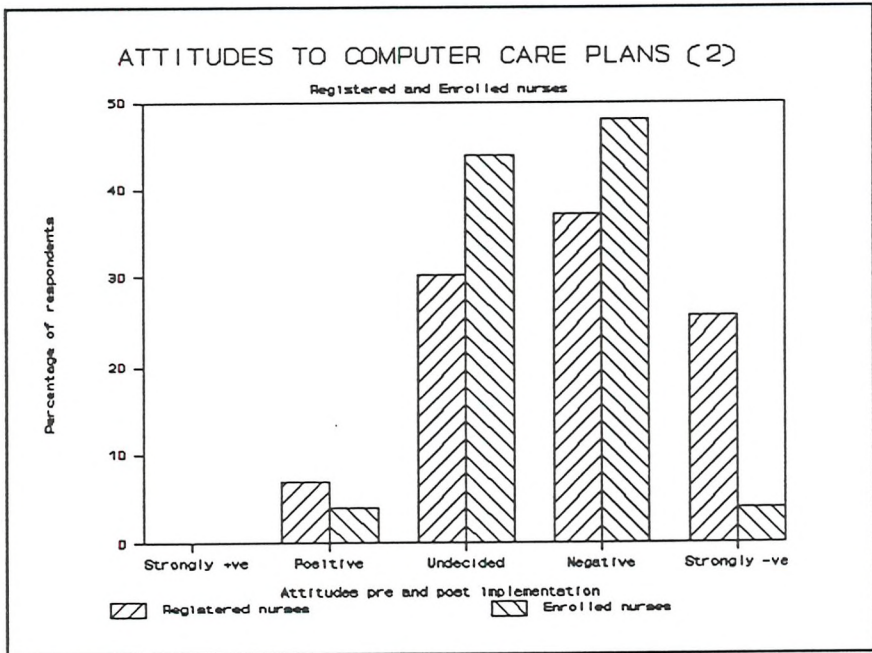


Figure 7. Comparison of attitudes of Registered and Enrolled Nurses 3 months after implementation.

FACTOR ANALYSIS APPLIED TO INDIVIDUAL STATEMENTS RELATED TO COMPUTER CARE PLANS

Attitude responses have also been analysed on the basis of professional, practical, ethical and technological factors. Tables 5.10 (A,B,C and D) in the previous chapter classify the individual statements into professional, practical, ethical and technological factors.

The following table demonstrates the differences in the aggregated mean attitude scores in the pre and post implementation studies, in relation to the identified factors. (Individual ward comparisons are included in Appendix). The average attitude score of the fifteen wards in the pre implementation study was compared with that of the eight in the post implementation study. Each average attitude towards each factor remained in the same attitude category twelve weeks after implementation, though all had shifted towards the negative pole. Responses to professional and technological factors remained undecided in each of the time periods, but each shifted towards the negative pole (4.5% and 6.8% shift). Similarly, responses towards practical and ethical factors remained negative with a marginally higher shift towards negative (9.5% and 9.1% shift).

TABLE 6.9

Aggregated average attitude scores for all wards before and after introduction of computer care plans			
	Before	After	Variance
Professional factors	59.2	55.8	-3.6
Practical factors	49.0	43.7	-5.3
Ethical factors	52.4	43.3	-9.1
Technological factors	62.6	55.8	-6.8

Of the five wards that were undecided about professional factors before implementation, four remained undecided and one became negative after using the care plans for three months. However of the two who were positive, both became undecided by the time of the second study, while for one ward, negative in the first study, the attitude score shifted fractionally towards the positive pole and according to the standardised score guide became ambivalent twelve weeks after implementation.

Six of the wards were negative about practical factors before implementation and four of these became strongly negative twelve weeks later. The other two, the one which was ambivalent and the one that was positive also became mildly negative.

Towards the ethical factors, the four wards which were ambivalent before they started using the care plans became negative afterwards while those which felt negative before implementation stayed of the same opinion.

"unfreeze", they had examined their practice and prepared for the change to computer care planning but were in the stage of uncertainty, or "fluid state". There is no statutory time for change to be accepted by those who are experiencing it and it is impossible to know if at this time the nurses were adjusting to the new system or "shape" or were still in a state of uncertainty. To address this possibility, a further short questionnaire was sent to all qualified nurses one year after implementation, when it may be inferred that they were more settled with the changes. This is the subject of a later chapter.

CHAPTER 7

INDIVIDUAL COMMENTS FROM QUESTIONNAIRES

In this chapter comments from individual respondents from both aspects of the study will be presented. Respondents have not been identified by age, qualification or gender. Comments will be introduced under the heading of pre or post implementation.

AN OVERVIEW OF THE COMMENTS AND ATTITUDES EXPRESSED

The comments provide a diversity of opinions about the principles of the Nursing Process and manual or computer care planning. Some demonstrated an understanding of the interaction and individuality of the process and the care plans as the working tools for communication. Others show that many nurses think of the Nursing Process as a "paper" exercise only. Several comments confirm that this attitude exists whichever care planning system is used, by stating that even when care plans are made, they are not always consulted or shared with the patients.

The time element is introduced in several comments. Many nurses emphasised that shortage of staff and time made care planning difficult whether using the manual or computer system, although some felt that comprehensive care planning *should* take time if it was to be individual.

In the post implementation questionnaire some comments focused on the fact that time taken to select computer care plans took time away from direct patient contact. Viewed in isolation, this is a justifiable criticism as there are only three terminals for each ward and none are portable, or situated in a position where it would be simple for even an ambulant patient to participate.

Another factor is that adapting to a new method of work is usually time consuming, so it is understandable that, at least at first, computer care planning will take more time. However, this criticism must be also seen in the context of some of the comments related to the paper system, which may indicate that planning care was not always an interactive, or relevant, process. There are two ways of interpreting these comments in relation to the assertion that computer care planning reduces patient contact. One, already mentioned, is that care planning on paper was not interactive or relevant. If this is the case it appears unjust that the change to computer care plans is held responsible.

The other interpretation is that although these comments are true, it could be assumed that the actual care planning, as opposed to the documentation, *was* interactive; patients were involved in planning their care, and the paper documentation was carried out at a later, more convenient time. If that was the case, planning care using the computer for documentation may be carried out in the same way.

Some comments assume a perspective of computers versus patients; this may indicate a general sense of dissatisfaction or frustration with a new system, which other comments expressed more directly.

Anxiety about the effect of computer care plans on student learning was expressed by several nurses after they had been using them for three months. In some cases this identifies existing problems of practice. One respondent expresses worries that as first year students are not able to create care plans by themselves their confidence will be undermined. In theory, first year students have never been allowed to plan care unsupervised until their competence in care planning has been assessed. This has become more noticeable now that they are not allowed a personal identification number (PIN) until assessed. Other comments express the anxiety that students will still be required to write care plans in their examinations, and will not gain the writing skills during their ward experience.

Similar opinions have been expressed about the effect on nursing care assistants. (This view is repeated during the interviews, reported in Chapter 8). Respondents on one ward identified the effects of the computer system on staff relationships, in particular the effect on the care assistants. One nurse stated that care assistants felt "down graded and under valued", presumably because they have assumed more direct patient care and are not allowed to plan care for patients. It is not part of my objective to comment on the fact that nurses are making the assumption that direct patient care is under valued. However, as care assistants have never had the responsibility for planning patient care and writing care plans, this should not have affected practice. It has arisen because professional boundaries have become more clearly defined with the allocation of the PIN scheme for access to the system. On the same ward, one comment suggests that staff relationships are suffering because computer work is not considered real work and the computer therefore allows those who so desire to "to do very little".

In both phases of the questionnaires some comments identified the need for understanding principles of the Nursing Process and computer system before either could be used to advantage. The degree of ambivalence about the definition of the Nursing Process, identified in Chapter 5, may be seen in some of the comments. The dynamic perspective of the Nursing Process as the process of what happens between a nurse and patient is denied, and it is emphasised as an isolated task of documentation.

Several nurses commented on technical difficulties of the system, making care plans "difficult to manipulate" or "inflexible". This had already been recognised and the manner in which this was addressed forms a later stage of my research.

The overall average attitudes towards the Nursing Process and computers before implementation were undecided. After implementation average attitudes to computer care plans had become negative. However despite this, a few optimistic comments were offered, which are presented later in this chapter.

Limitations identified in Chapter 6, relating to the difficulty of identifying attitudes specifically towards care plans when nurses were using the computer for other functions, almost certainly influence the individual comments offered in this chapter.

In the pre implementation questionnaire, before any nursing systems were in use, one nurse included

"If care plans are written they are hardly ever looked at, patients not encouraged to participate."

"Most nurses hardly ever bother to use them."

"Care plans are written but hardly ever referred to."

"Care plans are often written *after* the care is given."

"Care plans are written but very rarely ever referred to again."

"Care plans are *not* used as working documents..they are often written after the care has been given."

"Documentation is not suitable, priorities are not identified. Nurses still use an automatic approach and even if care is documented care plans are hardly ever looked at or written professionally. Patients are not encouraged to participate."

"Most nurses never even bother to read them [care plans] or even fill them in. Used properly they might be more useful for things like dressings, also for students but for trained staff they are not needed."

"We didn't need the Nursing Process in my early days, didn't need bits of paper and all patients got the best care and attention."

"Having been in the health service prior to the introduction of nursing care plans I can honestly say that they have created more paper work for what I consider very little benefit."

Other nurses appear positive about the principles of the Nursing Process but qualify their comments:

"Although most of what is written is only common sense, its [the Nursing Process] use in the areas of teaching over rides this problem. However the Nursing Process only works when it is understood, always used and the care plans updated."

"The Nursing Process would be good if there were more education, more time."

"I think the Nursing Process works well. It will be better when everywhere (all wards) is doing the same thing and helps to give 24 hour care without backtracking from one nurse to another. At the moment some areas just do the bare essentials."



"It will take more time..the system is very slow and the need to use it will increase time spent on the computer and reduce time spent with patients."

"I cannot imagine having just one computer with everyone trying to use it, when we have hardly any time now to write our individual care plans."

[At this stage the number of terminals to be supplied to the wards had not been decided]

Other comments, although anticipating that the new care plans may take more time, expressed more optimistic views.

"I don't believe time wasted waiting for the computer will be a problem. There is always something else to get on with."

"They could be quick, see things at a glance and not too time consuming and would work. If time has to be spent typing in assessments, it will detract from time spent with the patient."

"I find it exciting being at the start of a project. Initially computers will take time away from patients until nurses are fully familiar and feel confident and comfortable. I do hope nurses will not miss out the little important notes because they take too long to type, or use the usual phrase 'I'll do it later'."

COMMENTS RELATED TO PATIENT INDIVIDUALITY

Lack of individuality was cited throughout the research study as a cause of dissatisfaction with the new care plans.

"They [patients] need individual care, not to be put into a category on computer."

"Individual care is important. I hope computer care plans will allow that."

"They [computer care plans] will adversely affect individual patient care. Nurses will not be able to sit at the bedside. Its criminal to waste millions of pounds on computers when we are short of nurses and equipment."

"Care plans are meant to be individual. I don't know how they can be generalised. One person on a computer at a time will be difficult. Computers have their uses, but not for care plans or pharmacy."

"Computer care plans will be less of a working document, less accessible and more difficult to involve patients."

COMMENTS RELATED TO DECISION MAKING

The following comments appear to demonstrate the fear that the care planning system would be totally prescriptive, reduce nurses' autonomy and impede student learning. At this stage nurses had not seen the new system, so may not have appreciated that this need not be so. The options for care planning provided by the flexibility of the system, described in Chapter 3, allow nurses to create care plans as they wish, while the predetermined plans may act as a learning tool for students. However these comments must be taken seriously and in Chapter 14 the action taken to redress these fears will be outlined.

"If care plans are already printed, students don't have to think. The final exam doesn't have printed care plans."

"The only way they will benefit students is if they give up nursing to work in an office. They can't increase professionalism, only behaviour can do that."

"I think the computer will take decisions about care away from the patients and back to nurses only."

GENERAL COMMENTS RELATED TO THE FUTURE CARE PLANS

Some nurses were very pessimistic about the new system in general.

"I hope they won't be introduced. Terminals will have to be somewhere private to prevent interruptions. They are alright for admitting, discharging and transferring but nursing care is different. The only way they will benefit students is if they give up nursing to work in an office. They can't increase professionalism, only behaviour can do that."

"Computers are a good thing in this day and age but should be used by people who understand and have been on a course and are solely responsible for feeding in correct information."

"I am against computerisation of any medical or nursing document. Computer records are too easily accessible to anyone with a knowledge of computers, eg hackers. I think it is scandalous that drug charts are to be computerised, leaving us with no paper record and relying on the computer not to go down every night around 10 pm."

"Will everyone have access to care plans? Will there be enough terminals? What happens when the system goes down? We often have to queue at the computer now...it has doubled our work load with no benefits seen. I'm pretty negative up to now but I'm not anti technology. I've seen it work at other hospitals" [she is not

computer care plans and the following comment appears to illustrate the general unhappiness.

"Please take them away."

In view of the fact that this was carried out only twelve weeks after implementation, it seemed too soon to instigate any major changes to the system based on these attitudes alone. Consequently a further questionnaire was carried out one year after implementation and forms the subject of Chapter 10.

CHAPTER 8

THE INTERVIEWS

The interview is suggested as the method of choice when the researcher needs to collect data related to subjective feelings, and when it is desirable to allow the respondent to raise unscheduled issues of individual or collective importance. (Treece and Treece 1986, Babbie 1983, Seaman & Verhonik 1982; Denzin 1970). In order to collect this type of information, I carried out focused interviews using key informants from the two wards, which were in the second batch of wards to start using computer care planning in May 1989. The first interviews took place during the week of implementation and the follow up interviews were carried out twelve weeks after implementation.

Yin (1984) suggests development of a descriptive framework as a strategy for analysis of a case study. Topics relevant to the main subject of the research are organised as a framework for analysis. The topics I selected are based on the original proposition that computer care plans would affect attitudes of nurses, quality of documentation and the time taken to carry out care planning. Respondents were asked to focus on first impressions of the change, technical difficulties, time taken to carry out care planning, attitudes and relationships among ward staff, content of the assessment and care plans, training and effects on direct patient care.

At the start of each interview, I asked the nurse to talk freely about his or her own experience of the introduction of computer care plans, with special regard to these areas of interest. Each nurse agreed to the use of a cassette recorder to record the interview and to return in three months for a follow up interview. Although there were two men among the informants, as the numbers are so small, all will be referred to in the feminine gender in this chapter to avoid identification.

Of the nine informants, two were nurses who had provided the clinical information for care plans for their own ward and two had been designated as trainers for their ward. With such a small number of informants, I have not identified these nurses. Five of the informants had completed the Open University course "A Systematic Approach to Nursing Care".

THE INTERVIEWS DURING IMPLEMENTATION

There were nine key informants for this stage of the interview study, five from ward D (1,2,4,5 and 9) and four from ward F, (3,6,7 and 8). Although originally there were five from both wards, one was unable to attend for personal reasons and no substitute was selected. I have identified the nurses by these numbers in the section entitled "Overall attitudes of individual nurses" but not elsewhere in the text. In all the interviews I attempted to encourage informants to adhere to, or return to, the

Feelings of resentment were focused on by two nurses, which they experienced when they were trying to train other staff. This feeling dominated both interviews to the exclusion of most other issues. One quoted other nurses as saying that she should be giving patient care instead of using the computer, that computers take nurses away from patient care. She felt bad about trying to help, saying

" I'm not better than the others, but I'm trying to help. We've got to bear with it. I'll escape for 2 days as I'm off now - I don't think I'll dread it again."

The other quoted other nurses who had also experienced resentment. She complained that nurses on the ward needed help but thought they could do it themselves.

"You'd think they'd be glad of help, but no, they want to make their own mistakes."

There were no comments about how non nursing personnel were affected by the change.

PERCEIVED EFFECT ON PATIENTS AND NURSING PRACTICE

The effect of the new care plans on patient care was mentioned by five nurses. A few comments could be construed as fairly optimistic. One nurse, despite her discomfort at the way things were going, offered the consolation that

"at least the patients will all have care plans now."

Another expressed the opinion that care planning took time away from patients, but added

"only because it is early days."

When asked how she thought the new system would affect patient care, replied

"I think care is good now. It won't make it any better"

One nurse believed that contact with patients had decreased, saying

"Patients are hanging around waiting because things take so long and we don't discuss the care plans with the patients as we did before."

Another quoted a patient as saying he had not seen a nurse for 2 hours because they were all on the computer. One nurse did not openly express any view about the effect on patients but said

"clients still come first, but you [the nurses] tend to get overawed."

TRAINING

Six nurses considered that the training they had received did not prepare them for the reality of the situation, as illustrated by the following very similar comments:

"more worrying with a real patient."

"the real thing is different - I worry."

"when I did it for real it was quite different."

"it's different in the training to the real thing."

"...quite different doing the real thing."

"I need help with the *actual* care plans, should like to go through *actual* patients."

Most felt that the training should have been organised differently. Surprisingly they appeared to have received training sessions of varying lengths. Two said they had received three hours of training in one session, which they felt was too long and needed to be split into shorter periods. One nurse had a two hour session and she also would have preferred additional shorter periods with more individual tuition, thought the training should have started earlier and criticised the skills of the trainers.

"They aren't sufficiently up dated with what's needed, not ready to teach. It was all panic."

This theme was continued by another nurse, saying the trainers used the computer too quickly for the learners and also that

"they're not teachers and they are too familiar to us."

One nurse who had received a full day's training, considered it

"virtually useless. At the end of the day I was pressing any key just to get finished."

Three nurses mentioned feeling guilty when learning to use the computer. One thought that one hour should be the limit for a training session and it should be supplemented by training on the ward, with real patients but being relieved of the responsibility of patient care during the training time. However she thought this would be impossible,

"not enough staff. Too hard to arrange, you'd feel guilty."

Another nurse felt she would have liked more training but it was hard to concentrate in the middle of work. She said Sister had ensured the ward had enough staff during the first week, so that it made training on the ward easier, because

" If anyone is extra, I don't feel so guilty."

The overall feeling of guilt was repeated

"I'm afraid I get guilt feelings myself if I sit at the computer. They all [the nurses] do."

Despite the comments of the two nurses who experienced resentment when they were helping with training, three nurses made special reference to the helpfulness of those who helped to train.

" ... did a good job, I don't want to let her down."

" ... was there..she helped."

" ... has been brilliant about it all."

CONTENT OF ASSESSMENT AND CARE PLANS

Assessment

Nurses focused on the length of the assessment pathways and the corresponding length of time they took to complete. [At the time of this interview this was already apparent and the assessment was being reduced from forty eight, to sixteen, screens.]

"It took me 50 minutes to do the assessment."

"The number of screens need to be cut down, they'll [the nurses] go for the 72 hour assessment."

"Assessments are so long. We never asked half the questions we have to ask now."

"It takes me about 15 minutes to enter it on computer and that's after interviewing the patient."

"short stay assessments - they're okay."

"Old way of doing assessment took 20 minutes, but less information. Now 1 hour. I think it will get quicker."

"Basic admission took 45 minutes, I was pleased with it."

"Night staff said it took 2 hours to do assessment."

"I'm enthusiastic, I was pleased with my assessment."

"It's lovely, the short stay assessment. Ours [normal adult assessment] is awful."

Three nurses complained that there were too many words or phrases to select from on each screen which made it difficult to find what was wanted. Two suggested that this was exacerbated by the omission of a word or phrase to indicate that the patient had no problems in a particular activity.

"a lot of abnormal things, difficult to find the normal."

Four nurses pointed out that some screens were repetitive with the same information being displayed under the headings of more than one activity of living.

"vision seemed to be repeated - I felt I'd been there before."

One nurse had found several omissions from the screens, eg some conjunctive words to create sentences and no mention of whether or not the patient wore false teeth,

"but they, [the HIS project team] have put them on now."

Another queried the necessity of basing the assessment on a model of nursing and considered that information about a patient's sleeping or eating habits, for example, were superfluous;

"Trouble is, everyone gets bogged down by it. if it's there, they [nurses] fill it in, even if it's unnecessary ... everyone has to conform, need rules and regulations, can't alter times in an organisation like ours."

Care plans.

Some nurses thought that care planning might improve now they were on the computer. One suggested that this was because having the information on screen provides ideas and nurses are able to look up treatments and procedures they are not familiar with. She also thought that nurses would practise more, that it was useful to be able to add individual problems and that the care plan information would help new doctors. One nurse considered that having information on screen also helps the nurse to discuss the care plan with the patient.

Two had found the care plans difficult to write using the free type facility, and found the pathways illogical.

"seems more difficult for my mind to work when writing on computer."

"I can't spell when typing and make mistakes, it looks bad on the screen."

One also found it more difficult to find suitable plans for individual problems, for example patients who had other problems not necessarily related to the current diagnosis. Two nurses had discovered omissions of care plans which were needed, but one had already requested them and was pleased that they had now been added. She thought nurses would request more changes as they became more used to the system.

Some nurses were not specific, volunteering "quite good" when asked to comment on the care plans, while one remarked that

"they set you going - help to standardise what is written."

she perceived the general atmosphere of the ward. Despite this she emphasised some enthusiasm and optimism, tempered with caution.

"The general feeling about care planning is quite good. But there's a bit of feeling going round up there [on the ward] a bit high."

This nurse was unable to take part in the follow up interview as she was training for a further qualification and no longer using the system twelve weeks later.

Nurse 2 agreed that there was an air of panic but it was not reflected in her behaviour. She had also familiarised herself with the system and made practical comments. She identified worries as, the computer "going down", forgetting to enter information, coping with the drugs as well as care plans and trying out different methods to give the handover report. She thought use of the hospital system would be helpful if she changed her job, saying

"Computers are the future, lets make the most of them."

Nurse 3 was very agitated about the way she perceived the other nurses were behaving towards her and was feeling guilty about the time spent at the computer. In general she was enthusiastic and, like the previous informants, had familiarised herself with the care planning functions. She concluded her interview

"I think there's a lot of fear about computers. I'm no expert, just have to get on with it. Nobody likes change."

Nurse 4 owned a computer and felt that the hospital system did not function as well as her own. Despite her obvious interest in computers she did not show any particular enthusiasm for the new system and most of her comments were negative. She summed it up as

" a general air of being fed up with it all."

This nurse started a period of sick leave shortly before the follow up interviews, which lasted three months, and therefore did not take part.

Nurse 5 focused the interview mainly on the role of the trainer and the attitudes of the rest of the nurses which she perceived as unhelpful. She was scornful about the technical abilities of the hospital system and the use of a model of nursing as a basis for patient assessment. She admitted she was very unhappy.

"I feel competent but they [nurses] don't listen. I find it irritating - I don't get bad tempered. I'm not doing a good job, it's terrible."

Nurse 6 gave the general impression of enthusiasm for the system and satisfaction about the way it had been implemented on her ward. She made practical and objective comments about the system and had already approached the HIS team about minor alterations, with satisfactory results. She had also clarified the issue of excess generation of paper. She expressed the feeling

"overall, it's going okay."

Nurse 7, unlike the other informants, did not respond spontaneously and needed considerable prompting. She presented a general attitude of disinterest. When asked, she expressed dissatisfaction with the training, thought care plans and assessments were difficult and that the paper system was better, did not understand the goal date and evaluation pathways and was not familiar with all the functions. She mentioned that there had been an upset on the ward but did not know the cause and concluded the interview, saying

"I'm not that worried about computers, or terribly anti."

This nurse did not attend the follow up interview. She agreed to do so, apparently willingly, but did not respond voluntarily to my reminders or keep the appointments. When contacted each time she apologised and said she was prepared to be interviewed again but after three attempts I abandoned the venture.

Nurse 8 talked freely about her own difficulties adjusting to the introduction of the system, expressing the anxiety that computers would become more important than patients. She also had reservations about the use of care plans, but responded optimistically, saying,

"Computers go against all that I've been taught professionally...I wasn't brought up on care plans; I'm trying to see the good points, I think computer care plans will be a plus. I do know my strengths and weaknesses, I'll get there in the end."

This nurse left the hospital, and the district, to take up another post, so was not interviewed three months later.

Nurse 9 used her interview as a forum to express her dislike of every aspect of the care planning system. She found fault with the clinical content of each action and goal, the wording of problems, goals, actions and assessment screens. She appeared confused about the fundamental principles of care planning and the functional abilities of the computer system. She criticised the training and the trainers. She finished the interview saying

"It makes me angry, I'm the go between. The others are frightened, I think it is too early to talk about it. See us in a month. I don't want to feel I've been hypercritical."

INTERVIEWS THREE MONTHS AFTER IMPLEMENTATION

Five informants (numbers 2,3,5,6 and 9) attended these interviews. The general climate of the interviews appeared more composed, with nurses focusing less on the emotive response to computers and more on specific areas of care planning. Since the original interviews, the pharmacy system had been activated on these two wards, so many comments were related to this, but I have not included them in this report. There were three informants from ward D and two from ward F.

GENERAL IMPRESSIONS OF THE PRESENT SITUATION

From the following responses it appeared that most nurses were feeling more comfortable with the new system.

"There is no animosity now, but in the beginning people were uptight. Things have improved since we started."

"Things have settled down, not so much ill feeling."

"No ill feeling on the ward."

"I'm very pleased....the nurses are tackling it well."

"They [the nurses] are keeping up."

DIFFICULTIES IDENTIFIED

In these interviews nurses did not identify difficulties in the same way as in the earlier interviews. One nurse identified older nurses as the group most reluctant to change, but did not qualify this. Most comments about difficulties were made in relation to how the situation affected the ward practice in general and have been included in the section about relationships, below.

ATTITUDES AND RELATIONSHIPS AMONG NURSES

Two nurses commented that some nurses still did not like the computer and were reluctant to use it.

"Perhaps they need more training...well, there is only one nurse really and she's better than she was."

"They seem to get away without doing it."

Another agreed that some nurses do not like doing care planning on computer, but did not identify a specific group. She said

"they get their turn."

A similar comment revealed that nurses who had developed more computer skills did more care planning than those who had not.

"The good ones tend to do more because the others recognise their skills."

This nurse also suggested that care assistants should be allowed to enter biographical data on the computer, as long as qualified staff collected the information and did the assessment.

"Some care assistants have typing skills. I think they should have more responsibility. It would please them." [This had already been discussed at the Nurses User Group meeting but no conclusions had been reached]

This meeting was referred to by one nurse, saying,

"We are trying to involve care assistants more..they are valuable, they are world wise, have common sense."

One nurse again described the feeling that trained staff were considered to sit at the computer too much

"but it [the resentment] is not as bad as it was."

PERCEIVED EFFECT ON THE PATIENTS AND PRACTICE

Two nurses commented that it was difficult to sit with a patient to plan the care, but almost immediately realised that their practice had not changed.

"You can't sit with a patient and do a care plan but we never used to, at least not often, so that's no different."

"We don't go to the patient - we know what's happening. In fact this is the same as it used to be."

Two nurses described changes in the way the handover reports were being carried out. One said on her ward they used the daily patient status report, which includes all the patients names and details of general condition. The nurses just added any general remarks as required to the printout.

"The report seems sorted out now."

The other said that her ward was planning a complete change of practice for the handover and had ordered cassette recorders to use for the report. At present they were also using the status report in a similar way.

One nurse felt that nurses were on view more since the introduction of computers.

"We used to be able to find a cubby hole for the writing."

She also observed that nurses were going off duty later due to the length of time taken to do care plans.

TRAINING

Only one nurse commented on training, saying she thought some nurses may need more. However two others made comments about the support they received. One complained that when she made requests to the HIS project team

"nothing ever happens."

and observed that the revised assessment was still not on the system.

The other, apparently in relation to various aspects of the care planning and pharmacy systems which she did not like, posed the question

"are the right people on the User Group? Have they experienced a global view of the situation?"

CONTENT OF ASSESSMENTS AND CARE PLANS

Assessment

Planning for the new assessment screens was completed but due to pressure of work the HIS project team had not entered them into the system. Two nurses commented on the fact that they were still very long, saying they had to write it all down first and then enter it on the computer or else they forgot part of the information. One added that the questions in the computer system are not the same as those on the old paper system and questioned the need for their inclusion. She requested forms which followed exactly the order and structure of the screens in order

"to prompt us to ask the right questions."

[these were compiled and supplied to all the wards as soon as possible]

Care planning.

All five nurses made some favourable comments about the care plans.

"I like the care plans. They are easy, I like to choose rather than creating them".

"Care plans are alright...they are quicker."

"Care plans are good."

"Care plans are okay, I like them. I like being able to look things up."

"I like care plans....look and see what you want. Better than sitting and thinking, you can always add on once you've got the basic framework."

Care planning was not without problems. According to one nurse

"The problem is updating them. Not everyone does it."

Another describes the attitude to care plans,

"who looks at them, anyway? It has always been that attitude. No different now."

One nurse described a meeting on the ward with the District General Manager. She told him that

"Care plans have made a difference - more work! It's a hassle.

At least we don't have to read illegible writing."

She also described computer care planning as a theoretical exercise rather than a means of communication, but added that it has always been so. This nurse spent some time trying to explain that she felt the care plans and the care were separate entities which did not connect. She discussed the use of goal dates and said that the nurses were not using them, so the next person to read the plan had no idea when the goal should be evaluated.

TECHNICAL AND PRACTICAL ASPECTS

Three nurses still identified paper management as a problem. Two highlighted the problems on night duty when they each said it took an hour and a half

"ripping up and sorting paper."

"sorting out all the paper being churned out, stapling it and filing it."

The other acknowledged that paper management was a problem, but felt they were beginning to tackle it in a small way by reducing the number of print-outs used now they were using only one for the hand over report.

Only one nurse mentioned technological problems, saying that

"there always seems to be a technical hitch - it's always going down, it's worrying."

[There was more 'down time' in the early months. Subsequently there was a planned period of down time each day, between 0200 and 0300 hours]

OVERALL ATTITUDES OF INDIVIDUAL NURSES

The overall impression from the five interviews was that nurses were settling down with the new system and beginning to develop ways of managing to incorporate the new skills.

Nurse 2 thought that care plans were better than they were before but qualified this by saying

"they were not that brilliant then."

She also felt that nurses' computer skills had improved in the three months, more realistic care plans were being made and they took less time to complete. She said nurses felt more conscientious about doing them when they were on computer. She did not mention any anxieties in this interview, even her earlier worries about computer break down.

Nurse 3 was very much more relaxed in the follow up interview. She referred briefly to the problems mentioned in her first interview but more dismissively. She concluded

"It's okay now."

Nurse 5 behaved in a manner similar to that of the first interview. Although she repeatedly claimed to like the care plans, saying they were easy, she also claimed they had increased the nurses' workload and were no more than an exercise distinct from the actual planning of patient care. She repeated some of her earlier complaints that the nurses were difficult to teach and kept making the same mistakes. She was not satisfied with the support they received from the HIS team and said in general she was very unhappy. She maintained there was no ill feeling on the ward caused by the fact that some nurses were better than others, and offered as a justification for being among this group

"I like computers anyway."

B. PLANNING	
OBJECTIVES	QUESTIONS
All problems requiring nursing intervention identified in the assessment will be included in the care plan.	Are all the problems identified in the assessment included in the care plan?
All care must be planned to include realistic, measurable goals. Nursing actions planned to meet the goals must include times and methods for carrying them out within the stated time period.	Do the goals include specific statements, such as how and when the goal should be achieved? Does the care plan specify the nature and frequency of care related to tubes e.g wound drains, catheters?

C: EVALUATION	
OBJECTIVES	QUESTIONS
The evaluation must be carried out within the stated timescale.	Is the goal evaluated within the timescale indicated by the review date?
The evaluation must state the extent to which the care has been effective.	Is the evaluation carried out effectively?
The evaluation must relate to the appropriate goal.	Does each evaluation statement relate to the relevant goal?

Although this instrument has been modified and Anglicised, the principles remain the same so the validity and reliability of this instrument is established, as outlined in Chapter 4. Reliability is re tested by two observers applying the questionnaire to the same subject and comparing results at the start of each study. The purpose of carrying out the study for this research was to obtain some indications of the quality of the documents only, without making the assumption that this is any indication of the quality of nursing care. Consequently, only the section related to nursing documents was used, divided into the areas of assessment, planning, and evaluation. There are twenty four questions related to documentation. The study was carried out in the week preceding implementation of computer care plans, and again four months later, with the help of one other nurse from our department.

METHODOLOGY

The usual practice is to select a random 50% sample of patients to participate in a quality assurance study, all of whom have been in hospital a minimum of 48 hours. This time period was selected to allow patients an opportunity to settle and to accumulate a range of experiences, and allow time for

this to be recorded in the documents. Although only documents were being examined in this study, we adhered to this time period.

In a full quality assurance study, if patients in the sample do not have care plans or assessments according to hospital policy, the final scores would be reduced. In this study, as the purpose was to examine documentation only, random sampling was not used so only those patients with assessments or care plans, or both, were included.

The total number of patients on both wards who met the "48 hour" criteria for selection in the pre implementation study was only 28, and of these only 17 had care plans, so documentation of all seventeen was studied. In the second study, of a total of 22 patients on Ward D, only 9 had documents so these were all examined whereas on Ward F, where all 24 patients had documents, a 50% sample was studied. The selection of a date to start was pragmatic due to my unforeseen absence until the week prior to implementation. Permission was requested from both ward sisters and the nurse manager. The process of data collecting has been described in Chapter 4.

EXPLANATION OF THE SCORING SYSTEM

Each response scores one mark for a "YES", 0.5 for a "SOMETIMES" or "PARTIAL" and zero for a "NO". Questions which are not relevant are scored as non applicable, "NA", and do not influence the final score. Each section is analysed independently, with the sum of all the individual responses expressed as a percentage of the total possible score in that section, after the non applicable scores have been deducted.

RESULTS OF THE STUDY PRIOR TO IMPLEMENTATION

Quality objectives related to care planning documentation state that all patients have written assessments within 12 hours, and care plans for all the current patient problems within 48 hours, of admission.

Indicators of quality in documentation are measured in terms of statements related to medications, allergies, prostheses, patient and family perception, condition of the skin, emotional state and physical appearance and individuality in specified activities of living; measurable goal statements, specifically prescribed nursing interventions, information and relevant evaluations.

WARD D

Number of patients on ward for over 48 hours	= 13
Number of patients with assessments	= 8 (61.5%)
Number of patients with care plans	= 4 (30.75%)
Number of documents studied	= 8
Overall score for documents on ward	= 48.3%

Assessment. Total average score 64.8%. All patients had appropriate assessments although there was some variation in the amount and detail of the information written. All assessments had statements related to prosthetic devices such as spectacles and dentures. For six patients, current medications, skin allergies diet preferences and emotional state were fully recorded and five included a record of allergies and extent of ambulation. Only one assessment described the patient's physical appearance while three included statements about patients' own perceptions. Two included a record of the information given to relatives.

Planning the care. Total average score 26.5%. Four patients had no care plan at all which immediately reduced the score in this section. In only two care plans were the following included: specific times and methods for carrying out the nursing care; a distinction between nursing actions and self care; relevant signs and symptoms of complications which require observation. These two care plans also included goals set in measurable terms. Teaching, position changes and care to increase independence in activities of living were included in only one plan. Care of catheters and wound drains was not recorded in the plans for any of the three patients for whom this would have been relevant.

Evaluation. Total average score 35%. In two of the four care plans, evaluation had been completed effectively with statements related to specific goals. Three patients had all problems included in the care plans and self care activities recorded.

WARD F

Number of patients on ward for over 48 hours	= 15
Number of patients with assessments	= 9 (60%)
Number of patients with care plans	= 5 (33.3%)
Number of documents studied	= 9
Overall score for documents on ward	= 52.4%

Assessment. Total average score 66.9%. All nine patients had appropriate assessments although there was some variation in the amount and detail of the information written. All but one patient had statements about allergies, medications and skin condition, and all but two had statements about spectacles and dentures. In only one assessment was the patient's understanding of the present problem recorded, although a description of the emotional state was included in six. Elimination patterns were recorded specifically in three assessments, were mentioned briefly in a further three and not recorded at all in the others. Statements referring to diet and food preferences received a similar response, while the extent of ambulation was recorded for three patients. Of the nine patients there was no record at all of any information being given to relatives.

Planning the care. Total average score 38.5%. Four patients did not have care plans at all which reduced the score. In only three of the five care plans were times and methods specified for nursing interventions, although in some statements about planned care were included in progress notes. Three care plans had measurable goals. Teaching was included in one plan only, and identification

of relevant clinical signs to observe, was included in only three plans. Care of catheters and wound drains was recorded in the progress notes for two patients and not at all for the others.

Evaluation. Total average score 36.9%. In only two of the five care plans did evaluation relate to a specific goal, and in only one was a review date set and evaluation carried out on or before this date.

RESULTS OF THE STUDY THREE MONTHS POST IMPLEMENTATION

Although care planning using the predetermined statements on computer requires different skills, the indicators for quality remain the same. The major difference is that the pre written care plans already include some of the criteria by which quality may be measured; the skill lies in using professional clinical judgement to select suitable assessment, problem, goal and nursing action statements for individual patient care, and determining the time in which goals should be evaluated. If a free type care plan is created, the skills required are the same as when writing a paper care plan, with the addition of typing skills. In this study, I have not distinguished between the type of care planning pathways used, but have concentrated on the overall quality of the documents.

WARD D

Number of patients on ward for over 48 hours	= 22
Number of patients with assessments	= 9 (40.9%)
Number of patients with care plans	= 9 (40.9%)
Number of documents studied	= 9
Overall score	= 71.9%

Assessment. Total average score 82.5%. All nine patients had assessments, all of which included statements referring to current medication and allergies, and to information given to relatives. Seven of them also included records of prostheses and descriptions of emotional state and skin condition. Six assessments included descriptions of physical appearance, diet preferences and elimination patterns and five mentioned the patients' own perception of current problems. Six of the seven for whom it was relevant included records of the specific extent of ambulation.

Planning the care. Total average score 70.4%. All goals, selected or written, were measurable. Teaching plans were included for all eight of the patients for whom this appeared relevant and in seven plans, actions specifying times and methods for implementing nursing care, had been selected or typed and signs of complications requiring observation had been identified. Five patients required nursing care related to catheters and wound drains, but this was included in only one care plan. It was included in the progress notes for three of these patients, thus achieving a 0.5 score, but not recorded at all for the fifth patient. Three patients appeared to require position changes, according to their state of mobility and skin condition, but only one care plan recorded the care related to this.

Evaluation. Total average score 47.6%. Although all the goals which had been selected or written

were measurable, none had been specifically evaluated. Six patients had care plans which had included all identified problems but none included any record of their self care activities, although in five cases this was recorded in the progress notes.

WARD F

Number of patients on ward for over 48 hours	= 24
Number of patients with assessments	= 23 (95.8%)
Number of patients with care plans	= 24 (100%)
Number of documents studied	= 12
Overall score	= 78.9%

Assessment. Total average score 73.9%. One patient had no assessment at all, but of the rest ten were comprehensive and one less so. There were statements about allergies, prosthetic devices, extent of ambulation and elimination patterns for ten patients; about emotional state, skin condition, diet preferences and medications for nine patients and the patient's understanding of the current problem was recorded for eight patients. Four of the eleven assessments had no statement relating to information given to relatives.

Planning the care. Total average score 85.5%. All twelve patients had care plans, and all included goals, selected or written, which were measurable. In eleven of these, nurses had selected or typed actions which specified times and methods for interventions, which included aspects of teaching and indicated relevant signs or symptoms to be observed. Care of catheters and drains was specified in the care plans of the seven patients for whom this was relevant. Nine care plans specified the activities which patients carried out themselves.

Evaluation. Total average score 83%. In this study all evaluations related to a specific goal. Although evaluation in this system is goal orientated and this pathway has to be used, it would still be possible to write an inappropriate evaluation or evaluate in the progress notes.

LIMITATIONS OF THE QUALITY ASSURANCE STUDY

Using QICC to examine computer documentation has identified several inadequacies of the tool for use with documents created within the new system, so accurate comparison is questionable. For example, although nominally the paper system was based on a model of nursing, it was not made explicit and only certain activities were identified for assessment. The computer assessment includes all twelve activities for assessment, so that the indicators of quality in documentation must now include statements related to all of them. The objective stating that all goals should be written in measurable terms has been addressed already by the predetermined goal statements, so that the corresponding question is no longer needed except in the case of free text goals, and requires appropriate modification.

For pragmatic reasons there was no attempt to select a typical time period for carrying out the

"before" study which resulted in a very small, atypical number of patients on the wards at that time. The selection of a time period for the "after" study was also arbitrary, in order to create a similar situation in which we had no control over the size of the target population. Random sampling would have reduced the numbers available still more, so purposive sampling was employed to produce the optimum number of documents to study and this method was repeated in the second study. With such a small sample it is not possible to generalise these results.

ANALYSIS OF RESULTS

I recorded the number of patients with assessments and care plans made on each ward, before and after the introduction of computer care plans, and the quality of the documents in the same time periods. The individual wards presented an inconsistent picture, as may be seen in Tables 9.2,3,4 and 5 below. On ward D the percentage of patients with care plans decreased by 33.4 %, while on Ward F the percentage increased by 66%. Although fewer patients had care plans on ward D after the change, the quality of those that were made had improved. The total average score for the quality of the documents had increased for ward D and F by 48.8% and 50.3% respectively.

Statistical tests were carried out on the following results to determine the significance in the difference in the number of patients with assessments and care plans, and also to determine the significance of the difference in quality scores, as measured by QICC, on the two wards.

CHANGES IN THE NUMBER OF ASSESSMENTS AND CARE PLANS MADE

TABLE 9.3

PERCENTAGE OF PATIENTS WITH NURSING DOCUMENTS: Paper/computer care plans				
	WARD D		WARD F	
	Paper	Computer	Paper	Computer
Assessment	8 (61.5%)	9 (40.9%)	9 (60%)	23(95.8%)
Care plan	4 (30.7%)	9 (40.9%)	5 (33%)	24(100%)

I applied the Chi square analysis for one set of data, to analyze data related to assessments and care plans on each ward. This test does not identify the trend of the change, only the significance. This showed that there was a significant reduction in the percentage of patients with assessments but no significant change in the percentage with care plans on Ward D, while on Ward F there was a significant increase in the percentage of assessments and care plans.

[Null hypothesis: there will be no change in the percentage of patients with assessments after computerisation.
WARD D: If $X^2 = 4.15$, at $\alpha .05 = 3.84$, X^2 is greater than 3.84. The null hypothesis is rejected. Conclusion: There is a significant difference in the percentage of patients with assessments after computerisation. In this case the percentage is significantly reduced.
WARD F: If $X^2 = 10$, at $\alpha .05 = 3.84$, X^2 is greater than 3.84. The null hypothesis is rejected.
Conclusion: There is a significant difference in the percentage of patients with assessments after computerisation. In this case it is significantly increased.]

[Null hypothesis: there will be no change in the percentage of patients with care plans after computerisation.
WARD D: if $X^2 = 1.46$, at $\alpha .05 = 3.84$, X^2 is not greater than 3.84. so the null hypothesis is not rejected. Conclusion: There is no significant change in the percentage of patients with care plans after computerisation.
WARD F: If $X^2 = 10$, at $\alpha .05 = 3.84$, X^2 is greater than 3.84. The null hypothesis is rejected. Conclusion: There is a significant difference in the percentage of patients with care plans after computerisation. In this case it is significantly increased.]

CHANGES IN THE QUALITY SCORES

As reported above, and shown in the tables below, both wards achieved an increase in the overall quality score. These results were also subjected to the same statistical analysis which showed that there was no significant improvement for assessment on either ward; there was a significant improvement in care planning on both wards but while there was no change for evaluation on Ward D, it had improved significantly on Ward F.

TABLE 9.4

WARD D			
QUALITY SCORES SHOWING THE PERCENTAGE OF INCREASE PER SECTION.			
	PAPER % score	COMPUTER % score	%INCREASE
Assessment	64.8	82.5	27.3
Planning	26.5	70.4	165
Evaluation	35	47.6	36
Average score for ward	48.3	71.9	48.8

ward; that the quality of care planning had improved significantly on each ward, while the improvement in evaluation was significant in Ward F, but not in Ward D. Aggregate results showed overall quality scores for both care planning and evaluation had significantly increased with the use of computer care plans.

In Chapter 13 results of QICC studies will be discussed and compared to the quality of care planning 18 months after the introduction of the computerised system, when measured by the new audit tool.

CHAPTER 10

COMPUTER CARE PLAN SATISFACTION QUESTIONNAIRE

In Chapters 5,6 and 7, attitudes to computer care plans were examined before, and three months after they were introduced on the wards. At the time of the first post implementation questionnaire nurses had not had time to incorporate the change into practice and were still unsure of the system. Implementation of the pharmacy system was taking place at the same time, which may have made it difficult to isolate attitudes. This period of change described by Lewin as "a fluid state", is the stage when participants are still trying to make sense of the situation.

The pharmacy system concerns the prescribing, administration and recording of medication for each patient, representing a change in practice for pharmacists, doctors and nurses. With the original system, doctors prescribed for each patient on an individual prescription sheet and nurses administered the drugs during four major drug rounds in twenty four hours, or at the time indicated on the prescription. This involved taking the drug trolley to each patient, scanning each prescription sheet for any medication due, giving the prescribed drugs, dating and signing the prescription sheet. At the same time, if the patient had been prescribed medication to be taken when needed, (P.R.N. or *pro res nata*) the nurse would check whether this was required at this time. With the computer system, nurses request a print out of drugs due before each drug round. This list includes only those patients with medication prescribed for this time, while another list includes all P.R.N drugs prescribed for the ward. In theory this allows the nurse to go to only those patients indicated on the list, rather than every patient on the ward, reducing time taken to scan the prescription sheets of the other patients. After administration, the nurse records this for each patient on the computer, also identifying reasons for any drug not given. Nurses expressed a great deal of anxiety about the possibility of drug errors, while still not fully confident of the system, especially errors of omission. For this reason, it may have been difficult to concentrate thoughts on care planning.

The aim of this part of the study was to determine perceptions about the effect of computer care plans on practice, after they had been in use for a year, when it could be assumed that the change was consolidated and nurses sufficiently familiar with care planning and pharmacy systems to be able to comment on them as separate systems.

Although care planning had been used on wards for at least a year, many nurses had left and been replaced in this time. I decided to send the questionnaires to all qualified nurses, not only to those who had experienced the introduction of the care plans, because this would have reduced the number of respondents, focused on more senior staff among whom there is a smaller turnover and excluded a large number of nurses who wanted to express opinions. I also believed, that although the computer system would be an innovation to nurses new to the hospital, it would be seen as part of general orientation to a new ward rather than an intrusive change of practice, so these nurses would

This response is disappointing, but not surprising. The area of research is related to the effects of my own work in the hospital, and I am acquainted with the feelings of many nurses towards computer care plans, as I was to previous attitudes towards the paper care plans. I am aware that morale is influenced by concurrent events, especially in the present financial climate, the atmosphere of uncertainty about the future status of District Hospitals and even in some cases an aftermath of dissatisfaction about regrading, discussed in Chapter 1. One anxiety is that if the hospital accepts Trust Status, decisions may be made about terms of employment and salaries which affect staff confidence. Also the growth of quality initiatives in the Health Service, such as Standard Setting, Clinical Audit and Total Quality Management, applies pressure on the existing service to provide higher quality care within diminishing resources. The introduction of standard setting means that not only are nurses having to make their standards of care explicit but also having to devise a means of measuring whether the standards are being achieved.

Although at this stage nurses were clearly becoming more competent in the use of the computer, as may be seen in Chapter 11, they still seem to consider it an extra burden on their prevailing workload.

Paradoxically, the majority of respondents also considered care planning technology to be easy, but would not miss the computer if it was taken away. A small percentage of nurses perceived the support they received to be poor, while the rest perceived it as good or inconsistent. Eight wards demonstrated that perceptions about support corresponded with perceptions about ease of technology, possibly indicating that the quality of support received influences nurses perceptions of computer competence. However, this principle was shown not to apply to perceptions about documentation.

Taking all these aspects of computer care planning into consideration, on average throughout all the fifteen wards, 26% of respondents perceived the computer care plans to exert a positive effect, 37% a negative effect, while 34% considered they had no effect at all on usual practice.

Forty three of the one hundred and thirty nine respondents added a total of one hundred and twenty two comments, of which 62% were negative. The percentage of negative comments is much greater than the percentage of nurses who perceived computer care plans as negative, which must indicate that a greater number of these nurses are "vocal" about their grievances, as was seen in Chapter 7. The largest number of comments from a single ward, thirty seven, (30%) included only four which were mildly favourable. Comments will be discussed at the end of the chapter.

ANALYSIS OF AGGREGATED RESPONSES

SECTION 1: PRACTICAL ASPECTS

Just over half of the respondents (59.6%) considered that computer care plans had made no difference to actual nursing practice. A small percentage (7%) perceived an improvement in nursing care while nearly a third (31.2%) felt that practice had been adversely affected. 2.26% of nurses did not respond to all questions.

Aggregate responses to individual questions show that nurses perceived that computer care plans have the greatest impact on time spent with patients and the general workload. 64% of respondents perceived that workload had increased as a result of computer care plans, while 67% thought that time spent with patients had decreased. Conversely, they perceived very little influence on understanding and knowledge or actual patient care. 75% nurses indicated that actual patient care was unchanged since the introduction of computer care plans, 80% perceived no difference in nursing knowledge and 82% no change in the general understanding of patient needs. 2 % nurses left some questions unanswered in this section. Table 10.2 below shows the frequencies of nurses' perceptions about the effects of computer care plans on their nursing practice.

SECTION 2: TECHNOLOGICAL ASPECTS

Analysis of perceptions of technological aspects of care planning produced a different pattern of responses. 53.3% of nurses found entering data in the care planning system easy, in contrast to the 17% who find it difficult, whilst a further 25.6% saw the care planning pathways as generally confusing. 4% of respondents omitted to respond to some questions in this section.

Responses to individual questions showed that the greater proportion of respondents found each component of care planning documentation technologically easy to carry out, that is assessing (61%), planning (51%) and evaluating, (49%). Table 10.3 below shows the frequencies of nurses' perceptions about the use of technology associated to care planning.

Although it has been recognised in this study that change of documentation may influence aspects of practice, I included one question directed at documentation as a whole. In view of the responses to the questions about ease of technology, the results are surprising. The largest proportion of respondents (63%) indicated that they found computer documentation, as a whole, more difficult than using the manual paper system. 18% of all respondents found the new documentation simpler, while 17% thought there was no difference between the two systems. 2% respondents did not respond to this question. Results are shown in Table 10.4 below.

TABLE 10.2

PERCEPTIONS OF EFFECTS OF COMPUTER CARE PLANS ON NURSING PRACTICE				
Responses to each question				
Respondents n = 139				
	POSITIVE	NO EFFECT	NEGATIVE	NO RESPONSE
Patient time	7	39	93	0
Workload	3	46	89	1
Understanding care	19	111	3	6
Patient care	10	104	24	1
Patient needs	11	114	18	6
TOTAL RESPONSES	50	414	217	14

TABLE 10.3

PERCEPTIONS ABOUT CARE PLANNING TECHNOLOGY				
Responses to each question				
Respondents n = 139				
	EASY	CONFUSING	DIFFICULT	NO RESP
ASSESSMENT	85	31	20	2
CARE PLANNING	70	35	29	4
EVALUATION	68	42	22	7
TOTALS	223	108	71	13

TABLE 10.4

SUMMATIVE QUESTION		
PERCEPTIONS ABOUT DOCUMENTATION		
Respondents n = 139		
Simpler	25	(17.9%)
No change	23	(16.5%)
More difficult	88	(63%)
No response	3	(2.1%)

Each of these sections looked at different effects of computer care plans, but all responses may be classified as representing positive, negative or neutral perceptions. Average aggregate responses demonstrated that 26.1% respondents showed positive perceptions about the new care plans, 37% perceived them negatively and 34% felt impartial. Overall there was a 2.6% non response rate in these sections, representing possibly haphazard omissions.

SECTION 3. SUPPORT FOR COMPUTER CARE PLANNING

There were two questions in this section, as shown in Table 10.1 above. Responses showed that nearly half the respondents felt that the support they received was good, but nearly 70 % would not miss the computer if it were taken away. A summary of responses may be seen in Table 10.5 below.

TABLE 10.5

SUPPORT FOR COMPUTER CARE PLANNING			
Responses to each question			
Respondents n = 139			
QUALITY OF SUPPORT		WOULD YOU MISS THE COMPUTER?	
Good	65 (46.8%)	Yes	24 (17%)
Variable	51 (36.8%)	No	97 (69.7%)
Poor	17 (11.8%)	Indifferent	12 (9.1%)
No response	6 (4.6%)	No response	6 (4.2%)

Teaching before, and support during, implementation of each stage of the computer system was largely technical, and provided by members of the Hospital Information Team. They were available on the wards during normal working hours and offered round the clock support as required during each phase. This continued for varying lengths of time. While care planning was being introduced in each area, additional specific help was supplied by myself and two other nurses on a demand basis, and this continues. This question was not intended to address individual components of support, but to discern the nurses' perceptions of support on the whole.

On average, a small minority of nurses thought that support provided was of poor quality, the largest proportion perceived it to be good, while the rest thought it varied. In a project such as this, with implementation carried out in monthly stages, it is almost inevitable that this would be so. For example, the first three wards to use the computer care plans had already been using the pharmacy system for three months, allowing nurses to become familiar with this before tackling the next change. Therefore support was provided in two separate periods which may have been perceived as more helpful by these nurses. In addition, as this was the first group of wards there were no others competing for the help available, which may also be perceived as beneficial. Conversely, it is always difficult to be the first to experience a change in practice and it was new ground, not only for the nurses on the ward but also for those giving the assistance, which may have clouded perceptions. Consequently it is difficult to say with confidence why perceptions about support differ so widely. It may be that one of a group of wards received the bulk of attention for some reason, leaving the others with proportionately less and consequently feeling neglected. This may have been the case in one group of wards, where 90% of nurses on one ward perceived the support as good, while smaller percentages of nurses on the other two wards felt positive.

In order to identify possible reasons for the variation in perceptions, I compared the percentage of nurses on each ward who perceived the support to be good, technology easy and documentation simpler. This is based on the proposition that if the nurses received what they perceived to be good support in the implementation stage and after, they might also perceive the technology of care plans to be easy and the documentation simpler. The actual tables may be seen in the Appendix to this chapter.

I selected 50% or over response to any one response category to indicate that a greater percentage of nurses share this perception, than those implied by the other two possible responses. Based on this premise, only one ward produced a 50% or more response to all the variables examined, with the greatest percentage of nurses perceiving the support to be good, technology easy and the documentation simpler, to confirm my proposition. Five wards showed an over 50% response to two variables, that is, perceived the support to be good and technology easy. Two wards with less than 50% respondents perceiving the support to be good, nevertheless produced higher percentages of nurses who thought that technology was easy. The remaining seven wards had fewer than 50% of nurses responding positively to any variable, thus confirming my proposition in a negative sense.

Pearson's Product Moment Correlation Coefficient test of analysis confirmed that there was no correlation between the quality of support nurses perceived and ease of technology or simplicity of

documentation. [statistical tests are included in the Appendix]

The largest proportion of nurses demonstrated that they would not miss the computer if it were taken away. On three wards this evoked a 100% response. There was one exception to this, where only 10% of nurses subscribed to this view. This was from a small ward of only sixteen beds, with a slow turnover of patients and nurses. There are no learners on the ward and most patients are being treated for the same condition. This implies that the range of medication used and nursing care interventions is limited to the condition, and very familiar to all nursing staff, who have more time and energy to develop the technical skills. The question was included mainly for interest and I have not attempted to analyze it owing to the possibility of an emotive response and the existence of so many other variables. For example, nurses also use the Patient Administration system, pharmacy system, ward ordering, pathology results and maintenance requests. It is therefore impossible without more specific research to identify the reasons for this response. Although areas of further research such as studying a ward using only one part of the system, may be clearly implied by this response, such research would be of necessity disruptive and impractical at present.

SECTION 4: METHOD OF NURSE TO NURSE REPORTING

Respondents were asked whether they used the terminal or a printout for hand over reports, and to specify which printout, if any, was used. Eight different printouts were mentioned by respondents, and will be described for clarification in order of frequency of use.

- 1 The Patient Status report includes nursing diagnosis, patient condition, general information, type of operation and cardiac arrest note for all patients on ward.

- 2 The Care Plan is patient specific and includes allergies, all patient problems, goals of care, prescription for nursing care and evaluation statements. This may be a very long document taking up a maximum of 45 screens, or about 15 sheets of A4 printout.

- 3 Progress notes are not specific for one patient but include the names of all patients on the ward and the nursing comments for the day requested. (Any day's notes may be printed out, but for a handover report the current day would be selected)

- 4 Patient Record is specific for one patient and includes patient, allergies, nursing diagnosis, patient condition, patient alert, general information, cardiac arrest note, progress notes.

- 5 Nursing Assessment is patient specific and includes biographic and demographic information and an assessment of activities of living. This may take up a maximum of about 16 screens or 5 sheets of A4 printout for one patient.

- 6 The 7 day medicine printout includes all the scheduled medications for one patient over a period of 7 days.

7 Patient Care Summary is specific for one patient and includes allergies, reason for admission, nursing diagnosis, patient alert, medical orders and current medications.

8 Interim summary is patient specific and includes general information, type of operation and cardiac arrest note. It only includes information for the day it is printed.

9% of respondents said they relied on memory only for these reports and of the rest, 27% used the terminal, although in some cases this was in addition to a printout. The status report was the most commonly used printout, being the choice of 66% of respondents throughout the hospital. Table 10.6 shows the percentage of nurses who use the different printouts. A breakdown of ward usage is included in the Appendix.

TABLE 10.6

MODE OF NURSE TO NURSE REPORTING		
Percentage of total respondents using each mode of information for handover reports.		
Status report	66%	
Care plan	33%	N.B.
Progress notes	27%	Nurses may use more
VDU	27%	than one mode of
Patient record	27%	nurse to nurse
Assessment	24%	reporting
Drug printouts	12%	
Patient care summary	10%	
Memory	9%	
Interim summary	9%	
30% of respondents who specified printout did not specify which one they used		

ANALYSIS OF ADDED COMMENTS

Comments related to time

A large number of respondents are concerned with the time aspect of computer care planning. Forty two comments, making up 34% of the total, included the word "time". Sixteen were directly related to time with patients. The comments are too numerous and similar to justify quoting in full, but included phrases such as

- "less time with patients"
- "I'd rather spend time with patients"

"wasting patient time at computer"
 "difficult to find time to deliver care"
 "We don't have the same amount of time with patients"

Twenty six comments concerned non specific computer time, including phrases such as

"time consuming"
 "takes longer"
 "takes too much time"

Four comments cited lack of typing skills as reasons for care plans being time consuming. One nurse, who perceived an increase in work load, wrote

"The ward is busy now even when it used to be quiet."

Another who explained she had only been on the ward for a short time, commented favourably that

"Printouts are useful and *save* time at handover. (Status report)"

Comments related to quality of care

One comment simply claimed that standards of care had dropped, but did not clarify this statement. Four nurses believed that using the computer for care plans prevented nurses planning and discussing care with the patients, thus indicating they perceived a reduction in quality of care. Eight who felt that care in general had stayed the same or improved, believed that this was despite the computer, rather than because of it. Three nurses claimed that this is due to staying on duty after hours to complete care plans, or just having to work harder in general. Two nurses felt that care in general had improved but added, enigmatically,

"Not because of the computer."

Some nurses emphasised that use of a computer could not influence their care, understanding or knowledge:

"The use of a computer cannot improve my understanding of a condition or the care."
 "A computer does not aid or teach understanding."
 "I cannot see the connection between a person and a machine."

Two nurses complained about the effect on patients, albeit in different terms:

"takes senior staff away from nursing the patients and leaves junior nurses and care assistants to do it."

general or the care plans in particular. From a ward that had devised its own core care plans on which the computer care plans are directly based:

"I think computer care planning is *dreadful*. By far the worst aspect of computerisation. It destroys everything we are trying to do in practising primary nursing. They are not individual, they are not used as we used to use the old care plans they are not evaluated properly. In fact I think they should be scrapped."

There were no comments about the free type facility for nurses to create their own care plans if not satisfied with the pre determined ones. The existence of this facility should negate many of the negative comments, for example the one quoted above. These are being used, as may be seen in Chapter 11. Some of the comments pertaining to typing and time may refer to use of free type care plans but have not been explicit.

Two nurse wrote that they would rather create their own care plan than use those on the system, which implies that they are using this free type facility. Two nurses from the same ward wrote identical comments, claiming that they found care planning easy because

"I do not use the available screens"

again implying use of free type care plans.

Comments related to paper management

Six comments referred to paper management. One qualified the assertion that care planning was time consuming by explaining that everything was written on paper first. Three other nurses simply commented that computer care plans use too much paper, while one added that

"No one knows which piece of paper to use"

Miscellaneous comments

One nurse believed that the computer system had altered the definition of nursing, writing:

"I still find the Hospital Information System the biggest waste of nursing time I have come across in my ten years experience. The definition of a nurse as 'one who cares for the sick, feeble and injured' will soon have to be altered to 'one who organises and oversees others to care for the sick, feeble and injured' It seems we are more concerned with facts and figures than patients as people."

DISCUSSION

The inclusion of individual comments adds an extra dimension, illustrating nurses' perceptions more vividly than numeric results alone. Nonetheless, the comments introduce conflicting evidence, sometimes demonstrating inadequate understanding of practice and principles. There is no doubt that nurses perceive the computer care plans have reduced their time for other nursing activities. Because of difficulties in the early stages of this study, the component planned to measure the time taken to write care plans was abandoned and further attempts to do so, made as part of a concurrent study, were also unsuccessful. Consequently, there is no evidence that care planning is taking longer now it is automated, except from the perceptions of the nurses themselves.

Two issues arise from this which may indicate changes in practice are required. Using the paper system of care planning, a practice in some areas was to complete care plans as an end of shift task. Nurses would congregate in the office or some other convenient place, discussing individual patients, exchanging ideas and catching up on any other outstanding business, so that time devoted specifically to care planning was not always clear. Sitting at terminals shared by other professionals on the ward creates "queuing", nurses staying late and general discontent. Additionally terminals are at the work station in view of patients, visitors and other staff they are more conscious of time spent on this task. These issues will be considered in the final chapter in the context of proposals for change.

Comments related to paper management illustrate early problems of the system. Because it is flexible and may be user defined to a large extent, there is potential for considerable selection of reports. Little guidance was given initially for paper management and until wards were competent enough to be selective, many reports were automatically generated creating an enormous task of sorting, retention and disposal of paper involved. A Nurses Hospital User Group (HUG), with representation from each ward, was established for discussing all aspects of the system, and the group has been able to decide which reports are required and which should be suppressed. In addition paper is now collected for recycling. A concurrent project is being carried out on two wards by another researcher to address these problems as part of a project to develop a model for best practice.

Comments demonstrate that nurses feel that quality of care is affected, because less time is spent with the patients. If this is happening, it represents an unquestionable decline in the quality of patient care, but it is difficult to accept that nurses who believe that care planning should be interactive have allowed this to happen. It is more likely that the previous practice continues, that nurses continue to plan care with patients, but now need to make notes on paper before entering data on the computer. Respondents who claimed that the quality of care remained the same, but nurses had to work harder or stay late, and the one who observed that she had to "write everything down first" were possibly more accurate. The perceptions strongly indicate a need for change of provision in the care planning system.

The apparent dissatisfaction with the composition of the computer care plans has initiated further

action leading to a complete modification of the care plan system, which is discussed in the final chapter. Phrases such as "cumbersome, long winded, too much writing to look through" are justifiable observations, as are the comments that care plans on other topics were required. This study employs a proactive approach so that problems may be dealt with during the course of the project, by adding or modifying care plans to individual needs.

However criticism of clinical and professional content of the care plans is questionable. Every care plan was composed with guidance from nurses working in the specialty, was approved by ward nurses before implementation and specialist information was provided by nurses with qualifications related to stoma care, breast surgery, infection control, burns, dermatology, cardiac care, genito-urinary surgery, paediatrics, rehabilitation, ophthalmology, ear nose and throat surgery and orthopaedics. The nurse who criticised the content of the computer care plans and compared them unfavourably with the core care plans the ward previously used, must have been aware that the core care plans provided the basis of information for the new plans. It cannot be denied that these nurses are expressing real dissatisfaction, which must be addressed, but the root of the discontent is not overt.

The Strategy for Nursing proposed by the Steering Committee of the Department of Health Nursing Division 1989, states that

"The nursing profession will increasingly use clinical technology within their direct delivery of health care in every setting.....Whilst there is no doubt that technology is important, practitioners must maintain their caring role by using technology as an adjunct to care, rather than as a substitute for it."

specifying that

"In the hospital the computer will be the primary tool for a whole range of tasks. It will be the preferred vehicle for patient records, the scheduling of drug administration and implementation of individual care plans." (Poole, A, 1989:16)

The comment that the Hospital Information System had destroyed the definition of nursing appeared to be implying that qualified nurses no longer nurse the patients but simply enter data into a computer. This, and other comments, do not suggest evidence that the computer is perceived by nurses as an important part of practice, or as an appropriate tool for care planning. Nevertheless, nurses have made it clear that they are striving to "maintain their caring role" despite reservations about care planning technology. The proactive nature of this research aims to facilitate the use of technology as "an adjunct to care" by modifying both the content and technological functions of the care plans. This will be the subject of the final chapters, where these attitudes will be re-examined. Now that we are free from constrictions of the implementation programme, it will be possible to work with each ward, talk to individual nurses and to modify the care plans to the satisfaction of the nurses using them.

CHAPTER 11

MONITORING COMPUTER CARE PLANNING

After the quality measurement component of this study had been carried out on two wards, it became apparent that the quality instrument, Quality Indicators for Client Care (QICC) used in the hospital and described in Chapter 9, was not wholly appropriate for measuring the quality of computer documents. However, in the absence of a more suitable tool, the nursing documents from each ward were monitored informally using a modified version of this tool, from six months after they had started to use computer care plans. Because of the limitations of this tool, identified in Chapter 9, results of these studies have not been used as part of this research except as a basis for developing the new audit tool.

In addition, some questions were considered irrelevant in the context of individual care. These included reference to specific nursing interventions, such as teaching, position changes or rehabilitation for example. Standard 4 in the Wessex Regional Health Authority plan for implementing Nursing standards (1989-90:17) states:

"For each patient, a registered nurse shall assess the patient's needs for nursing care, prepare a plan for care, ensure that care is provided and evaluate the outcomes"

If this standard is met, care is planned for each patient, so that a record of the above interventions may or may not be an indication of quality of care.

In early 1990, Medical Audit was introduced in the hospital and the format for an audit tool for this purpose suggested development of a more suitable tool to monitor care plans.

DESCRIPTION OF AUDIT.

Audit is defined by Dixon et al (1990:5) as

"The systematic peer evaluation of the quality of patient care, based on explicit and measurable indicators of quality for the purpose of demonstrating and improving the quality of patient care."

From models of audit described by Dixon, I selected the model described as "Criterion based audit" in which criteria are specifically defined measures of quality of care, agreed in advance as a basis for data collection. This approach has been developed to include "audit screening criteria", consisting of an aspect of care and a screening percentage, arbitrarily set at 100% or 0%. In this way, potentially unacceptable practices may be identified and the number of instances which do not meet the criteria are subject to review. This model assumes a commitment to identify problems and

take necessary action, and each individual case which does not meet the agreed standard is subject to review.

THE AUDIT PROCESS

Steps in developing an audit programme defined by Dixon et al include:

- 1 Audit design, selection of topic, establishing objectives, sampling and the time span.
- 2 Establishing audit indicators/criteria
- 3 Collecting and organising data
- 4 Analysing data
- 5 Identifying problems, establishing causes
- 6 Recommending action

1. Audit design

Care planning documentation is the topic of this audit and the objectives are based on criteria defined to measure regional standards related to care planning. Standard 4, cited above, includes the following criterion.

"The systematic approach to patient care is carried out in accordance with policies and procedures agreed by the district health authority, which provide assessment, planning, provision and evaluation of nursing care"

This is accomplished by demonstrating that:

- a) Care planning includes both those functions which are unique to the profession of nursing and therefore can be undertaken independently or in conjunction with other health care professionals, and those which are dependent upon the orders of the patient's doctor.
- b) Care plans are developed in consultation with the patient and/or his/her family or significant other person, to the extent possible
- c) Care plans are revised as the patient's needs change

2. Establishing audit criteria/indicators

I wrote sixteen indicators, partly based on the original questions in QICC, to measure the extent to which the objectives would be met. These reflect the policies related to care planning, as stated in the Regional standard. They are listed below in Table 11.1

TABLE 11.1

CARE PLANNING AUDIT
INDICATORS USED IN COMPUTER CARE PLAN AUDIT
1 Each patient has a nursing assessment
2 Assessment is started within 12 hours of admission
3 Assessment is appropriate to length of stay
4 Current medications are recorded
5 Information to relatives is recorded
6 Patient's perception of illness is recorded
7 All activities of living are assessed
8 A key point summary is completed
9 Allergies are recorded
10 Each patient has a care plan
11 Care plan is created within 48 hours of admission
12 All identified problems are included
13 A goal date is attached to each goal
14 Goals are evaluated on stated date
15 Goals are evaluated in the care plan
16 All resolved problems are completed

The standard set for each of the of the above indicators is 100%, that is, each should be met for every patient. However, in some instances there may be acceptable exceptions. As described in Chapter 9, care planning policy defines an in patient stay of less than 72 hours as "short stay" and for which a full assessment is not *necessarily* required. Based on this premise, an exception to indicator 7, states:

"patients who were admitted for less than 72 hours"

For some indicators, the objective may be achieved by alternative management. For example, the facility for recording information given to relatives is in the admission assessment pathway. If, instead, it is adequately recorded in the patient's progress notes, this is considered as meeting the criteria by alternative management.

The type of care plan is recorded and the topics about which free type care plans are made, are listed. The topics included in the progress notes are also recorded. Nurses are encouraged to write economically in the progress notes for two reasons. First, it perpetuates the objection that time is wasted on typing because nurses do not have typing skills, and secondly, free type information in progress notes cannot be retrieved for use with the resource management system.

To keep a record of how much information is typed in the progress notes the number of patients for whom each topic is recorded, is calculated and the number of times these topics are repeated in the care plans is also recorded. Table 11.3 below shows the types of care plans used. The actual topics included in the free type care plans and the progress notes, and the actual number of topics recorded and the number repeated, are included in the Appendix for this chapter.

TABLE 11.3

TYPES OF CARE PLANS USED		Patients n = 211
	NUMBER USED	% USED
Specialty	129	61.7
Free type	66	31.6
Activity of living	14	6.7
TOTALS	209	

Of the fifty four topics included in the free type care plans, only nine are not specifically the major topic covered by either type of pre written care plan. These are

- Back pain
- Ascites
- Haematemesis
- Cramp
- Hypertension
- Hypotension
- Investigations
- Gastric pain
- Dizziness

Most of these are covered by more generalised pre written care plans, which could be made more specific by the addition of free type, for example plans for general or post operative pain; vomiting; haemorrhage; sleep disturbed by discomfort, or discomforts associated with clinical condition. However the purpose of the free type facility is to retain nurses' choice in care planning and they are free to exercise this choice.

Nonetheless, creation of one hundred and twenty seven free type care plans for sixty six patients represents a considerable amount of typing and may indicate that the pre written care plans are inadequate in content or not easily located in the system. Information obtained from monitoring the free type care plans has provided a basis for modification of the system.

In the same way, the topics included in the progress notes are recorded. The original purpose of these notes, described in Chapter 1, was for entering information that did not logically fit into any other category but needed to be communicated or recorded. Sometimes nurses also use this facility as an alternative to the care plan and sometimes as an adjunct to the care plan.

Of the forty three topics included in the progress notes, twenty nine are specifically the subject of pre written care plans. Of the rest, medication, intravenous fluids and assessment information are recorded elsewhere, while visits from doctors or other disciplines are considered necessary topics to record in the progress notes. There was a total of 1,355 separate instances of recording these topics for 211 patients. Of these, there were 350 instances of repeats of the same topic in the care plans, which represents a 26% repeat rate overall.

If the care plans are being used as the tool for communication, it may be assumed that wards with a greater percentage of patients with care plans should include fewer topics per patient in the progress notes. However, this has not been demonstrated by these audit results.

On average each patient had six different topics recorded in progress notes. Of the six wards where all patients had care plans, only three had a lower than average number of topics recorded in the progress notes. This has affirmed the assumption that wards where all patients have care plans will use the progress notes for fewer topics, and no statistical test has been applied.

Using the average standard achieved by each ward for the section of audit concerned with care planning, as an indication of the quality of the care plans, it may also be assumed that the wards with a higher average standard will be using the care plans more effectively and therefore would repeat fewer care plan topics in the progress notes. This assumption also has not been clearly demonstrated by the results, presented in the Appendix. On average the percentage of repeats was 26%. Of the five wards with the highest care planning standard, three have a higher than average percentage of topics repeated in the progress notes, one has a lower than average percentage and one has no repeats at all. Conversely, taking the five wards with the lowest care planning standards, similar results have occurred. Three have a higher than average percentage of repeats in the progress notes and two have a lower than average percentage. At face value there is no correlation between average audit scores and the percentage of topics recorded in progress notes so no statistical test of analysis was applied. Please see Table 11.4 below.

TABLE 11.4

PERCENTAGE OF PATIENTS WITH CARE PLANS COMPARED TO THE NUMBER OF TOPICS APPEARING IN PROGRESS NOTES		
	Patients with care plans	Topics per patient in progress notes
(descending order)		
WARD I	100%	5
WARD J	100%	8
WARD K	100%	7
WARD L	100%	4
WARD N	100%	7
WARD P	100%	5
WARD B	95%	5
WARD F	87%	8
WARD C	86%	5
WARD H	83%	3
WARD M	81%	8
WARD G	71%	2
WARD A	67%	8
WARD O	63%	6
WARD D	58%	9

DISCUSSION

The audit results discussed in this chapter were the first using the new instrument based on the principles of audit described by Dixon. Because the original instrument used, a modification of an existing quality assurance tool, was unsatisfactory for use with computerised care plans, and the analysis was carried out in a different way, the earlier results cannot be compared directly with these. However, in Chapter 13, six aspects of care planning are identified for comparison of the paper and computer care plans using the two tools.

By the time this audit was carried out, each ward had been using the care plans for at least one year and the original assessment had already been drastically modified, as a result of the interviews, early attitude questionnaires and general observations. Further modification to the assessment, following these results, concerned the low standards achieved for recording the information given to relatives and patients' perceptions. These changes are reported in Chapter 14.

On average, standards for assessment throughout the fifteen wards were higher than standards for care planning. There were nine wards where all patients had assessments as opposed to six wards where all patients had care plans. Out of a possible 135 assessment standards between the fifteen

wards, 39 (29%) achieved 100%, whereas out of a possible 105 care planning standards, 13 (12%) achieved 100%

In the care planning section, other concerns included the use of goal dates, which as explained above, introduces professional and technological issues. The reasons for poor use of these facilities can only be speculative and anecdotal. This, together with the poor standards achieved for completion of care plan on discharge, is addressed as part of the major modification to the system, outlined in the final chapter to illustrate the proactive nature of the research.

Observation of types of care plans used, showed that the "Specialty " pathway care plans were used for 62.9% of patients, "Free type" plans for 31.5% and the "Activity of Living" care plans, based on the Roper, Logan and Tierney model of nursing were used for only 6.7% of patients. Earlier in this study, it was explained that the specialty plans describe the way in which a specific clinical condition affects an activity of living while those in the Activity of living pathway describe the most common problems which may occur in each activity of living.

The disparity in the frequency of use of the two types of pre written care plans, suggests one possible major difficulty, that despite the use of a model of nursing in the hospital, and the use of specific care plans to put it into practice, nurses still think in a medically orientated way, so that access via the specialty pathway seems more natural. It is also a slightly quicker process than using the other pathway, because all the possible problems are contained under the title of the patient's medical diagnosis.

This does not explain why nurses are using free type, rather than activity of living care plans, for patients additional problems. This suggests two possible shortcomings in the care planning system. At first glance it would appear that the activity of living care plans may not provide adequate information for care planning needs. The other possible reason is that, having started to make a care plan in the specialty pathway, it may seem cumbersome to go through the system to look for an appropriate care plan for other problems which may exist independently of the current clinical condition. (For example, a patient who has undergone hip surgery and has an established colostomy) In this case, a nurse may hastily type a care plan, rather than search for one that she is not sure about outside her own specialty. A total of 127 individual problems were free typed for 66 patients, which is a considerable amount of typing.

Heavy use of the progress notes, in which nurses type information in chronological essay form, may be another indication that the care plans are considered inappropriate, in content, ease of access, or ease of use. I hypothesised that if care plans were adequate, wards in which all or most of the patients had care plans, would not need to include information about so many problems in the progress notes. With the exception of one ward, this was not the case.

Another hypothesis, that wards which achieved a high average standard of care planning were using the care plans in practice and would not need to repeat this information in the progress notes, was also shown to be not necessarily correct. It appears therefore, that when care plans have been made

for patients, they are not always used as the "working tool" of the process of nursing, but rather as an additional document which nurses are required to use. This strengthens the probability of limitations of the care planning system, suggesting as above that the content of care plans is not adequate for communication purposes or access to the information they contain is difficult or time consuming.

The audit was the last component of data collection of this research study. Results from this and the other data collection methods have been analysed as a foundation for further change in the care planning system.

CHAPTER 12

SUMMARISING THE RESULTS: NURSES' ATTITUDES

Throughout this research the emphasis has been on the way in which nurses perceive the computer care plans and the way in which they are using them. This chapter brings together the components of data collection related to attitudes, from questionnaires and interviews, summarises the attitudes in three distinct time periods, analyses them in the context of change literature, correlates attitudes to the Nursing Process and computer care plans at each stage of the change and determines the statistical significance of attitude changes over a period of time. Attitudes to the Nursing Process are discussed as a foundation for analysis. Results will be analysed in the context of other relevant work in the final chapter.

THOUGHTS ON THE METHODOLOGY USED

As described in the chapter on methodology, the study employed an embedded case study design, by using the nurses and documents from all wards as the main units of analysis, with the addition of quantitative analysis of documents and data from interviews from two wards as sub units. Although Yin (1984) advises against using the process of change as a unit of analysis in a case study, because it is difficult to set a start and a finish to the study, applying Hakim's (1987) description of the case study as a portrait of contemporary phenomenon within its real life context, I argued that if the implementation of a computerised care planning system was a contemporary phenomenon, it was also a process, which required elements from the process approach to study it comprehensively. Blackler and Brown (1985) describe a process approach as one which takes account of the psychological and social needs of those involved, acknowledges that the process is as important as the outcome, and utilises continuing evaluation. This approach is influenced by action research, which, like the case study, examines factors in the context which gives them meaning, but also uses continuous feedback to identify problems so that modifications may be incorporated as required. This appeared to me to be the most natural method of studying the change to computer care plans at different stages of the process of adaption. Consequently, elements of both these approaches were incorporated in the design.

My research was supported by quantitative data from attitude responses and patient documents, and qualitative data from observations, individual comments and interviews, collected over a period of four years, during the process of implementation and adaptation to the new care plans.

The data collection, related to nurses' perceptions and attitudes, consisted of attitude questionnaires, interviews and computer satisfaction questionnaires. Attitude responses were obtained from a total of three hundred and thirty three questionnaires over a period of eighteen months, with additional free text comments. Attitudes were also obtained from fourteen semi focused interviews using key

disquiet and anxiety. I have likened this phase to the second stage of the innovation process described by Kjerulff as "Attitude formation and decision substage."

The decision to install the Hospital System had been taken at Regional level, and so imposed "from the top" but it is difficult to find relevant archival documents identifying the responsibility for the decision to computerise care plans. As the system is integrated, allowing for all operational functions to be computerised, it is probable that the decision was never made explicit. Nurses started using the Hospital Information System (HIS) in September 1987 for patient administration functions only, and were aware that the computerised care planning system would be introduced, but had no idea of time scale, or how the system would work. Collaborating groups were established to provide information networks and involved representatives from wards and education department in the decision making related to care planning, but the design was not available to view until activated on the wards. Documents used in the manual system were collated in this period, nurses were providing information for the new care plans and the training for Phase 2 of the implementation process was taking place.

Pre implementation attitude questionnaire

From results of the questionnaires completed during this period and presented in Chapter 5, it was seen that, on average, the largest number of nurses demonstrated "undecided" attitudes towards computerised care plans before implementation. This attitude may have been envisioned, as no one had actually seen the new system, so that expectations were based on information from the vendors and personal perceptions. The positive attitudes held by respondents about the part that the Nursing Process plays in teaching and research, were carried over to the anticipation of computer care plans. These, with the opinion that use of the light pen would facilitate rapid selection of care plans, were the only overall positive statements from this part of the study. In the same way, negative feelings that there are not enough nurses to write care plans, were transferred to the projected use of computer care plans. Similarly, if nurses feel that using the Nursing Process does not affect the delivery of care at all, and hold negative attitudes to the amount of time taken writing care plans using the paper system, it is not surprising that they envisage that this will be true of computer care plans.

Negative attitudes about whether computer care plans will improve communication and patient care may illustrate suspicions that communication and patient care need improving, that present practice is being criticised. These and other negative attitudes towards the proposed care plans may be explained by the state of uncertainty experienced in this "unfreezing" phase, a state in which nurses may have felt their values and competencies were in question.

Individual comments added to questionnaires added depth to the attitudes expressed. The time element was introduced in several comments. Many nurses emphasised that shortage of staff and time made care planning difficult using the manual system so would be likely to be the same with a computer system, although others felt that this was acceptable, explaining that comprehensive care planning *should* take time if it was to be individual. This aspect will be examined in the context of

The purpose of eliciting attitudes towards the Nursing Process was to determine whether attitudes to this influenced attitudes towards the new care plans. A comparison of frequency of individual respondents' attitudes towards the nursing process and proposed computer care plans was seen in Chapter 5 and subjected to statistical analysis which concluded that there was a significant association between attitudes to the Nursing Process and computer care plans on nine wards but not over all fifteen wards.

THE ORGANISATION IN A FLUID STATE

Post implementation Attitude questionnaire

The second phase of the attitude questionnaires involved only eight of the original fifteen wards, with a total of seventy two respondents, and took place three months after implementation on each of these wards. The period during which these questionnaires were completed, corresponds to the stage described by Lewin as the organisation being in a fluid and disorganised state. Equilibrium has been disturbed, the old structure and shape of things has gone, and continuing the analogy, individuals cannot grasp anything solid or tangible. This evokes a picture of stranded individuals, struggling to make sense of the situation, trying to restore some kind of balance and meaning, while having to carry on with the day to day operations of the organisation.

It corresponds with the modulation corollary of personal change described by Kelly, where constructs are loosened and ideas are floating. This situation is partly illustrated by the average responses to the post implementation questionnaire. Three months after nurses had started using the new care plans, only six out of the seventy two respondents were on average mildly positive about them, fourteen were still undecided, but fifty two were negative, sixteen of whom expressed strongly negative attitudes. The shift towards the more negative attitudes may be seen by comparing the frequency of attitudes of individual respondents from the pre implementation questionnaire, in the eight wards involved, later in this discussion. At this stage, only two statements evoked mildly positive responses overall: the use of the light pen to speed selection on screen, and the need for nurses to develop computer skills.

Attitudes towards the Nursing Process were shown to be associated with attitudes to computer care plans before implementation, but although they still appear to influence these attitudes three months later, statistical analysis showed that this was not the case for these eight wards. For attitude scores for individual wards, please see Appendix for Chapter 12.

[Pearson's Product Moment Correlation Co-efficient was used to determine the degree of association. Null Hypothesis: There is no association between attitudes towards the Nursing Process and computer care plans three months after implementation. When $r = -0.114$ and $\alpha 0.05 = 0.706$, r is not significant at either critical value, therefore the null hypothesis cannot be rejected. Conclusion. There is no significant association between the two variables.]

Responses continue to stress that there are not enough nurses and that using computer care plans, like the paper ones, takes too much time. The lack of value placed on care plans in general may also be assumed from the response that the time spent making a computer care plans was out of

proportion to the benefit perceived.

Kjerulff's assumption that attitudes formed during the pre implementation phase would influence adaptation, corresponds to Kelly's theory that a persons' anticipations influence his change processes. This appears to be demonstrated by some responses. Before implementation, nurses anticipated that computer care plans would increase workload, would require more nurses, reduce time spent with patients and make orientation of staff more difficult. They retained these views after using them for three months. This may illustrate Kjerulff's contention, so that expectations formed in the pre-implementation phase are fulfilled.

These responses may be considered in two ways. The first way is to assume that attitudes are so entrenched that nurses perceive what they expect to perceive, or alternatively that the information presented to nurses prior to implementation, combined with their own previous knowledge of computer systems and manual care planning, may have led them to anticipate correctly.

Similarly, nurses may have held negative attitudes about the suggestion that the proposed computer care plans may improve communication and patient care because of the implication that these aspects need improving. That they continued to hold these attitudes three months later may again illustrate Kjerulff's assumption, that the pre implementation attitudes are ingrained. Another possible interpretation may be that in continuing to believe that computer care plans do not improve communication or patient care, nurses are reasserting the efficacy of previous practice and effectively denying that there is a change. They are exercising the choice corollary, described by Kelly above, and asserting their preference for the former state of affairs.

This also illustrates the second phase of reaction to change, described by Turrill as the time when individuals try to deny the change exists. It is impossible to identify or generalise about, the stage of personal change that existed at this time, because all individuals react at different rates, so that many reactions may be portrayed in these responses. Using individual responses as a basis for analysis, it seems clear that as only six out of seventy two respondents held positive attitudes to the new care plans few, if any, had reached the stage of adaptation or consolidation.

Walton's criticism that the general confusion over the Nursing Process is often semantic in origin, may be generalised and illustrated by responses to two statements in this questionnaire. The statement that

"Computer care plans help to improve standards of care"

received an ambivalent response. I think this is understandable and a possibly well considered response, so soon after implementation. However, an almost identical statement,

"Computer care plans help to improve patient care"

received a definite negative response, implying that patient care is divorced from standards of care,

with nurses viewing standards as a totally separate entity. This period of time coincided with the time that Wessex Regional Standards were being written, so that the word was becoming a part of nursing vocabulary as opposed to a loosely used term. "Standard setting" was included as a topic in post basic education modules, and nurses were being asked to participate in writing ward standards. This identifies one of the disadvantages of the questionnaire, in that this point could have been clarified during an interview, but in a questionnaire presents a discrepancy which invites speculation. It may also indicate that inclusion of two such similar statements did not help to validate responses, but caused confusion. Criticisms about the inflexibility of the computer system imply that it is difficult to manipulate, which may be responsible for the frustration expressed in many comments from the questionnaires at this stage in the process.

In Chapter 6 I compared the overall results of both stages of attitude questionnaires, using all the wards in the first study with the eight wards in the second, and also comparing the results of just the eight wards which took part in both. The results from these eight wards cannot necessarily be generalised to all wards. However, the percentage of responses to each attitude category from all wards and that from the eight wards in the first phase, illustrated a similar enough pattern to allow the results to provide an overall picture of the direction of nurses feelings at this time. Tables 6.1 and 2 in Chapter 6 show this. Statistical analysis in Chapter 6 also demonstrated that using either means of comparing results, nurses attitudes had become significantly more negative after three months.

I also wanted to determine whether the numbers of nurses expressing each attitude in the two stages of the questionnaire was significant. I compared the number of individual respondents expressing each attitude category in the eight wards used before and after implementation. It was seen that the major shift in individual responses was towards negative. It seems reasonable that there should be fewer undecided responses after the system had been in use for three months, but it is noticeable that none had shifted from undecided to positive. This seems to be in accordance with the general feeling of fluidity and lack of stability in this period, as described by Lewin. The shift was again found to be significant. Actual results are included in the Appendix.

[Chi square test of analysis was applied to measure the significance regardless of direction of change. Null hypothesis: There will be no significant shift in attitudes after using the care plans for three months. When $\chi^2 = 29.6$ and $\alpha .005 = 12.838$, χ^2 is greater than $\alpha .005$ so the null hypothesis is rejected. Conclusion: there is a significant shift in individual attitudes, away from positive and undecided towards the negative pole.]

Kjerulff identified this stage as the initial implementation substage, asserting that negative opinions already formed will become more negative soon after innovation. The average responses to each statement were compared in both questionnaires where an obvious shift to negative is demonstrated and standardised scores were used to demonstrate this more precisely. A Table showing the actual scores for each statement in each of the questionnaires is included in Chapter 6. The statement towards which the greatest move has occurred is the practical issue of queuing for terminals. These comparisons also show that after three months use, nurses feel more strongly that computer care plans do not help to improve patient care and communication, do not reduce paper work or allow more time with patients. Statistical analysis in Chapter 6 showed that the attitude shift towards

negative when comparing all the wards in the first study with the eight in the second, and comparing the eight wards with themselves, were significant at all critical values.

Kjerulff claims that this is the period during which problems start to be identified. From analysis of attitudes towards individual statements in Chapter 6, critical problems were identified in professional, practical and ethical aspects of care planning. From a professional view point nurses indicated that they were anxious about an increased risk of litigation, did not consider that the care plans would enhance accountability or strengthen the learning process for students and did not contemplate worthwhile benefits from the system.

Practical problems included an increased work load, queuing for terminals, shortage of nurses and difficulties when orientating new staff. The greatest number of negative attitudes, however, existed towards ethical aspects of care, all of which may be seen to be caused by the practical problems. Responses suggested that patient care was suffering mainly as a result of nurses being able to spend less time with patients, being less able to involve them in care planning and reducing patient individuality. These attitudes were also elicited from the interviews, described below. It must be inferred that nurses feel that using computer care plans is not improving patient care, and in some cases is having the opposite effect. This provided the principal justification for planning action to redress the problems. Some attitudes and comments were difficult to understand. For example, before introduction of the care plans, nurses believed that their use would help research, but after using them for three months this attitude did not endure. This shift in opinion is difficult to understand, as the care plans were based on research and clinical standards wherever possible and written with full support and assistance of ward and specialist nurses. It is also perplexing that nurses fear use of the new care plans will increase risk of litigation, but do not increase accountability. A nurse is accountable for the care plan whichever system is used, but an electronic signature reinforces this by allowing accurate identification, thus making nurses more aware. This may make them more aware of litigation but does not increase the risk.

The anomaly of these responses may be explained by the general bewilderment and lack of discernible guidelines experienced by nurses at this stage in the change process. Confusion, fear, perceptions of loss of control, threats to role or status and illogical behaviour have been described by Turrill, Lewin, Kjerulff and Harris in relation to initial stages of innovation.

The perception of threat to personal roles and relationships described by Kelly was evident in the comments from one ward. Respondents claimed that because only qualified nurses had personal identification numbers (PIN) which allowed creation or modification of care plans, much of the direct nursing care was being devolved to care assistants, creating disharmony and dissatisfaction among both groups. The limited access to specific functions highlighted areas of previous practice which had been difficult to identify with the paper system. The resulting change caused the care assistants to experience a loss of status, which appears to indicate that care assistants perceive documentation as a task of higher status than direct nursing care. (Care assistants now have limited, and mainly secretarial, access to the care planning pathways at the discretion of the ward sister and their entries are countersigned by a qualified nurse.)

Interviews: week of implementation and three months later

The first set of interviews was held during the week of implementation and as such does not fit neatly into the stages of innovation described by Kjerulff, above, but may be considered to fit well in the fluid disorganised state of Lewin's description of organisational change. Nonetheless, the feelings expressed here cannot be compared to those expressed in the pre implementation questionnaires, as the care plan system had been already implemented, but neither can they be compared to attitudes three months post implementation. The period of the preliminary interviews could be construed as a time of crisis, rather than anticipation or attempting to settle "in a new and tangible state" as described by Lewin. The purpose of conducting the interviews at this stage was to capture the feelings of the nurses in this time of crisis, and to compare them to those expressed three months later. The second set of interviews took place approximately twelve weeks later, at the same time as the post implementation attitude questionnaires and quality assurance study for nursing documents on these two wards. Results of the post implementation attitude questionnaires, showed that on average these wards expressed undecided attitudes at this time. Only five of the original nine key informants attended the second interviews.

The words used by nurses to describe the general atmosphere during the week of implementation included "panic, hectic, traumatic, horrendous," and to describe reactions of staff, "helplessness, discomfort, resentment, irritation and anger". In terms of personal change nurses were in a state of shock. Twelve weeks later the general feeling conveyed was one of composure, as opposed to the panic described above, which suggests that they were beginning to adapt.

One difficulty identified at this time was the time taken for new nurses to obtain their PIN numbers. Some nurses also identified night nurses and older nurses as having more difficulty in adapting than other staff and the view about older nurses was repeated in the second interviews. This is not reflected by the attitude responses elicited during the same time period from these two wards, where of the nine nurses over 36 years, only two (2.2%), expressed negative views, in contrast to eleven (57.8%) of the nineteen nurses aged 35 or under. My research did not distinguish between permanent night staff and day staff; most nurses work on an internal rotation system, working a designated period of night duty throughout the year, so the proportion of permanent night staff is low.

Difficulties with relationships between care assistants and qualified nurses, and between trainers and the rest of the staff, were identified in the first interviews. Resentment from care assistants was also identified from the comments from the questionnaires from these wards. Three months later, the nurses being interviewed felt this had been addressed but new roles had developed among the qualified nurses. By this time, nurses who had adapted well to the new system were being recognised for their skills and were also doing most of the care planning, so that those who were still anxious or resistant were able to avoid full use of the system.

Nearly all perceived some detrimental effect on the patients, because they felt unable to spend so much time with them. Defensive attitudes were also evident from the comments implying that the

change was seen as a criticism of present practice. Others believed that by using the computer, careplans would be made for all patients, which had not been the case when using the manual system.

Twelve weeks later some of these earlier opinions were clarified in the second interviews, when nurses acknowledged that computer care plans had not really made it more difficult to plan care with a patient as this had not been the practice when using paper care plans. This illustrates one of the strengths of the interview method as compared to the questionnaire, where respondents write the first idea that occurs and there is no framework for elucidation. To counterbalance this, it is possible that in a one to one situation, interviewees may be more polite, and less critical than in the anonymity of a questionnaire.

The principle of individual patient care underlying use of the Nursing Process supports the idea that care planning is interactive. It appears that nurses subscribe to this view in theory, but do not always integrate it into practice. The advent of computers has highlighted the difficulties experienced and may be sometimes blamed for a pre existing problem.

Another important concern identified during these interviews was the fact that nurses are more visible when they work at computers. Previous practice had been write care plans with a particular patient or in the office, but now with terminals at the nurses station they are on view to everyone on the ward. The length of time taken to complete computer entries may be observed and commented on, especially as medical, para medical and clerical staff are all competing for computer time. This alone may be a key factor in influencing attitudes and perceptions.

During the week of implementation, none of those interviewed was totally satisfied with the training received because training off the ward was unrealistic and on the ward, was never free from pressure of patient needs. The general atmosphere of these interviews exuded a feeling that the pressure of work was always too great for nurses to get down to tackling the new system without experiencing guilt and conflict, which Kelly asserts always accompanies personal change. Three months later, as memories of training receded, the nurses commented more about the continuing support available especially criticising the length of time required to effect specific changes to the system.

All nurses interviewed the first time thought assessment pathways were too long, quoting excessive times needed to complete an assessment for each patient. Although these interviews were held at a very early stage of the implementation process, the extra work involved by the use of the over long assessment and the intensity of the feelings produced, provided sufficient justification for altering it as soon as possible, while only six wards were actually using it. However, the new pathways had not been completed by the time of the second interviews which invoked some adverse comments.

Kjerulff considers that this is the time when problems start to be identified in a constructive manner, and during the second interviews one nurse requested paper forms which followed the format of the computer assessment, so that nurses could use them as "aide memoirs" prior to entering details on

the system. These were easy to provide and have proved useful aids to assessment.

Care plans received a variety of responses in both sets of interviews. In the first period, four nurses identified positive aspects, two found them difficult, two felt they did not always meet the needs of the patients and one was non committal. I considered it was too early to make major changes on the basis of these comments, but they provided the first indication that changes would possibly be required when everyone was using them and had become more experienced. At this stage there was also an air of cautious optimism, and evidence that one nurse at least enjoyed using the computer and was satisfied by the results. Three months later all five nurses offered some favourable comments about the care plans, but problem areas were also defined, especially the perceived increase in work load. The belief, that care plans were made but not used, appeared in the nursing process questionnaire and both attitude questionnaires and was repeated in these interviews, reinforcing the notion that care planning in general is not valued.

Paper management was an issue discussed during both sets of interviews, but after twelve weeks, nurses were beginning to sort it out by reducing the number of reports they used. In neither phase were any specific technological problems identified, although they could have been inferred from the complaints about illogical pathways and lengthy procedures.

THE ORGANISATION REFREEZING

Lewin compares this stage in organisational change to the melted ice cube refreezing in a different shape. The organisation has regained solidity, but has a new structure within which people are able to grasp the new meanings and ideas. This represents a time when all but persistent resisters have absorbed the change into their daily lives and are less likely to refer back to former ways. It is a time when individuals are so involved with the present responsibilities that the old ways seem far back in the past, and intrude into consciousness less often. This does not mean that the new ways are necessarily embraced enthusiastically but if not, individuals are resigned to them.

Turrill suggests that the last stage of reaction to change is adaptation, when individuals find new personal resources to cope with new systems. Kjerulff refers to this stage as the consolidation of innovation, but accepts that individual resistance may still persist and may thwart the smooth operation of the system. In terms of Personal Construct theory, to reach this stage of change demands different behaviour and responses, and a tightening up of loose ideas.

Computer satisfaction questionnaires

Computer satisfaction questionnaires were distributed to all fifteen wards that had been involved in the first phase of the attitude study, approximately one year after each ward started using the new care plans. These were not replications of the attitude questionnaires. Thomas (1988) devised different questionnaires to measure attitudes over a period of time as she claimed that use of the same questionnaire at different stages does not produce useful results. I considered that this was sufficient time for the wards to have reached the stage at which the changes had been incorporated

into practice, as described above. I discussed the fact that new nurses on the ward would not have been using the care plans for this length of time in Chapter 10. Unfortunately, I did not ask respondents to specify the length of time they had been using the HIS and computer care plans, which must be identified as limitation of this study.

No major changes had been introduced to the system, based on the dissatisfaction expressed in the attitude questionnaire, but during the intervening period, minor changes had been carried out at the request of the nurses; apart from the change in access to care planning pathways for the care assistants described above, these mainly involved changing or adding information in areas where practice had changed. This questionnaire was carried out to find out if attitudes had altered after a year, as the change had become consolidated. However, responses to this study showed that not all problems identified in the earlier study outlined above, had been resolved one year later.

Looking at the effects of the care plans on practice, forty three of the hundred and thirty nine respondents perceived computer care plans to exert an overall negative effect on patient care, only ten perceived them to exert a positive effect, while by far the largest number, eighty three, considered they had no effect at all on usual practice. This result continues to echo the attitudes examined earlier in this work, which demonstrated that nurses felt that use the of Nursing Process, or care plans, had no effect on actual care.

The five questions in the section dealing with perceptions of practice, were included primarily to reflect the problem areas identified in the earlier questionnaires. The perception that nurses are not able to spend so much time with patients as a result of computer care plans endures, to the extent that ninety three nurses still claim this to be true and not surprisingly a similar number, eighty nine, considered the care plans had increased their workload. Despite these assertions, evidence that some consolidation had occurred at this stage may be seen by the responses to the question directly concerned with patient care. One hundred and fourteen respondents maintain that use of the care plans has had no impact at all on patient care. (It is difficult to reconcile this with the claim that less time is spent with the patients. I can only assume that nurses give the same amount of care in a shorter time.) Although it is disappointing that no positive benefits have been identified, this attitude appears to indicate that after a year, nurses were no longer feeling chaotic, but have come to terms with the present situation, drawing on new resources and behaviour to cope with the extra demands of a system which they do not like, without damaging patient care.

Questions concerning the professional content of the care plans and whether they helped to increase nurses' understanding received similar responses, with the greatest number of nurses experiencing no advantage in these areas.

Responses from the technology section of the questionnaire showed that seventy four respondents found the technology of care planning easy, but eighty eight found the documentation as a whole more difficult than using the paper system. This response helps to establish that problem areas are seen in the content of the care plans rather than solely due to difficulties with technology.

As a way of summarising this questionnaire, I asked the nurses whether they would miss the computer if it were taken away. Ninety seven nurses responded that they would not miss it at all, twenty three stated that they would miss it and thirteen felt indifferent.

I was interested in the extent to which nurses' attitudes changed over a period of time, and examined this in the context of the stages of change referred to in this chapter. Each of these three components of data collection had taken place in one of the stages of change described by Lewin and Kjerulff, above. Although the computer satisfaction questionnaire was not a replication of the two previous studies, the responses still provide an indication of whether nurses perceived the advent of the new care plans positively or negatively. In the period of change referred to as "being in a fluid state" a large proportion of attitude responses shifted from positive or undecided to negative. My results from the second attitude questionnaire concur with these findings. At this time, three months into their use, nurses were trying to make sense of the new situation and to incorporate it into their practice. After a year, when the organisation was settling (refreezing) perceptions had shifted slightly, as the care plans were consolidated into practice, and although there was still a high percentage of nurses who regarded computer care plans unfavourably, the percentage that regarded them positively was greater now than in the other two time periods. Actual results are tabulated in the Appendix.

[Chi square analysis was used to determine whether the shift in attitudes was statistically significant.

Null hypothesis: nurses' attitudes to computer care plans would not change over a period of a year. When $X^2 = 34$, $df = 4$ and $\alpha = .05 = 9.48$, X^2 does fall in the rejection region therefore the null hypothesis may be rejected. Conclusion: nurses attitudes had become significantly more favourable after they had used the new care plans for a year.]

The reason for this part of the study was primarily to give nurses an opportunity to express their attitudes and to identify problems in order to address them. Results confirmed the need for extensive re examination of the system. The dissatisfaction expressed represented a situation that was not acceptable to nurses, who were also implying that it was affecting patient care. This suggested that changes were required in both the technology and written content of the care plans.

SUMMARY

Exploring the attitudes to the Nursing Process while nurses were still using the manual system of care planning, provided a useful foundation for analysing attitudes to the computer care plans and the way in which attitudes influenced use of care plans. This is discussed in the next chapter. Lewin proposed that the total circumstances of the change must be examined, including the value systems of the groups and sub groups. Average overall attitudes towards the Nursing Process illustrated that although nurses respected the underlying principles they did not seem to value the use of care plans. Findings also demonstrated inadequate understanding of the Nursing Process, which reflect conclusions from major Nursing Process literature from the time of its inception.

By examining attitudes over a period of approximately two years, starting before the change was introduced, it has been possible to demonstrate the effects of the change process on the attitudes of the nurses, in organisational and personal terms.

Kjerulff's assertion that negative attitudes formed in the period preceding the innovation would become more negative in the period following the introduction of change was corroborated by this research. This shift to negative was found to be statistically significant. This does not explain why attitudes were negative in the first place, but general ambivalence towards the process of care planning using the paper system may have set the scene. Apprehensions about technology and change of any sort may also have had a part to play.

Some nurses commented unfavourably about the training they received and this may also have influenced the way in which they anticipated the advent of the new care plans. Personal Construct theory which states that the change process is influenced by the way a person anticipates events helps to explain the shift towards more negative attitudes in this context.

Turrill, when describing the second phase of reaction to change as defensive retreat where the individual may become negative and withdrawn, advises that this stage must be tolerated and individuals helped to keep their minds on reality before any further progress can be made.

In the final period of analysis, findings from the computer satisfaction questionnaire showed that although the greatest proportion of respondents still expressed unfavourable attitudes, the proportion had decreased, while the proportion demonstrating positive attitudes had increased. This change in attitudes was shown to be statistically significant.

This appears to support the ideas of Lewin, Kjerulff and Turrill in that some degree of adaptation has taken place. The next chapter will discuss the analysis of data relating to the care planning documents and results will be considered in conjunction with those from this chapter and the relevant literature.

CHAPTER 13

SUMMARISING THE RESULTS: AN AGGREGATE ANALYSIS

Data collection for the quality of documentation was obtained from a total of two hundred and sixty two patient documents. A quality assurance study, using the instrument modified from Rush Medicus, Quality Indicators of Client Care (QICC), described in Chapter 9, was carried out for a total of thirty eight documents on the two wards from which the key informants were drawn, and in the same time periods as the interviews, discussed in Chapter 12. Seventeen documents were examined in the first study and twenty one in the study twelve weeks later.

An audit programme, using the audit tool designed based on Dixon's model, described in Chapter 11 and included in the Appendix for that chapter, was carried out on two hundred and twenty four documents on fifteen wards, over a period of nine months, starting at least one year after care plans were activated on each ward.

Findings from these components will be discussed separately initially in the same time periods used in the previous chapter, and subsequently in the context of attitudes and perceptions. Statistical analysis has been applied to some results, but tables of actual results have only been included in this chapter if they have not been addressed previously. These tables will be included in the Appendix for this chapter as stated in the text.

EXAMINING THE QUALITY OF NURSING DOCUMENTS

THE ORGANISATION UNFREEZING

The study of the paper care plans took place approximately a week before computer care plans were installed on the two wards involved. It is possible that the general feelings attributed to this period will have influenced care planning, as nurses were apprehensive about the new system. The method of carrying out this study, the tools used and the quality objectives related to care planning documents were described fully in Chapter 9.

At this time, thirteen patients on Ward D had been admitted for over 48 hours and of these eight (61.5%) had assessments and four also had care plans. (30.7%) On ward F, out of fifteen patients, nine (60%) had assessments and five (33.3%) had care plans. These two wards presented very similar pictures. Results presented in Chapter 9 showed that scores for both wards using the manual system were very similar, with both wards achieving only low scores for care planning and evaluation, and higher scores for assessment. These scores may reflect the average attitudes of these wards towards the Nursing Process and proposed computer care plans, where Ward D was mildly negative and Ward F ambivalent about both topics.

Later in this chapter, I shall revisit these results to compare them with results of the quality study on the computer care planning documents, and the audit results.

THE ORGANISATION IN A FLUID STATE

Two aspects of the results were compared: the percentage of patients with assessments and care plans, and the quality of recording assessment, planning and evaluation. The quality objectives which apply to manual care planning apply to computer care planning. Documentation associated with each component of the Nursing Process was studied and the scores when using the paper system were compared to those using the computer system.

This part of the study was carried out in the stage where old practices had been discarded but no one was completely familiar or comfortable with the new ones. Kjerulff considers this period as one where resistance may be passive or active, where attitudes become more negative and any positive attitudes that may have been held, become strained. It is surprising in view of these expectations that for each ward the scores had increased for each component. To determine the significance of the improvements, the t-Test for paired samples was applied to each of these components, that is assessment, care plan and evaluation, for each ward. It was established that use of computer care plans had a significant effect on the quality of planning care in Ward D, and on planning and evaluation in Ward F, as measured by the QICC tool. The lack of significant improvement in assessments may be explained by the fact that nurses were completing the assessments comparatively well using the paper system, and when this study was carried out, the very long computer assessment pathways were still being used, which meant working through forty eight screens of tightly packed information to create one assessment. Although the quality of this component had not significantly improved during the three months nurses had been using the new system, I wanted to establish whether use of the computer system had an effect on the percentage of patients for whom assessments and care plans were being made. Statistical analysis showed that there was a significant reduction in the percentage of assessments made on Ward D but no significant change in percentage of care plans. On Ward F, there was no significant change in the percentage of assessments made but a significant increase in the percentage of care plans was established. All statistics were reported in Chapter 9.

Examining the results in relation to attitudes

Examining results of the quality assurance analysis in the context of the interviews, one nurse predicted during the first interview that more patients would have care plans when the computer ones were available and this occurred on these two wards. The quality of the care plans had also improved significantly, which may be because the nurses who had mastered the technology were doing most of the care planning, according to one nurse interviewed. Although only five nurses were interviewed three months after care plans had been activated, they each offered some favourable comments, and these positive attitudes, if only from a few nurses, may have been influential in the improvements in documentation at this time.

Results were also examined in the context of the attitudes expressed by nurses on these two wards in the attitude questionnaire at approximately the same time as the second quality study. Despite the significant improvement in planning and evaluating care shown by Ward F, both wards demonstrated mildly negative average attitudes to computer care plans in the post implementation questionnaire. This may demonstrate that the nurses who were interviewed were not representative or that they were less critical in a one to one situation.

In Chapter 12 I discussed the extent of correlation between attitudes to the Nursing Process and towards computer care plans. This showed that Ward D was one of the wards for whom there was a correlation between attitudes to both elements, but Ward F showed no correlation. I also wanted to find out whether attitudes to the Nursing Process were associated with the way nurses wrote manual care plans, and attitudes to computer care plans associated with the way they were used. To do this I looked at the overall standardised attitude scores with the overall standardised quality score for each phase of the study. Tables presenting these results are included in the Appendix.

In each ward it was seen that average attitudes to computer care plans three months after they had been introduced were more negative than attitudes to the Nursing Process, but the quality of care planning using the computer system was better than when using the manual system. For these two wards I must conclude that it is unlikely that nurses' attitudes towards care plans influence the way they are used, and I did not carry out any statistical analysis.

Harris's 1989 study, cited in previous chapters, showed that nurses did not need to approve of the care plans to use them effectively, and this will be considered in the final chapter in the context of research concerned with behaviour patterns and use of computers.

THE ORGANISATION REFREEZING

The audit of computer care plans was carried out to monitor the way in which the care plans were being used, to identify further problems and to try to determine whether the changing attitudes to the care plans, during the change process, influenced the way in which they were used. I do not claim that the quality of the nursing assessments and careplans can be used as an indicator of the quality of nursing care. I have not been able to find any research to show that the quality of nursing documentation is significantly related to the quality of the care given to patients although this was implied by the nursing process literature cited earlier in the previous chapter.

The audit took place in the period Lewin refers to as "the organisation refreezing" and Kjerulff describes as the "sustained implementation stage". Both agree that the change is consolidated, new norms and values are fashioned and constructive problem identification takes place.

INFERENCES DRAWN FROM AUDIT RESULTS

By examining individual indicators, it was possible to identify possible problem areas. I recorded the number of records on each ward which met each care planning indicator, and calculated an

average percentage (relative frequency) for the fifteen wards. These were divided for purpose of analysis into three percentiles. I considered that frequencies falling in the third percentile indicated problems that were fairly general across most wards and it was imperative to address these as soon as possible; those in the second percentile did not represent urgent problems in terms of the whole hospital but individual ward difficulties needed to be considered, while those in the first percentile demonstrated general competent use of the system.

The third percentile had a range of average scores between 24% and 58%. Several inferences may be drawn from each finding, usually related to either technology or the professional value placed on the particular element of care planning. These indicators are discussed in order from lowest:

- Completion of problems on discharge or when resolved.
- Using goal dates.
- Recording information given to relatives on admission
- Recording patient's own understanding on admission
- Inclusion of all problems in care plans

Completion of a problem involves only four light pen actions, a rapid operation, so results may indicate that care plans are made but not used comprehensively. This was a frequently heard comment from interviews and questionnaires.

Using dates with goals in care plans is also simple technologically. However, adding a date by which a nurse expects a goal to be achieved, involves professional judgement and accountability. Attitudes revealed that nurses had misgivings about increased risk of litigation when using computer records and this may explain this situation. The change of terminology from "review" to "goal" date was discussed in Chapter 11 and as seen in previous discussion of care planning literature, the problem may be semantic in origin.

The issue of recording information given to relatives may be examined in a different perspective. The statement related to this in the assessment pathway requires a free type entry and follows on immediately after the question "have relatives been seen by the doctor?". I conjectured that nurses may have associated these two statements, thinking that the information referred to that given by doctors which was not necessarily known to them, so no entry is made. However the range of frequencies for individual wards for this indicator was from 0% to 91% for this aspect of assessment, leading me to conclude that although some confusion in the pathways does exist, on some wards it may also be influenced by the values held about recording such information.

Entering a statement describing the patient's understanding is a straightforward free type entry and does not present any technological difficulty so the reason for omission may again be associated with the value placed on recording such information; alternatively it may be that nurses do not want to type.

The issue of including all patient problems in a care plan is a professional one, introducing questions

concerning actual or potential problems, and nursing or medically initiated problems, for example. However problems may have been omitted because there was not a suitable pre written care plan for specific needs and that is a matter that can be addressed.

The second percentile had a range of frequencies from 66% to 77% and were as follows:

- Evaluating care in the care plan
- Use of the assessment key point summary
- Assessing all activities of living
- Making a care plan for each patient
- Making a care plan within 48 hours of admission

Lack of evaluation, or use of the key point summary to list the problems identified in the assessment as a basis for the care plan, may illustrate the lack of understanding of the Nursing Process problem solving approach. This further supports the view that care plans are made but not used. However two points must be considered. The key point summary requires free type entry, and therefore more time, while the evaluation pathways may be seen as cumbersome. Modifications may be possible and need to be addressed.

As one ward at this time was continuing to use a combination of paper and computer assessments, less comprehensive information was included on the computer so that some elements were not recorded on the system at all on this ward. Although I anticipated addressing these issues on the ward concerned, as well as issues associated with the number of patients for whom care plans were made, I did not see any problems common to all fourteen wards.

The first percentile included indicators with frequencies with a range of 88% to 96%:

- Use of appropriate assessment
- Record of allergies
- Record of medication
- An assessment for each patient
- Assessment started within 12 hours of admission

These aspects of care planning, all in the assessment stage of the process are being used competently and no general problems were identified.

Scrutiny of the frequency with which care planning indicators were met by individual wards identified specific issues. One ward in particular achieved a less than 50% average audit score, whereas another produced the largest average percentage of records meeting the care planning indicators at 88%. The two wards used as the subject of the interviews and quality study, produced dissimilar results as they did in the quality study, Ward D achieving a 56% compliance with care planning indicators and Ward F achieving 76%. Later in this chapter I shall examine the average audit scores in the context of findings from the computer satisfaction questionnaire, with special

reference to these four wards.

Examining audit results in the context of perceptions after 1 year

By the time the audit was carried out each ward had been using the new care plans for between fifteen and eighteen months and many problems had already been identified. Results of the audit were analyzed in Chapter 11 in the context of the ward workload, where the assumption that the quality of documentation would be higher in those wards with a higher ratio of nurses, was not shown to be true. Statistical analysis demonstrated that there was no correlation between these two variables. It is interesting to note in this context that the ward with the lowest audit results, had more nurses than required on average per day during the month that the audit was carried out.

I also wanted to examine the effect of attitudes and perceptions on the way in which the nurses used the care planning system, postulating that wards where there was a high percentage of positive attitudes would use the system more comprehensively. The results of the comparative quality study for two wards above, did not confirm this, but this was a small sample and may not be representative. I examined the percentage of documents which met each indicator in the audit questionnaire against responses from the computer satisfaction questionnaire, as they both took place during this period of the change process. Tables are included in the Appendix.

It was seen that perceptions about whether using computer care plans improves nursing practice had no apparent association with the way in which the care plans are used, and a statistical test did not seem appropriate. Re examining the low audit score for one ward mentioned above, it was seen that although a small percentage of nurses thought that practice had improved on this ward, this was by no means the smallest percentage and the ward for example where there were no nurses who perceived any improvement achieved an 87.7% audit score. Harris's claim that nurses did not need to approve of the care plans to use them capably, is demonstrated by these results, as well as by results from the earlier quality study.

A further claim, that attitudes to care plans would influence the number of plans made, was made by Carlson (1983). Tests of analysis were used in two situations. First I used the results of quality scores from earlier quality assurance studies which were not carried out as part of this research. This is described later in this chapter. (A summary of results from these studies is available in the Appendix for this chapter). I compared the percentage of nurses with positive attitudes to the Nursing Process on each of the nine wards for which data about paper records were available, with the number of paper care plans made. Statistical analysis showed that for these wards there was an association. The figures for individual wards are included in the Appendix.

[Pearson's Product Moment Correlation Co-efficient test was used determine any correlation. Null Hypothesis: There is no association between the percentage of nurses with positive attitudes to the Nursing Process and the percentage of paper care plans made. When $r = 0.6911$ and $df = 7$, if $\alpha 0.05 = 0.6664$, r is greater than 0.6664, therefore the null hypothesis is rejected. Conclusion: there is a significant correlation between the two variables so that the percentage of nurses with positive attitudes is associated with the percentage of patients for whom care plans were made using the paper

system.]

I wanted to ascertain whether this association would be true for computer care plans, eighteen months after implementation. The same test was applied for all fifteen wards using the percentage of nurses with positive attitudes to the Nursing Process as the independent variable and the percentage of computer careplans made as the dependent variable. No significant correlation was found. (As attitudes to the Nursing Process for all the wards were reported in Chapter 5, and the percentage of patients with computer care plans in Chapter 11, the actual results are in the Appendix).

[Pearson's Product Moment Correlation Co-efficient test of analysis was used. Null Hypothesis: There is no association between the percentage of nurses with positive attitudes to the Nursing Process and the percentage of computer care plans made at the time of the audit study. When $r = 0.2986$ and $df = 12$, if $\alpha 0.05 = 0.5324$, r is not greater than 0.5529 so is not significant at any critical value, so the null hypothesis is not rejected. Conclusion: The percentage of nurses with positive attitudes to the Nursing Process was not necessarily associated with the percentage of computer care plans made.]

However, I argued that nurses who perceived the technology to be easy would use the care plans more competently and vice versa. I compared the percentage of nurses who claimed to find technology easy with the average percentage of documents meeting the audit care planning criteria. No obvious association could be seen between the two variables, with wards presenting a high percentage of nurses who claimed to find technology easy, produced a low percentage of documents meeting all the care planning criteria, and vice versa. Statistical analysis confirmed this impression. Tables of these results are presented in the Appendix.

[Pearson's Product Moment Correlation Co-efficient test of analysis. Null Hypothesis: There is no association between perceptions of ease of technology and documents meeting the audit indicators. When $r = -0.267$ and $df = 12$, if $\alpha .05 = .5234$, r is not greater than .5234, so is not significant at any level of significance. There is no correlation between the two variables, and the null hypothesis is not rejected. Conclusion: Perceived ease of technology is not associated with the number of nursing documents reaching the suggested standards.]

In the computer satisfaction questionnaires nurses were asked whether they thought the support they received when using the computer system was good, poor or variable. On the assumption that nurses who perceived that support to be good would use the care planning pathways more confidently and therefore more competently, I also attempted to correlate these two variables. This table is included in the Appendix.

At face value there appeared to be little correlation between the two variables over all the wards. There were exceptions, such as ward F which produced the largest percentage of nurses who were satisfied with the support received and also achieved a high percentage of documents which met the care planning indicators, whereas Ward D stayed in the middle ranges for both. The ward with the lowest audit scores also produced a small percentage of nurses who were pleased with the support received. Statistical analysis confirmed my impression that there was no correlation.

[Pearson's Product Moment Correlation Co-efficient test of analysis was used. Null Hypothesis: There is no association between perceptions of support received and documents meeting the audit indicators. When $r = .0836$ and $df = 12$, if $\alpha .05 = .5234$, r is not greater than .5234. The null hypothesis is not rejected. Conclusion: There is no association

between the perception of quality of support received and quality of computer care plans.]

HAS THE QUALITY OF CARE PLANNING IMPROVED SINCE THE INTRODUCTION OF COMPUTERS?

The primary purpose of any computer system is to improve the quality and management of information and there have been many claims in nursing literature about improvement in quality of nursing documents after introduction of computers; some were identified in Chapter 9. . Because my research is mainly qualitative and participative, and started only a short time before the new system was introduced it has developed in response to the needs of the nurses as shown in questionnaires and interviews and in day to day observations or conversations. Apart from the two wards used for the comparative quality assurance study, I initiated no formal hospital wide comparison of the quality of the paper and computer documents . Quality assurance studies had been carried out at the hospital on nine wards over a period of two years before the Hospital System was installed. However, the tool used for quality assurance was found unsuitable for monitoring computer care plans and an audit tool was developed as explained in Chapter 11, so that direct comparison of manual and computer documents was not straightforward. To overcome this I identified six aspects of care planning which could be compared, despite the use of different methodologies.

Nevertheless, the differences between the two methodologies represent limitations for comparative study. Data related to paper care plans were obtained from the documentation section of the original quality assurance studies, as previously described. Data related to computer care plans were obtained by carrying out an audit from a terminal away from the ward. Records of all patients on the ward during a randomly selected time period are examined after discharge so that the whole picture of the admission episode is captured and nurses have no idea when this is carried out.

These results therefore were not obtained under scientific experimental conditions. When the quality assurance studies were performed it would have been *possible*, although unlikely, for nurses to exclude patients with poor documentation, for example, by stating that they were unfit to be interviewed. Also nurses may have made an effort to improve documentation before a study, when they knew it would be scrutinised. No such possibilities exist with the audit of computer care plans. Consequently, data relating to paper care plans may only reflect the quality of care plans made for 50% of patients on the ward during a period where special effort and selection were *possible*.

The nine wards for which the quality assurance study had been carried out were used for comparisons. The aspects of care planning which had been monitored for both paper and computer care plans, to provide a comparison of quality were:

- 1 An assessment is made for each patient
- 2 The assessment is appropriate for length of stay
- 3 Activities of living (AL) are assessed
- 4 A care plan is made for each patient

- 5 All problems are included in plan
- 6 Goals are evaluated in plan

Table 13.1 below shows the aggregate results for the nine wards using relative rather than absolute frequencies due to the disparity in number of documents studied. The table shows that all but one aspect of care planning has improved overall, and the improvement was shown to be significant.

TABLE 13.1

RELATIVE FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING OVER ALL NINE WARDS		
Paper documents	n = 99	
Computer documents	n = 224	
ASPECT	PAPER	COMPUTER
Assessment	91	96
Appropriate assess	78	84
Als assessed	62	73
Care plan	69	73
All problems	55	54
Goals evaluated	56	57

[A t test analysis for paired samples was used to test the Null hypothesis: there will be no difference in the overall relative frequencies with which documents met the six aspects of care planning after computerisation for the nine wards involved. When $d = 6.632$, $t = 2.380$ and df is 5, $t_{.05} = 2.015$, the Test statistic does fall in the rejection region. The null hypothesis is rejected. Conclusion: Computer care plans have a significant influence on these six aspects of care planning on average over all nine wards.]

In order to determine whether changes were significant in any individual aspect of care planning, I used the *t test* analysis for paired samples again to test the null hypothesis that there would be no significant difference in the frequency with which documents met each of the six aspects of care planning over all wards after computerisation.

The null hypothesis was not rejected for five aspects, but the improvement was found to be significant in the area of assessing activities of living, as shown in Tabular form in the Appendix. Tables and tests of analysis for all the non significant aspects are also included in the Appendix. Statistical analysis is as follows:

[Null hypothesis: there will be no difference in the frequencies with which activities of living are assessed after computerisation for the nine wards involved. When $d = 26.31$, $t = 2.191$ and df is 8, $t_{.05} = 1.8595$, the Test statistic does fall in the rejection region. The null hypothesis is rejected. Conclusion: Activities of living are assessed more frequently when using the computer system]

I also wanted to discover if the numbers of documents meeting all six care planning aspects had changed on any individual ward. Using the *t* test analysis as above, it was demonstrated that on three wards the number of documents meeting the criteria had increased significantly at critical values of .025 and .05. Conversely, on one ward the number of documents meeting the criteria had decreased significantly at critical values of .025 and .05. All these results are tabled in the Appendix, with details of statistical analysis for individual wards.

After using computer care plans for over a year the quality of the documents in the six aspects examined has improved for only three wards and has deteriorated for one ward. For the remaining five wards computer care plans have exerted no significant effect on the quality of care planning.

IDENTIFYING SPECIFIC WARDS

I selected four wards to look at: the two involved in the interviews and quality study and the wards with highest and lowest average frequencies for records meeting the care planning indicators. Significant changes in the six identified aspects of care planning were demonstrated for the latter two wards. The six aspects have significantly improved on the ward with the highest frequency, but the reverse has happened on the ward with the lowest. It is impossible to isolate reasons for the reduction of records meeting care planning criteria on this ward from these results, but it is a concern which will be addressed as part of the action research approach.

By comparing the quality of the six identified aspects when using the paper system and the computer system eighteen months after it was introduced, it was shown that for the two wards involved in the quality study and interviews there was a significant improvement for ward F but not for Ward D. Ward F increased the percentage of assessments from 60% to 95.8% and care plans from 33% to 100% after three months, maintaining this after eighteen months. However Ward D showed no consistent pattern; having decreased the percentage of assessments from 61.5% using the manual system to 40.9% three months after computerisation, the percentage increased to 100% after eighteen months. Conversely, care plans increased from 30.7% to 40.9% after three months, but after eighteen months care plans were made for only 13% of patients. These results may be seen in tables in the Appendix.

Using Chi square analysis for one set of data, the test was applied before and eighteen months after, implementation of computers, on each ward. The increase in the number of assessments was shown to be significant, the increase in the number of care plans on Ward F and the reduction in the number on Ward D, were also significant at a critical value of 0.5.

[Ward F, Null Hypothesis: There will be no change in the percentage of patients with care plans and assessments eighteen months after computerisation. Assessment: $X^2 = 10$ and $\alpha .05 = 3.84$, X^2 is greater than 3.84 so the null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of patients with assessments eighteen months after computerisation. Care plans: $X^2 = 10$ and $\alpha .05 = 3.84$, X^2 is greater than 3.84 so the null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of patients with care plans eighteen months after computerisation.]

[Ward D, Null Hypothesis: There will be no change in the percentage of patients with care plans and assessments eighteen months after computerisation. Assessments: $X^2 = 9.18$ and $\alpha .05 = 3.84$, X^2 is greater than 3.84 so the null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of patients with assessments eighteen months after computerisation. Care plans: $X^2 = 7.19$ and $\alpha .05 = 3.84$, X^2 is greater than 3.84 so the null hypothesis is rejected. Conclusion: There is a significant reduction in the percentage of patients with care plans eighteen months after computerisation.]

THE ENTIRE PROCESS AT A GLANCE

Throughout this and the previous chapter, I have summarised and discussed the elements of data collection, each as a separate entity and in the context of change theories and relevant literature. I have also attempted to establish associations between all the findings. These separate elements only represent the part of the change process which can be analyzed quantitatively.

THE PROCESS DURING THE STAGE OF "UNFREEZING"

The process of changing from a manual system of care planning to a computer system, started in late 1987 with the setting up of a Care Planning Sub Committee for decision making as part of a greater communication network. At this time the introduction of a Hospital Information System (HIS) had been decided and selected, but not yet implemented. This is the time of innovation in which decisions are made and attitudes formed. In the collegiate change strategy, described by Turrill, (1986) participative decision making is a principle feature, but is often difficult in the context of a large, hierarchical organisation. Nonetheless, from the start this was attempted by including nurses at ward level in the formal decision making and communication network. Informal networks continue to exist alongside the conventional structured networks and a great deal of useful information is always obtained in this way. The communication and decision making teams set up at this time, were disbanded when the specific tasks of the moment were completed. Taking their place for nursing, is the Nurses' Hospital User Group (HUG). The group is composed of representatives from each ward, from Nurse Managers and from the HIS project team. All issues relating to nursing use of the system are addressed at this forum, and communicated to relevant people for necessary action. Any changes to the system must also be approved by this group.

In early 1988, participation was increased as nurses from each ward supplied information for me to write the new care plans. This process, described fully in Chapter 4, was different for each ward as the nurses themselves decreed the way in which it would take place. As there was usually more than one ward in each specialty, each contributing information for similar topics, a considerable amount of refining and organising was necessary to provide acceptable care plans for the specialty. All were approved by the wards before being entered into the system. This information gathering period lasted until the last set of care plans was activated, in November 1989.

Other activities took place during this time. In late 1988, the first pre implementation attitude questionnaires were distributed to sixteen wards.

THE PROCESS DURING THE "FLUID" STAGE

In April 1989 the new care plans were introduced on the first three wards, followed in May by a further three and in June by two more. These wards were entering the stage in the change process referred to as the "organisation being in a fluid state." Two of these wards took place in the interviews and quality assurance document study, the first stages of which took place in May. All eight wards were involved in the post implementation questionnaires which were distributed in September, at the same time that the second quality assurance study and interviews took place and short reports of all results were sent to the appropriate wards and Nurse Managers. The implementation process continued on schedule, with three wards "going live" in September, four in October and the last in November. My participation in the actual implementation process involved physically typing every care plan, a total of over seven hundred, on to the computer, with the help of two other members of the department. It also involved providing support to each ward during the early days and continuing help on demand, in conjunction with the two other members of the department and the HIS project team.

By the time implementation was completed, in November 1989, a programme to formally monitor use of assessments and care plans began with the first three wards to "go live", and was continued until documents on all wards had been monitored at least once and had received reports, by early summer 1990. The existing quality assurance tool QICC was used but found inadequate to monitor computer documents, so the development of an audit tool grew out of these early results.

THE PROCESS DURING THE STAGE OF "REFREEZING"

Beginning in spring 1990, when computer care planning had been established for one year on the first three wards, computer satisfaction questionnaires were distributed in stages to all wards in turn. Data collected from these questionnaires, reflects the attitudes in this final stage of the change process. This part of the research was completed in November 1990, the last ward being omitted as other research was being carried out there and I did not want to cause further pressure. Reports on results of this questionnaire were received unfavourably by nurses on one ward, who considered that urgent action should be taken on the basis of the dissatisfaction expressed. I responded to this with presentations, explanations, clarifications and reassurances that action would be taken, to the individuals concerned and the nursing HUG. This was the first report which had evoked any response.

The last stage of data collection, audit of the care plans, took place between November 1990 and September 1991, using the new audit tool. Each ward had been using the care plans for approximately eighteen months by this time. The method of reporting the findings was changed from a written report to a spread sheet table, accompanied by an explanation and a table of comparisons with previous monitoring findings on the particular ward. I tendered an invitation to discuss results and draw up action plans to which some wards responded. This programme continues as a regular feature of evaluation and has provided useful information about the way the care plans are being used and the difficulties encountered, which in turn has identified the areas where modifications are

needed. Action developing from this process will be included in the final chapter.

SUMMARY OF ALL THE FINDINGS

The overpowering impression evoked by the hospital wide results of the three attitude questionnaires is a combination of ambivalence and disapproval. Analysis of individual wards and statements identified the specific areas in which positive, negative and equivocal feelings are expressed. Uncertain attitudes towards the Nursing Process demonstrated, in some cases, an apparently inadequate understanding of the underlying principles but also posed the question of whether, despite all the literature advocating use of the Nursing Process to deliver high quality care, nurses actually believe that this is true. Comments stressed that care plans were made, but not used. Although this system of nursing was introduced over a decade ago, I would suggest that it still requires considerable research.

I was unable to demonstrate a significant association between attitudes towards the Nursing Process and attitudes to computer care plans on all fifteen wards although this was established on nine of them. It was also shown that attitudes became significantly more negative after using the new care plans for three months, which concurs with Kjerulff's propositions. The chief problems identified at this stage were concerned with time taken to actually accomplish care planning, shortage of staff, a reduced time spent with patients, lack of patient individuality and a reduction in decision making and autonomy for nurses.

I was unable to establish any significant association between the number of staff available and the way the care plans are made, despite the constant claim that "there are not enough nurses to do care plans." Individual comments from questionnaires and interviews helped to illuminate the attitudes expressed. I was also unable to find any significant association between the age and qualification of the respondents and their attitudes to the care planning system.

Findings from the computer satisfaction questionnaire showed that the above problems still predominated, and the greatest number of nurses felt that the change in care planning had no effect on nursing care. Over half the respondents found the technology of care planning easy but found the documentation as a whole more difficult than using the paper system. This appeared to indicate that problem may be in the content of the care plans themselves rather than solely due to difficulties with technology. The overall responses showed evidence of a shift towards positive attitudes one year after computerisation.

The quality assurance study carried out on two wards did not produce consistent results; one ward produced significantly improved documents as measured by the quality assurance criteria, and the other did not. No correlation between these findings and the attitudes of nurses on these two wards was found.

Results of the care plan audit showed a significant overall improvement in six aspects of care planning for the nine wards involved in the comparison, and specifically in the assessment of

activities of living. There was also a significant over all increase in the number of patients for whom care planning was documented. Three individual wards showed a significant improvement after computerisation but one showed a deterioration in the quality of care planning. No correlation was established between the quality of documents and favourable perceptions of technology, support or improvements in practice. This supports Harris's claim that nurses do not need to like the care plans to use them competently.

Positive attitudes to the Nursing Process were shown to be associated with the number of care plans made using the manual system, but this did not hold true for the computer system. Monitoring the way the care planning system was being used also revealed that nurses were doing a large amount of free type, in carrying on with the old system of writing a precis of care for each patient in the progress notes, instead of using the care plans for communication. This not only identified an area of practice which may need addressing but also suggests that the care plans do not provide the information that nurses require.

I have drawn heavily in these two chapters on Lewin's 1952 work on organisational change, Kjerulff's 1988 interpretation of innovation theory and Kelly's Personal Construct Theory of Personal Change (1955). These and other authors refer to the anxieties caused by the effect of the change on the existing values held by the participants. Lewin suggests that the total circumstances of the change must be examined, including value systems of the groups and sub groups. He believes that at the start of any change, existing values are altered, and this may cause emotional agitation, with a breakdown of current complacency. Kjerulff asserts that fears of looking foolish may exist, and attitudes formed in this stage may influence adaptation to the new system.

Personal Construct Theory affirms this by postulating that personal change is influenced by the way a person anticipates events. Kelly considers that anxiety is present in any change, accompanied by a threat to an individual's personal view of herself, her role and responsibilities and guilt about giving up her former role, while Turrill suggests that change of any kind is a predominant cause of individual stress.

The change that the nurses in this research have experienced is one of the most major changes of recent years, and there is no reason to presume that these nurses have escaped the anxiety, guilt, threat and stress described in these works cited above. Many individual responses and comments illustrate such feelings and the general nature of some of the negative attitudes expressed in the early part of the change, may be attributed to these well documented features.

I started this research with the assumption that resistance to change was inevitable. Pearson and Vaughan (1984) list all the above features as causes of resistance, which may be manifested by apathy, aggression towards the change agent, persistent complaints or non compliance, or by sometimes employing new methods and sometimes reverting to former ways.

Cope (1984) adds that resistance may also be caused by the participants not being convinced of the need for change and thinking that it will harm the present situation. (Cope D. in Skevington S. ed

theory, I have been able to put it into practice to a very limited extent. The attitudes of the respondents have been sought and I have attempted to make sense of opinions expressed and act upon them. As seen by the outline of the process of implementation above, episodes of participation and close collaboration with the nurses have been intense for only short periods. There have been many indications that some nurses place small value on the use of the care plan, and have inadequate understanding of the Nursing Process. These are both areas in which normative re-education may be required.

Blackler and Brown (1985) subscribe to a similar ideology in their support of the process approach to evaluation of the change to technology, which is influenced by action research and in which importance of the relationship of the researcher to those being researched is dominant, and the ways in which both technical and social systems develop are examined. The role of the researcher is collaborative, and the focus is on the process, skills and motivations of the participants. Although psychological fulfilment of employees is a feature of this approach, the authors recognise that this is not always compatible with economic aims of an organisation. My research has been illuminative rather than evaluative, and has been influenced by the action research approach which underlies process evaluation described by Blackler and Brown. In any organisation a researcher is limited by the aims of the organisation so that any action which may be initiated as a result of findings must take place within these parameters.

Caputo (1988) examines the concepts of authority, decision load and information systems in the context of a change to a computerised information system in Human Services. He examines the relationship between knowledge and administration, arguing that the introduction of information technology, in which rational decision making dominates, has resulted in a conflict between these two elements in human service organisations where collection of information is often not systematic and decision making influenced by political or value laden factors. Nurses have argued that care plans are not easily transferred to the computer for this very reason, that they reduce the individuality possible with personalised care plans and that an outside authority has made the decisions that should be made within the nurse/patient partnership. He suggests that increased accountability increases the importance of information as a resource and power shifts to those who have the technological knowledge to supply it. Comments and attitude responses have suggested that this is a source of anxiety to some nurses.

Turrill (1986) looks realistically at change in the National Health Service, saying that it is always likely that it is the wrong time for change, that there is a lack of resources and that the change is seen as revolution rather than evolution. The response to the change to computerised care plans is not unique. Lewin asserts that the ultimate level of change is reached when the whole institution assimilates the new norms, values and behaviours, and re-establishes a new state of equilibrium, resembling the "refreezing" of the fluid state into a recognisable, tangible, new shape. From the improvements in the quality of the care plans since computerisation and the small though significant shift to more positive attitudes over a period of time, it appears that some consolidation has occurred. It is more difficult to decide whether the new shape is better than the former one. This is not primarily an evaluative study, so this decision is not my responsibility; it is not necessary for

me to define success or failure, but only to try to act on the findings to provide a more satisfactory service for the nurses who use it. In the final chapter I shall make recommendations, suggest areas for further research and outline the changes already effected as a result of these findings.

CHAPTER 14

CONCLUSIONS, RECOMMENDATIONS AND FURTHER ACTION

In this final chapter the aims of my research will be examined to ascertain the extent to which they have been achieved; limitations of the study will be identified and the lessons learned throughout the study will be discussed; problem areas revealed by the findings will be identified and discussed in relation to the application of this information; there will be a final visit to the relevant literature, and my own perceptions of evaluation, with recommendations and suggestions for further research, will be offered.

THE AIMS OF THE STUDY REVISITED

There were two main aims. The first was to observe, monitor and describe the change. The objectives set to achieve this were to establish feedback systems in order to incorporate modifications during the process; to seek and record attitudes of participants; and to develop criteria to evaluate the way in which nurses were using the new care plans. I think that these are necessary to provide information for anyone contemplating such a change in the future. My intention was to employ a proactive approach to enable me to learn from the results in order to apply them to practice in whichever way seemed appropriate. For this purpose I drew on aspects of the action research approach which seemed suitable for examining a process in which I was deeply involved.

The second aim was to demonstrate to the nurses that their attitudes were important and their participation valued. Although not an explicit aim I hoped that, by doing so, adaptation to the new system would be as painless as possible. Objectives were to involve the nurses in writing the care plans, to acknowledge and make full use of their professional knowledge and experience, to seek approval for the finished care plans, to encourage suggestions, to involve them in the evaluation and to be available for support as required.

An aim of any information system is to improve the quality and reliability of the information input and output. Although this was not a reason for my research, it was an expected outcome of the change to pre written care plans, based on research and professional knowledge.

TO WHAT EXTENT HAVE THESE AIMS BEEN MET?

Aim: To observe, describe and monitor the change.

I shall examine each objective individually. The change has been described chiefly in the context of nurses attitudes analysed within a framework of change theories. To do this, attitudes to computer care plans were first sought from questionnaires before the system was activated, in order to determine expectations and anticipations. As care plans are the way in which the

Nursing Process is recorded, attitudes to the Nursing Process were also invited. By doing this, it was possible to synthesise these findings as a foundation for the opinions expressed three months and one year after computer care plans were introduced. In this way previous expectations and current values were taken into account, to illustrate how nurses were feeling about the change at these stages. Relating attitudes to major personal and organisational change theories provided a rationale at all stages.

By inviting individual comments in each of the three questionnaires and by interviewing key informants, a formal, though unstructured, feed back system was established at three different stages of the process. A more structured framework for continuous feedback exists via the nurses Hospital User Group (HUG), where all wards are represented and information related to care planning is communicated to me, or vice versa. Informal "grapevines" which exist in any organisation are also invaluable sources of information, which can be acted upon and formalised. Informal visits to the wards, and continuing support which is always available, is another source of feedback information.

Reports on each questionnaire and each study of the care plans, were distributed to the wards and the nursing managers to keep them informed at all stages. I invited comments about the information, and offered help with any action required. Response to this information has been variable.

Development of a tool for evaluating the way in which the care plans were being used took place in two stages. Early attempts to monitor the care plans was by use of the existing quality assurance tool. This was expeditious at the time, because it was necessary to provide feedback within a reasonable time and use of a ready made tool allowed this and provided breathing space in which to consider modifications. In addition, results from these early studies pointed the way for development of a new instrument. In Chapter 9, I explained the reasons why this quality tool was not suitable for monitoring computer care plans, and modifications were made promptly, after records from all wards had been studied once. The advent of Medical Audit at the hospital in 1990, provided the opportunity to learn new methods of evaluating quality and I used this to completely revise the monitoring system and methods of presenting reports.

I set myself the objective to be proactive and this has been achieved at each stage, mainly in very minor ways, but in the intervening time major modifications have been completed. These, and the action taken to reduce the number of screens for the assessment pathways, will be outlined later in this chapter. Minor modifications have been effected on an ad hoc basis in response to requests. These concern changes in the clinical content of care plans as research findings have changed practice; the addition of care plans as nurses discover they are needed; the inclusion of a short stay evaluative care plan for wards who have many patients who stay only 24 hours; provision of a paper form which replicates the assessment screens, so that nurses are able to note information when interviewing the patient and before entering it on the computer and small changes to the assessment screens such as inclusion of spaces for information that had been omitted in the original design.

Aim: To demonstrate the importance of nurses participation

The objectives set to achieve this aim were based on literature related to implementation of the Nursing Process, change strategies and theories outlined in the literature review and methodology chapter. Walton (1985), Chin and Benne,(1986) Turrill (1986) and others all emphasise the importance of user participation to facilitate change. Other factors, over which I had no control, such as the timing of the implementation of computer care plans and the order in which they were introduced on the wards, were major influences in adaptation.

I am able to say that I based my work on the principles advocated in these works, and met all the objectives, and so achieved the aim. I am unable to claim, however, that by doing so, it has eased the path of adaptation, as I had hoped. Results of the attitudes and computer satisfaction questionnaires demonstrated overall attitudes of discontent, which does not illustrate smooth adaptation. Conversely examination of the nursing records shows general improvements in the way they are completed.

Cope (1984:155) suggests that change can only be brought about by influence from other people, by the process of behaviour modification, and is never achieved painlessly.

"Something must be hurt before anything changes"

I believe that nurses know that I have tried to heed their opinions and to provide them with care plans that meet their needs and the needs of the patients. This was my aim. But despite my support for, and strict adherence to, the principles expressed in change literature, from my own structured and participant observation, I know the change has been far from painless.

LIMITATIONS OF THE STUDY

NURSES' ATTITUDES

In constructing the three attitude questionnaires I followed closely the original format proposed by Likert. Retrospectively, I question whether inclusion of a category for uncertainty in the five point scale, has diluted the impact of attitudes expressed and I have identified this as a limitation of these studies. My rationale for including this category was partly because it was suggested in the literature and partly based on the democratic belief that nurses should be allowed to express indecision about this change. Since analysing the responses I believe that this category may be vulnerable to misuse and used as an alternative to thoughtful responses.

In each attitude questionnaire I included some statements with similar meanings but worded slightly differently in order to test the reliability of the responses. This sometimes led to anomalies, for example nurses who thought computer care planning had not increased accountability but had increased the risk of litigation. Or those who thought it had not improved practice but had improved standards of care. These responses identify limitations of the use of questionnaires, where

opinions cannot be clarified at the time as in the interview. In the post implementation attitude and the computer satisfaction questionnaires, respondents were not asked to state how long they had worked on the ward, which was an oversight and which I have identified as another limitation. Because of this I cannot confirm the length of time each respondent had used the computer system, only the length of time it had been "live" on the ward. Despite this I believe that individuals are soon absorbed in the group culture of any ward and it may be that ward values, rather than individual beliefs, shape the attitudes expressed. Lewin (1952) asserts that it is easier to change a group than the individuals within it, so this may partially mitigate this limitation.

THE DOCUMENTS

Quality of documentation

The quality assurance programme was one of my responsibilities prior to introduction of HIS, when it was postponed to make more time for work on care planning. Before this, a few wards had been studied using a commercially available quality assurance tool, but problems were identified and a new tool developed specifically for use at the Royal Hampshire County Hospital. This had been used on nine wards by the time HIS was introduced. At the outset, I considered my research descriptive rather than evaluative and made no formal preparation to measure the quality of nursing records on all wards using the manual system as part of a comparison. As the research evolved, it was clear that on the only two wards used for comparison, some aspects of care planning had improved significantly after computerisation, so that it seemed imperative to determine whether this change was reflected in other wards. As a consequence, there was no ready means of comparison so I identified only six aspects of care planning that could be used to compare manual with computer care plans. Although these six aspects were identified specifically in both studies and the comparison between the two is accurate, the methodologies were different, which represents a limitation.

Time taken for documentation

In the methodology chapter, I explained the reasons for lack of success in establishing the time taken to write paper care plans as a basis for comparison. As part of a concurrent study examining broader aspects of computer use, attempts to record the time taken to complete the computer care plans were equally unsuccessful. This has proved to be a serious limitation of my research, as respondents have repeatedly emphasised that computer care planning takes longer and reduces the time spent with patients. The perceptions of those involved must be accepted, but may be clouded by many other issues in addition to time, but these cannot be challenged in the absence of concrete evidence to the contrary.

LESSONS LEARNED

LESSONS LEARNED FROM THE RESEARCH IN GENERAL

Possibly the most important lesson learned from this research is that the change to computer care planning not only produces problems concerned with the new system, but also highlights pre existing problems in practice which may have been present for a long time. The use of an integrated computer system allows documentation to be visible and immediately accessible to managers (and researchers); imperfections are instantly noticed, questions are asked and flaws in practice may be revealed. In the same way, interpretation of attitudes and individual comments in this research has led me to question knowledge, understanding, organisation and practice.

Literature associated with personal and organisational change was the source of a great deal of learning, and helped to explain and justify many of the anomalies shown up by the attitude and satisfaction questionnaires. The preponderance of negative attitudes and comments, which at times seem unrewarding for the researcher, may be viewed objectively in the context of change theories which demonstrated the commonalities of all types of change and provided a basis for constructive action.

Toffler (1983) in a broad analysis of modern society, predicts that power will shift from those with specific and traditional knowledge to those with the experience of how to disseminate such information. This view is shared by Caputo (1988) writing about authority, decision making and information technology, who asserts that power shifts to those who have the technological knowledge to supply information. This lesson has been illustrated in small ways in this research. The most apparent change is the power held by the HIS project team. Any technological problems in the system have to be dealt with by members of this team, so that for the first time nurses have experienced care planning difficulties which they cannot deal with themselves. Problems encountered when using the paper system would usually concern selection of appropriate words or phrases. Now they may be faced with an apparently unfriendly system which will not accept data and they need to consult the experts before being able to continue. The system may "go down" while they are modifying a care plan, and they are powerless to continue until experts action is taken. One major problem in the care planning system is that if too many evaluation comments have been entered, the system truncates the last entry, which necessitates the nurse completing the goal she is evaluating in order to create a new one before starting again. This is frustrating, time consuming and so far an intractable problem, a dilemma for the technical team, but to nurses it may appear as an example of power held by others which controls their ability to work efficiently.

In smaller ways this power shift has occurred among the nurses themselves. One nurse interviewed observed that some nurses were quickly acknowledged as computer experts and much of the care planning was left to them. I have not tried to verify this, but have observed it on some wards, especially those where primary nursing, (a primary nurse is responsible for planning the care for her own patients) is not well established. Observations have shown that less confident nurses often refer me quickly to one whom they consider more of an expert in use of the computer.

LESSONS LEARNED ABOUT THE NURSING PROCESS

Nurses' attitudes towards the Nursing Process, and therefore towards care planning documents, were illuminative and thought provoking. The Nursing Process was formally adopted as a basis for practice by the then General Nursing Council in 1977, yet the overall average attitude of nurses a decade later was ambivalent. Many comments showed that nurses were unable to apply principles to practice; despite valuing the principles of individual care, they were not sure if the process affected the way they cared for patients, they considered care plans were unnecessary adjuncts to practice and were unable to make the distinction between the principles of this approach and the functionalities of care plan documents.

There are two possible lessons to be learned from these results. One is that education for introduction of the Nursing Process and beyond, may have been, or is still, inadequate for most nurses. It may have failed to integrate theory with practice and ignored existing value systems. However, this possibility can be supported only if all nurses have received education of similar content and quality. As in any hospital, the nurses at this hospital are not a static group; they include people who have trained at the hospital, and those who have trained elsewhere and come from a wide selection of hospitals from many different areas. In addition, in the years since this approach was introduced, many nurses have started and completed pre registration training never knowing an alternative approach, yet it is this diverse group that responds with an overall average attitude which remains equivocal.

This suggests a second, more radical, possibility that care planning as it is generally understood, is not the most suitable method of documenting the Nursing Process. It was not the intention of this research to debate this issue, but it is so fundamental to the way in which nurses view care planning, both manual and automated, that it cannot be ignored. There is no doubt from the attitude responses and comments, that nurses fully advocate individually planned, participative, holistic care, but they do *not* agree as a whole on the way in which this care should be recorded, or even that this is an essential part of the process. This is contrary to beliefs of leading statutory bodies.

The World Health Organisation (1980) recognised the use of a logical recording system as an essential component of accountability and responsibility. It recommended that systematic documentation should be introduced as part of current nursing practice and education, to facilitate individual care, develop new knowledge, validate existing beliefs, emphasise accountability and act as a source of legal protection for practitioners and public.

The Wessex Standard for individualised patient care states that each patient must have a written plan of care, including assessment, expected outcomes, and evaluation, which must be revised as the patient's needs change and which must reflect current knowledge and standards of practice. (Wessex Regional Health Authority, 1990) This is endorsed by the Strategy for Nursing proposed by the Department of Health, 1989, which not only recommends the use of the nursing care plan, but also the use of the computerised document, to act as an adjunct to the caring role.

I feel that most nurses agree about the value of assessing individual needs, discussing possible

outcomes, planning individual care and evaluating the extent to which nursing care has achieved the desired outcomes. The question seems to be how, and to what extent, this process is documented.

LESSONS LEARNED ABOUT COMPUTER CARE PLANS

Four main themes of discontent have been expressed by nurses, which have remained constant throughout the three phases of questionnaires, and have provided lessons on which to base further action. The first is that using the computer system for care planning takes longer than using a manual system, thus increasing workload and reducing time spent with patients. The second echoes the first when nurses assert that there are not enough nurses to write care plans, while the third, which must also be influenced by the others, is that computer care plans reduce individuality of patient care. The fourth area of disquiet is the concern that using computer care plans takes away decision making and autonomy. These are not all discrete issues but I will address them individually.

Increased workload and time taken away from patients

As I did not establish time taken to do manual or computer care plans, this perception cannot be verified. Nonetheless, an obvious reason for care planning taking longer is that some work is duplicated. Nurses collect assessment information from the patient using a form designed as a memory aid, before entering the information on computer. With the present siting of computers this is the only possible way to accomplish this function.

Another possible reason is that nurses duplicate information in different computer pathways. In Chapter 11, I demonstrated that nurses had made 1,355 separate references to 43 topics in the progress notes of 211 patients. Of these topics, 29 were also the subject of pre written care plans, so need not have been included in progress notes at all. In all 26% of all information in the progress notes had been duplicated in the care plans. As the progress notes are free type, this represents a considerable amount of typing and thus a considerable amount of time.

It is also possible that apart from areas of duplication, nurses perceive care planning takes longer for a variety of reasons, some of which will be outlined here. One probable reason is the fact that terminals at the central work station are in clear view of medical staff, all visitors and some patients, so that nurses are more conscious of time spent sitting at a computer. They are also more vulnerable to interruption in this position, which breaks the train of thought and lengthens the process. Although many nurses planned and evaluated care at the bedside, it must be accepted that it was common practice on some wards when completing the actual documentation, to congregate in the ward office or some other convenient area to do this before going off duty in the afternoon. Sitting in public view at a terminal represents not only a change in practice but also a change in the social norms of the ward group. This introduces the issue of the number and position of terminals. There are three terminals on each of the wards, two at the central work station and one in the ward office. These are used by nursing staff, medical and para medical staff and the ward clerk, so if a nurse is working on a care plan, while it is obvious that other staff also need to use it, she may

feel under pressure to hurry, which increases the perception that she is taking a long time.

Care assistants are not allowed to plan or evaluate care, whichever system is used. Using a computer system of care planning enforces this policy as care assistants were not issued with PIN numbers allowing access to care planning, and also highlighted some of the loop holes of the manual system. The burden on qualified nurses appeared to increase as a result of this.

Other reasons for care planning taking longer may be caused by complexities or deficiencies of the system, knowledge of which has provided lessons about the general organisation of the care planning screens. To create a free type care plan takes longer for most nurses than writing one, unless they have rapid and accurate typing skills. The "type in" facility does not have word processing capabilities, so that errors and spelling mistakes are cumbersome to correct. For nurses who have been accustomed to creating a care plan for a problem expressed in the patient's words, it may be difficult to find one which exactly meets these needs, and although the flexibility of the system is an important feature, individualising an existing care plan may be time consuming. In addition, the technology does not allow a menu choice, so that many screens may have to be worked through to find appropriate problems, goals and actions. As most patients do not have neatly categorised problems, it is likely that a patient admitted for elective surgery will have other problems in any activity of living or in any other clinical specialty. It takes time to find appropriate care plans from the care plan lists for other specialties with which a nurse is not necessarily familiar.

Patient participation and individual care.

The issue of patient participation in care planning, and thus individuality of care, involves the nurse assessing, planning and evaluating with the patient. It used to be possible for nurses to sit at the bedside and write the paper assessment and care plan. It is still possible for nurses to carry out the assessment interview, discuss the plan of care, to show the patient the care plan print out and to evaluate the care in this way, but to enter the information on the computer imposes another task and places fresh demands on nurses time.

I believe that nurses who have always incorporated principles of individual and participative care into practice, will take all necessary steps to maintain this, despite difficulties. I collected no data related to the quality of direct nursing care, so cannot discuss the patients' perception of involvement or individual care since computers have been used. This would be very difficult to carry out for the following reasons: quality assurance studies would have to take place before and after computerisation of care plans, to provide a comparison. If they were carried out too soon after implementation, the feelings of chaos and uncertainty accompanying any change may cloud the issue. If a reasonable time were to elapse, other numerous and diverse changes may have occurred to act as variables so that fluctuations in the overall quality of nursing care could not be attributed to a change in documentation.

Difficulties in creating individual care plans have been described above, as trying to do so unquestionably takes time in some circumstances. However the potentiality for creating individual

care plans is present and may be achieved in a variety of ways, although the need for improvement has been demonstrated by the dissatisfaction expressed. I suggest that the extent of individuality possible for every patient is debatable, as there is usually a core of care which remains essentially the same for all patients experiencing the same problem or undergoing the same treatment. This is all that the pre written care plans can hope to provide; the free type facility and nurses' creativity and knowledge must provide the rest.

Evidence of individuality may be gleaned from nursing documents; the way in which a person carries out activities of living illustrates his individuality, and in Chapter 13 assessment of activities of living on admission was shown to have significantly increased since using the computer system. This seems to imply that, despite the feelings of some respondents, the computer system has helped to *increase* the individuality of the assessment process, if not the planning of the care.

There are not enough nurses to do care planning

This frequently heard comment is easy to understand, from personal experience and observations on the wards. This opinion was expressed about care planning using the manual system, and in the questionnaires related to computer care plans in each of the three time periods. This notion was not supported as a result of my research, using the information available. From the figures from the wards using the workload/dependency study, the number of nurses required to nurse the patients is calculated daily for each shift. In Chapter 11, I attempted to correlate the percentage of nurses available with the overall frequency with which care planning documents on each ward met the required indicators for quality, in the same time period using an audit tool. No correlation was established. The perception that there are not enough nurses to carry out care planning satisfactorily, however, persists and may suggest two areas for investigation. It is possible that the information produced about the required number of nurses was never, or is no longer, accurate and does not reflect changes on each ward which have occurred since the original workload/dependency analysis. The alternative is that reorganisations in practice may be required for nurses to feel that they are not too short of staff to complete care plans to their satisfaction. The 1991 Audit Commission report cited later in this chapter found that care planning received low priority in some cases, being seen by nurses as a task separated from the actual care of the patient and usually done as a last minute task before going off duty. Although this hospital was not one of those included in this audit, I have already observed that this practice may still exist on a few wards.

Loss of decision making and autonomy

In providing pre written care plans it was never the intention to reduce nurses' autonomy in any way, and the fact that this has been suggested has been an unexpected lesson. Comments implied that nurses no longer have to think about a patient's problems and how to care for them, as the solutions are all on screen. I would suggest that nurses still need to identify the problems, but, having done so have a data base of goals and actions from which to choose. Selection and individualisation involves decisions based on professional judgement, while the data base of nursing knowledge, provided by the nurses who are using the system, enhances the autonomy of nurses in

general. However the perception that autonomy is reduced must be taken seriously and addressed.

Although in my research I did not formally examine nurses' attitudes to the model of nursing, I have recorded the number and type of care plans used, and it was seen in Chapter 11 that out of a total of 209 care plans made, 129 were specialty care plans, 66 were created by using free type, while only 14 were used from the activity of living pathways. The purpose of having these different pathways is to allow nurses choice. This choice is also intended to illustrate the principles of the Roper Logan and Tierney model of nursing, which describes the derivation of problems from two main sources; problems associated with activities of living and problems derived from medical (or other) prescription. The flexibility of this model in practice, avoids the cumbersome necessity of attempting to fit every patient problem into a category of an activity of living, which becomes contrived. The small percentage of care plans used from the activity of living pathway, may demonstrate that nurses do not actually think in terms of the nursing model when planning the care. However, the specialty, or medically initiated care plans, include under one heading, problems associated with the way that the medical diagnosis or treatment influences the activities of living, which may support the nurses claim that they are not having to think for themselves when confronted with the care plans.

THE RESEARCH IN THE CONTEXT OF OTHER WORK

My research has concentrated on two predominant aspects: nurses' attitudes towards paper and computer care plans and the way in which they are using them. In the context of other studies, I shall compare the overall findings of each piece of work in turn, rather than concentrate on each individual aspect.

NURSING PROCESS LITERATURE

Research by De La Cuesta, (1983) analysed the development of the Nursing Process in sociological terms, and found that care plans were often not written and when they were, were not used. Nurses felt that care plans were superfluous and bureaucratic, that care was given regardless of the care plan. Observations showed that there was no increase in patient participation or nurse/patient interaction when the Nursing Process was used and that evaluation of care was poor.

Some of my findings, at least five years after De la Cuesta's research, reflect features of her results. About both manual and computer care planning, nurses commented that if care plans were made, they were superfluous and not used, the care often being carried out even before they were made. Many nurses were uncertain about the value of care plans and questioned whether they exerted any influence on patient care. In the questionnaires and interviews concerned with computer care plans the view that computer care plans had *decreased* patient participation was introduced. However in the interviews, when I was able to question this opinion, nurses agreed that patient participation had *not* always been a prominent attribute of practice before the introduction of computers, which agrees with De la Cuesta's findings.

Her study also showed that evaluation was poorly carried out on the whole. Results from the two wards in the small quality assurance component of my research, showed that before computerisation, evaluation received a lower percentage score than assessment, using the QICC tool, but about the same as care planning. Three months after starting to use computer care plans, evaluation had improved significantly on one of the wards but not the other. Poor evaluation was also a feature of the QICC study on paper documents on the nine wards from which results were available. I cannot generalise from these results but at first glance it appears that they do agree with De la Cuesta's findings, in that evaluation is carried out less well than assessment and planning. My findings have shown that computer care plans have helped to improve evaluation in a few instances, but not as a general precept.

Friend and Hayward (1986), in the report of the DHSS Nursing Process Evaluative Working Group, also showed that nurses questioned the practicalities of the Nursing Process and whether it benefited the patients. This seems to demonstrate the same superficial understanding of the Nursing Process which my findings have shown several years later. Nurses in the 1986 report complained that documentation was cumbersome and took time away from patients. This opinion was voiced in relation to paper care planning in my research and remained a constant cry in relation to computer care plans. I think my findings agree with those of Friend and Hayward despite the fact that their working group were examining the Nursing Process from the time it was introduced whereas my interest in it was to provide a foundation for attitudes to computer care plans. Nurses in my study were in the period of change when they know that change is imminent, their complacency is being disturbed and they may be thinking that the current system is better than the proposed system. However, as results show, they did not necessarily display favourable opinions towards the Nursing Process, and despite familiarity with the paper care plans, still perceived that they took time away from patients. By the time they proffered opinions about computer care plans, they were feeling much the same about this innovation.

The study found inconclusive evidence that use of the Nursing Process improved patient care, although there were indications that patient and family involvement had increased. As my research did not set out to evaluate the use of the Nursing Process, I did not examine these two aspects specifically in that context, but inclusion of patient and relative involvement in the assessment are considered as indicators of quality and as such were analyzed. It is interesting to note that both aspects achieved frequencies in the lowest percentile of results in the audit study, despite being considered a benefit to be derived from use of the Nursing Process.

As in De la Cuesta's study, the working party also observed that evaluation was seldom achieved effectively and reasoned that this was because nurses lacked knowledge of the type of data required; they set unrealistic goals and had difficulty in distinguishing the effects of nursing care in a multi disciplinary care team. If this assumption is correct it suggests a rationale for the improvement in care planning on some wards, after they have been provided with pre written, specific goals with measurable objectives. It is interesting to note that no elements of the multi disciplinary approach to care were commented on during my research. Hayward and Friend's work revealed that nurses thought difficulties with care planning were caused by staff shortages although no literature was

found to support this. My findings show that nurses still perceive this to be the case, but correlation between the two factors was not established.

The report found that doctors made negative comments about the Nursing Process, considering that it encouraged an ill defined status for nurses. Although no data was formally collected about doctors attitudes in my research, as a result of the report on the care plan audit sent to all the wards, one doctor voiced similar opinions about the use of the computer for care plans, within the forum of the Nurses Hospital User Group (HUG). Informal observations have also shown that nurses experience a degree of disapproval from doctors as competing users, because of the time spent using the computer for care planning.

The working party concluded that pre existing problems had been highlighted by the introduction of the Nursing Process. Problems identified included attitudes toward the purpose and value of nursing records, responsibility for writing them, provision of continuing education about the Nursing Process and shortage of staff. All of which has been highlighted by my findings.

Walton (1986) in her review and analysis of Nursing Process literature identifies the issues arising from the introduction of the Nursing Process in the context of nursing and health care developments. She argues that many grievance about the Nursing Process have focused on documentation because this has been over emphasised to the detriment of the underlying principles, claiming that semantic differences in presentation of Nursing Process literature have contributed to the general confusion. She discovered from the literature that the change itself was seen as stressful where it was construed as criticism of the old ways of nursing. She asserts that nurses interpret the Nursing Process in four ways; as a system of recording nursing care, a system of organising delivery of care, a tool for education and practice or an ideology. Overall attitudes from respondents in this study suggests that many nurses still subscribe to the first interpretation.

Nurses attitudes to care planning and the Nursing Process

Barnett (1983) carried out a study to introduce the Nursing Process on a medical and surgical in Tower Hamlets Hospital, London. The attitude questionnaires sent to the nurses produced a 78% response from the medical ward and a 36% response from the surgical ward. Results indicated more positive attitudes from the medical ward. The questionnaires about the Nursing Process in my study also showed a more favourable response and a higher response rate from the medical wards, but the variation between the wards was small at 64.5% compared to 55.9%. Aggregate responses from both groups of wards demonstrated an undecided average response to the Nursing Process, but two of the six medical wards were favourable, while the others were undecided, whereas in the surgical group, one of the eight wards responded favourably, one negatively and the rest were undecided. One year later, response rates to the computer satisfaction questionnaire were reversed, with the medical wards producing a 67.8% response rate and the surgical wards returning 84.9%.

Bowman, Thompson and Sutton, carried out their 1983 attitude survey of the Nursing Process to determine the difference in attitudes between nurses who had received structured education for the

used differentiated between the different functions of the computer systems so the results cannot be considered specifically concerned with nursing care plans. My findings have demonstrated significant improvements in assessment over all wards compared and significant overall improvements in the care planning documentation on three wards.

Cook (1983) describes the nurse care planning components of the TDS system at Al Camino Hospital, USA. She claims that after introduction of this system, the percentage of patients for whom care plans had been constructed increased by about 60%. My results do not support the magnitude of the increase shown in Cook's study, with an overall increase from 91% to 96% after eighteen months use, for the nine wards that were compared. Cook's claims appear to be supported by my results, but it appears that the nurses at the Royal Hampshire County Hospital were already creating a high percentage of care plans using the manual system. (Results from the comparative study on two wards also showed increases in percentage of care plans made, but in a different time period. See Chapters 9 and 13.) She also claimed that attitudes became more positive after a period of time, although the actual time was not specified. This is partially endorsed by my work which showed that attitudes became more negative three months after starting to use the care plans but moved towards the positive pole after a year.

Ashton (1983), reviewing the Exeter System, added the claim that there were fewer unacceptable abbreviations and it was possible to identify the nurse who had written the record. The generalisation that records are more legible than handwriting must be accepted, though I think this claim omits to recognise that although the writing is legible, the records may be more difficult to access and read as an integrated document. My study also showed from informal observations, that fewer unrecognised abbreviations were used; this is because they are not included in the pre determined care plans which immediately reduces the number of care plans created by the nurses, which may have included such abbreviations. As it has always been the practice to sign any entry using the paper system of care planning it has always been possible in theory to identify the nurse who has written in a care plan. An electronic signature is a perpetuation of this practice which allows instant identification.

Murphy (1988) examined the development of nursing diagnosis based standard care plans as part of an Integrated Hospital System in Milwaukee, Wisconsin. A cost benefit analysis was unable to quantify potential time saving, which endorses my difficulties in establishing any useful data in this respect. At the time of writing I have been unable to find any results of the project which was being carried out to investigate the impact of the care plans and to compare the quality of documentation before and after implementation.

Mason, (1988) carried out her evaluative study of the "Excelcare" system in three hospitals in the USA to determine the extent of time saving and improved quality of documentation. Overall this study showed that the mean time saved by a nurse per shift was one hour. My study has been unable to substantiate any of Mason's findings.

A small evaluative study was carried out in the USA by Norris et al, (1990) to compare the quality

of care plans using different methods of decision support. 143 nurses wrote care plans for hypothetical patients each using three different means of support. These were traditional, that is text books, nursing dictionary, or colleagues; secondly, a printout of a computerised protocol for care planning and finally the protocol as above with the addition of learning objectives, key bibliographic resources for specific case studies and access to the computer library. Results showed that the quality of those care plans written with computer support was superior, but took longer to compile. My research cannot be directly compared to this, as the comparison of documentation in mine was between traditional care planning and a computer data base of pre written care plans, combined with a free type facility. Also Norris's study used hypothetical patients whereas all my data is based on actual patient documents. As already reported, the quality of one aspect of assessment showed an improvement in quality, but only on three wards, or 33% of those compared, was an overall improvement in documentation produced.

Hoy (1990) in a review of care planning systems in the UK, looked at the possibility of mechanistic behaviour as a result of using computer care plans but considered the high involvement of nurses made designers sensitive to this risk. Many users in his review expressed fears that nurses would lose the faculty to think if care plans were made too explicit or comprehensive menu systems were used. This hospital was one of the six systems reviewed but as the report did not identify specific hospitals it is not possible to confirm whether these attitudes were expressed by nurses from other hospitals as well. My findings confirm this attitude.

Henney, (1983) and Harrow (1988) describing CANIS, developed at Ninewells hospital, Dundee, identify problems in understanding the principles of the Nursing Process which underlie problems in use of the computer care plans, which my findings endorse.

Woods, (1989) describes the development and design of the of CNCS system in the Women's Hospital, London, as "ward led" and cites the major advantage as a reduction in time taken to complete paper work to allow more time for patient contact. This is facilitated by portable computers which allows all recording to be done at the bedside, which supports my recommendation for this facility.

Walters (1986) describes the introduction of a care planning system in Bay Hospital Medical Centre, California, claiming as benefits better quality care planning, more time spent with patients, 98% of patients with care plans made within 48 hours and improved communication between nurses. She offers no data to support these claims.

Nurses' attitudes to computers and computer care plans

In a study of nurses' attitudes to computer use, Stronge and Brodt (1986), applied their questionnaire in a community hospital in America to a cross section of nurses of different educational levels and working in different specialities. Results demonstrated that nurses with a higher educational level and longer years in service held more favourable attitudes towards computers. This research was not specifically concerned with care planning, so cannot be directly

Harris (1990) interviewed fifteen nurses to ascertain attitudes towards computer care plans. A major finding was that nurses considered that computerised care plans diminished their professionalism, expertise and autonomy. Harris describes the meaning of these effects metaphorically. The "velvet glove" metaphor indicates that computerisation facilitates control from supervisors, and nurses carry out care planning as a task that has to be seen to be done, rather than an integral part of quality care. Comments offered by respondents in my interviews and post implementation questionnaire, which infer that care plans have to be made but are never looked at, agree with these findings, but results of the Nursing Process attitude study showed that this occurred with paper care plans, so is not specific to computer care plans as suggested by Harris's study. Results of my study also demonstrate perceptions of loss of expertise, when nurses claim that the computer care plans "think" for the nurses which in the case of students would diminish their confidence. Others believed that qualified nurses possess enough expertise to make the pre written care plans superfluous.

Harris's metaphor "oil and vinegar" describes nurses' attitudes to the inflexibility of the system, indicating that nurses' minds do not operate in the same way as the computer programme and that it is the nurses who have to adapt. This was commented on in my study and may be responsible for the frustration expressed in many comments from the questionnaires at this stage in the process.

Harris continues her metaphors by describing "one size fits all". Many comments in my questionnaires and interviews refer to loss of individuality when using predetermined computer care plans, which supports Harris's findings and has been used as a basis for making radical alterations to the system.

Harris (1991) suggests that computerised records facilitate control by supervisors, which may be a reason why the care plans are being used but not liked. She identified five different types of behaviour in reaction to computer care plans, with most nurses demonstrating more than one type. Indications of individual behaviour cannot be accurately elicited from generalised ward results such as these. However it is possible to do so from the interviews and some of the anomalies in these results suggest illustrations of the types of behaviour described.

The first she calls "contented leaner" who is happy to select items that approximate to the individual patient, rather than think for herself. This was illustrated by the response of one nurse during an interview, who was happy not to have to think but just selected the care plans provided.

The second, "neutral complier" does as she told, and uses the care plans because it is something that has to be done. The results from the comparative quality assurance study on two wards and from the audit appear to illustrate this behaviour.

Next is "matter of fact tool user", who sees the computer simply as a tool which helps her to plan care, enjoys the sense of control over technology and gets on with the job without frustration. Although my research did not demonstrate this, there was an overall air of matter of fact acceptance in the second set of interviews which has been illustrated by the way nurses on most of the wards are using the computer system.

what has always happened in a few areas at this hospital. If this is so, with the additional problems that use of a new system generate, it is understandable that some nurses feel that the ward is not staffed well enough to cope efficiently with this extra work.

The Audit report recommends that there is more incentive to incorporate the documentation of care planning into practice, if primary nursing is practised as the method of organising the care. Primary nursing is the obvious choice for achieving the aim in Reference 5 of the Patient's Charter, (1991:15) which states:

"You should have a named, qualified nurse, midwife or health visitor, who will be responsible for your nursing or midwifery care"

Primary nursing is well established on some wards in the hospital and being introduced on several others. As a general recommendation, I would endorse the advantages of primary nursing in providing motivation for care planning, whatever system is used, and especially the advantages of getting it well established before computer care plans are introduced.

TECHNOLOGY

It must be acknowledged that installation and maintenance of a HIS system is an expensive operation. Despite this it seems that to install an apparently inadequate number of terminals is a mistake which adds to feelings of frustration. Observations related to position and numbers of terminals prompt several suggestions. An increase in the number of terminals would at once remove some of the pressure from all users. If in addition, it were possible to cable and supply portable, lap top or note book computers, the question of duplicating nurses' work would be eliminated. They could be used at the bedside and information entered in the same way as it was when writing paper care plans. The patient would almost certainly be able to read computer entries more easily than reading hand written care plans, thus increasing, rather than reducing, participation and time spent with the patients. This would also reduce the feelings of guilt experienced by sitting at a terminal instead of being involved in active contact with a patient, reduce the number of interruptions which always occur at a central work station and thus help the workload. However this may be an unrealistic recommendation in the present impoverished financial situation.

Brady (1991) suggests the use of bedside terminals as a solution for shortage of nurses only if their use enhances the use of the Nursing Process. She states that many nursing computer systems ignore the Nursing Process and believes that a thorough evaluation of the way in which nurses work should be carried out before the implementation of any system. In addition procedures and data which add to the quality of care should be included. The care planning system in use here is established strongly on the principles of Nursing Process, model based care and nurses' own knowledge and practice. I believe that nurses have demonstrated concern about maintaining interaction with their patients and any system which helps to increase this should be the way forward.

Achieving individually planned care for patients, not only requires changes in organisation of care,

but also appears to be a matter of improving the content and technical functions of the care plans themselves. These improvements would also help to speed up the process of care planning. I have already recommended that the care plan system has menus so that applicable care plans are more readily accessible for nurses to "mix and match" from all specialties and activity of living pathways. I have also proposed that the plans are coded in so that it is possible to include the patient's name and add individual statements more easily, which accentuates the practice of individually planned care.

I should like care plans to be cross referenced, so that access is possible in more than one way to accommodate the different ways of thinking. Although I support model based care, I have to accept that at present it is not realistic to expect this, when it is clear that it has not always been comfortably integrated into practice. As an example, a patient who has suffered a pneumothorax, will almost certainly experience pain and breathing difficulties, as well as other individual problems. A nurse may start looking for a care plan described in terms of the most urgently presented problem, or under the relevant activity of living, or alternatively under the medical diagnosis. I would suggest that the same care plan should be accessible via "pain", or the activity of living pathway, under "breathing" or via the diagnosis of "pneumothorax". Until all nurses truly incorporate the principles of a model of nursing into their thinking, I believe it is important that access to care plans accommodates the different processes of thought which exist, as well as acting as a learning process for the model of nursing.

A wide variety of menus available throughout the system, with a greater distribution of care plans, would stimulate more thought than the present system where all possible problems are included under the heading of each clinical condition or operation. This may help to address the problem of perceived loss of autonomy.

HOW THE RESEARCH FINDINGS ARE BEING APPLIED

EDUCATION AND PRACTICE

In the area of education and practice, I have been able to achieve very little directly, although the underlying reasons for most technological changes concern both aspects.

The Open University course, "A Systematic Approach to Nursing Care" continues to be held twice yearly for any qualified nurses who are interested. A newly incorporated feature of this course is practical help with computer care planning on the wards, during and after the course, as required. This serves the purpose of helping course members as requested and also providing visible support which has encouraged nurses who have not attended the course to request help when needed.

Regular monitoring of care planning started within six months of the implementation of computer care plans on each ward, and has been carried out ever since. The audit tool used in this research was developed as part of this process, and in turn findings from the audits have provided a basis for alterations to the system. Feedback to the relevant ward occurs each time the care plans are audited and responses from some wards have resulted in several individual small changes in

practice, as well as prompting suggestions for major system changes.

APPLICATION OF FINDINGS AS PART OF PRO ACTIVE APPROACH

Because I have used a modified form of action research approach throughout this project, application of findings has taken place at any stage of the process, when it has become necessary. This was an objective. The changes have been mainly minor ones, but have helped to address areas of dissatisfaction or inadequacy promptly, and to demonstrate that the research has practical outcomes, rather than being a theoretical exercise. Many modifications have been effected in response to individual requests, which may be construed as a by product of the research process, rather than a direct consequence. Others have been carried out as a result of frequently occurring attitudes and comments and some as a result of audit results. These have already been outlined above, when attempting to evaluate the extent to which this research had meet the original aims. As guidelines and procedures have changed, these have been incorporated into the existing care plans and advice from specialists in each field is constantly sought for authentication.

An example of individual requests, is that sometimes nurses realise they are now caring for patients with problems which have not been included in the computer data base; sometimes with the advent of new consultants, new ways of treating existing problems are introduced. These have been dealt with as they have been identified.

The five day surgical ward realised it was too busy with the volume of admissions at any one time, to use the conventional care plans effectively. For this ward, inclusion of a short stay evaluative care plan, addressing the salient points from admission to discharge, was introduced. An example of this is included in the Appendix for this chapter. This plan states that care has been carried out according to the care plan which is appropriate for this patient's problems, so that the nurse is accountable for that care. This has also been adopted for use by the gynaecology ward, when the number of patients admitted for only 24 hours, increased.

Because duplication of assessment information recording has proved a problem, each ward has been provided with a paper form exactly replicating the assessment pathways, so that nurses are able to write memory prompts when interviewing the patient and before entering it on the computer. This does not eliminate the need for duplication but does speed up the process, if all the information is provided in the same order as it is requested on the screen.

CHANGES TO ASSESSMENT SCREENS

Major modification of all assessment screens

The first major change carried out as a result of the attitude questionnaires, interviews and observations concerned the assessment screens. This change was started almost as soon as the care plans were introduced on the first three wards in April 1989, and was completed in autumn 1989, after care planning had been activated on the first eight wards. The original pathway took up forty

eight screens, each packed with a maximum of words for selection by light pen to create sentences and eliminate the need for typing. Nurses were overwhelmed by the magnitude of choice and were unable to find appropriate words or punctuation quickly, so decided it would be simpler to have a smaller choice of phrases to select by light pen, and a greater facility for free type entries. This involved redesigning the assessment pathways so that each screen looked less crowded, more free type was required, and the pathway was reduced to sixteen screens. Although I redesigned the screens, I lacked the appropriate technological skills to carry out the changes at this stage, so was dependent on the HIS project team to make the changes to the system. Because of the urgency of this change, no formal evaluation was carried out to determine the effects.

To undertake some of the recommendations related to technology requires a large amount of work, beyond the capacity of the present HIS project team who are constantly involved in work concerned with the next phase of implementation. To prepare for this I received four days training in the basic elements of matrix coding, a system specific to the T.D.S Hospital Information System, together with two other members of the Research and Development department. This allows us to carry out these suggestions without increasing the work of the HIS team.

Other assessment changes: Information to relatives

One small change to the assessment screens, following our training, was as a direct result of the audit study, and concerns poor recording of information given to relatives. Originally this facility consisted of a space to type in the information immediately following the question asking if relatives had been seen by a doctor. In most assessments, the statement referring to this was completed, but the same was seldom true for the information statement. I conjectured that nurses may have been misinterpreting this statement, believing that it referred to information given during the interview with the doctor, which is not necessarily known by the nurse. To clarify this, a whole screen was devoted to this section, which is important for communicating the information given to relatives, to other staff. The new screen includes several appropriate statements which may be selected by light pen, in order to direct nurses' thoughts to the type of information they give to relatives. Further audit studies have shown that better use is being made of this facility since the alterations, as shown in the Appendix. Statistical analysis confirmed that the improvement is significant.

Patient understanding

This change concerned recording the patient's understanding of his illness, or reason for admission. It was seen in chapters 11 and 13 that this was often poorly recorded. I speculated that it may be that when a patient is unable to respond for any reason, this was not made clear, so that it appeared that nurses were ignoring the facility. The change involved adding a statement to the effect that the patient was unable to respond, which could be selected by light pen if appropriate. The results of the audits before and after this was changed are included in the appendix. Statistical analysis showed that these improvements were significant.

CHANGES TO THE CARE PLANNING SCREENS

The change to standard based care plans is largest and most critical change to be undertaken, changing elements of the structure and function of the care planning system. Work on the standards based care planning system began in the autumn of 1990, and was completed in autumn of 1992. Standard based care plans are now in use for all the wards, with the exception of Intensive Care. The aim of this project was to provide practical, succinct care plans which can be used as working tools supported by explicit standards of care. The work was initiated by the general dissatisfaction expressed by respondents in the three phases of questionnaires, and by personal observation. It was also carried out to support the process of standard setting which started with the publication of the Wessex Regional Standards, 1989, and has been continued at District and ward level. The Royal College of Nursing has also published standards for some specialties and guidelines for setting standards by nurses in practice. The facility allowing nurses to type in their own care plans has not been altered in any way, while the facility to individualise the pre written care plans has been increased.

Reasons for making changes

The original computer care plans were written to include behavioural goals and actions which specified the nursing care to be given to meet the goals. To do this I referred to the course book of the Open University "A Systematic Approach to Nursing Care". and attempted wherever possible to base nursing prescriptions on research rather than tradition or ideology. In this we were helped by nurses with specialty knowledge. The process of writing the computer care plans was described in Chapter 3. Despite this nurses have not found the care plans totally satisfactory.

Below, I have outlined the reasons for dissatisfaction and the ways in which they are being addressed. The reasons have all been identified from the results of analysis of attitudes and individual comments.

1. The original care plans are too long. Each clinical condition or operation has a care plan which includes all the problems likely to be experienced by a patient with that condition. To find a particular problem, nurses select the medical diagnosis or operation, and may have to work through up to 30 screens in search of the problem they have identified. This is time consuming and part of the reason why nurses protest that computer care planning takes more time than writing the paper ones. In addition, because all the problems are found under one heading, nurses feel that the care plans deprive them of decision making and autonomy. The alternative is to select all the problems, goals and actions rapidly, without making decisions as to their suitability to avoid missing any, which reinforces the criticism. To address these issues, the new specialty care plans have menu systems which may be arranged in any way to suit the specialty. For example, the medical wards have an index of all the medical conditions treated on the ward, each of which has its own menu listing the problems likely to be encountered by the patient with the condition. Alternatively the surgical care plan indices consists of aspects of care carried out in surgery, such as wound care. Each aspect has its own menu with a list of care plans for the specific care for particular operations

as well as a general plan for care concerned with that aspect. Whichever method of classification is used, it is less time consuming to select the desired care plan from a menu than searching through screens of text. The menus are also designed to allow nurses to select the problems for the individual patient, instead of being presented with a "ready made package."

The care plans accessed from the Activity of Living pathway have the same menu system, and care derived from problems with activities of living are cross referenced in the specialty care plans.

2.The care plans are technologically cumbersome. Because of the absence of menus in the original care plans, outlined above, if the patient has problems not specifically included under a particular heading it involves working through several screens in order to mix and match care plans, although this is possible. In addition, to add goal dates and information to pre written statements to individualise them, or to use the free type goals and actions included in each care plan, involves several computer actions. Additions may only be included at the at the end of the statement, thus eliminating whole areas of individualisation. The effects of all these difficulties are widespread, not only contributing to the frustration expressed by nurses, but also making care planning more time consuming.

The inclusion of menus to address dissatisfaction has been described above. Activity of Living and specialty care plans may be accessed from the same screen, and the main care planning guide may be accessed from a wide variety of screens. Because the screens are coded differently, the problem, goal and action statements include space for free type individualisation in the relevant portion of the statement where indicated, for example a space to include the patient's name. The additional details, as well as a whole free type goal and action, may now be typed directly onto the screen, instead of having to make at least three light pen selections to achieve the facility.

3.The care plans include too many details. Some nurses think that it is unnecessary to include explicit standards of care which are already part of nursing knowledge, and feel that this approach implies criticism of their existing professional competence. As part of the process of change, individuals may perceive that change is being introduced as a criticism of current practice, and the care plans appear to have perpetuated that belief. However, standards of care must be explicit and, since the introduction of The Patient's Charter 1991, must also be available for the patient to see if requested.

I have confronted this issue by writing explicit standards of care for every problem included in the care planning system, but not including them in the functional care plan. Standards for each care plan may be accessed via each care planning screen for reference only. In this as before, I have collaborated with ward and specialist nurses. I have worked on the principle that qualified nurses do know what to do without having it written in minute details, and have treated the care plan as a basic working document with the minimum of information necessary for a qualified nurse to undertake the care required.

4.Evaluation is difficult. The problem solving process on which the Nursing process is based, is

a goal oriented system, so it is logical to transfer this principle to the computer. However, nurses responses to the statement in the questionnaires "care plans do not transfer successfully to the computer" showed that they agreed with this sentiment, so the possible reasons were examined. The Nursing Process approach, and therefore the care planning system, requires each goal to be evaluated individually, rather than the whole problem. Using a paper system where all statements are immediately visible, this was an acceptable means of evaluating, and is the method recommended by the Open University team and most other care planning literature. However, using a computer system fragments the care plan, making it more difficult to view the problem as a whole, making it difficult to get a complete picture of what is happening. Audit results showed that goal dates in care planning were also poorly used and the professional issues implied by this have been discussed in an earlier chapter.

Nevertheless, even if nurses are confident about making a decision about goal dates, to attach them to goals is fairly time consuming, especially if several goals are selected for each problem. In order to make the process simpler and quicker but no less professionally sound, I have written a broad long term goal for each problem, which is supported by several outcome standards to provide a means of measuring whether the goal is being achieved. Each outcome standard is written so that it can be measured by some form of measurement scale, by patient report or by direct observation. The goal date has become the review date, so that instead of selecting a date on which the nurse decides the goal should be met, she is able to select a date on which she feels the problem should be reviewed. The final evaluation provides the opportunity to appraise the standards in order to judge whether the goal has been met.

5.The standards were not written explicitly. The standards incorporated in goals and actions were not written in the same format which has now been adopted at ward level and thus not recognised as standards, but only as care planning minutiae. The standards now incorporated in the system have been based on principles proposed by Mason (1984), and using her terminology, that is Process, Outcome and Content standards. The ward standards written by the nurses are also based on these principles.

6.The care plans do not function as nurses expect them to function. The original care plans were entered on screens in the part of the system designed for doctors personal order sets, which allows the original care planning data to be typed in without coding every statement. As these plans include over 700 problems it would have put too much pressure on the technological staff to code all this information in the time available so by using these screens, members of the Research and Development department were able to type the care plans onto the system themselves. The disadvantage of this method is that the screens are not coded to carry out all the functions that would make care planning technologically easier. Many of the frustrations expressed about the system are founded on the technological shortcomings and changes were made to address these.

I have referred to the matrix coding training that I received in order to create a new care planning system, and described many of the technological improvements that have been carried out. An example of a new care plan is included in the Appendix for this chapter.

FUTURE RESEARCH

This study has described the change from a manual to automated system of care planning in a district general hospital, and has examined the attitudes of qualified nurses towards the Nursing Process and computer care plans, in the context of existing change theories. It has also examined the way in which nurses use the computerised care plans. Further research would be necessary to ascertain whether the findings from this research are typical, and if nurses in other hospitals, faced with the same sort of changes, would react in the same manner.

Because my research also examined nurses' attitudes towards the Nursing Process and paper care plans, it has highlighted problems with care planning as a whole, rather than just computer care planning. It has also identified an inadequate knowledge of the principles of the Nursing Process. On the basis of this, I would suggest that further research is needed into the whole subject of how the philosophy of individual patient care is taught, and how the process is documented, no matter which system is being used.

As elements of the methodology were borrowed from an action research approach, major modifications have already taken place as a result of the findings. I would also suggest that any future local research replicates the quantitative part of this study in respect of the modified care planning system now in the process of implementation, in order to determine the effect the changes as a guideline for future systems. If such research demonstrates that no significant improvement had occurred in attitudes or quality of care planning, it would increase the importance of looking at the basic premise underlying the use of any care planning system, whether manual or automated. Further research could also be used to extend the care planning system into a multidisciplinary care planning system, so that the care plan would be truly patient centred.

Although there is not a great volume of published evaluative research about nurses and computers, the majority is concerned with the general use of computer systems in nursing, rather than any individual aspect, such as care planning. My own research has focused only on the care planning system of an Integrated Hospital Information System. Neither approach supplies the whole picture; the first fails to specify particular areas of satisfaction or discontent, while the second does not take into consideration the effect of the interaction between the systems, on attitudes and usage. Future research could help to clarify the former and expand the latter, to produce a complete illustration.

Findings from this research have led me to speculate on the multitude of feelings, beliefs and values underlying the responses from the nurses. Many comments express similar views reflecting similar feelings, suggesting corporate beliefs among nurses. In many instances comparable comments have been made about both systems of care planning, implying that it is care planning, rather than the medium by which it is carried out, that is being judged.

The widespread belief among nurses that they are too short staffed to complete care planning, whether on paper or computer, to their satisfaction, has been revealed by this research, although data from workload and dependency studies do not reflect this. The often repeated comment is that

There is also scope for future research to examine the part that care planning plays in actual patient care. The Audit report referred to above cites research which claims that effective care planning influences pain control and speedy recovery. Future nursing research should extend this by trying to determine the extent to which the effective documentation of care planning influences specific aspects of patient care. If results showed that care plans played a positive part in improving standards of care, that would provide motivation for their use by nurses and encouragement from managers. Conversely if negative results were produced, this would support the need for a radical examination of care planning documentation.

My research has made no distinctions between the different methods of organising nursing care and nurses attitudes, in the effectiveness of their use of the computer care plans. The Audit Commission advocated the introduction of Primary Nursing to improve care planning, based on the premise that if a nurse has full responsibility for the care of an individual, she will be motivated to plan and record the care effectively. Future research could focus on this expected outcome of primary nursing, in relation to manual or computer care planning.

CONCLUSIONS

I am satisfied that this research has met the original objectives and has achieved the aims within my own area of responsibility. The implicit aim that adaptation to the new system would be smoothly facilitated, is doubtful, in the context of dissatisfaction expressed. However the desired outcome of the change to a computerised care planning system, in providing more accurate information, has been partly demonstrated by improved quality of some documentation.

Results of my research demonstrated overall an unfavourable attitude to computer care plans in each of the three time periods studied. In line with the change theories referred to, original attitudes became more negative after three months use, but were moving to the positive pole after using the care plans for a year, when constructive criticism provided a useful base for corrections and modifications.

Examination of the paper care plans showed that attitudes influenced the way in which they were written, but this was only found to be true for some of the wards when computer care plans were used. This may illustrate an unexpected outcome of computer care plans, that being more easily accessible, nurses feel more obligation to be seen to be completing them, but do not necessarily hold favourable attitudes towards care planning.

Results of my study, relating to care planning in general, corresponded closely to major Nursing Process studies by De la Cuesta (1983) and Friend and Hayward (1986). Results of the attitude study, based on that of Bowman, Thompson and Sutton (1983) did not correspond significantly with the results of the original, but the circumstances and purpose of the studies were different. Neither did my results compare with Carlsons's (1986) work to determine the influence of attitudes on the way in which care plans were written.

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APPENDIX A: CHAPTER 1

1 THE KÖRNER REPORTS

Terms of reference
Individual reports

2 THE REGIONAL INFORMATION SYSTEMS PLAN (RISP)

Hospital services
Choice of software.

3 THE ROPER, LOGAN AND TIERNEY MODEL OF NURSING

The 12 activities of living (ALs):
The model assumptions:

4. EXAMPLES OF PAPER CARE PLANNING DOCUMENTATION

APPENDIX A: CHAPTER 1

1 THE KÖRNER REPORTS

Terms of reference:

1. To agree, implement and keep under review, the principles and procedures to guide the future developments of health service information systems.
2. To identify and resolve health service information issues, requiring a coordinated approach.
3. To review existing health service information systems.
4. To consider changes to, or developments in, health service information arising elsewhere, and, if acceptable, to assess priorities for their development and implementation.

Individual reports:

- Report 1. Hospital facilities and Diagnostic services
- Report 2. Patient Transport
- Report 3. Manpower and Personnel
- Report 4. Paramedical services.
- Report 5. Community services.
- Report 6. Finance.

(Windsor, 1986)

The first report recommends the collection of a minimum set of data to be contained in one patient information system, for each patient on any one ward, specifying:

- *length of stay on ward
- *time a patient spends in care of one consultant

Data may be identified:

- *on admission
- *at the start of each consultant episode
- *at the start of each ward stay
- *at the end of each consultant episode
- *at discharge or death.

Collecting this information for the DHSS became mandatory in April 1987.

2 THE REGIONAL INFORMATION SYSTEMS PLAN (RISP)

RISP consisted of the following components:

- Hospital services (Represented by the Hospital Information System)
- Community health care
- Manpower/personnel
- Accounting/finance
- Capital and estates management.

Hospital services includes:

- Patient administration system
- Patient care (which includes care planning system)
- Aggregate patient information
- Medical records.

Choice of software.

In order to reduce the risk of incompatibilities or inefficiencies caused by a multiplicity of systems within the region, the Wessex Regional Health Authority went out to tender and selected a standard software supplier, (TDS, formerly Technicon), for what was intended to develop as a regional standard clinical and management system. This not only has the potential advantage of a single supplier for the soft ware but also allows for user familiarity which develops from the use of a standard system.

3 THE ROPER, LOGAN AND TIERNEY MODEL OF NURSING

The 12 activities of living (ALs):

- Maintaining a safe environment
- Communicating
- Breathing
- Eating and drinking
- Eliminating
- Personal cleansing and dressing
- Controlling body temperature
- Mobilising
- Working and playing
- Expressing sexuality
- Sleeping
- Dying

The model assumptions:

- 1 An individual carries out twelve categories of activities of living from conception to death in order to meet basic human needs.
- 2 The activities are observable behavioural manifestations of human needs.
- 3 The way in which the activities are carried out is influenced by developmental, physical, psycho-social, environmental, political and economic factors.
- 4 An independence/dependence continuum is related to an individual's life span so that at periods through life independence in each activity of living may change.

ASSESSMENT SHEET

[illegible]

[illegible]

۱۱

[illegible]

[illegible]

Forenames			Marital State		Next of Kin		Day		Night		
Address			Telephone:								
Date of Birth			Male / Female		Address						
Occupation			Practice								
Admission			I.D. Bracelet		Telephone:		Home		Business		
Reason for Admission			Provisional Medical Diagnosis		Relevant Past Health History						
Education on Admission			Patient's Perception of Current Health								
Referral Forms			Transport Arranged		Day Hospital		Social Services		O.T. Ass.		
			Private Stretcher								
			Ambulance Sitting								
			O.P.D. App.								
			Liaison Sister								
Ref Assessment Summary					T.		P.		R. B / P		
					Urinalysis		Weight				
PROGRESSIVE NOTES											
Date						Signature			Investigations		
Surname			Forenames								

operation:

Drains:

Catheters:

Special Instructions:

Date	No.	Goals	Nursing Care	Signature	Evaluation						Signature					
		Safe return to consciousness	(a) Maintain a clear airway													
		Normal breathing pattern	(b) Recumbent or Semi-prone position													
		No Cyanosis	(c) Leave airway in situ till patient is swallowing or rejects it													
			(d) Stay with patient													
			(e) O ₂ administered if instructed													
			Suction available													
		Stable B/P and Pulse	(a) 4" hourly observations of B/P and Pulse		Recovery Observations											
			(b) Change to 1 hourly, 2 hourly as stable													
		No blood loss	(c) Check drains, Check dressings													
		Pain free	(a) Analgesia to be given when required as prescribed. Advise medical staff if pain not controlled													
Surname			Forenames		Age	Consultant		Ward	Unit Number							

THERAPY

[illegible]

Appliances

Surname

[illegible]

Appliances

Surname	Forenames	Age	Consultant	Ward	Unit Number

APPENDIX B: CHAPTER 3

1 THE ACUITY SYSTEM ON HIS

By dependency category.

By task.

By patient care area.

2 EXAMPLE OF A CORE CARE PLAN

3 EXAMPLES OF ASSESSMENT SCREENS

4 EXAMPLES OF CARE PLANNING SCREENS

APPENDIX B: CHAPTER 3

1 THE ACUITY SYSTEM ON HIS

a) By dependency category. The category into which the nurse considers a patient will fall is selected by light pen and the screen will show a description of this category. Each ward may define its own category specifications and selection of the category will automatically generate the number of whole time equivalent (WTE) of nurses required. The screen displays patient name and location, acuity level, WTE available and WTE required. This is the simplest method and useful for short stay areas, such as Day surgery.

b) By task. The screen displays a list of all the nursing tasks likely to be performed on the ward and the nurse selects those performed for the patient. The system provides WTE and staff mix for selected tasks and the screen will show name and location of patient, and the time equivalent of staff mix required to nurse the patient.

c) By patient care area. The system provides a list of up to nine patient care areas, such as "nutrition", "emotional care" and may include nursing procedures, all of which may be user defined. Each care area includes four levels of nursing care and the nurse selects the level of care which each patient requires. The screen then displays patient name and location, acuity scoring, WTE available and required and final acuity score.

CORE CARE PLAN FOR PATIENT WITH MYOCARDIAL INFARCT

DATE	GOALS	NURSING ACTIONS	EVALUATION	SIGNATURE
PROBLEM Change in heart rhythm				
	Any changes in rhythm will be promptly identified and the patient will understand reason for monitoring	Observe cardiac monitor at each patient contact Record apex and radial pulse Record radial pulse before digoxin Report changes in cardiac rhythm		
PROBLEM Anti coagulant therapy				
	Any unwanted effects to be identified promptly	Test urine for blood daily Examine gums for bleeding daily Explain signs for patient to observe Provide information booklet Advise patient to carry card at all times		
PROBLEM Diet changes				
	patient will understand diet changes and importance of weight control	Provide diet sheet and check understanding Record weight once during admission Encourage discussion. Involve family as desired		
PROBLEM Discharge home				
	The patient will feel confident about care after discharge	Check that patient and/or family have read information booklet Check that patient and/or family know about sources of help after discharge Check that patient has TTOS and understands about administration Refer to Community Liaison Sister		

CORE CARE PLAN FOR PATIENT WITH MYOCARDIAL INFARCT

DATE	GOALS	NURSING ACTIONS	EVALUATION	SIGNATURE
PROBLEM Anxiety				
	Patient will show fewer signs of distress and demonstrate understanding of condition and treatment	Stay with patient during episodes of pain and distress Explain what has caused heart attack Offer health information booklet from day 3 Encourage discussion about discharge, involve family as desired Provide privacy and quiet environment Check that patient understands any information Observe for signs of increased anxiety.		
PROBLEM Chest pain				
	The patient indicates that pain is relieved and remains comfortable during rest and nursing or other activities	Ask patient to report pain promptly Help into comfortable position Give oxygen as prescribed Explain cause of pain and cardiac regime. Observe effects of exercise Discuss effect of medication		
PROBLEM Enforced bedrest				
	Patient will understand reasons for bedrest and return to previous level of activity after 6 days with no further chest pain.	Select appropriate consultant regime Explain regime to patient Encourage preventative care Turn patient regularly Observe calves and pressure areas each shift Check bowel actions daily		
PROBLEM Fluid imbalance				
	The patient will show no symptoms of fluid imbalance	Record fluid balance until day 3 Observe for oedema each shift Offer mouth washes as required		

3 ASSESSMENT PATHWAYS

WARD PATIENT LIST
(select patient name)

PATIENT CONFIRMATION	
ORDER ENTRY:	JOHN SMITH
MASTER GUIDE:	JOHN SMITH
RETRIEVAL GUIDE:	JOHN SMITH
PAS FUNCTIONS:	JOHN SMITH
	WRONG NAME - ERASE

NURSING MASTER GUIDE

(Select charting time) -->
(Select desired hours and minutes)-->
(Select adult assessment)

ADULT ASSESSMENT GUIDE	
SS	> OBSERVATIONS
SS	> GENERAL INFORMATION
SS	> DRUGS ON ADMISSION
SS	> PATIENT ALLERGIES
	> MAINTAINING SAFE ENVIRONMENT
	> COMMUNICATION
	> BREATHING
	> EATING AND DRINKING
	> ELIMINATING
SS	> WASHING, DRESSING AND SKIN CONDITION
	> CONTROLLING BODY TEMPERATURE
	> MOBILISING
	> HOME AND SOCIAL
	> SELF IMAGE
	> SLEEPING
	> DYING
SS	> KEY POINT SUMMARY
SS = SHORT STAY, LESS THAN 72 HOURS.	
RETURN	
ERR	
TYPE	
RETRIEVE	
	REVIEW

GENERAL INFORMATION		
* ADMISSION DIAGNOSIS --__		
* PAST MEDICAL HISTORY --__		
* PATIENT UNDERSTANDING OF CONDITION --__		
* RELATIVE SEEN BY DOCTOR	YES	NO
* INFORMATION GIVEN TO RELATIVES --__		
* ADDITIONAL PHONE NUMBERS --__		
* NIGHT CONTACT NUMBER --__		
NEXT BACK		
RETURN		REVIEW
ERR	TYPE	RETRIEVE

SAFETY		
* USUALLY	* SELF CARING	
* ON ADMISSION	* PARTIALLY DEPENDENT	
	* TOTALLY DEPENDENT	
	* INDEPENDENT	
* NEEDS HELP WITH	ALL THE TIME	
* NEEDS SUPERVISION	ALL ACTIVITIES	
* NEEDS CLOSE OBSERVATION		
--__		
IS FRAIL	WANDERS	
IS CONFUSED	PRONE TO FALLS	
IS LIABLE TO INJURE SELF		
IS LIABLE TO INJURE OTHERS		
APPEARS VIOLENT		
	> COMMUNICATING	
RETURN		REVIEW
ERR	TYPE	RETRIEVE

4 CARE PLANNING PATHWAYS

WARD PATIENT LIST
(select patient name)

PATIENT CONFIRMATION	
ORDER ENTRY:	JOHN SMITH
MASTER GUIDE:	JOHN SMITH
RETRIEVAL GUIDE:	JOHN SMITH
PAS FUNCTIONS:	JOHN SMITH
	WRONG NAME - ERASE

NURSING MASTER GUIDE
(Select care planning)

CARE PLANNING GUIDE	
SELECT CARE PLANNING METHOD	
1 - ACTIVITIES OF LIVING	
2 - SPECIALTY	
3 - TYPE-IN ADDITIONAL PROBLEM	
> RETRIEVALS, UPDATES, PRINTOUTS	
> RETRIEVAL, COMPLETION, PRINTOUT GUIDE	
> CHANGE GOAL DATE/EVALUATION	
RETURN ENTER	REVIEW

CARE PLANNING	
CHOOSE SPECIALTY	
> ACUTE ELDERLY	
> DERMATOLOGY	
> ENT	
> GENERAL MEDICINE	
> GENERAL SURGERY	
> GYNAECOLOGY	
> OPHTHALMIC	
> ORTHOPAEDIC ELECTIVE	
> ORTHOPAEDIC SHORT STAY	
> ORTHOPAEDIC TRAUMA	
> RHEUMATOLOGY	
> STROKE UNIT	
ERR	TYPE
NEXT	RETRIEVE
	REVIEW

CARE PLANNING		*print*
MAJOR ABDOMINAL SURGERY	SELECT CARE	
PLAN ITEMS		
PROBLEM	PATIENT IS ANXIOUS ABOUT OPERATION	**
GOAL	PATIENT WILL UNDERSTAND NATURE OF OPERATION AND THE SEQUENCE OF EVENTS ASSOCIATED WITH PRE AND POST OP CARE	**
GOAL	PATIENT WILL BE ABLE TO ASK QUESTIONS AND EXPRESS FEELINGS AS DESIRED	**
GOAL	_____	**
> ADDITIONAL PROBLEM		> ALL OF ABOVE
> CARE PLANNING GUIDE		> ADD GOAL DATE
> ADDITIONAL INFORMATION		
RETURN	BACK	NEXT
ERR	TYPE	RETRIEVE
MASTER REVIEW		

EVALUATION SCREEN	
CHANGE GOAL DATE ONLY AND EVALUATE	
TYPE IN NEW GOAL DATE AND THEN PRESS F10	
THEN SELECT REASON OR TYPE-IN	
DATE: __/__/__	
EVALUATION:	
* PROBLEM INAPPROPRIATE	
* GOAL DATE INAPPROPRIATE	
* GOAL UNREALISTIC	
* CONDITION UNCHANGED	
* CONDITION DETERIORATED	
-- _____	
RETURN	CAREPLAN GUIDE
ERR	REVIEW

EXPLANATIONS OF SCREENS

The main screen is the working screen, from which statements may be selected or added to.

On the care planning screens these are indicated by *, while on the assessment screen only the main statements are indicated in this way and the others may be selected in conjunction. > prefixes selection of a "jump" to another screen.

The lower screen is the function screen. Commands may be selected by light pen. ERR cancels the last selection or moves to the previous screen, cancelling all the selections. RETURN also returns to the previous screen but does not cancel work.

EXPLANATIONS OF PATHWAYS

To carry out assessments and care planning

- 1 SIGN ON
- 2 SELECT "PATIENT NAME"
- 3 SELECT "MASTER GUIDE"

Assessment

- 1 SELECT CHARTING TIME, SELECT HOURS AND MINUTES
- 2 SELECT DESIRED ASSESSMENT (ADULT, PAEDIATRIC, ANAESTHETIC/DAY SURGERY)
- 3 SELECT "OBSERVATIONS" AND WORK THROUGH ALL SCREENS
- OR
- 4 SELECT CATEGORIES APPROPRIATE TO SHORT STAY PATIENT

Care planning

- 1 SELECT "CARE PLANNING"

To make a care plan:

- 2 SELECT TYPE OF CARE PLAN
- 3 SELECT DESIRED CARE PLAN
- 4 SELECT GOALS AND ACTIONS
- OR FREE TYPE

To evaluate the goals:

- 2 SELECT "CHANGE GOAL DATE/EVALUATION
- 3 TYPE IN NEW GOAL DATE AND SELECT
- APPROPRIATE STATEMENT OR FREE TYPE

APPENDIX C: CHAPTER 4

1 INDIVIDUAL WARD RESPONSE RATES

2 ATTITUDE QUESTIONNAIRES AND LETTERS

3 SELF RECORDING DIARY AND LETTER

4 COMPUTER SATISFACTION QUESTIONNAIRES

5 AUDIT TOOL

6 QUALITY ASSURANCE TOOL

APPENDIX C: CHAPTER 4

1 INDIVIDUAL WARD RESPONSE RATES

TABLE C.1

ATTITUDE STUDIES RESPONSE RATE % BY WARD			
Pre-implementation	n = 119	from 182 questionnaires	
Post-implementation	n = 72	from 97 questionnaires	
Computer satisfaction	n = 137	from 182 questionnaires	
WARD	PRE- IMPLEMENT STUDY % response	POST IMPLEMENT STUDY % response	COMPUTER SATISFACTION % response
WARD A	64	67	62
WARD B	63	91	100
WARD C	100	89	88
WARD D	81	71	93
WARD E	25	60	87
WARD F	64	80	83
WARD G	75	85	85
WARD H	44	50	80
WARD I	57		88
WARD J	45		73
WARD K	71		100
WARD L	85		58
WARD M	55		47
WARD N	67		53
WARD O	64		71
WARD P	34		
AVERAGE RESPONSE	61.5	74.1	76

October 1988

Dear Colleague,

As you know, during the implementation of Phase 2, Nurse care planning will be one of the systems to become computerised. This will represent another big change for all of us and possibly there will be many concerns about various aspects. At present it is not finally decided which will be the first ward to "go live" with care plans, but we do know that the implementation will be staged so that it will be possible to spend time with each ward providing any necessary support.

There are many nurses working together to ensure that the change goes as smoothly as possible and that the finished product is acceptable to everyone. However anxieties are certain to arise. Within this department care planning is one of my responsibilities and I feel it is of the greatest importance that every step of this change is closely monitored, so that worries may be expressed and problems dealt with as they occur.

To do this I shall need constant feed back from all of you, the users. I am already starting to examine the time factor. However I also need to know your feelings about much broader issues, and how you feel about the Nursing Process in general, in order to understand your views.

For this reason I am asking you to help by filling in the enclosed questionnaires, which is being distributed to all qualified nurses on all wards. A report documenting the results of these will be circulated and be available for everyone to read, if desired. Instructions are included below.

Yours sincerely,

Charleen Newton.

INSTRUCTIONS

This set of questions should take about 10 minutes to complete. Don't sit and ponder over it, just put down your immediate response to each statement.

Each ward has been provided with a large envelope in which to return the questionnaires, on the outside of which all your names are listed. I should like you to cross off your name as you return your papers, purely so that I can remind anyone who has not returned it. However, none will be looked at until the big envelope has been collected from the ward, so anonymity will be preserved. All responses will be treated confidentially.

Please return the completed forms by: 14th October 1988

THANK YOU

PRE IMPLEMENTATION ATTITUDE QUESTIONNAIRE: THE NURSING PROCESS

Please indicate with a tick in the appropriate space, your feelings about each statement.

ALL STATEMENTS REFER TO THE NURSING PROCESS

Strongly agree
Agree
Undecided
Disagree
Strongly disagree

SA
A
U
D
SD

STATEMENT	SA	A	U	D	SD
Its use improves patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using it means too much paper work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is too time consuming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Its use increases awareness of patient needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It takes time away from patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It can be used in any care setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is an elaborate system of recording care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It works well in practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It has never been totally accepted by most nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0. It increases accountability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. It is a description of what happens between a nurse and a patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. It is all common sense so nurses do not need to write it all down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. It helps to identify priorities of care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. It is good in theory but falls down in practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It does not affect the delivery of care, only the recording of it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. It is a logical approach to total patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE OVER PAGE.

	SA	A	U	D	PAGE SD
17. There are not enough nurses to write care plans properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. It is a good learning framework for students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. It doesn't make any difference to the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The evaluation stage is useful for furthering nursing research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE WRITE ANY COMMENTS IN THE SPACE BELOW

Thank you for filling in this questionnaire. Will you now please provide the following details by ticking the appropriate box.
thank you. All responses will be treated confidentially

AGE

Under 25 years

25 .. 35 years

36 .. 45 years

Over 45 years

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

GRADE

RGN

EN

<input type="checkbox"/>
<input type="checkbox"/>

GENDER

MALE

FEMALE

<input type="checkbox"/>
<input type="checkbox"/>

PRE IMPLEMENTATION ATTITUDE QUESTIONNAIRE: COMPUTER CARE PLANS

Please indicate with a tick in the appropriate space, your feelings about each statement.

Strongly agree	SA
Agree	A
Undecided	U
Disagree	D
Strongly disagree	SD

No	STATEMENT	SC	A	U	D	SD
1.	Computer care plans will increase workload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Computer care plans will improve communication between nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Computer care plans will increase the need for more nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Computer care plans will allow more time with the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Time spent on computer will be out of proportion to the benefits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Confidentiality will be a problem with computer care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Computer care plans will help to improve patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Queuing for terminals will be a problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Computer care plans will be a useful learning experience for students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Computer care plans will reduce paper work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Nurses should not be expected to use computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Computer care plans will help to set standards of care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Computer care plans will take away individuality of patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Computer care plans will be more research based.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Computer care plans will make orientation of new staff more difficult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Light pen selection will save time in writing individual care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SA	A	U	D	SD
----	---	---	---	----

17. Care planning will not transfer successfully to computer
18. Using computers for care planning will help nurses to overcome fear of new technology
19. Computer care plans will expose nurses to increased litigation.
20. Computer care plans will help to increase knowledge base.
21. Computer care plans will take time away from patient care.
22. Computer care plans will help to increase accountability and professionalism.

PLEASE WRITE ANY COMMENTS IN THE SPACE BELOW

Thank you for filling in this questionnaire. Will you now please provide the following details by ticking the appropriate box.
thank you. All responses will be treated confidentially

AGE		GRADE	
Under 25 years		RGN	
25 .. 35 years		EN	
36 .. 45 years		GENDER	
Over 45 years		MALE	
		FEMALE	

Nursing Research & Development

September 1989

Dear Colleague,

As you will remember at the end of last year you were all asked to share your opinions on the proposed computerisation of nursing care plans. Your response to these questions was very useful and helped to provide an overall picture of your expectations.

However, it is now just over 14 weeks since implementation took place on your ward and it is important to find out and document what all of you, the users, feel about the change in these early days. For this purpose, I am asking you to help once more by filling in the enclosed questionnaire, which is being distributed to all permanent qualified nursing staff on each of the eight wards already using the new care plans. I know that various members of our department have spoken to some of you individually, but this will provide an opportunity to obtain opinions from everyone. A report, documenting the results of the questionnaires, will be produced and will be available for anyone to read. Although this is primarily intended to discover attitudes, it is hoped that it will form a basis for any modifications required.

Instructions for filling in and returning the questionnaire are below.

Thank you for your help again,
Yours sincerely,

Charleen Newton

INSTRUCTIONS

This set of questions should take about 10 minutes to complete. Don't sit and ponder over it, just put down your immediate response to each statement.

Each ward has been provided with a large envelope in which to return the questionnaires, on the outside of which all your names are listed. I should like you to cross off your name as you return your papers, purely so that I can remind anyone who has not returned it. However, none will be looked at until the big envelope has been collected from the ward, so anonymity will be preserved.

All responses will be treated confidentially.

Please return the completed forms by: 16th October 1989

THANK YOU

POST IMPLEMENTATION ATTITUDE QUESTIONNAIRE: COMPUTER CARE PLANS

Please indicate with a tick in the appropriate space, your feelings about each statement.

Strongly agree

Agree

Undecided

Disagree

Strongly disagree

SA
A
U
D
SD

No	STATEMENT	SC	A	U	D	SD
.	Computer care plans have increased workload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans have improved communication between nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans have increased the need for more nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans allow more time with the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Time spent on computer is out of proportion to the benefits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Confidentiality is a problem with computer care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans are helping to improve patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Queuing for a terminal is a problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans are a useful learning experience for students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans reduce paper work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Nurses should not be expected to use computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans are helping to set standards of care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans are taking away individuality of patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computer care plans are more research based.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Computers make orientation of new staff more difficult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.	Light pen selection saves time in writing individual care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	SA	A	U	D	SD
17. Care planning has not transferred successfully to computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Using computers for care planning is helping nurses overcome fear of new technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Computer care plans are exposing nurses to increased litigation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Computer care plans are helping to increase knowledge base.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Computers take time away from patient care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Computer care plans are helping to increase accountability and professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 Computer care plans make it more difficult to involve patients in planning care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 Computer care plans help to obtain a more comprehensive patient assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE WRITE ANY COMMENTS IN THE SPACE BELOW

Thank you for filling in this questionnaire. Will you now please provide the following details by ticking the appropriate box.
thank you. All responses will be treated confidentially

AGE		GRADE	
Under 25 years	<input type="checkbox"/>	RGN	<input type="checkbox"/>
25 .. 35 years	<input type="checkbox"/>	EN	<input type="checkbox"/>
36 .. 45 years	<input type="checkbox"/>	GENDER	
Over 45 years	<input type="checkbox"/>	MALE	<input type="checkbox"/>
		FEMALE	<input type="checkbox"/>

Nursing Research & Development

September 1989

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Please return the completed forms by: 16th October 1989

THANK YOU

POST IMPLEMENTATION ATTITUDE QUESTIONNAIRE: COMPUTER CARE PLANS

Please indicate with a tick in the appropriate space, your feelings about each statement.

Strongly agree	SA
Agree	A
Undecided	U
Disagree	D
Strongly disagree	SD

No	STATEMENT	SC	A	U	D	SD
	Computer care plans have increased workload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans have improved communication between nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans have increased the need for more nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans allow more time with the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Time spent on computer is out of proportion to the benefits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Confidentiality is a problem with computer care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans are helping to improve patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Queuing for a terminal is a problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans are a useful learning experience for students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	Nurses should not be expected to use computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	Computer care plans are taking away individuality of patient care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computer care plans are more research based.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Computers make orientation of new staff more difficult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Light pen selection saves time in writing individual care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	SA	A	U	D	SD
17. Care planning has not transferred successfully to computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Using computers for care planning is helping nurses overcome fear of new technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Computer care plans are exposing nurses to increased litigation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Computer care plans are helping to increase knowledge base.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Computers take time away from patient care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Computer care plans are helping to increase accountability and professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 Computer care plans make it more difficult to involve patients in planning care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 Computer care plans help to obtain a more comprehensive patient assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE WRITE ANY COMMENTS IN THE SPACE BELOW

Thank you for filling in this questionnaire. Will you now please provide the following details by ticking the appropriate box.
thank you. All responses will be treated confidentially

AGE		GRADE	
Under 25 years	<input type="checkbox"/>	RGN	<input type="checkbox"/>
25 .. 35 years	<input type="checkbox"/>	EN	<input type="checkbox"/>
36 .. 45 years	<input type="checkbox"/>	GENDER	
Over 45 years	<input type="checkbox"/>	MALE	<input type="checkbox"/>
		FEMALE	<input type="checkbox"/>

Nursing research and development dept

September 1988

Dear Colleague,

As you know, during the implementation of Phase 2, Nurse care planning will be one of the systems to become computerised. This will represent another big change for all of us and possibly there will be many concerns about various aspects. At present it is not finally decided which will be the first ward to "go live" with care plans, but we do know that the implementation will be staged so that it will be possible to spend time with each ward providing any necessary support.

There are many nurses working together to ensure that the change goes as smoothly as possible and that the finished product is acceptable to everyone. However issues such as "will it take longer?", or "will it mean more time away from the patients?" or "will we be able to retain individuality and confidentiality?" are certain to arise. Within this department care planning is one of my responsibilities and I feel it is of the greatest importance that every step of this change is closely monitored, so that worries may be expressed and problems dealt with as they occur.

To do this I shall need constant feed back from all of you, the users. The first issue I want to examine is the time factor and to provide a base line for comparison, I shall need to know how long it takes you now to write care plans every day using the present paper system. It will not be possible to ask every qualified nurse on every ward so with your co operation I intend to ask 3..5 nurses on each ward using care plans (names chosen at random from all qualified nurses who have been on their present ward for a minimum of 8 weeks and working 28 hrs or more) to record the time it takes to write the nursing notes each time she/he is on duty, over a period of 14 days. I will provide a diary of some description to make it as painless as possible. I shall get in touch with each nurse individually and ask her/his permission, and everyone has the right to refuse to take part, but of course I am hoping that you will want to help.

Yours sincerely,

Charleen Newton.
Research and Development.

SELF RECORDING DIARY

Please indicate with a tick the shift you are working

Date at start of shift:

Early	
Late	
Night	

Please write in the time taken for each patient in the appropriate box

	ASSESSMENT	CARE PLANNING	EVALUATION	PROGRESS NOTES
PATIENT 1				
PATIENT 2				
PATIENT 3				
PATIENT 4				
PATIENT 5				
PATIENT 6				

An example page of the Self Recording Diary

USER SATISFACTION QUESTIONNAIRE

Please tick your response in the appropriate box

As result of computer care plans			COMMENTS
Has time spent with patients	increased		
	decreased		
	stayed the same		
Has your workload	increased		
	decreased		
	stayed the same		
Has your understanding of patient care	increased		
	decreased		
	stayed the same		
Has your care of patients become	more effective		
	less effective		
	stayed the same		
Has your understanding of the patient as whole person	improved		
	become worse		
	stayed the same		
Has the system made patient care documentation	simpler		
	less simple		
	as before		
Is entering assessment data	easy		
	difficult		
	confusing		
Is entering careplan data	easy		
	difficult		
[Please turn over page]	confusing		

COMMENTS

9 Is entering evaluation data

easy	
difficult	
confusing	
yes	
no	
sometimes	
yes	
no	
indifferent	
terminals	
printouts *	

10 Is adequate help available if you have problems

11 Would you miss the system for care planning if it were removed

12 For handover reports do you rely on

* please specify which printout(s) you use.

Please indicate:

R.G.N.	
E.N.	
Age under 25	
Age 26 – 35	
Age 36 to 45	
Age 46 or over	
Female	
Male	

Thankyou for filling in this questionnaire. All responses are treated with complete anonymity and confidentiality.

AUDIT OF COMPUTER CARE PLANS

No	INDICATOR	STANDARD	EXCEPTIONS	DEFINITIONS
1	AN ASSESSMENT IS MADE FOR EACH PATIENT	100%	NONE	
2	ASSESSMENT IS STARTED WITHIN 12 HRS OF ADMISSION OR TRANSFER?	100%	None	
3	AN ASSESSMENT APPROPRIATE TO LENGTH OF STAY IS USED	100%	NONE	Short stay assessment up to 72 hrs, Adult assessment over 72 hrs, Paediatric assessment for under 16 yrs. Anaesthetic/day
4	THERE IS A STATEMENT ABOUT MEDICATIONS PRIOR TO ADMISSION?	100%	None	
5	THERE IS A STATEMENT ABOUT INFORMATION GIVEN TO RELATIVES	100%	ALTERNATIVE MANAGEMENT Information under other headings	Will include content of information given NOT just seen by doctor
6	THERE IS A STATEMENT ABOUT THE PATIENT'S UNDERSTANDING OF THE PROBLEM	100%	ALTERNATIVE MANAGEMENT Info under other headings	
7	EACH ACTIVITY OF LIVING IS ASSESSED	100%	Short stay assessments Assessment of "Dying" is optional	Look for assessment in each activity of living
8	THE KEY POINT SUMMARY IS COMPLETED	100%	Day surgery assessments	Look for summary of problem areas
9	THERE IS A STATEMENT ABOUT ALLERGIES	100%	None	Look at care plan
10	THE PATIENT HAS A CARE PLAN	100%	Short stay evaluative care plan for day patients	
11	THE CARE PLAN IS STARTED WITHIN 24 HOURS	100%	None	Look at date of admission, date of care plan
12	ALL PROBLEMS REQUIRING NURSING INTERVENTION HAVE A CARE PLAN	100%	None	Look in assessment and progress notes to identify problems
13	A GOAL DATE IS ATTACHED TO EACH GOAL	100%	None	Look at current care plan
14	GOALS ARE EVALUATED ON THE STATED DATE	100%	None	Look at current care plan
15	ALL GOALS ARE EVALUATED IN CARE PLANS	100%	ALTERNATIVE MANAGEMENT Evaluation in progress notes	Look in care plan and progress notes for evidence

ate:

[illegible]

indicator totals
EX AM REV

Indicator
Number[illegible]

SPECIALTY
ACT/LIV
FREE TYPE
MIXTURE

Number of pts 15

ASPECT OF ASSESSMENT OF CARE PLANNING	Expected standard	Actual standard	Reasons for standards not met	Adjusted %
1 An assessment for each patient	100%	93 %	1 without assessment	93 %
2 Assessment within 12 hours	100%	93 %	1 without assessment	93 %
3 Appropriate assessment	100%	80 %	1 without assessment 2 short stay assessments after 72 hrs	80 %
4 Medication statement	100%	93 %	1 without assessment	93 %
5 Information to relatives	100%	27 %	1 with information elsewhere 9 with no statements	33 %
6 Patient understanding	100%	60 %	1 without assessment 5 with no statements	60 %
7 AL pathway	100%	53 %	1 without assessment 4 exceptions. Under 72 hour stay 2 short stay assessments after 72 hrs	87 %
8 Key point summary	100%	53 %	1 with no AL pathway 4 exceptions. Under 72 hour stay	80 %
9 Allergies	100%	93 %	2 short stay assessments after 72 hrs 1 without assessment	93 %
10 Care plan for each patient	100%	100 %		100 %
11 Care plan within 48 hours	100%	87 %	2 completed after 48 hrs	87 %
12 All problems included	100%	73 %	4 with some problems omitted	73 %
13 Goal date for each goal	100%	47 %	4 with short stay care plans 4 with few goal dates	73 %
14 Goals evaluated on date	100%	53 %	4 with short stay care plans	80 %
15 Goals evaluated in plan	100%	60 %	4 with short stay care plans 2 with goals not eval in plan	87 %
16 Problems completed	100%	60 %	4 with short stay care plans 2 with problems not completed	87 %

TYPES OF CARE PLANS USED

SPECIALTY	8	FREE TYPE	1
ACT/LIV	4	MIXTURE	1

RECORDS SECTION OF ORIGINAL QUALITY ASSURANCE TOOL

QUALITY INDICATOR FOR CLIENT CARE

Dependency Category ->
Patient Identifications ->

INSTRUCTIONS: please tick one answer per question.
Assessor Name.....Ward Name..... Study Start Date.....
Assessor Code.....or Ward Code..... Stop Date.....

N	Y	Y	Nt
0	1	0.5	N/A

Records *DOES THE NURSE INTERVIEW/OBSERVE THE PATIENT
1 *FOR ASSESSMENT OF PROBLEMS WITHIN 24HRS OF
*ADMISSION/TRANSFER?

Pt 1
Pt 2
Pt 3

Records *IS THERE A STATEMENT ABOUT ALLERGIES WRITTEN
2 *WITHIN 24 HOURS OF ADMISSION/TRANSFER?
*ARE THE PATIENTS ELIMINATION PATTERNS
*RECORDED WITHIN 24 HOURS OF ADMISSION/
*TRANSFER?
*Refers to patterns prior to present hospital stay

Pt 1
Pt 2
Pt 3

Records *OF ADMISSION ABOUT WHETHER OR NOT THE
3 *PATIENT WAS TAKING ANY MEDICINES IMMEDIATELY
*PRIOR TO ADMISSION/TRANSFER?

Pt 1
Pt 2
Pt 3

Records *IS THERE A STATEMENT ABOUT RELEVANT ASPECTS
4 *OF SAFETY
*Includes smoking. Otherwise not applicable
*to an obviously fully independent patient

Pt 1
Pt 2
Pt 3

Records *ARE COMMUNICATING ABILITIES AND BEHAVIOUR OF
5 *MENTAL/EMOTIONAL STATE RECORDED WITHIN 24
*HOURS OF ADMISSION?

Pt 1
Pt 2
Pt 3

Records *IS THE GENERAL PHYSICAL APPEARANCE OF THE
6 *PATIENT RECORDED WITHIN 12 HOURS OF ADMISSION
*INCLUDING ANY NOTABLE DEFICIENCIES.
*Accept any description of physical appearance
*e.g. pale, emaciated, obese.DO NOT accept
*general descriptions such as "in no acute
*distress",behavioural descriptions, or refers
*age, sex, marital status.

Pt 1
Pt 2
Pt 3

Records *IS THE PATIENTS UNDERSTANDING OF HIS ILLNESS
7 *RECORDED ON ADMISSION/TRANSFER?
*Refers to patients answer to questions
*e.g.Why are you in hospital?

Pt 1
Pt 2
Pt 3

Records *IF THE PATIENT DEPENDS ON PROSTHETIC DEVICES	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 *FOR ACTIVITIES OF DAILY LIVING, IS THIS	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*RECORDED WITHIN 48 HRS OF ADMISSION/TRANSFER?	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*E.g. Dentures, spectacles, hearing aids,					
*artificial limbs, etc.					
*					
Records *ARE THE PATIENTS DIET OR FOOD PREFERENCES	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 *RECORDED WITHIN 12 HRS OF ADMISSION/TRANSFER?	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*					
*					
*					
Records *IS THERE A STATEMENT WRITTEN ABOUT THE SKIN	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 *CONDITION WITHIN 12HRS OF ADMISSION/TRANSFER?	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Relates to any problems with skin e.g.	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*skin lesions, pressure sores, IV cannula					
*sites.					
Records *DOES THE CARE PLAN SPECIFY TIMES AND METHODS	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 *FOR CARRYING OUT NURSING TREATMENTS FOR	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*PROBLEMS IDENTIFIED IN THE PLAN?	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*For 'Yes complete' each order should give					
*the time at which procedure should be done,					
*and method used.For 'Yes incomplete' Score.5					
*					
Records *DOES THE CARE PLAN DISTINGUISH BETWEEN THE	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 *ACTIVITIES THE PATIENT IS ABLE TO DO HIMSELF	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*AND ACTIVITIES THE NURSES SHOULD PERFORM?	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Refers to stoma care, mobility problems,					
*hygiene requirements and elimination problems.					
*					
Records *DOES THE CARE PLAN INCLUDE ATTENTION TO THE	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 *PATIENTS NEEDS FOR TEACHING?	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Refers to information re disease process,	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*teaching activities of daily living,					
*treatments, e.g. giving insulin etc.					
*					
Records *DOES THE NURSING PLAN INDICATE PERTINENT	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 *SIGNS OR SYMPTOMS TO BE OBSERVED IN REGARD	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*TO MEDICAL TREATMENT, MEDICATIONS,DISEASE	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*PROCESSES OR POSSIBLE COMPLICATIONS					
*Refers to major signs and symptoms of patients					
*present condition.Does not apply to observ-					
*ations indicated in the doctors orders.					
*					
Records *IS THERE A WRITTEN STATEMENT INDICATING THE	Pt 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 *FAMILY'S LEVEL OF UNDERSTANDING OF THE	Pt 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*PATIENTS CONDITION?	Pt 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Refers to any time during the hospital stay.					
*					
*					

ords *DOES THE ASSESSMENT INDICATE THE SPECIFIC	Pt 1				
16 *EXTENT OF AMBULATION					
*Refers to distance patient walks, or length	Pt 2				
*of time out of bed.					
*Does not apply to patients on bed rest or	Pt 3				
*those able to walk freely.					
ords *IS THE PATIENTS PERFORMANCE OF SELF-CARE	Pt 1				
17 *ACTIVITIES(E.G. ADL,DOING OWN TREATMENTS ETC)					
*RECORDED?	Pt 2				
*Applies to self-care in hospital in past					
*2 days.	Pt 3				
*					
ords *DOES CARE PLAN SPECIFY NATURE AND FREQUENCY OF	Pt 1				
18 *RELATED TO PRESENCE OF TUBES (E.G.CATHETERS					
*T-TUBES, IV'S)?	Pt 2				
*E.g. cleaning round tube,irrigation etc.					
*Code Yes, only if both time and nature of	Pt 3				
*care are recorded for each type of tube					
*present. Otherwise Code .5.					
*					
ords *DOES THE CARE PLAN INCLUDE TURNING AND	Pt 1				
19 *POSITIONING THE PATIENT?					
*Check with nurse. Ask: Is Mr/Mrs..... able	Pt 2				
*to turn and position himself?					
*Code Nt Ap if patient does not need help.	Pt 3				
*Code Yes if there is a written plan.					
*					
ords *DOES THE CARE PLAN INCLUDE STATEMENTS ABOUT	Pt 1				
20 *CARE BEING GIVEN TO INCREASE THE PATIENTS					
*INDEPENDENCE OR RESTORE HIM TO A HIGHER	Pt 2				
*LEVEL OF FUNCTION E.G. INCREASING SELF HELP					
*OR INCREASING ACTIVITY?	Pt 3				
*Applies only if patient needs such care.					
*Applies to care not included in medical plan.					
*					
ords *DOES THE EVALUATION RELATE TO THE STATED GOAL	Pt 1				
21 *					
*	Pt 2				
*					
*	Pt 3				
*					
*					
ords *WERE ALL THE RELEVANT PROBLEMS IDENTIFIED FROM	Pt 1				
22 *THE ASSESSMENT					
*	Pt 2				
*					
*	Pt 3				
*					
ords *WERE THE GOALS SET IN MEASUREABLE TERMS	Pt 1				
23 *					
*	Pt 2				
*					
*	Pt 3				
*					
ords *DO NURSES COMPLETE THE EVALUATION COLUMN OF	Pt 1				
24 *THE CARE PLANS EFFECTIVELY					
*i.e. are they signed, evaluated within time	Pt 2				
*limits, is the goal evaluated etc.					
*	Pt 3				
*					

APPENDIX D: CHAPTER 5

1 LIKERT SCALE

2 INDIVIDUAL WARD RESPONSES

3 SPECIALTY GROUP RESPONSE BY AGE GROUP

Surgical Wards
Orthopaedic Wards
Special Surgery Wards
Medical Specialty Wards
Medical Wards
Paediatric Ward

4 SPECIALTY GROUP RESPONSE BY QUALIFICATION

Surgical Wards
Orthopaedic Wards
Special Surgery Wards
Medical Specialty Wards
Medical Wards
Paediatric Ward

5 FACTOR ANALYSIS

APPENDIX D: CHAPTER 5

1 LIKERT SCALE

Scoring

Each statement has a value from 1 to 5 attached, The minimum necessary and maximum possible scores per question are calculated by multiplying the number of respondents by 1 or 5 respectively. The minimum and maximum scores per respondent are calculated by multiplying the number of questions by 1 or 5.

For example:

If there are 6 respondents and 10 questions,

Maximum possible score per individual question = 30

Maximum possible score per individual respondent = 50

A neutral point, to identify the middle point above which the scores will represent positive attitudes and below which they will represent negative attitudes, is set as follows:

The minimum necessary score is subtracted from the maximum possible score, and half of the resulting number is added to the minimum score. For example, if there are 6 respondents:

Maximum score = 30

Minimum score = 6

Difference = 24

Minimum score + 1/2 of difference = 6 + 12 = 18

Neutral point for questions = 18

2. INDIVIDUAL WARD RESPONSES

Comparison of attitudes: Nursing Process and Computer Care Plans

TABLE D 1

NURSING PROCESS. STANDARDISED ATTITUDE SCORES FOR ALL WARDS				
Nursing Process		Computer care plans		
	Attitude score	Attitude score	Attitude score	Attitude score
WARD A	56.9	Undecided	52.2	Mildly - ve
WARD B	67.5	Mildly +ve	56.5	Undecided
WARD C	63.1	Undecided	59.2	Undecided
WARD D	53.6	Mildly - ve	53.2	Mildly - ve
WARD E	56.8	Undecided	56.2	Undecided
WARD F	54.0	Undecided	61.8	Undecided
WARD G	60.4	Undecided	59.0	Undecided
WARD H	64.2	Undecided	64.5	Undecided
WARD I	56.6	Undecided	54.6	Undecided
WARD J	67.1	Mildly + ve	44.5	Mildly - ve
WARD K	67.2	Mildly + ve	54.4	Undecided
WARD L	64.3	Undecided	54.4	Undecided
WARD M	60.7	Undecided	65.9	Undecided
WARD N	59.2	Undecided	45.4	Mildly - ve
WARD O	59.5	Undecided	55.2	Undecided
Average	60.5	Undecided	55.8	Undecided

TABLE D 2 Showing degree of variance

AVERAGE STANDARDISED ATTITUDE SCORES FOR ALL WARDS			
	Nursing process	Computer careplans	Variance
WARD A	56.9	52.2	-4.7
WARD B	67.5	56.5	-11
WARD C	63.1	59.2	-3.9
WARD D	53.6	53.2	-0.4
WARD E	56.8	56.2	-0.6
WARD F	54.0	61.8	+7.8
WARD G	60.4	59.0	-1.4
WARD H	64.2	64.5	+0.3
WARD I	56.6	54.6	-2.0
WARD J	67.1	44.5	-22.6
WARD K	67.2	54.4	-12.8
WARD L	64.3	54.4	-9.9
WARD M	60.7	65.9	+5.2
WARD N	59.2	45.4	-13.8
WARD O	59.5	55.2	-4.3
Average attitude	60.5	55.8	-4.7

3 SPECIALTY GROUP RESPONSE BY AGE GROUP: Average standardised responses per age group

SURGICAL WARDS

Age specified n = 28
 All n = 31
 < 25 n = 16
 25-35 n = 6
 36-45 n = 4
 > 45 n = 2

TABLE D 3

SURGICAL WARDS				
Frequency of individual responses by age group				
1.Nursing Process				
	< 25 n = 16	25-35 n = 6	36-45 n = 4	over 45 n = 2
Strongly positive	0	2	0	0
Positive	4	3	1	1
Undecided	6	0	1	0
Negative	6	0	2	1
Strongly negative	0	0	0	0
2. Computer care plans				
	< 25 n = 16	25-35 n = 6	36-45 n = 4	over 45 n = 2
Strongly positive	0	0	0	0
Positive	2	3	0	1
Undecided	2	2	2	0
Negative	11	1	2	1
Strongly negative	1	0	0	0

ORTHOPAEDIC WARDS.

All n = 24 Age specified n = 22
 < 25 n = 7
 25-35 n = 8
 36-45 n = 4
 > 45 n = 3

(1 respondent did not complete computer questionnaire)

TABLE D 4

ORTHOPAEDIC WARDS				
Frequency of individual responses by age group				
1.Nursing Process				
	<25	25-35	36-45	over 45
	n = 7	n = 8	n = 4	n = 3
Strongly positive	0	0	0	0
Positive	1	1	0	0
Undecided	6	3	2	0
Negative	0	4	2	3
Strongly negative	0	0	0	0
2 Computer care plans				
	< 25	25-35	36-45	over 45
	n = 7	n = 8	n = 4	n = 3
Strongly positive	0	0	0	0
Positive	2	2	1	0
Undecided	5	4	1	1
Negative 0	1	2	2	
Strongly negative	0	0	0	0

SURGICAL SPECIALTY WARDS

All n = 17 specified age n = 17

<25 n = 1

25-35 n = 7

36-45 n = 6

> 45 n = 3

(1 respond did not complete computer questionnaire)

TABLE D 5

SURGICAL SPECIALTY WARDS frequency of individual wards by age group				
1 Nursing Process	< 25 n = 1	25-35 n = 7	36-45 n = 6	over 45 n = 3
Strongly positive	0	0	0	0
Positive	0	1	2	0
Undecided	1	5	4	3
Negative	0	1	0	0
Strongly negative	0	0	0	0
2 Computer care plans	< 25 n = 1	25-35 n = 7	36-45 n = 6	over 45 n = 3
Strongly positive	0	0	0	0
Positive	0	0	1	0
Undecided	1	5	5	2
Negative	0	1	0	1
Strongly negative	0	0	0	0

MEDICAL SPECIALTY WARDS.

All	n = 21	Specified age n = 21
< 25	n = 10	
25-35	n = 9	
36-45	n = 1	
> 45	n = 1	

TABLE D 6

MEDICAL SPECIALTY WARDS				
frequency of individual wards by age group				
1 Nursing Process	< 25	25-35	36-45	over 45
	n = 10	n = 9	n = 1	n = 1
Strongly positive	0	0	0	0
Positive	6	5	0	0
Undecided	4	2	1	1
Negative	0	2	0	0
Strongly negative	0	0	0	0
2 Computer care plans	< 25	25-35	36-45	over 45
	n = 10	n = 9	n = 1	n = 1
Strongly positive	0	0	0	0
Positive	1	1	0	0
Undecided	1	3	0	0
Negative	7	4	1	1
Strongly negative	0	0	0	0

MEDICAL WARDS

All	n = 19	Specified age = 19
< 25	n = 7	
25-35	n = 7	
36-45	n = 4	
> 45	n = 1	

TABLE D 7

MEDICAL WARDS frequency of individual wards by age group				
1 Nursing Process	< 25 n = 7	25-35 n = 7	36-45 n = 4	over 45 n = 1
Strongly positive	0	0	0	0
Positive	3	4	3	0
Undecided	2	0	0	0
Negative	2	3	1	1
Strongly negative	0	0	0	0
2 Computer care plans	< 25 n = 7	25-35 n = 7	36-45 n = 4	over 45 n = 1
Strongly positive	0	0	0	0
Positive	2	3	0	0
Undecided	1	1	1	0
Negative	2	2	3	1
Strongly negative	2	1	0	0

PAEDIATRIC WARD.

All	n = 8	Specified age n = 8
< 25	n = 1	
25-35	n = 7	
36-45	n = 0	
> 45	n = 0	

TABLE D 8

PAEDIATRIC WARD				
frequency of individual wards by age group				
1 Nursing Process	< 25	25-35	36-45	over 45
	n = 1	n = 7	n = 0	n = 0
Strongly positive	0	0		
Positive	0	0		
Undecided	1	5		
Negative	0	2		
Strongly negative	0	0		
2 Computer care plans	< 25	25-35	36-45	over 45
	n = 1	n = 7	n = 0	n = 0
Strongly positive	0	0		
Positive	0	0		
Undecided	1	5		
Negative	0	2		
Strongly negative	0	0		

4. SPECIALTY GROUP RESPONSE BY QUALIFICATION : Average standardised responses per qualification

SURGICAL WARDS

All	n = 31
Registered nurses	n = 25
Enrolled nurses	n = 6

TABLE D 9

SURGICAL WARDS		
frequency of individual wards by qualification		
1 Nursing Process		
	RGN	EN
	n = 25	n = 6
Strongly positive	1	1
Positive	9	2
Undecided	3	2
Negative	12	1
Strongly negative	0	0
2 Computer care plans		
	RGN	EN
	n = 25	n = 6
Strongly positive	0	0
Positive	5	1
Undecided	6	3
Negative	13	2
Strongly negative	1	0

ORTHOPAEDIC WARDS

All n = 24

Registered nurses n = 14

Enrolled nurses n = 9

TABLE D 10

ORTHOPAEDIC WARDS frequency of individual wards by qualification		
1 Nursing Process		
	RGN n = 14	EN n = 9
Strongly positive	0	0
Positive	3	0
Undecided	8	3
Negative	3	6
Strongly negative	0	0
2 Computer care plans		
	RGN n = 14	EN n = 9
Strongly positive	0	0
Positive	3	1
Undecided	6	5
Negative	5	2
Strongly negative	0	0
(1 enrolled nurse did not complete computer questionnaire)		

SPECIAL SURGERY WARDS

All	n = 16
Registered nurses	n = 9
Enrolled nurses	n = 7

TABLE D 11

SPECIAL SURGERY WARDS		
frequency of individual wards by qualification		
1 Nursing Process		
	RGN	EN
	n = 9	n = 7
Strongly positive	0	0
Positive	3	1
Undecided	6	5
Negative	0	1
Strongly negative	0	0
2 Computer care plans		
	RGN	EN
	n = 9	n = 7
Strongly positive	0	0
Positive	1	1
Undecided	8	5
Negative	0	1
Strongly negative	0	0

MEDICAL SPECIALTY WARDS

All n = 20
Registered nurses n = 13
Enrolled nurses n = 7

TABLE D 12

MEDICAL SPECIALTY WARDS		
frequency of individual wards by qualification		
1 Nursing Process		
	RGN	EN
	n = 13	n = 7
Strongly positive	0	0
Positive	8	2
Undecided	5	3
Negative	0	2
Strongly negative	0	0
2 Computer care plans		
	RGN	EN
	n = 13	n = 7
Strongly positive	0	0
Positive	3	0
Undecided	2	1
Negative	7	6
Strongly negative	0	0

MEDICAL WARDS

All	n = 19
Registered nurses	n = 16
Enrolled nurses	n = 3

TABLE D 13

MEDICAL WARDS		
frequency of individual wards by qualification		
1 Nursing Process		
	RGN	EN
	n = 16	n = 3
Strongly positive	0	0
Positive	8	1
Undecided	2	0
Negative	6	2
Strongly negative	0	0
2 Computer care plans		
	RGN	EN
	n = 16	n = 3
Strongly positive	0	0
Positive	5	1
Undecided	2	0
Negative	6	2
Strongly negative	3	0

PAEDIATRIC WARD

All	n = 9
Registered nurses	n = 5
Enrolled nurses	n = 3
Nursery nurses	n = 1

TABLE D 14

PAEDIATRIC WARD			
frequency of individual wards by qualification			
1 Nursing Process	RGN	EN	Nursery nurse
	n = 5	n = 2	n = 1
Strongly positive	0	0	0
Positive	0	0	0
Undecided	5	1	1
Negative	0	1	0
Strongly negative	0	0	0
2 Computer care plans	RGN	EN	Nursery nurse
	n = 16	n = 3	n = 1
Strongly positive	0	0	0
Positive	0	0	0
Undecided	4	1	1
Negative	1	1	0
Strongly negative	0	0	0

5. FACTOR ANALYSIS

Individual ward analysis

TABLE D 15

FACTOR ANALYSIS				
Before implementation				
WARD	PROFESS- IONAL	PRACT- ICAL	ETHICAL	TECHNO- LOGICAL
WARD A	58.9	42.2	49.0	60.0
WARD B	53.6	43.0	42.8	57.0
WARD C	62.9	52.3	57.0	66.7
WARD D	59.4	42.2	50.8	63.0
WARD E	62.0	51.5	53.8	63.0
WARD F	66.3	56.7	64.0	70.0
WARD G	62.1	53.8	54.4	65.7
WARD H	68.1	59.2	62.0	70.0
WARD I	58.8	46.8	52.2	64.7
WARD J	46.0	43.0	38.0	54.7
WARD K	59.0	48.7	53.6	54.7
WARD L	58.1	49.0	50.0	63.0
WARD M	68.3	60.0	65.0	72.3
WARD N	47.5	38.5	44.2	55.7
WARD O	56.4	48.0	49.0	62.7
AVERAGE	59.2	49.0	52.4	62.6

APPENDIX E: CHAPTER 6

1 ANALYSIS BY INDIVIDUAL STATEMENT IN WARD GROUPS

2 SPECIALTY GROUP RESPONSE BY AGE GROUP

Surgical Wards
Orthopaedic Wards
Special Surgery Wards

6 SPECIALTY GROUP RESPONSE BY QUALIFICATION

Surgical Wards
Orthopaedic Wards
Special Surgery Wards

APPENDIX E: CHAPTER 6

1. ANALYSIS BY INDIVIDUAL STATEMENT IN WARD GROUPS

TABLE E 1

SURGICAL WARDS			
Pre implementation n = 31			
Post implementation n = 26			
(all scores have been standardised)			
Statement	Before	After	Variance
Increase work load	43	29	-14
Improve communication	50	34	-16
Increase need for nurses	43	45	+2
Make more time for patients	50	32	-18
Time is disproportionate to benefits	48	37	-11
Reduce confidentiality	54	64	+10
Improve patient care	52	36	-16
Are a good learning tool	35	30	-5
Reduce paper work	68	50	-18
Cause queues at terminals	64	39	-25
Make nurses learn unnecessary skills	60	67	+7
Improve standards	52	53	+1
Take away individuality	67	42	-25
Are more research based	49	58	+9
Complicate staff orientation	72	40	-32
Light pen saves time	52	58	+6
Do not adapt to computer well	63	45	-18
Overcome technological fears	55	52	-3
Increase litigation risk	56	52	-5
Increase knowledge base	57	54	-3
Reduce time with patients	47	30	-17
Increase accountability	57	54	-3
TOTAL AVERAGE SCORE	54.3	45.4	-8.9

TABLE E 2

ORTHOPAEDIC WARDS			
Before implementation n = 24			
After implementation n = 30			
All statements refer to effects of computer care plans (All attitude scores have been standardised)			
Statement	Before	After	Variance
Increase work load	48	35	-13
Improve communication	53	43	-10
Increase need for nurses	42	45	+3
Make more time for patients	48	35	-13
Time is disproportionate to benefits	48	41	-7
Reduce confidentiality	59	58	-1
Improve patient care	58	41	-17
Are a good learning tool	38	48	+10
Reduce paper work	63	62	-1
Cause queues at terminals	58	43	-15
Make nurses learn unnecessary skills	64	67	+3
Improve standards	58	54	-4
Take away individuality	52	49	-3
Are more research based	73	69	-4
Complicate staff orientation	48	34	-14
Light pen saves time	72	67	-5
Do not adapt to computer well	55	49	-6
Overcome technological fears	60	57	-3
Increase litigation risk	56	50	-5
Increase knowledge base	58	67	+9
Reduce time with patients	48	36	-12
Increase accountability	63	54	-9
TOTAL AVERAGE SCORE	55.5	50.2	-5.3

TABLE E 3

SPECIAL SURGERY WARDS			
Before implementation n = 16			
After implementation n = 16			
All statements refer to effects of computer care plans (All attitude scores have been standardised)			
Statement	Before	After	Variance
Increase work load	54	44	-10
Improve communication	61	41	-20
Increase need for nurses	46	54	+8
Make more time for patients	58	40	-18
Time is disproportionate to benefits	59	43	-14
Reduce confidentiality	56	45	-11
Improve patient care	59	50	-9
Are a good learning tool	49	51	+2
Reduce paper work	79	56	-23
Cause queues at terminals	65	44	-21
Make nurses learn unnecessary skills	73	70	-3
Improve standards	54	61	+7
Take away individuality	60	43	-17
Are more research based	64	61	-3
Complicate staff orientation	59	53	-6
Light pen saves time	74	73	-1
Do not adapt to computer well	64	53	-11
Overcome technological fears	61	55	-6
Increase litigation risk	54	45	-9
Increase knowledge base	61	63	+2
Reduce time with patients	49	38	-11
Increase accountability	64	53	-11
TOTAL AVERAGE SCORE	55.5	50.2	-5.3

TABLE E 4

DISTRIBUTION OF RESPONSES TO INDIVIDUAL STATEMENTS		
SURGERY		
	Before	After
Strongly positive	0	0
Positive	3	1
Undecided	8	6
Negative	10	8
Strongly negative	1	7
ORTHOPAEDICS		
	Before	After
Strongly positive	0	0
Positive	2	4
Undecided	11	5
Negative	9	9
Strongly negative	0	4
SPECIAL SURGERY		
	Before	After
Strongly positive	0	0
Positive	3	2
Undecided	16	7
Negative	3	13
Strongly negative	0	0

2. SPECIALTY GROUP RESPONSE BY AGE GROUP: Average standardised responses per age group

SURGICAL WARDS

All	n = 26	Age specified n = 23
< 25	n = 13	
25-35	n = 9	
36-45	n = 1	
> 45	n = 0	

TABLE E 5

SURGICAL WARDS. 12 WEEKS AFTER IMPLEMENTATION					
Frequency of individual responses by age group					
1.Computer care plans 12 weeks after implementation					
	< 25	25-35	36-45	45	Over
	n=13	n=9	n=1	n=0	
Strongly positive	0	0	0	0	
Positive	1	0	0	0	
Undecided	2	0	0	0	
Negative	5	3	1	0	
Strongly negative	5	6	0	0	

ORTHOPAEDIC WARDS

All	n = 30	Specified age n = 28
< 25	n = 7	
25-35	n = 12	
36-45	n = 7	
> 45	n = 2	

TABLE E 6

ORTHOPAEDIC WARDS. 12 WEEKS AFTER IMPLEMENTATION					
Frequency of individual responses by age group					
2.Computer care plans					
	Under 25 n= 7	25-35 n = 12	36-45 n = 7	Over 45 n = 2	
Strongly positive	0	0		0	0
Positive	0	1		1	1
Undecided	4	3		4	1
Negative	3	4		1	0
Strongly negative	0	4		1	0

SPECIAL SURGERY WARDS

All	n = 16	Specified age n = 14
< 25	n = 2	
25-35	n = 6	
36-45	n = 5	
> 45	n = 1	

TABLE E 7

SPECIAL SURGERY. 12 WEEKS AFTER IMPLEMENTATION					
Frequency of individual responses by age group					
2.Computer care plans					
	< 25 n= 2	25-35 n = 6	36-45	Over 45 n = 5	n = 1
Strongly positive	0	0		0	0
Positive	0	0		0	0
Undecided	1	3		4	1
Negative	1	2		1	0
Strongly negative	0	0		0	0

TABLE E 8 Comparing average attitudes

Before and 12 weeks after implementation All attitude scores are standardised			
Under 25 years	Before	After	Variation
SURGICAL WARDS	46	38	-6
ORTHOPAEDIC WARDS	66	51	-15
SPECIAL SURGERY	60	54	-6
25-35 YEARS			
SURGICAL WARDS	67	27	-40
ORTHOPAEDIC WARDS	55	41.6	-13.4
SPECIAL SURGERY	59	56	-3
36-45 YEARS			
SURGICAL WARDS	50	40	-10
ORTHOPAEDIC WARDS	55	31	-24
SPECIAL SURGERY	63	56	-7
OVER 45 YEARS			
SURGICAL WARDS	60		
ORTHOPAEDIC WARDS	44	70	+26
SPECIAL SURGERY	53	60	+7

3. SPECIALTY GROUP RESPONSE BY QUALIFICATION : Average standardised responses per qualification

SURGICAL WARDS

ALL n = 24 specified qualification n = 24
RGN n = 20
EN n = 4

TABLE E 9

SURGICAL WARDS. 12 WEEKS AFTER IMPLEMENTATION Frequency of individual responses by qualification		
2. Computer care plans		
	RGN n= 20	E.N n = 4
Strongly positive	0	0
Positive	1	0
Undecided	2	0
Negative	8	3
Strongly negative	9	1

ORTHOPAEDIC WARDS

ALL n = 30 specified qualification n = 29
RGN n = 15
EN n = 14

TABLE E 10

ORTHOPAEDIC WARDS. 12 WEEKS AFTER IMPLEMENTATION Frequency of individual responses by qualification		
2.Computer care plans		
	RGN n = 15	E.N n = 14
Strongly positive	0	0
Positive	2	0
Undecided	6	7
Negative	5	7
Strongly negative	2	0

SPECIAL SURGERY WARDS

ALL n = 16 specified qualification = 15
RGN n = 8
EN n = 7

TABLE E 11

SPECIAL SURGERY WARDS. 12 WEEKS AFTER IMPLEMENTATION Frequency of individual responses by qualification		
2.Computer care plans		
	RGN n = 8	E.N n = 7
Strongly positive	0	0
Positive	0	1
Undecided	5	4
Negative	2	2
Strongly negative	0	0

APPENDIX F: CHAPTER 9

1 AGGREGATE RESULTS FROM WARDS D & F IN QUALITY STUDY

Table of comparisons between both phases of the quality study
Statistical tests

APPENDIX F: CHAPTER 9

1. AGGREGATE RESULTS FROM WARDS D & F IN QUALITY STUDY

TABLE F.1

COMPARISON OF QUALITY OF PAPER AND COMPUTER CARE PLANS OVER BOTH WARDS (All percentage scores)			
	Paper	Computer	Variance
Assessment	65.9	77.6	17.7
Planning	33.1	79.2	139
Evaluation	35.9	68.1	89.6
Total average	50.5	75.9	50.2

[Chi square analysis for one set of data was applied to the data above. Null hypothesis: there will be no change in the overall quality of documents for patients on these two wards when using computer care plans.

Assessments.

$X^2 = 0.96$, $\alpha .05 = 3.84$. X^2 is not greater than 3.84. The null hypothesis is not rejected.

Conclusion: There is a no significant difference in the quality of assessments after computerisation.

Care plans

$X^2 = 18.1528$, $\alpha .05 = 3.84$. X^2 is greater than 3.84. The null hypothesis is rejected.

Conclusion: There is a significant difference in the quality of care plans after computerisation. In this case the score is significantly increased.

Evaluation

$X^2 = 5.11202$, $\alpha .05 = 3.84$. X^2 is greater than 3.84. The null hypothesis is rejected.

Conclusion: There is a significant difference in the quality of evaluation after computerisation. In this case the score is significantly increased.

APPENDIX G: CHAPTER 10

1 ANALYSIS BY INDIVIDUAL WARD RESPONSES

- Practical aspects
- Technological aspects
- Perceptions about documentation
- Perceptions about support received
- Would nurses miss the computer?

2 CORRELATIONS BETWEEN PERCEPTIONS

- Support, ease of technology and documentation
- Statistical tests

3 USE OF PRINTOUTS FOR NURSE TO NURSE REPORTING

Individual Wards

TABLE I 3

COMPARISON OF AVERAGE ATTITUDE % SCORES TO COMPUTER CARE PLANS, FROM 8 WARDS, PRE -AND POST IMPLEMENTATION			
	Pre Implementation	Post Implementation	Difference
WARD A	52	46	-6
WARD B	49	51	+2
WARD C	59	56	-3
WARD D	53	51	-2
WARD E	58	54	-4
WARD F	63	37	-26
WARD G	65	42	-23
WARD H	59	47	-12

3. CHANGES IN ATTITUDES IN THREE TIME PERIODS

TABLE I 4

COMPARISON OF ATTITUDES AND PERCEPTIONS IN 3 STAGES OF CHANGE			
	Unfreezing % score	Fluid state % score	Refreezing % score
Favourable	15	8	27
Undecided/no change	44	20	35
Unfavourable	41	72	38

APPENDIX J: CHAPTER 13

**1 ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS
AND QUALITY OF CARE PLANNING**

**2 ASSOCIATION BETWEEN PERCEPTIONS ABOUT EFFECTS ON
PRACTICE AND QUALITY OF CARE PLANNING**

**3 ASSOCIATION BETWEEN PERCEPTIONS ABOUT EASE OF
TECHNOLOGY AND QUALITY OF CARE PLANNING**

**4 ASSOCIATION BETWEEN PERCEPTIONS ABOUT SUPPORT
RECEIVED AND QUALITY OF CARE PLANNING**

**5 ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS
AND PERCENTAGE OF CARE PLANS MADE**

**6 COMPARISON OF QUALITY BETWEEN PAPER AND
COMPUTER CARE PLANS:INDIVIDUAL WARDS**

Individual wards: An increase in quality scores

Individual wards: A decrease in quality scores

Individual wards: A decrease in quality scores

**7 COMPARISON OF QUALITY BETWEEN PAPER AND
COMPUTER CARE PLANS:INDIVIDUAL ASPECTS FOR EACH
WARD**

APPENDIX J: CHAPTER 13

1. ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND QUALITY OF CARE PLANNING

Wards D and F in the Quality Assurance study

TABLE J 1

ASSOCIATION BETWEEN ATTITUDE AND QUALITY SCORES		
Pre implementation		
	Attitude Nursing process % score	Quality Paper system % score
Ward D	55	42.1
Ward F	57	47.4
Post Implementation		
	Attitude Computer % score	Quality Computer % score
Ward D	46	65
Ward F	51	78.8

2. ASSOCIATION BETWEEN PERCEPTIONS ABOUT EFFECTS ON PRACTICE AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 2

PERCENTAGE OF NURSES WHO THINK PRACTICE HAS IMPROVED AND THE AVERAGE FREQUENCY OF DOCUMENTS MEETING CARE PLANNING INDICATORS (in descending order for frequency of documents)		
Ward	% nurses	% documents
WARD A	0	88
WARD H	25	81
WARD G	25	78
WARD B	10	77
WARD F	40	76
WARD I	0	75
WARD J	13	73
WARD O	10	68
WARD K	20	67
WARD M	43	65
WARD C	57	61
WARD N	0	58
WARD D	31	56
WARD L	26	46

3. ASSOCIATION BETWEEN PERCEPTIONS ABOUT EASE OF TECHNOLOGY AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 3

PERCENTAGE OF NURSES WHO THINK CARE PLANNING TECHNOLOGY IS EASY COMPARED WITH FREQUENCY OF DOCUMENTS WHICH MEET THE AUDIT INDICATORS (in descending order for frequency of documents)		
Ward	% Nurses	% Documents
WARD A	42	88
WARD B	63	77
WARD C	95	61
WARD D	38	56
WARD F	70	76
WARD G	44	78
WARD H	75	81
WARD I	31	75
WARD J	50	73
WARD K	43	67
WARD L	67	46
WARD M	52	65
WARD N	81	58
WARD O	47	68

4. ASSOCIATION BETWEEN PERCEPTIONS ABOUT SUPPORT RECEIVED AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 4

PERCENTAGE OF NURSES WHO PERCEIVED SUPPORT TO BE GOOD AND FREQUENCY OF DOCUMENTS MEETING CARE PLANNING INDICATORS (in descending order for frequency of documents)		
Wards	% Nurses	% documents
WARD A	38	88
WARD B	40	77
WARD C	57	61
WARD D	46	56
WARD F	90	76
WARD G	42	78
WARD H	50	81
WARD I	21	75
WARD J	63	73
WARD K	40	67
WARD L	25	46
WARD M	71	65
WARD N	57	58
WARD O	40	68

5. ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND PERCENTAGE OF CARE PLANS MADE

Based on attitudes to the Nursing Process and paper care plans for 9 wards

TABLE J 5

PERCENTAGE OF NURSES WITH POSITIVE ATTITUDES TO THE NURSING PROCESS AND THE PERCENTAGE OF PAPER CARE PLANS PRE COMPUTERISATION		
Wards	% nurses	% care plans
WARD A	36	27
WARD B	25	54
WARD C	50	93
WARD D	33	31
WARD F	39	33
WARD H	37	88
WARD J	62	89
WARD K	57	88
WARD L	52	93

Based on attitudes to the Nursing Process and computer care plans one year after implementation

TABLE J 6

PERCENTAGE OF NURSES WITH POSITIVE ATTITUDES TO THE NURSING PROCESS AND THE PERCENTAGE OF COMPUTER CARE PLANS AT TIME OF AUDIT STUDY		
Wards	% Nurses	% Care plans
WARD A	36	100
WARD B	25	96
WARD C	50	80
WARD D	33	13
WARD F	39	100
WARD G	23	71
WARD H	37	83
WARD I	53	82
WARD J	62	100
WARD K	57	100
WARD L	52	83
WARD M	43	81
WARD N	41	100
WARD O	43	70

6. COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL WARDS

Based on results of the quality assurance study carried out prior to the research study and results from the audit scores. Tables 7,8 and 9 demonstrate an increase in % documents meeting criteria.

TABLE J 7

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD A				
Paper documents n = 11 Computer documents n = 17				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	11	100	17	100
Appropriate assess	11	100	17	100
ALs assessed	8	73	16	94
Care plan	3	27	17	100
All problems	3	27	17	100
Goals evaluated	2	18	16	94

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward A

Standard deviation = 37.35

Test statistic = 2.65

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria at both levels of critical value for Ward A.

TABLE J 8

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD B				
Paper documents n = 13 Computer documents n = 25				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	9	69	24	96
Appropriate assess	5	38	21	84
ALs assessed	4	31	19	76
Care plan	7	54	24	96
All problems	5	38	21	84
Goals evaluated	7	54	21	84

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward B

Standard deviation = 8.506

Test statistic = 11.29

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria at both levels of critical value on Ward B

TABLE J 9

FREQUENCIES FOR DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD F				
Paper documents n = 15 Computer documents n = 18				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	9	60	24	96
Appropriate assess	9	60	21	84
ALs assessed	6	40	19	76
Care plan	5	33	24	96
All problems	4	27	21	84
Goals evaluated	2	13	21	84

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward F.

Standard deviation = 8.506

Test statistic = 3.992

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected at both levels of critical value. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria on Ward F.

Table 10 demonstrates a decrease in % documents meeting criteria.

TABLE J 10

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD L				
Paper documents n = 14 Computer documents n = 23				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	14	100	17	74
Appropriate assess	7	50	13	57
ALs assessed	8	57	8	35
Care plan	13	93	19	83
All problems	9	64	10	43
Goals evaluated	9	64	9	39

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward L.

Standard deviation = 12.55

Test statistic = -3.18

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected. Conclusion: There is a significant decrease in the percentage of documents meeting the six criteria at both levels of critical value on Ward L.

TABLES 11,12,13,14 and 15 demonstrate no significant change in % documents meeting criteria.

TABLE J 11

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD C				
Paper documents n = 15 Computer documents n = 10				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	15	100	10	100
Appropriate assess	13	87	9	90
ALs assessed	12	80	90	90
Care plan	13	87	8	80
All problems	11	73	4	40
Goals evaluated	13	87	4	40

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward C.

Standard deviation = 22.57

Test statistic = -1.32

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward C.

TABLE J 12

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD D				
Paper documents n = 13 Computer documents n = 23				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	62	23	100
Appropriate assess	8	62	23	100
ALs assessed	6	47	20	87
Care plan	4	31	3	13
All problems	3	23	3	13
Goals evaluated	2	15	3	13

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward D.

Standard deviation = 27.24

Test statistic = 1.296

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward D.

TABLE J 13

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD H				
Paper documents n = 8 Computer documents n = 6				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	100	6	100
Appropriate assess	8	100	6	100
ALs assessed	5	63	6	100
Care plan	7	88	5	83
All problems	5	63	5	83
Goals evaluated	7	88	5	83

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward H.

Standard deviation = 17.07

Test statistic = 1.195

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward H.

TABLE J 15

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD J				
Paper documents n = 9 Computer documents n = 9				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	89	9	100
Appropriate assess	8	89	7	78
ALs assessed	6	67	7	78
Care plan	8	89	9	100
All problems	8	89	8	89
Goals evaluated	5	56	9	100

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward J.

Standard deviation = 18.59

Test statistic = 1.414

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward J.

TABLE J 15

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD K				
Paper documents n = 8				
Computer documents n = 7				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	100	6	86
Appropriate assess	8	100	4	57
ALs assessed	6	75	4	57
Care plan	7	88	7	100
All problems	6	75	4	57
Goals evaluated	6	75	7	100

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward K.

Standard deviation = 24.28

Test statistic = -0.93

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward K.

7. COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL ASPECTS
Based on results of the quality assurance study carried out prior to the research study and results from the audit scores.

Table 16 below demonstrates an increase in % patients for whom activities of living were assessed. (statistical tests are in Chapter 13)

TABLE J 16

FREQUENCIES WITH WHICH ACTIVITIES OF LIVING ARE ASSESSED		
	PAPER Relative	COMPUTER Relative
WARD A	73	94
WARD B	31	76
WARD C	80	90
WARD D	47	87
WARD F	40	89
WARD H	63	100
WARD J	67	78
WARD K	75	57
WARD L	57	35

Tables 17, 18 and 19 below demonstrate aspects of care planning where there is no significant change.

TABLE J 17

FREQUENCIES WITH WHICH AN APPROPRIATE ASSESSMENT IS MADE		
	PAPER Relative	COMPUTER Relative
WARD A	100	100
WARD B	38	84
WARD C	87	90
WARD D	62	100
WARD F	60	94
WARD H	100	100
WARD J	89	78
WARD K	100	57
WARD L	50	57

Null hypothesis: There will be no significant difference in the percentage of patients with an appropriate assessment when using computer care plans.

Standard deviation = 27.69

Test statistic = 0.890

Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of patients with an appropriate assessments.

TABLE J 18

FREQUENCIES WITH WHICH ALL PROBLEMS ARE INCLUDED IN THE CARE PLAN		
	PAPER Relative	COMPUTER Relative
WARD A	27	100
WARD B	38	84
WARD C	73	40
WARD D	23	13
WARD F	13	61
WARD H	63	83
WARD J	89	89
WARD K	75	57
WARD L	64	43

Null hypothesis: There will be no significant difference in the percentage of patients with all problems included in care plans.
 Standard deviation = 36.87
 Test statistic = 0.949
 Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of patients with all problems included in care plans.

TABLE J 19

FREQUENCIES WITH WHICH GOALS ARE EVALUATED IN CARE PLANS		
	PAPER Relative	COMPUTER Relative
WARD A	18	94
WARD B	54	84
WARD C	87	40
WARD D	15	13
WARD F	13	11
WARD H	88	83
WARD J	56	100
WARD K	75	100
WARD L	64	39

Null hypothesis: There will be no significant difference in the percentage of goals evaluated in the care plans.
 Standard deviation = 37.28
 Test statistic = 0.840
 Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of goals evaluated in the care plans.

APPENDIX K: CHAPTER 14

1 CHANGES TO ASSESSMENT SCREENS

Information given to relatives

The patient's understanding of the current problem

2 EXAMPLE OF SHORT STAY EVALUATIVE PLAN

3 COMPONENTS OF NEW CARE PLANS

Care planning screens

Standard screens

APPENDIX K: CHAPTER 14

1. CHANGES TO ASSESSMENT SCREENS

Information given to relatives

TABLE K 1

RECORDING THE INFORMATION GIVEN TO RELATIVES ON ADMISSION		
WARD	% DOCUMENTS WITH RECORD OF INFORMATION	
	Original	Modified
WARD A	76	56
WARD B	56	48
WARD D	65	40
WARD E	31	08
WARD F	33	60
WARD G & H	29	62
WARD J	44	60
WARD K & C	18	59
WARD L	9	56
WARD M	56	68
WARD N	38	80
WARD O	25	56
WARD P	7	36

[N.B. SOME WARDS HAVE BEEN AMALGAMATED]

I used a paired T test to test the significance of these changes, with the null hypothesis: Changes to the assessment screens will not influence the frequency with which information to relatives is recorded.

Standard deviation $d = 26.06$

Test statistic $t = 2.149$.

Rejection region when $df = 5$ is 1.782,

The Test statistic does fall in the rejection region. (that is above 1.782 or below -1.782.)

The null hypothesis is rejected. Conclusion: I am able to conclude that changes to the assessment screens had a significantly positive influence on the recording of information to relatives on admission.

The patient's understanding of the current problem

TABLE K 2

RECORDING THE PATIENT'S UNDERSTANDING OF ILLNESS			
WARD	% DOCUMENTS WITH STATEMENT		
	Original	Modified	
WARD A	76	94	
WARD B	68	76	
WARD D	83	90	
WARD E	85	69	
WARD F	83	75	
WARD G & H	29	69	
WARD J	78	76	
WARD K & C	73	76	
WARD L	13	61	
WARD M	75	74	
WARD N	62	80	
WARD O	46	50	
WARD P	13	86	

[N.B. SOME WARDS HAVE BEEN AMALGAMATED]

I used a paired T test to test the significance of these changes, with the null hypothesis: Making changes to the assessment will not influence the frequency with which the patient's own understanding is recorded.

Standard deviation d = 18.08

Test statistic t = 1.824.

Rejection region when df = 5 is 1.782,

Test statistic does fall in the rejection region. The null hypothesis is rejected. Conclusion: changes to the assessment screens had a significantly positive influence on the recording of the patient's own understanding of illness or reason for admission.

APPENDIX G: CHAPTER 10

1. ANALYSIS BY INDIVIDUAL WARD RESPONSES
Practical aspects

TABLE G 1

PERCEPTIONS OF EFFECTS OF COMPUTER CARE PLANS ON NURSING PRACTICE				
Analysis by percentage of individual responses per ward				
	POSITIVE	UNCHANGED	NEGATIVE	NO RESPONSE
WARD A	0	63	35	2
WARD B	4	68	26	2
WARD C	3	68	29	0
WARD D	3	58	36	3
WARD E	2	53	42	3
WARD F	26	50	24	0
WARD G	10	50	20	10
WARD H	3	75	22	0
WARD I	1	48	51	0
WARD J	8	50	38	4
WARD K	6	70	22	2
WARD L	26	37	31	6
WARD M	7	57	36	0
WARD N	63	31	6	0
WARD O	8	68	24	0
AVERAGE	7.64	58.9	31.3	2.26

Individual Wards

TABLE I 3

COMPARISON OF AVERAGE ATTITUDE % SCORES TO COMPUTER CARE PLANS, FROM 8 WARDS, PRE -AND POST IMPLEMENTATION			
	Pre Implementation	Post Implementation	Difference
WARD A	52	46	-6
WARD B	49	51	+2
WARD C	59	56	-3
WARD D	53	51	-2
WARD E	58	54	-4
WARD F	63	37	-26
WARD G	65	42	-23
WARD H	59	47	-12

3. CHANGES IN ATTITUDES IN THREE TIME PERIODS

TABLE I 4

COMPARISON OF ATTITUDES AND PERCEPTIONS IN 3 STAGES OF CHANGE			
	Unfreezing % score	Fluid state % score	Refreezing % score
Favourable	15	8	27
Undecided/no change	44	20	35
Unfavourable	41	72	38

APPENDIX J: CHAPTER 13

1 ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND QUALITY OF CARE PLANNING

2 ASSOCIATION BETWEEN PERCEPTIONS ABOUT EFFECTS ON PRACTICE AND QUALITY OF CARE PLANNING

3 ASSOCIATION BETWEEN PERCEPTIONS ABOUT EASE OF TECHNOLOGY AND QUALITY OF CARE PLANNING

4 ASSOCIATION BETWEEN PERCEPTIONS ABOUT SUPPORT RECEIVED AND QUALITY OF CARE PLANNING

5 ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND PERCENTAGE OF CARE PLANS MADE

6 COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL WARDS

Individual wards: An increase in quality scores

Individual wards: A decrease in quality scores

Individual wards: A decrease in quality scores

7 COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL ASPECTS FOR EACH WARD

APPENDIX J: CHAPTER 13

1. ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND QUALITY OF CARE PLANNING

Wards D and F in the Quality Assurance study

TABLE J 1

ASSOCIATION BETWEEN ATTITUDE AND QUALITY SCORES		
Pre implementation		
	Attitude Nursing process % score	Quality Paper system % score
Ward D	55	42.1
Ward F	57	47.4
Post Implementation		
	Attitude Computer % score	Quality Computer % score
Ward D	46	65
Ward F	51	78.8

2. ASSOCIATION BETWEEN PERCEPTIONS ABOUT EFFECTS ON PRACTICE AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 2

PERCENTAGE OF NURSES WHO THINK PRACTICE HAS IMPROVED AND THE AVERAGE FREQUENCY OF DOCUMENTS MEETING CARE PLANNING INDICATORS (in descending order for frequency of documents)		
Ward	% nurses	% documents
WARD A	0	88
WARD H	25	81
WARD G	25	78
WARD B	10	77
WARD F	40	76
WARD I	0	75
WARD J	13	73
WARD O	10	68
WARD K	20	67
WARD M	43	65
WARD C	57	61
WARD N	0	58
WARD D	31	56
WARD L	26	46

3. ASSOCIATION BETWEEN PERCEPTIONS ABOUT EASE OF TECHNOLOGY AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 3

PERCENTAGE OF NURSES WHO THINK CARE PLANNING TECHNOLOGY IS EASY COMPARED WITH FREQUENCY OF DOCUMENTS WHICH MEET THE AUDIT INDICATORS (in descending order for frequency of documents)		
Ward	% Nurses	% Documents
WARD A	42	88
WARD B	63	77
WARD C	95	61
WARD D	38	56
WARD F	70	76
WARD G	44	78
WARD H	75	81
WARD I	31	75
WARD J	50	73
WARD K	43	67
WARD L	67	46
WARD M	52	65
WARD N	81	58
WARD O	47	68

4. ASSOCIATION BETWEEN PERCEPTIONS ABOUT SUPPORT RECEIVED AND QUALITY OF CARE PLANNING

All wards one year after introduction of computer care plans

TABLE J 4

PERCENTAGE OF NURSES WHO PERCEIVED SUPPORT TO BE GOOD AND FREQUENCY OF DOCUMENTS MEETING CARE PLANNING INDICATORS (in descending order for frequency of documents)		
Wards	% Nurses	% documents
WARD A	38	88
WARD B	40	77
WARD C	57	61
WARD D	46	56
WARD F	90	76
WARD G	42	78
WARD H	50	81
WARD I	21	75
WARD J	63	73
WARD K	40	67
WARD L	25	46
WARD M	71	65
WARD N	57	58
WARD O	40	68

5. ASSOCIATION BETWEEN ATTITUDES TO NURSING PROCESS AND PERCENTAGE OF CARE PLANS MADE

Based on attitudes to the Nursing Process and paper care plans for 9 wards

TABLE J 5

PERCENTAGE OF NURSES WITH POSITIVE ATTITUDES TO THE NURSING PROCESS AND THE PERCENTAGE OF PAPER CARE PLANS PRE COMPUTERISATION		
Wards	% nurses	% care plans
WARD A	36	27
WARD B	25	54
WARD C	50	93
WARD D	33	31
WARD F	39	33
WARD H	37	88
WARD J	62	89
WARD K	57	88
WARD L	52	93

Based on attitudes to the Nursing Process and computer care plans one year after implementation

TABLE J 6

PERCENTAGE OF NURSES WITH POSITIVE ATTITUDES TO THE NURSING PROCESS AND THE PERCENTAGE OF COMPUTER CARE PLANS AT TIME OF AUDIT STUDY		
Wards	% Nurses	% Care plans
WARD A	36	100
WARD B	25	96
WARD C	50	80
WARD D	33	13
WARD F	39	100
WARD G	23	71
WARD H	37	83
WARD I	53	82
WARD J	62	100
WARD K	57	100
WARD L	52	83
WARD M	43	81
WARD N	41	100
WARD O	43	70

6. COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL WARDS

Based on results of the quality assurance study carried out prior to the research study and results from the audit scores. Tables 7,8 and 9 demonstrate an increase in % documents meeting criteria.

TABLE J 7

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD A				
Paper documents n = 11 Computer documents n = 17				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	11	100	17	100
Appropriate assess	11	100	17	100
ALs assessed	8	73	16	94
Care plan	3	27	17	100
All problems	3	27	17	100
Goals evaluated	2	18	16	94

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward A

Standard deviation = 37.35

Test statistic = 2.65

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria at both levels of critical value for Ward A.

TABLE J 8

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD B				
Paper documents n = 13 Computer documents n = 25				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	9	69	24	96
Appropriate assess	5	38	21	84
ALs assessed	4	31	19	76
Care plan	7	54	24	96
All problems	5	38	21	84
Goals evaluated	7	54	21	84

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward B

Standard deviation = 8.506

Test statistic = 11.29

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is rejected. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria at both levels of critical value on Ward B

TABLE J 9

FREQUENCIES FOR DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD F				
Paper documents n = 15 Computer documents n = 18				
ASPECT	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	9	60	24	96
Appropriate assess	9	60	21	84
ALs assessed	6	40	19	76
Care plan	5	33	24	96
All problems	4	27	21	84
Goals evaluated	2	13	21	84

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward F.
Standard deviation = 8.506
Test statistic = 3.992
Rejection region at $\alpha = 0.05$ = 2.015
Rejection region at $\alpha = 0.025$ = 2.570
Null hypothesis is rejected at both levels of critical value. Conclusion: There is a significant increase in the percentage of documents meeting the six criteria on Ward F.

Table 10 demonstrates a decrease in % documents meeting criteria.

TABLE J 10

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD L				
Paper documents n = 14 Computer documents n = 23				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	14	100	17	74
Appropriate assess	7	50	13	57
ALs assessed	8	57	8	35
Care plan	13	93	19	83
All problems	9	64	10	43
Goals evaluated	9	64	9	39

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on Ward L.
Standard deviation = 12.55
Test statistic = -3.18
Rejection region at $\alpha = 0.05$ = 2.015
Rejection region at $\alpha = 0.025$ = 2.570
Null hypothesis is rejected. Conclusion: There is a significant decrease in the percentage of documents meeting the six criteria at both levels of critical value on Ward L.

TABLES 11,12,13,14 and 15 demonstrate no significant change in % documents meeting criteria.

TABLE J 11

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD C				
Paper documents n = 15 Computer documents n = 10				
Aspect	PAPER Absolute	Relative	COMPUTER Absolute	Relative
Assessment	15	100	10	100
Appropriate assess	13	87	9	90
ALs assessed	12	80	90	90
Care plan	13	87	8	80
All problems	11	73	4	40
Goals evaluated	13	87	4	40

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward C.

Standard deviation = 22.57

Test statistic = -1.32

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward C.

TABLE J 12

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD D				
Paper documents n = 13 Computer documents n = 23				
Aspect	PAPER Absolute	Relative	COMPUTER Absolute	Relative
Assessment	8	62	23	100
Appropriate assess	8	62	23	100
ALs assessed	6	47	20	87
Care plan	4	31	3	13
All problems	3	23	3	13
Goals evaluated	2	15	3	13

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward D.

Standard deviation = 27.24
Test statistic = 1.296
Rejection region at $\alpha = 0.05$ = 2.015
Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward D.

TABLE J 13

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD H				
Paper documents n = 8 Computer documents n = 6				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	100	6	100
Appropriate assess	8	100	6	100
ALs assessed	5	63	6	100
Care plan	7	88	5	83
All problems	5	63	5	83
Goals evaluated	7	88	5	83

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward H.

Standard deviation = 17.07
Test statistic = 1.195
Rejection region at $\alpha = 0.05$ = 2.015
Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward H.

TABLE J 15

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD J				
Paper documents n = 9 Computer documents n = 9				
Aspect	PAPER		COMPUTER	
	Absolute	Relative	Absolute	Relative
Assessment	8	89	9	100
Appropriate assess	8	89	7	78
ALs assessed	6	67	7	78
Care plan	8	89	9	100
All problems	8	89	8	89
Goals evaluated	5	56	9	100

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward J.

Standard deviation = 18.59

Test statistic = 1.414

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward J.

TABLE J 15

FREQUENCIES OF DOCUMENTS MEETING THE 6 ASPECTS OF CARE PLANNING ON WARD K				
Paper documents n = 8				
Computer documents n = 7				
Aspect	PAPER Absolute	Relative	COMPUTER Absolute	Relative
Assessment	8	100	6	86
Appropriate assess	8	100	4	57
ALs assessed	6	75	4	57
Care plan	7	88	7	100
All problems	6	75	4	57
Goals evaluated	6	75	7	100

Null hypothesis: There will be no significant difference in the percentage of documents which meet the six criteria for care planning after computerisation on ward K.

Standard deviation = 24.28

Test statistic = -0.93

Rejection region at $\alpha = 0.05$ = 2.015

Rejection region at $\alpha = 0.025$ = 2.570

Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of documents meeting the six criteria on Ward K.

7. COMPARISON OF QUALITY BETWEEN PAPER AND COMPUTER CARE PLANS:INDIVIDUAL ASPECTS
Based on results of the quality assurance study carried out prior to the research study and results from the audit scores.

Table 16 below demonstrates an increase in % patients for whom activities of living were assessed. (statistical tests are in Chapter 13)

TABLE J 16

FREQUENCIES WITH WHICH ACTIVITIES OF LIVING ARE ASSESSED		
	PAPER Relative	COMPUTER Relative
WARD A	73	94
WARD B	31	76
WARD C	80	90
WARD D	47	87
WARD F	40	89
WARD H	63	100
WARD J	67	78
WARD K	75	57
WARD L	57	35

Tables 17, 18 and 19 below demonstrate aspects of care planning where there is no significant change.

TABLE J 17

FREQUENCIES WITH WHICH AN APPROPRIATE ASSESSMENT IS MADE		
	PAPER Relative	COMPUTER Relative
WARD A	100	100
WARD B	38	84
WARD C	87	90
WARD D	62	100
WARD F	60	94
WARD H	100	100
WARD J	89	78
WARD K	100	57
WARD L	50	57

Null hypothesis: There will be no significant difference in the percentage of patients with an appropriate assessment when using computer care plans.

Standard deviation = 27.69

Test statistic = 0.890

Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of patients with an appropriate assessments.

TABLE J 18

FREQUENCIES WITH WHICH ALL PROBLEMS ARE INCLUDED IN THE CARE PLAN		
	PAPER Relative	COMPUTER Relative
WARD A	27	100
WARD B	38	84
WARD C	73	40
WARD D	23	13
WARD F	13	61
WARD H	63	83
WARD J	89	89
WARD K	75	57
WARD L	64	43

Null hypothesis: There will be no significant difference in the percentage of patients with all problems included in care plans.
 Standard deviation = 36.87
 Test statistic = 0.949
 Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of patients with all problems included in care plans.

TABLE J 19

FREQUENCIES WITH WHICH GOALS ARE EVALUATED IN CARE PLANS		
	PAPER Relative	COMPUTER Relative
WARD A	18	94
WARD B	54	84
WARD C	87	40
WARD D	15	13
WARD F	13	11
WARD H	88	83
WARD J	56	100
WARD K	75	100
WARD L	64	39

Null hypothesis: There will be no significant difference in the percentage of goals evaluated in the care plans.
 Standard deviation = 37.28
 Test statistic = 0.840
 Rejection region at $\alpha = 0.05$ = 1.859
 Rejection region at $\alpha = 0.025$ = 2.306
 Null hypothesis is not rejected at either level of critical value. Conclusion: There is no significant change in the percentage of goals evaluated in the care plans.

APPENDIX K: CHAPTER 14

1 CHANGES TO ASSESSMENT SCREENS

Information given to relatives

The patient's understanding of the current problem

2 EXAMPLE OF SHORT STAY EVALUATIVE PLAN

3 COMPONENTS OF NEW CARE PLANS

Care planning screens

Standard screens

APPENDIX K: CHAPTER 14

1. CHANGES TO ASSESSMENT SCREENS

Information given to relatives

TABLE K 1

RECORDING THE INFORMATION GIVEN TO RELATIVES ON ADMISSION		
WARD	% DOCUMENTS WITH RECORD OF INFORMATION	
	Original	Modified
WARD A	76	56
WARD B	56	48
WARD D	65	40
WARD E	31	08
WARD F	33	60
WARD G & H	29	62
WARD J	44	60
WARD K & C	18	59
WARD L	9	56
WARD M	56	68
WARD N	38	80
WARD O	25	56
WARD P	7	36

[N.B. SOME WARDS HAVE BEEN AMALGAMATED]

I used a paired T test to test the significance of these changes, with the null hypothesis: Changes to the assessment screens will not influence the frequency with which information to relatives is recorded.

Standard deviation $d = 26.06$

Test statistic $t = 2.149$.

Rejection region when $df = 5$ is 1.782,

The Test statistic does fall in the rejection region. (that is above 1.782 or below -1.782.)

The null hypothesis is rejected. Conclusion: I am able to conclude that changes to the assessment screens had a significantly positive influence on the recording of information to relatives on admission.

The patient's understanding of the current problem

TABLE K 2

RECORDING THE PATIENT'S UNDERSTANDING OF ILLNESS			
WARD	% DOCUMENTS WITH STATEMENT		
	Original	Modified	
WARD A	76	94	
WARD B	68	76	
WARD D	83	90	
WARD E	85	69	
WARD F	83	75	
WARD G & H	29	69	
WARD J	78	76	
WARD K & C	73	76	
WARD L	13	61	
WARD M	75	74	
WARD N	62	80	
WARD O	46	50	
WARD P	13	86	

[N.B. SOME WARDS HAVE BEEN AMALGAMATED]

I used a paired T test to test the significance of these changes, with the null hypothesis: Making changes to the assessment will not influence the frequency with which the patient's own understanding is recorded.

Standard deviation d = 18.08

Test statistic t = 1.824.

Rejection region when df = 5 is 1.782,

Test statistic does fall in the rejection region. The null hypothesis is rejected. Conclusion: changes to the assessment screens had a significantly positive influence on the recording of the patient's own understanding of illness or reason for admission.

COMPONENTS OF NEW CARE PLANS

Care planning screens

All statements on care planning screens may be selected by light pen and individualised by free type.

The care plans each conform to the following specifications:

1. **PROBLEM** statement, written as before
2. **GOAL** statement written as an overall goal. One goal only is written as the general rule and conforms to the standard statement.
3. **ACTION** statements include the minimum information required to carry out the care.
4. **FACILITY** to type individual goals and actions direct to screen.
5. **FACILITY TO "JUMP"** from each care planning screen to
 - Care plan menu
 - Review date
 - Additional information (for individualisation of any statement)
 - Problem list
 - Standards

Most problems take up only one screen, in contrast to their predecessors.

Standard screens

Standard screens are for reference only and cannot be selected or individualised. They refer to a specific topic but do not attach to an individual patient care plan; the standards may apply to several care plans, for example, some aspects of the discharge procedure will be different for different patients, the standards for discharge are the same. Standards are on help screens which may be accessed from a variety of screens throughout the system. The standards, as the word implies, are not selectable.

They conform to the following specifications.

OUTCOME STANDARDS measure the extent to which the goal has been met.

1. Describe the desired outcomes for the patient,
2. Include measurable patient behaviour.

CONTENT STANDARDS define the standards of nursing care described in the nursing actions.

EXCEPTIONS define any situations where a particular standard may be unlikely to be achieved

FACILITY TO "JUMP" at the end of each set of standards to

- Care planning selection
- Evaluation screen

Menu/index screens: Care plans

Each specialty has an individual screen showing:

1. LIST of specialty care plans.
 2. LIST of Activity of Living care plans.
- When care plan is selected from either list a relevant problem list screen is accessed.
3. Each index screen allows access to
 - Standards index
 - Master Care Planning screen
 - Free type care plans.

Problem List index

Includes list of all problems likely to be experienced in a particular category, or care plan heading.
(Many problems will appear in more than one list for cross referencing and ease of selection)

Menu/index screens: Standards

An index of standards is available for each specialty. This is identical to the care planning index but jumps to standards screens via a standards problem list.

A hard copy of standards is also supplied to each ward.

Evaluation screens

Evaluation is still goal orientated but is measured by the outcome and content standards. On discharge there must be a statement recording whether or not all standards have been met. There are 3 modes for evaluation.

1. The statement "Problem completed: All standards met" may be selected, if appropriate. This attaches to the relevant problem and involves only 2 light pen actions. The problem is then removed from the current care plan, but may still be retrieved if necessary.
2. The statement "Problem completed: Some standards not met" may be selected if all standards have not been met for some reason. This allows access to a screen where the nurse may type in the reason for selecting this statement.
3. Interim evaluation. A screen is available for evaluative comments prior to resolving a problem.

2 SHORT STAY EVALUATIVE PLAN FOR SHORT STAY SURGERY

SHORT STAY PLAN		*PRINT*
<ul style="list-style-type: none">* FOR THEATRE A.M.* FOR THEATRE P.M.* PRE OP CARE GIVEN ACORDING TO RELEVANT CARE PLAN* PERI OP FORM COMPLETED* NIL BY MOUTH FROM --_____ HOURS		
POST OP CARE		
<ul style="list-style-type: none">* RETURNED TO WARD AT --_____ HOURS* OPERATION --_____* PROCEDURE --_____* DRESSING --_____		
* TEMP --.-- C	PULSE ---	B/P ---/---MMHG
* RESPS ---		
<ul style="list-style-type: none">* ALL OBS WITHIN NORMAL RANGE* TOLERATING ORAL FLUIDS/DIET* POST OP CARE GIVEN ACCORDING TO RELEVANT CARE PLAN* HAS PASSED URINE SINCE RETURN FROM THEATRE* PV LOSS WITHIN NORMAL LIMITS [GYNAE ONLY]		
RETURN		REVIEW
ERR	TYPE	RETRIEVE

3. EXAMPLE OF A STANDARDS BASED CARE PLAN

CARE PLANNING		SELECT ITEMS
MOBILISING: BEDREST		
PROBLEM	CHANGE OF MOBILISING DUE TO PRESCRIBED BED REST	
GOAL	TO EXPERIENCE NO COMPLICATIONS OF BEDREST AND ADAPT TO INCREASE IN DEPENDENCE WITH MINIMAL DISRUPTION OF ACTIVITIES	
GOAL	--__	
ACTION	HELP WITH ACTIVITIES AS NEEDED. CHANGE PATIENT'S POSITION 2 - 4 HOURLY AND OBSERVE CALVES AND PRESSURE AREAS EACH SHIFT AND AT POSITION CHANGES	
(CONT-)		
> ADD REVIEW DATE		> ADDITIONAL INFO
> STANDARDS		> PROBLEM LIST
> SELECT CARE PLAN		
RETURN	NEXT	REVIEW
ERR	TYPE	RETRIEVE

CARE PLANNING		SELECT ITEMS
MOBILISING: BEDREST		
ACTION	RECORD INTAKE AND OUTPUT	
ACTION	RECORD BOWEL ACTIONS DAILY	
ACTION	REMIND PATIENT ABOUT PREVENTATIVE CARE	
ACTION	PROVIDE PRESSURE RELIEVING MATTRESS --__	
ACTION --__		
> ADD REVIEW DATE		> ADDITIONAL INFO
> STANDARDS		> PROBLEM LIST
> SELECT CARE PLAN		
RETURN	BACK	REVIEW
ERR	TYPE	RETRIEVE

All the above statements are selectable by light pen, and may be individualised by free type. Standards amy be viewed by selecting the word "STANDARDS" at the foot of each planning screen, or by the hard copy kept in each ward.

STANDARDS SCREENS FOR ABOVE CARE PLAN

STANDARDS

PRINT

BEDREST

OUTCOME STANDARDS

1 THE PATIENT

A INDICATES S/HE FEELS RESTED BUT NOT BORED OR LONELY

B INDICATES S/HE HAS HAD ADEQUATE EXPLANATION ABOUT
REASONS FOR BED REST

C SHOWS MINIMAL SIGNS OF EMBARRASSMENT

D INDICATES S/HE IS COMFORTABLE IN BED/CHAIR

E PASSES 1 - 1.5 LITRES OF URINE IN 24 HOURS

F INDICATES THAT BOWEL PATTERN IS SATISFACTORY (BETWEEN
3 X DAILY TO 3 X WEEKLY

2 CALVES ARE SAME CIRCUMFERENCE WITH NO REDNESS OR
TENDERNESS

3 SKIN IS INTACT, COOL, DRY AND OF USUAL COLOUR FOR PATIENT
TEMPERATURE IS BETWEEN 35.5 - 37C

(CONT-)

RETURN

NEXT

REVIEW

ERR

TYPE

RETRIEVE

STANDARDS

PRINT

CONTENT STANDARDS

THE NURSE

1 LIAISES WITH OTHER PROFESSIONALS AS REQUIRED

2 EXPLAINS REASONS FOR BEDREST AND PREVENTION OF
COMPLICATIONS, CLARIFIES LIMITATIONS IMPOSED AND
CHECKS UNDERSTANDING

3 TEACHES/ENCOURAGES DEEP BREATHING, CALF MUSCLE EXERCISES
AND FREQUENT POSITION CHANGES

4 OBSERVES PRESSURE AREAS OF DEPENDENT PATIENT AT EACH

POSITION CHANGE

5 OBSERVES PRESSURE AREAS PER SHIFT IF PATIENT CHANGES
OWN POSITION

(CONT-)

RETURN

BACK NEXT

REVIEW

ERR

TYPE

RETRIEVE

STANDARDS

PRINT

CONTENT STANDARDS (CONT-)

THE NURSE

- 6 OBSERVES CALVES FOR REDNESS, SWELLING AND TENDERNESS DAILY
- 7 LIAISES WITH EQUIPMENT NURSE TO PROVIDE SUITABLE PRESSURE RELIEF
- 8 PROVIDES RECREATIONAL ACTIVITIES ACCORDING TO INDIVIDUAL NEEDS WHERE POSSIBLE
- 9 OFFERS HANDWASHING FACILITIES AND AIR FRESHENERS AFTER USE OF COMMODE OR BEDPAN
- 10 ENSURES CALL BELL IS WITHIN REACH AND PATIENT KNOWS HOW TO USE IT

RETURN

BACK

REVIEW

ERR

TYPE

RETRIEVE

The standards are for reference only. When a nurse signs on to the system and creates a care plan, she is effectively signing that the care is carried out according to the content standards and evaluated against the outcome standards.