DOCTORS AND COMPUTERS

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ABSTRACT

The twin concerns of the thesis are (a) to develop a labour process analysis that is able to account for professional work and (b) in so doing to explain the reasons for hospital doctors various responses to the introduction of computer systems into medical work.

This thesis constitutes a study of hospital doctors (clinicians) use of information technology in their clinic work. The first part reviews the literature and general developments in medical computing in relation to a theoretical analysis of the organisation and control of the clinic/medical labour process. The second part consists of an ethnographic study of the introduction of computer-based medical information systems into three hospitals; two being case studies of renal units and associated clinics and the third a study of an outpatients' department at a small acute hospital. The computer systems involved either replaced or supplemented the traditional form of the medical records and for this reason it was possible to focus on the role of these organisational records in the maintenance and reproduction of dominance and subordination within the labour process of clinic/medical work.

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The North Staffordshire Polytechnic and my colleagues in the Department of Sociology have waited with seemingly endless patience for me to complete this thesis and more to the point were generous enough to grant me a sabbatical year in 1986/87. In addition I wish to register my appreciation to Carole Johnson for her help with the transcriptions of some of the renal nurses interviews. The library staff also need to be acknowledged for their help; they kept me supplied with all the inter-library loans I could think up even the most obscure.

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Other persons that must be acknowledged here are Madeleine, Josie, Robin and Carol Dent for they have had to put up with my working on the thesis for longer than most of them can remember.

I am, of course, solely responsible for any and all the errors and ommissions which may be found in this thesis.

DECLARATION

Much of the material contained within this thesis has been used before either in the form of seminar and conference papers and more recently as a published article. The details of conference papers presented are as follows,

"Innovation and medical work" The BSA Medical Sociology Conference, University of York. September, 1983 (contained material later used in chapters six and eight of this thesis).

"Doctors, Computers and the Labour Process: the introduction of computer-based medical information systems into hospital clinics". The Third Annual Organisation and Control of the Labour Process Conference, Aston/UMIST, March, 1985 (based on material used in chapters seven and eight of this thesis).

"Autonomy and the Medical Profession: medical audit and management control" The Fourth Annual Organisation and Control of the Labour Process Conference, Aston/UMIST, March, 1986 (utilised material from chapters three and four of the first draft of this thesis).

In addition, a number of papers have been given at staff and research seminars at polytechnics, universities and hospitals based on material some of which I have subsequently incorporated within this thesis. The published article is entitled "Autonomy and the Medical Profession: medical audit and management control" in The Non-Manual Labour Process. Edited by David Knights, Hugh Willmott and Chris Smith. Basingstoke: Macmillan, 1988 (forthcoming) and contains material from chapters three and four of this thesis.

The research has been funded in part by the ESRC and the regional health authority and in consequence reports have been submitted. In order to preserve the anonymity of the hospitals, doctors and other staff involved in the case studies reported here it is not possible to cite the references for the reports to the regional health authority involved. The details of the ESRC report, however, are as follows,

Doctors and the development of hospital computer systems: a case study - ESRC Report Reference Number G00230077, August, 1985

ABBREVIATIONS

ACS	American College of Surgeons.
ADNS	Assistant Director of Nursing Services.
AI	Artificial Intelligence
AMA	American Medical Association.
ARM	Annual Representatives Meeting (of the BMA).
BJHC	British Journal of Healthcare Computing
BMA	British Medical Association.
BMJ	British Medical Journal.
CAPD	Continuous Ambulatory Peritoneal Dialysis.
CCPD	Continuous Cyclic Peritoneal Dialysis.
CMC	Chief Medical Officer.
CORES	Computer-based Outpatients' REcord System (fictional name).
CPC	Computer Policy Committee
CTC	Computer Technology Committee
DGH	District General Hospital
DHA	District Health Authority.
DHSS	Department of Health and Social Services.
DMT	District Management Team.
DOH	Department of Health.
EEC/GATT	European Economic Community/General Agreement on Tariffs and Trade.
EN	Enrolled Nurse
ESRF	End Stage Renal Failure.

GMS	General Medical Services (Committee of the BMA).
GP	General Practitioner
HAA	Hospital Activity Analysis.
HCI	Human-Computer Interaction
HIPE	Hospital Inpatient Enquiry.
HJSC	Hospital Junior Staff Committee.
HMC	Hospital Management Committee.
HO	House Officer
MEC	Medical Executive Committee.
MIS	Management Information System.
MMI	Man-Machine Interface.
MUMPS	Massachussetts General Hospital Utility Multi Programming System.
NHS	National Health Service.
NIIP	National Institute of Industrial Psychology.
NPHT	Nuffield Provincial Hospital Trust.
OPD	Outpatients' Department
PAS	Patient Administration System.
POMR	Problem Orientated Medical Records.
PSRO	Professional Standards Review Organisation.
RGN	Registered General Nurse
RHA	Regional Health Board.
RHB	Regional Health Board.
SHO	Senior House Officer
TLC	Tender Loving Care.

CHAPTER ONE

INTRODUCTION

This thesis provides a detailed examination of the process and consequences of the introduction of information technology into hospital clinics. Beyond the immediate ethnographic objective of charting the social relations and experiences involved in such change the thesis is concerned to utilise and develop a labour process approach. This approach has not been straightforwardly adopted, because in addition to the fact that labour process analyses have become increasingly diverse and eclectic (Littler and Salaman,1982; Wood, 1983) it is also the case that it has only rarely been applied to employment in the state sector. This has largely been the result of the problems the non-market sector has presented for the unreconstructed labour process model. Nevertheless, I would argue that the concern with the control of work processes which is central to labour process theory is a critically important one and it is my wish here to,

(a) explore, and demonstrate, the relevance of this central concern of labour process theory within the NHS hospital service,

(b) seek to reassess and elaborate the theory in order to be able to clarify and specify the applicability of the approach in two hospital settings.

In this context, the concentration on the substantive issue of computerisation served two primary purposes,

(a) as a specific form of technical change which introduces a fresh dynamic into the pre-existing pattern of work within hospitals,

(b) as a putative process of rationalisation which exposes the forces of control.

The dynamic of the computerisation process provided the conditions within which the theoretical model could be assessed under circumstances in which the elements of labour process control would necessarily have to come into play. Such control related to,

(i) the decision to computerise

(ii) the resourcing of the computer systems and

(iii) the consequential effects on the clinic work processes, both among doctors and within the wider division of labour, including nurses, other professional occupations (e.g. social workers) and administrators.

My basic argument is that a revised labour process analysis, one which emphasises process as well as structure, provides an effective way of social theorising about medical, and clinic, work. The model developed here (Chapter Three) enables one to identify the crucial elements of the technical and social work processes and the division of labour (i.e. how the work is done and what persons, in terms of occupational groups, carry out what component of the work). These crucial elements are those most likely to facilitate outcomes that maintain *(reproduce)* the existing pattern of relations within the hospital clinics, commonly characterised among sociologists as *medical dominance* (Freidson, 1971a), even under conditions of innovation and change (as can occur with the introduction of new computer systems). With this focus the theory can be utilised to analyse the details of particular work processes, including the patterns of domination and subordination within them. It should also be able to relate

this specific account to a sociological analysis of the wider social structures within which the processes are embedded though it has not been possible to develop this second aspect of the theory very far within this thesis given that the main concern here has been with the specifics of computerisation and innovation within hospital clinics.

The plan of the thesis

The thesis is in two parts. In Part I the theoretical model is developed within a broader discussion, (i) of the historical and contextual factors relating to the development of computing within the NHS and hospital clinics and (ii) the literature relevant to the issue of the doctors' responses to the introduction and development of information technology (IT) and the organisation of medical work. In Part II the elaborated theoretical model underpins the accounts of the introduction and consequences of the implementation of two clinical information systems, one a renal patient-data system, the other a medical record system for use in outpatients' clinics. The renal system related to one medical specialty within a wider division of clinic labour while the outpatients' system was designed primarily for use by hospital doctors of different specialties. The first system was a commercially available computer 'package' designed for use in renal units, while the other was introduced on an experimental basis by one of the hospital consultants. The two systems, however, were similar in terms of the facilities they provided, even though one was implemented in the largely standardised environment of the renal units while the other was implemented in the more complex setting of a multi-specialty outpatients' department.

I will now provide a more detailed summary of the contents of each chapter, and their relationship to the central arguments of the thesis. In

Chapter Two it is the examination of the development of computing and computing policy within the NHS that is the main concern. This is in order that the different types of computer systems can be clearly identified in terms both of their function(s) and user group(s). The central argument developed in this chapter is that healthcare computing developed, at least in the NHS, not as a managerial strategy to rationalise the organisation and delivery of healthcare, but as the outcome of the interplay of economic, political and professional interests both within and outside the NHS. The point here is that a Bravermanesque labour process analysis would have failed to account for this apparently irrational mode of implementing computers, the technology of rationalisation, in hospitals.

This point is then taken up in Chapter Three which aims to critically evaluate the existing literature and theorisation of medical work and healthcare computerisation, thereby clearing the ground for a discussion and evaluation of labour process analysis in its various guises. Out of this discussion certain lacunae are identified leading to an elaboration of a more pluralistic *social choice* version of the theory (cf. Wilkinson, 1983). Within this elaborated model the professional autonomy of hospital consultants is identified as the outcome of the *Institutional Control* of the organised medical profession (BMA and the Royal Colleges) rather than the *Organisational Control* of the state and NHS. In the case of the medical profession, the concern has been with issues surrounding the organisation and control of hospital clinics whereas the longterm objective of the state (insofar as one can refer to this entity as a monolith) has been with the broader context of limited resources and changing healthcare priorities. The analysis does not, however, assume that doctors possess, or are able to exercise, absolute *Institutional Control* within the hospital service; only that they, the doctors, are not wholly subordinated to the

Organisational Control of the state and the management of the NHS. To disentangle the intertwining of these types of *control* necessitates both an historical analysis of developments within the NHS and a more detailed sociological examination of the clinic work of hospital doctors, and they provide the subjects of Chapter Four.

This fourth chapter, entitled, 'Hospital Doctors, Professional Autonomy and Control of Medicine' develops the theoretical argument further. Firstly, it examines how the analysis of clinical work processes might be satisfactorily integrated within the broader labour process model, for unless this is done the model will be unable to account for clinic work, in particular the medical encounter, and unable to tie together the processual and structural elements of the theory. At the same time it is important to delineate the way in which, historically, elements of *Institutional* and *Organisational* control were interwoven in defining the autonomy of the doctor working within the hospital clinic. These issues are examined here through a discussion of medical audit, which, to a greater or lesser extent, is about the control of medical work and the initiatives and responses of the medical profession to developments on the part of the state. This is the last chapter in Part I and brings to the fore such critical questions as: how is *Institutional control* actually maintained at the hospital clinic level, how does it manifest itself and what effect does its presence have on the implementation of new computer-based information systems?

In Part I these questions were addressed in the wider theoretical and historical contexts, but in Part II the focus shifts to specific examples of hospital clinics in order to gain more detailed information on the reality of day to day medical and clinic work and the nuances of the work processes and division of labour.

Part II starts with a chapter on my research methodology and thus forms a precursor to the substantive chapters. The chapter (Chapter Five) includes a discussion of the issues of research access and sponsorship, which were particularly pertinent to this project for they created constraints and tensions as well as facilitating the research. The fieldwork chapters themselves are three in number. Chapter Six ('The Politics of Innovation and Professionalism') deals with the decision-making processes relating to the introduction and clinical use of both of the computer systems mentioned earlier. This chapter, in drawing on the fieldwork data and descriptions, demonstrates that these doctors' adoption or rejection of computer systems was related to political as much, if not more than, technical reasons. The consultants were found to be sensitive to changes in work processes brought about by the adoption of these systems, leading some of them to be overtly critical of the systems or even to refuse to use them. This was the context in which the sponsors of the two computer systems (both consultants) found themselves. Each adopted a different strategy to avoid, or minimise, the degree to which their colleagues rejected, or openly criticised, the systems. One employed a strategy of establishing coalitions with members of the administration and with the computer specialists in order to improve the chances for greater technical and financial resources being made available; the other concentrated on a strategy of collegiate solidarity. The chapter demonstrates that the freedom of these sponsoring consultants to choose their strategy was very limited, while the consequences were markedly different.

Chapters Seven and Eight each deal with one of the computer systems, its implementation, usage and ultimate acceptance or rejection. In the first of the two chapters, the impact of the renal computer system is

analysed in terms of the effect on the clinic division of labour. The system was designed as a collator, calculator and presenter of *numerical* data, a task previously carried out by the nursing staff largely, but not entirely, for the benefit of the medical staff. The renal system was intended to be used as a *supplement* to the case notes and not as a *replacement* and in this key respect was far less ambitious in its design than the outpatients' system. The medical record system, in contrast, did rely on the doctors to capture the data for entry onto the computer's data-base and they were intended to make routine use of the system's outputs (reports and charts) instead of the traditional medical records.

The two case studies are sequenced such that the theme of the medical labour process could be explored in detail, looking at the less complex organisation of the renal units (numerical data/single specialty) before moving onto the more complex organisation of the outpatients' department (computerised case notes/multi-specialty). This approach made it possible for the day to day interaction within the clinics to be theorised in terms of a sociological model that could directly link the concrete work processes and relations to the wider structures within capitalist society. This point is developed through the two chapters and underpins the general conclusions laid out in Chapter Nine.

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PART ONE

CHAPTER TWO

DOCTORS, HOSPITAL ORGANISATION AND COMPUTERS IN THE NATIONAL HEALTH SERVICE

Introduction

The purpose of this chapter is to present details of the development of computer policy and systems, particularly medical computing, within the NHS. This is intended to contextualise both the case studies reported in part II and the theoretical discussion and analyses that are set out in the following two chapters.

My basic argument within this chapter will be that computerisation in hospitals has developed not as part of a managerial strategy to rationalise (cf. Child, 1985) but as the outcome of the interplay of interests of the British computer industry, central government and computer interests internal to the NHS. This latter grouping included computer and systems personnel and management services as well as a number of hospital consultants some of whom were to play an influential role in the development of computer systems within the service (1). The interplay of these various forces led to a greater emphasis being given to research, rather than the development of standard systems that could be easily implemented in order to improve organisational efficiencies or the quality of patient care (or both).

The development of computing and computer policy within the NHS and the role played by members of the medical profession are described in the central section of this chapter. In order to set this discussion in its context it is preceded by two sections containing brief accounts of the historical development of the hospital system and the institutional relationship between the medical profession and the state in Britain. Only after consideration of these broader issues, including the introduction of healthcare computing generally, will the specific subject of medical computing be dealt with. Medical computing has developed largely separately from the general developments of hospital computing and the reasons for this will need to be explained. I will then go on to identify the main types of automated medical information systems, distinguishing between *data-base* and *knowledge-base* systems, before briefly reviewing the present level of diffusion of these systems and indicating the likely reasons for what appears to be a general lack of enthusiasm by clinicians concerning the use of these systems in their clinics.

The NHS hospital service

There are two points crucial to the understanding of the NHS hospital service. The first relates to the organisational structure of the hospitals, the second to the ascendancy the hospital consultants possess within that structure. The basic structure of the hospital is characterised by polyarchy, with the medical, nursing and administrative hierarchies being organised separately from each other (Davies and Francis, 1976, pp. 120-127). Attempts *have* been made to integrate these hospital hierarchies both the 'Cogwheel' reports (1967a and 1967b) and the 1974 NHS reorganisation were intended achieve this (Klein,1983, p.95; Ham,1985, 2nd edition, p.28) while the most recent initiative was contained in the Griffiths Report

(1983). This process of integration, however, has not been completed and one can be sceptical as to the outcome given the sustained opposition of the medical profession during the previous reorganisations which had the aim of preventing any general erosion of their autonomy or the taking on of new responsibilities (see Chapter Four). Moreover, even in those capitalist countries (notably the USA) that have attempted to develop an integrated management structure earlier than in Britain, senior doctors have been able to exercise considerable autonomy from management control (Freidson,1975, pp. 249-252). This power to say 'no' reflects the ascendancy that hospital consultants have enjoyed within the hospital service and is part of the reason for their autonomy which is, in turn, legitimated by reference to the technical right of doctors to clinical freedom (Godber, 1975, p.87). The explanation for the autonomy and dominance of the hospital consultants is to be found in

(a) the institutional development of hospitals,

(b) the organisation of the profession within the health service

(c) the role of the British state.

I will now discuss each of these factors and their interrelationship.

(a) <u>The development of the hospital</u>

The modern hospital service grew out of a pre-existing network of voluntary hospitals and workhouse infirmaries (Abel Smith, 1964). The voluntary hospitals began to take a modern form in the eighteenth century; a process which continued at an accelerated pace during the following century. The key attribute of the modern form was that the hospital manifested a division of labour subordinated to the priorities, not of patient care, but of medical knowledge (Abel Smith, 1964, pp.16-31; Waddington, 1973; Larson, 1977, pp.40-47). The consultants within the voluntary sector enjoyed high status but this was not the case for the

doctors employed to provide medical care for the patients in the workhouse hospitals. Here the doctors were the servants of public authority in a very real sense and medical care frequently had to be delivered within the constraints of absolutely minimal budgets (Abel-Smith, *op cit.*; Cartwright, 1977, pp.158-161). It is against this historical background that the concerns and priorities of hospital doctors are to be understood, namely having a high regard for medical research and an aversion to bureaucratic and budgetary controls. There is, of course, considerable variation between the views of individual doctors but the point remains that this is the general view as articulated through the organised profession (see Chapter Four).

With the establishment of the NHS the hospitals became the organisationally ascendant institutions within the service, attracting most of the healthcare resources. Initially this was not the outcome of any considered policy (Klein, 1983, pp.36-37) but became so with the implementation of the Hospital Plan of 1962, which re-orientated the service around large district general hospitals (DGH) and away from the small, local, cottage hospitals (*ibid.*, pp.72-79). The Hospital Plan reflected the then growing faith in planning within the NHS and DHSS (ibid., p.74). The planners optimism was, in the event, not fully justified. The non-standard nature of clinical medicine and the inadequacy of bed occupancy as a formal measure of healthcare efficiency both contributed to the system's fundamental limitations (*ibid*, pp.77-78). Nevertheless, the Hospital Plan has continued to underpin the thinking behind the organisational reforms introduced since 1962 even if there is no longer the commitment to large 800 bed hospitals, as was initially the case (Ham,1985, 2nd edition, pp.56-58).

(b) The profession of medicine and the state organisation of healthcare

The medical profession has a particularly long history. The Royal College of Physicians can trace their origins back to 1518 (Berlant, 1975, p.134), while the surgeons' professional history goes back to the 18th century when the Royal College was established in 1797 (*ibid*,p.143; Larson, 1977 p.87) (2). The establishment of the Provincial Medical Surgical Association in 1832 (which changed it's name to the British Medical Association in 1855) and the passing of the Medical Registration Act in 1858 marked the official beginning of a reorganised and essentially modern medical profession (Forsyth, 1973, p.5; Berlant, 1975, pp.153-167; Larson, 1977, p.95; Parry and Parry, 1977, pp.826-828; Cartwright, 1977, pp.55-57).

It was the establishment of the NHS in 1948 that entrenched the profession's power and hence its ascendancy within the health service. The setting up of the NHS became more a rationalisation of the organisation of healthcare provision rather than a socialisation of medicine, in Eckstein's words the NHS was "a 'doctor's measure' much more than a 'patient's measure'" (1958, p.3). This was a 'battle', to borrow Klein's analogy (1983, pp.27-28), in which the doctors did not lose, but "obtained the monopoly of legitimacy among the health service providers" (*ibid.*), which gave them a strategic position within the organisation, enabling them to obstruct any initiatives from government they collectively did not agree with (*ibid.*)

(c) The role of the state

It was not, therefore, just the effectiveness of the organisation of the profession that ensured its ascendancy within the hospital service. The success of the modern medical profession lay, despite antagonisms, with its collaboration with the state and its historically evolved responsibility for the health of the citizenry (see above). Since the mid-nineteenth century the state in Britain has protected the interests of hospital doctors, and

the profession generally, from the domination of insurance companies, friendly societies and trade unions while at the same time insulated them from patients' inability to pay for treatment. The National Health Insurance Act of 1911 can be viewed in this light as can the 1948 nationalisation of the health service. At the same time the British state did not, or was not able to, develop its own effective system of controls over the medical profession and was, and is, faced with a medical profession that exercises a suzerain power that enables it to reasonably effectively counter any policy objectives of the state judged by the organised profession to be against their interests.

The one factor that may cause a fundamental change in the professional autonomy and dominance of the medical profession is that of escalating public expenditure. The time has come when the economic costs of the NHS (and the Welfare State generally) have proven to be politically too great for any government in Britain to remain inactive. The public debate relating to this issue has, however, been as much about ideology as it is about economic analysis (Gough, 1979, pp.128-146; Klein, 1984, pp.82-109; Mishra, 1984, pp. xii-xiv and 18-25).

These general arguments and issues are relevant here because they relate directly to the question of medical dominance within the NHS Hospital Service, which will be a continuing theme in this thesis. However, more particularly, they provide a critical context far any consideration of,

(a) the *potential* development of computer-based health information systems to reinforce any system of medical accountability and

(b) the implications, if any, in relation to the nature of innovation in information technology within hospitals.

These issues, of information technology and its potential role as a system

of control and the historical diffusion of the technology in hospital medicine are the subjects for the remainder of this chapter. The theoretical analysis of these issues are developed in the next chapter and are elaborated further within the case studies presented in Part II.

The development of computing and computer policy within the NHS

It is generally agreed that computer-based information systems offer the management of any work organisation the prospect of extending its control by providing a more rapid and comprehensive information feedback. As a result it is less necessary to delegate powers to other managers and professionals within the organisation. Furthermore, the development and implementation of information technology can have the effect of stabilising and simplifying the complexity of large scale organisations (Whisler, 1967, pp.304-317; Whisler, 1970, pp.53-69 and 81-82; Blau et al, 1976, pp 34-38; Crompton, 1979, pp.415-417; Bjorn Anderson and Rasmussen,1980, pp.105-108; Tomeski and Lazarus, 1975, pp.109-114; Pfeffer and Leblebici, 1977, p.247; Child, 1984, pp.215-216). Whether the introduction of any particular computer-based information system will actually have this rationalising effect will depend on factors in addition to the technological (Child *ibid.* p. 221). This part of the chapter is concerned with these matters as they relate to the development of hospital computing since the mid 'sixties. First, however, it will be useful to make some distinctions as between the different types of computer systems available within hospitals, particularly as they relate to medicine.

Types of hospital computing

In a general introductory textbook 'Computers and their Societal Impact' (Holoien,1977) there is a chapter on hospital computing in which the author makes the useful, if unsurprising, distinction between

administrative and *clinical* systems. The first kind of system deals with such matters as payroll, patient admissions, supplies and any other matters that lie in the province of the administration. The clinical systems, on the other hand, deal with medical, nursing and technical and scientific services. Under this heading are also included the medical records which are, in practice, 'clinical' with regard to their content, but 'administrative' in terms of their storage and retrieval and their legal status (Lindop, 1978, p.69). It is the medical records which are of particular interest because they constitute the medical information system within hospitals and thereby play a crucial role in the organisation and delivery of medical care.

Holoien's systems dichotomy is a useful one, for it clearly identifies the activities to be found or located within either the administrative or clinical spheres of activities. However, it does fail to identify the occupational groups or services within the hospital organisation which predominantly use the data involved. Medical information systems, for instance, primarily contain clinical information and data for use by doctors (See 'Computers as an aid to clinical work' in this chapter). Whereas the technical and scientific staff within a hospital will typically have access to computer support systems for their work. As an example, a hospital laboratory will be equipped with computer system designed to assay biochemical and haematological samples. The laboratory investigation 'results' being printed (or written) and delivered (manually or electronically) to the clinics where they will be filed in the medical record folder and become part of the medical information system. The case of nursing care information/record systems (whether paper or computer based) is different again; the information and data relates solely to nursing work and is not primarily intended for inclusion in the medical

records (DHSS 1977,pp.84-97; DHSS 1982,p.9).

In other words, one can categorise hospital computer systems into four groups according to who will predominantly use the system concerned,

(1) administrative systems;

(2) medical information systems;

(3) technical, professional and scientific support systems;

(4) nursing care systems.

Furthermore, this categorisation permits the question of organisational control to be addressed directly. While three of these categories (2-4) are *clinical* in their orientation (and thereby reducible to Holoien's distinction) the degree of autonomy each occupational grouping associated with these types of systems has from (a) administrative and (b) medical control varies, and this is reflected in the design and operation of the developing computer systems. Interestingly, the question of organisational control and the development of hospital information systems was, in fact, addressed in the 1974 'Cogwheel' report in which resources (including information and data) were identified and categorised as being either *controlled*, or *used but not controlled*, by doctors (Goldsmith and Mason,1974, p.174).

The NHS computer experiment

In Britain the first attempts to develop an integrated policy on the development and implementation of all types of computer systems within the National Health Service arose when the DHSS invited those hospitals where computer systems were already being developed to participate in the Experimental Computer Programme. This officially started in 1968 with the setting up of the NHS Experimental Computer Programme (3) (Gedrych, 1970, p.345; Lamb, 1973, p.29; DHSS, 1977, para.6.1.) Computer systems for both administrative and medical purposes had been developed, and in some cases

implemented at a local level several years prior to that (cf. Barber and Abbott, 1972, pp.3-5 and 89-91). Yet it is only since 1981, with the official ending of the NHS Experimental Computer Programme and with it the DHSS funding (DHSS, 1982 Foreword), that the computer-based patient administration systems developed within the Programme have begun to be made generally available.

The first data processing facilities within the NHS, as with other public service organisations, were to be found in the accounts departments in the mid and late 'fifties when punchcard systems were introduced (Lamb, 1973, p.37; Barber and Abbott, 1972, p.3). Only later did computing become the responsibility of the management services division and coordinated at regional level of the NHS (Birmingham RHB., 1966, p.177, para 520 and pp.179-181, para 525-530; Barber and Abbott, 1972 pp. 4-5). This parallels the development of computing in commercial and industrial work organisations (Mumford and Banks, 1967, pp 175; Gibson and Nolan, 1974, p.77).

By 1968 there had been established fifteen main computer projects (later to become fourteen) (see *Figure 2.1*) plus some smaller scientific and clinical ones within the overall DHSS Programme (Gedrych, 1970; DHSS, 1972; Scrivens, 1985, p.6). The programme was almost solely concerned with hospital systems. The one exception was the GP-hospital Community Health Services System developed and implemented at Exeter (DHSS., 1977, p.11, 115-126; Bolden, 1985, 116-120). The computer projects covered all areas of hospital activities although particular interest was initially shown in the development of computer based medical records which were to function as the integrating point of the hospital system (Gedrych, 1970 p.347). Initially the experimental programme was to have been completed about 1974, but it was not. The programme also became very costly - being

more than double the original estimates - and in 1976 had come under the critical scrutiny of the Public Accounts Committee (Laurance, 1981, p.23; Scrivens, 1985, pp. 10-11). Several of the projects were severely criticised on grounds of high and escalating costs (Scrivens, 1985, pp. 10-11). The basic problem was that the experimental programme was an

TABLE 2.1

HOSPITAL SYSTEMS INCLUDED IN THE NHS EXPERIMENTAL COMPUTER PROGRAMME (4)

1. Addenbrooke's Hospital (Cambridge)
2. Charing Cross Hospital (Fulham)
3. Exeter Community Health Services
4. Liverpool Royal Infirmiry
5. The London Hospital
6. North Staffordshire Hospital Centre (Stoke on Trent)
7. Nottingham
8. Oxford Medical Computer Centre
9. Queen Elizabeth Medical Centre (Birmingham)
10. St James Hospital (Leeds) Project
11. St Thomas' Hospital (London)
12. Southend General Hospital
13. Sunderland Area Hospitals
14. University College Hospital (London)

In addition 7 Laboratory Systems and 12 Scientific and Clinical Systems are listed

inappropriate means of developing and evaluating computing for the health services, in part because the rationale for the programme had been inadequately thought out (a point elaborated in more detail below) and because the technology was evolving at a faster rate than the pace of the programme (cf. Scrivens, 1985, p.11). One effect was that, while the minority of hospitals where the computer systems were being developed had access to powerful computer facilities and the services of computer

specialists, the majority of hospitals within the NHS remained without any computer support of any significance until the 1980s - and in the case of clinical computing this remains the case today. The criticism of the Public Accounts Committee did not, however, mark the end of the experimental computer programme in the NHS - this did not happen until 1981 - but it did cause those responsible to rethink their overall strategy and methods of systems evaluation.

Doctors, the medical record and the NHS experimental computer programme

Given the concern of the thesis it is necessary to point out the limits of the involvement of hospital doctors in the experimental programme. This section is concerned with the issue of medical records, for this is the one activity that can directly involve the clinicians because it is they for whom the contents of the records are principally provided. Possibly the best known initiative in this general area was that of Professor John Anderson to install a computer-held clinical record system on two general wards at Kings College Hospital. This was during the late sixties and early seventies, and it was one of the projects which attracted the attention of the Public Accounts Committee because of its high costs (Laurance, 1981, p.23; The Times, 5th October,1982, p.13). The doctors on the wards found it difficult to adjust to the requirements of the system, in particular the need to input and access data directly from VDU terminals on the wards (Anderson, 1984, p.109) and the system was eventually abandoned largely on the grounds that the medical information generated on the wards was too complex to maintain on a real time system reliant on doctors for updating (Opit and Woodruffe BMJ., 1970, pp. 80-82).

Only one other hospital within NHS Experimental Programme was to have developed a comprehensive automated patient medical record system

(DHSS.,1977, p.111). This would have directly involved the doctors (clinicians), but not necessarily in entering and accessing computer-held data which would have been done by secretarial or clerical workers,

> "(t)he prime objective (was) to improve the patient record by presenting a legible, clearly structured document as and when required" (ibid.).

There were delays in the start of this particular project (related to industrial relations problems) and by the time the project was ready to have started the DHSS funding was no longer available. But even had that not been the case there were major problems relating to the design of a "data collection" sheet. The consultants and their medical staff were to use this document instead of the case notes. This was to involve using 'freetext' structured within certain headings and the information/data would then be post-coded and entered on the computer system. The doctors would then receive an updated 'cumulative medical record' at the next attendance of the patient. All this confronted those involved with major problems for it proved impossible to agree a format which the consultants would use and the computer system could cope with (DA.1, Int. July, 1981, Side III, 330-410; DHSS.,1977, p.111). As will be seen there are some similarities with the fate of the CORES system reported in Chapter Eight. There were other attempts within the Experimental Programme to develop at least a computerised summary of the patient record (DHSS, 1977, pp.109 - 111), but in the final official evaluation of medical records projects within the programme no mention was made of these projects (North East Thames RHA/ DHSS, March, 1981 cf. para. 22; DHSS, January, 1982 cf. p.8).

Clearly, the computerisation of medical records (in particular the case notes) has proven to be more problematic than originally anticipated. As a result the strategy of using the medical record as the kernel of an

integrated hospital system gave way to a more pragmatic approach in which the various hospital activities were treated independently. Laboratory analysis, for example, would be computerised, but the results would still be printed or written on paper slips and delivered by hand to the relevant ward or clinic. Similarly with pharmacy and radiology. The one area were the medical records remained the integrating concept was that of patient administration systems, but even here it was not the patient record but the patient as a uniquely identifiable medical record number contained within an index of all patients that was the integrating component of the system. On this basis patient registration, admissions, discharges, appointments can all be recorded and referred to throughout the hospital on the one computer system.

The rationale of the experimental programme

The overt rationale for the computer programme was to develop and evaluate computer systems that could be implemented throughout the NHS, saving, it was believed by those involved, much duplication of resources and effort. The Programme was coordinated by three DHSS/NHS liaison committees,

a) Computer Policy Committee (CPC)

b) Computer Research and Development (R & D) Committee,

c) Computer Technical Committee (CTC).

Both the Research and Development and the Computer Technical Committees were phased out in the early 'eighties (MSC., Int.4c., May, 1981, side I, 210, side II, 99). The CPC, however, survived and is now part of the Centre for Information Technology (BJHC., Vol. 2 NO. 4, September, 1985, p.8) (see also Scrivens, May, 1985, pp. 13-29). The policy (CPC) committee was concerned with overall strategy, while the R & D committee had the responsibility for assessing computer projects submitted for funding. The

remaining committee, the CTC, had the task of devising and coordinating the evaluation of the systems. Following the criticisms of the Public Accounts Committee (see above) the experimental programme became more conservative to what it had been. One result of this was that it became more difficult to set up new projects and in 1980 nearly half of the R & D committee resigned because of their inability to agree with what they saw as the inflexibility of the DHSS. In particular, its unswerving commitment to (a) ICL systems and (b) centrally coordinating all computer developments through the regions (Laurance *op cit*; Scrivens, 1985, p.19. The experimental computer programme was in any case seriously flawed in its design right from its inception, for it lacked any clear objectives. It was assumed naively that computers somehow would be good for the NHS (cf. Caddick and Lee, 1974 pp.39-44; Hanby, 1974, pp.79-83). This naivety may well have sprung from a more general concern of the government of the day, for it has been suggested that there was a desire to protect and nurture the British computer industry. In the words of one member of the DHSS Research and Development Committee, "The Americans had the space programme. Britain had no space programme but we had the NHS ..." (Mike Healey, London School of Hygiene, quoted in Laurance, 1981, p.25). This covert aspect of the NHS Experimental Computer Programme had important ramifications for how hospital computing subsequently developed. There was specifically the decision to standardise on ICL mainframe computers (in 1971) (Caddick,P.T. and Lee,D.T. 1974, p.43): the formal agreement applied only to the regional level of the NHS but this was sufficient to ensure that the computer systems developed within the experimental programme would be standardised on ICL equipment. This did not mean all the systems were of ICL manufacture - the computer equipment at the Queen Elizabeth Medical Centre (Birmingham), for example, remained Univac right up to the end of

the official programme (i.e. 1981). Furthermore, the single tender policy also did not relate to machines other than the mainframes, specifically the 1900 and later 2000 series. Finally, since 1981 the agreement with ICL is no longer applicable following an EEC/GATT ruling that it is in restraint of trade (Hills, 1984, p.15). Nevertheless, while there are several exceptions, many regions have continued to standardise on ICL at least with regard to their corporate systems (i.e. patient administration, accounts and finance, works and supplies, etc.), for these are the systems that most DHSS and NHS management and computer staff are familiar with.

The evaluation

The DHSS were, right from the beginning, very concerned to evaluate the computer systems developed within the NHS Experimental Computer Programme. Initially the projects were assessed in terms of Improvement objectives measured 'before' and ' after' implementation. The problem they were then confronted with was how to disentangle what changes were to be directly attributable to computerisation, what were not, and whether the improvements could have been gained as efficiently by alternative means. There were also other, more prosaic, problems such as delays, and the fact that many of the evaluation staff were new to the NHS and therefore unfamiliar with its organisation and activities (DHSS, 1977, pp.129-20; 1982, p.3). Out of the recognition of these methodological difficulties developed an alternative approach. This was known as *Performance Criteria Measurement*. The *criteria* were devised by asking a 'panel' of nearly 1,000 staff within the NHS to rank order the desired improvements in performance they wished to see resulting from computerisation. The 'panel' of respondents was divided up into seven occupational or status groups: doctors and nurses constituted four groups, administrators and 'decision-makers', two groups and professional and technical staff, one group. By

this method the success or failure of a computer system was to be determined. The approach did create a basis for independent systems evaluation (DHSS, March, 1978), but the new methodology failed to change the underlying criticism of the whole experimental programme: the programme was prohibitively expensive (Laurance, 1981, p.23; Scrivens, 1985, pp. 10-11).

The adoption of the *Performance Criteria Measurement* methodology did, however, highlight the central problem with the whole exercise, and that was the impossibility of identifying any fundamental improvements derived from the experimental programme. An important part of the explanation lies in the fact that there was little in the way of an overall and effective policy relating to the organisation and presentation of the information captured within the computer systems. In the absence of any coherent national criteria or control over this matter the data content of systems was largely determined locally. It can be argued, as Scrivens has, that such an objective (data standardisation) within the health service would have been premature because insufficient was known "about how the NHS actually functions" (1985, p.51). The result would be to impose "rigidity in operational and management decision-making .." (*ibid.* p.50). Despite this danger of rigidity the priority within the NHS is now for greater accountability, currently characterised by the national policy to implement the recommendations of the Health Services Information Steering Group (Körner: chair) (*ibid*, p.52). This group was set up by the minister in 1980 following criticisms in the Royal Commission (1979) regarding the then inadequacies in relation to the arrangements for the collection of statistical and other information within the NHS (Scrivens, 1985, pp. 27-29; North East Thames RHA/DHSS, March, 1981, para. 22; DHSS, January, 1982, p.8). The implementation of the 'Körner' recommendations necessitated that the

information systems be computer-based ('Körner' First Report, 1982, p. 50, para. 4).

A postscript on the experimental programme

In 1981 the DHSS Experimental Project officially came to an end and the financial support from the DHSS ended (DHSS, 1982, p.1). Since 1985 computer policy has been incorporated within an *Information Advisory Group* which reports to the new *NHS Management Board* (Griffiths Report p.3, para.1; Ham,1985, 2nd edition, p. 33) which then decides the policy and translates it into a programme of work for the *Information Management Group* (which subsumes the Computer Policy Group under the new name of 'Centre for Information Technology' and 'Corporate Data Administration'). The *Information Advisory Group* is intended to advise on the development of a national information and information technology policy while the *Information Management Group* is broadly involved in the technical aspects of establishing common standards required for implementing the information technology required to sustain the information policies (BJHC Vol.2 No. 4 September, 1985, p. 8) (see also Scrivens, May, 1985, pp. 13-29 for a similar but more detailed account). What this means is that, in future, computer developments within the health service will serve the information requirements of the NHS and DHSS rather than the health service being the 'test bench' for the British computer industry.

<u>The development of computing for doctors</u>

The development of computers for doctors has occurred almost wholly separate from other computer systems developments within hospitals and the health service. This separate development results from,

(a) doctors having different priorities from those embodied in the NHS Experimental Programme (see above)

(b) the lack of sustained interest in medical computer systems among the profession as a whole.

(c) the reluctance of many hospital doctors to learn to use the technology

In discussing these issues the opportunity will be taken to present an account of the main types of medical computing available, or being developed, at least insofar as they concern us here.

Types of medical computing

Doctors, when they have been interested at all, were generally concerned with developing computer systems for research purposes. This research orientation tended to take two forms: either a computer system was used to support the data processing requirements of a project, or the computer system itself was the object of the research. The use of computers as a research tool is not my concern here - medical computing in this sense is little different to other forms of academic research. Research and development work by members of the medical profession into ways of using computers in medicine, however, is precisely the concern of this thesis. Currently there exist a number of sophisticated knowledge-based systems, probably the best known of which are MYCIN and INTERNIST. Both these systems were developed in the USA, while in Britain the one system that has claimed international recognition is MEDICL a system developed by Timothy de Dombal and designed to aid the diagnosis of patients presenting with acute abdominal pain (Wardle and Wardle, 1978 pp.15-28; Young, 1982, p.1334). A number of medical information and medical records (data-base) systems (6) has also been developed for and by clinicians, notably PROMIS and COSTAR, which have been designed to provide a clinical data-base for use by doctors as aids to training, diagnosis and treatment as well as clinical research. Before continuing it will be useful

to present first a brief description of the five systems cited.

i) **MYCIN** is a knowledge-based system known as a decision support system, and is designed to assist doctors select appropriate antibiotic drugs for patients with serious infectious diseases. An important characteristic of the system is that it will give the reason for its decision (see Figure 2.2). The system was developed at

Figure 2.1 MYCIN : sample question and explanation

```
**HOW DID YOU DECIDE THAT ORGANISM-1 MIGHT BE E.COLI?

I USED RULE 021 TO CONCLUDE THAT THE IDENTITY OF
      ORGANISM-1 IS E.COLI.
THIS GAVE A CUMULATIVE CF OF 0.47.
THEN I USED RULE 084 TO CONCLUDE THAT THE IDENTITY
      OF ORGANISM-1 IS E.COLI.
THIS GAVE A CUMULATIVE CF OF 0.55.
FINALLY I USED RULE 003 TO CONCLUDE THAT THE
      IDENTITY OF ORGANISM-1 IS E.COLI.
THIS GAVE A CUMULATIVE CF OF 0.74.
```

(From Davis, Buchanan and Shortcliffe,1977 quoted in Fitter and Sime, 1980, p.57. CF is a measure of confidence of the conclusion being valid)

Stanford University between 1972 and 1978 and the programme was called MYCIN after the suffix used in the names of many common antimicrobial agents. The system is an experimental one (Shortcliffe, 1983, p.222) which has attracted much attention outside medical computing as a particularly good example of a rule based (8) expert system (Fitter and Sime, 1980; Taylor, 1983; Simons, 1984; Shortcliffe, 1983 pp.209-237). The rules on which the system is based were initially acquired from collaborating clinical experts at the Stanford Medical Center. The system also has the capability to acquire new rules directly through interaction with a clinical expert (Shortcliffe, 1983, p.222).

ii) **INTERNIST** is similar in concept to the MYCIN system. Its knowledge base reflects in particular the 40 years personal clinical experience of one of the initiators of the system, Dr Jack D. Myers at the University of Pittsburgh (Taylor,1980. p.257). It is an experimental programme designed to cover the broad context of general medicine and not just a single discipline as with MYCIN. In attempting to be more general in application the system has been found to suffer serious deficiencies, principally its inability to construct diagnoses spanning multiple problem areas and to explain the reasons for its conclusions (Miller *et al*, 1982, pp. 468-476; Barnett, G.O. 1982). The system has now been enhanced to become INTERNIST-II which is considered to be about 75% comprehensive in its coverage of the diseases of internal medicine (Simons, G.L. 1984)

iii) **MEDICL**. de Dombal's approach to developing a computer programme to assist medical decision-making is to utilise statistical techniques based on Bayes Theorem and to ignore the rule-based approach altogether (de Dombal *et al*, 1972, de Dombal and Horrocks, 1974). The MEDICL (MEdical DIagnosis and Computer-aided Learning) system is one which is designed to aid the diagnosis of acute abdominal pain, which is a difficult category to diagnose accurately: clinical accuracy is of the order of 81% whereas the computers accuracy is in excess of 91% (Wardle and Wardle, 1978, p18). Technically the system is less complex than the rule-based approach adopted by Shortcliffe (MYCIN) and the associates of Dr Myers (INTERNIST). It does not reason, only calculates. Its higher accuracy over clinical diagnosis not only relates to the rigorous application of differential diagnosis but to the particular vagueness of the clinical symptoms commonly presented in cases of abdominal pain, which makes clinical judgement

particularly problematic. The system has been developed over more than 15 years and has recently become the first diagnostic system to be marketed by ICL hence the acronym MEDICL.

iv) **PROMIS** (Problem-Orientated Medical Information System) is a medical information (data-base) system designed to facilitate the capture of patient information comprehensively and systematically. It is premised on Dr. L. L. Weed's system of problem orientated medical records (POMR) (Weed, 1968, pp.593-600 and 652-657, 1969; McIntyre N. *et al* 1972, pp.603-611). The difference between POMRs and customary methods of recording case notes essentially relates to the clinicians approach to the patients and their complaints. Weed's approach is to identify the patient's problems and to deal with them systematically over time, the medical record being used as a set of active progress notes. The kernel of the computer system is a collection of computerised clinical displays called *frames* which are intended to both guide and teach doctors in their clinical work. These *frames* are interactive and the doctor can update the information contained within them, while at the same time being guided by the 'prompts' (an automated reminder) which the system gives in response to that information. An important component of the system is the 'audit trail' continuously maintained within every patient's file in order to ensure continuity of care/treatment (Giebinck and Hurst, 1975, pp.199-200). The system is installed at the University of Vermont Medical Center, Burlington, Vermont. It is claimed to be in operational use in at least the obstetrics and gynaecology ward (*ibid.*) but there is little evidence that it has been transferred to any other sites successfully (e.g. Fischer *et al*, 1980).

v) **COSTAR** was designed as a medical record system for ambulatory

patient care in the USA (Barnett, 1968, Barnett *et al.*, 1979). It is a data-based system designed both as an administrative system (dealing with appointments and registrations of patients), and as a medical records system (dealing with the contents of the clinic record, laboratory results etc.). On the clinical side, the patients' records are maintained on computer files which can be produced as,

(a) a printed *(encounter)* report of the *medical encounter*,

(b) a summary *(status)* report of a patient's medical condition, or

(c) a *flowchart*, which displays the *temporal* course of the disease process, or variations in clinical findings, over time.

These three *outputs* are produced as 'hardcopy' printouts for each clinic the patient attends. The clinical data is captured on a form, known as the *encounter form*, which is completed by the clinician (very similar to the aborted system within the NHS experimental project reported above). COSTAR is a data-base system and the data on each individual patient is accessible to aggregate analysis *via* report generator and query language facilities (5) (e.g. statistical analysis of patients with particular medical complications) (Barnett *et al*, 1979, pp.1226-1237). In addition, a doctor can have programmed into the system 'prompts' to remind the doctors treating patients to carry out certain procedures or to identify any potential complications (Barnett *et al*, 1978, pp.962-970). The system is technically well developed and its administrative modules have been implemented at a number of sites in the USA and Europe (Fiddleman, 1980, pp.1-4)

The first point to be be made is that this list is by no means complete. There are many other knowledge-based systems in existence (cf. Simons,

1984, pp.187-193; Wardle and Wardle, 1978, pp.15-28) as well as medical information and record (data-base) systems (Giebink and Hurst, 1975, p.37). Nevertheless, the list does give some idea of the better known systems in existence.

The significant difference between data-base systems and knowledge-based systems is that data-bases are costly and time consuming to maintain while knowledge-based systems do not suffer from this problem (Shortcliffe, 1976; Alvey, 1982, p. 21 para. 4.1.2(c); Solotovits, 1982, pp. 2-4 and 5-6). Instead, these systems require a comprehensive underlying conceptual structure (not a data-base) and the technical ability to emulate human reasoning often with incomplete evidence. This is known as the exercise of 'fuzzy' logic which has been defined as a system of symbolic reasoning codified as heuristics (Weizenbaum, 1976, pp. 221-222; Shortcliffe, 1976, pp. 159-194, 219; Fitter and Sime, 1980, pp. 60-62; Szolovits, 1982, pp. 2-4; Feigenbaum and McCorduck, 1984). Although some of these systems are based on statistical and not heuristic reasoning; in healthcare computing the most notable example is de Dombal's MEDICL system described above (page 28). It is the logistics of capturing and storing data that distinguishes the two types of system, not necessarily the way they function. Medical information systems (including some medical records systems) can provide 'advice', similar to a knowledge-based system, in the form of 'prompts' for clinical, educational (medical training) or audit purposes (see PROMIS and COSTAR above).

There are practical limitations to the usefulness of these systems to doctors for as Shortcliffe (writing of knowledge-based systems) has pointed out,

(a) doctors, like other mortals, quickly reject systems that are pedantic in their presentation of knowledge and advice.

Knowledge-based systems have to somehow discriminate as to how much information and/or advice is required at any particular time,

(b) it takes time to correct errors, or gaps, in the system's knowledge-base. There is often a delay of months between identifying an error and that error being correct in the next 'release' of the system.

(c) despite the intention, or optimism, of designers of knowledge-based systems it is an arduous and time consuming task acquiring the knowledge, whether based on statistical data or extracting judgmental information from the minds of experts (1984, pp.216-217)

These systems also raise very interesting philosophical and ontological questions concerning the nature of knowledge and understanding, for even if such systems are successful in terms of their designer's aims, they will not be intelligent in the sense of having understanding. While the *reasoning* programmed into such systems will be analogous, it is not identical to its human counterpart, if only because a computer does not *suffer* from the results of its own reasoning (cf. Weizenbaum, 1984, pp.202-227; Smith, 1980, pp.10-12 in Smith and Green)(6).

Hospital doctors, medical information (data-base) and knowledge-based systems

The various systems available to doctors have their supporters within the medical profession but, as already indicated, these people have been very much in the minority both in Britain and the USA. Computers as data- or knowledge-based systems have not been widely used by hospital doctors (Friedman and Gustafson, 1976; Young,1980; Jay and Anderson, 1982, pp. 303-305; Smith, R., 1982, pp. 1859-1860). Diagnostic systems are known to be

more accurate than real doctors in making diagnoses (Ellison, 1978, pp. 30-59; Wardle and Wardle, 1978, pp.15-28; Feigenbaum and McCorduck, 1984.). Yet these systems are not in anything like general use. The reasons for this arise fairly straightforwardly from the character of medical work,

(a) junior doctors learn their clinical skills practising on patients starting with the task of 'clerking' patients on the wards. This involves taking a comprehensive medical history and examination and concluding with a diagnosis (Rees, 1981). To replace this method with one appropriate for the data capture requirements of a computer system undermines the training of junior doctors.

(b) diagnosis may not be the most important consideration,

> "Hypertension, arthritis and heart failure are all usually treated before the cause (if there is one to be found) is determined. Treatment and views about the prognosis are more important, certainly to the patient" (Young, 1980, p. 522)

(c) a computer based diagnostic (knowledge-based) system cannot exceed the capabilities of a hospital medical or surgical team as a whole and especially not that of a specialist consultant, for such systems are based on the knowledge of real life specialists

In practice, these computer systems have not been treated as clinical tools so much as another object for medical research by individuals and small groups of doctors and computer personnel. Only the committed '*aficionados*' within the medical profession appear to be interested in designing and using any of these systems (Friedman and Gustafson, 1977; Anderson and Jay, 1983; Young, 1984). This has been so in both the USA and Britain and led to the development in the 'seventies of,

> "a disorganised array of computer languages and computer systems dedicated to medical applications" (Friedman and Gustafson, 1976, p.201)

and until recently little attempt was made to make any of these systems transferable from one site to another. There is now some evidence that this situation is changing. In Britain, fr instance, the NHS have adopted the US medical computing language MUMPS in order that medical systems might be standardised, therefore making such systems more readily available to other hospitals (DHSS 1977 p. 213 para 5.10.2; WMRHA, 1979). It would be wrong, however, to claim that this objective has been fully attained, for it has not. Secondly, certain 'packages' have, with the elapse of time, become more acceptable, and specialties are in effect standardising on particular systems. This, for example, is increasingly the case in renal medicine (Will and Selwood, 1985, pp 11-18 BJHC, Vol. 2, No. 1, Spring).

Summary and conclusions

It was only after consideration of the general issues relating to the organisation of hospitals and the introduction of healthcare computing generally that the specific subject of medical computing was dealt with. The first point made was that medical computing has developed separately from the general developments of hospital computing, This was in part because of the way the NHS Computer Experimental Programmed developed *(see below)*, but it also related to the doctors' own general desire for organisational separateness and their general lack of enthusiasm for the new technology.

Medical computer systems can be broadly categorised as being either data-based or knowledge-based. The former is the usual model for medical

information systems, the latter, for decision support systems (including diagnostic-aids). Data-base systems are plagued by problems of data-capture and input (onto the system) while knowledge-based systems seem to be largely (but not wholly) irrelevant to anyone but their creators and others interested in developing such systems rather than routinely using them. Most systems, at least within the NHS, have been developed as a research initiative of individual consultants and not as part of any general computer development, either within the hospital or the health service generally. Whether the systems have been developed independently of other NHS computer programmes or not, however, they have so far been unacceptable to the majority of clinicians.

This chapter was concerned, however, with more than just medical computing. My concern was to contextualise the subject of doctors and computers both institutionally and historically. First, I set out a brief account of the organisation of hospitals and the doctors' *medical dominance* (Freidson, 1970b) within them. Then I moved on to discuss the issue of healthcare computing generally, and here I argued that computer systems were developed within the hospital service as the outcome of the interplay of the political and economic interests of the British computer industry and central government and not as part of any managerial strategy to rationalise the service. This development manifested itself in the form of the NHS Experimental Computer Programme (1968-1981) which was funded by the DHSS. As a result of its pragmatic origins the experimental computer programme lacked any clear objective, other than a very general one of seeing what could be done with computers in hospitals. At first attempts were made to develop computerised integrated hospital information systems that incorporated all hospital activities, including those of hospital doctors. However, because the task of developing such integrated systems

were so complex, technically and organisationally, it was impossible for the computer specialists to create any - or certainly none that were readily transferable to other hospital sites.

There were not to be any transferable hospital systems until computer policy within the NHS changed and attention was shifted away from developing the technology and towards subordinating it to the informational requirements of the hospital service. This process had started as early as the mid-seventies (this was, at least in part, the result from the criticism of the Public Accounts Committee). One consequence of this change of emphasis was that far less attention was given to developing medical systems and the programme became more concerned with developing and implementing administrative systems.

The Experimental Programme ended formally in 1981, but by that time the policy makers within the DHSS and NHS had become concerned with information and its use for organisational control rather than with experimenting with computer systems. The new body of policy was articulated in the Körner Committee reports and incorporated within the Griffiths Report of 1983. From then on computers were to be used to automate specific administrative and other data collating tasks in order to facilitate, it was believed, more effective monitoring of the service.

As part of these developments there was renewed pressure on consultants, explicitly stated in the Griffiths Report (1983), to become resource managers. In fact, computer-based pilot schemes have been set up at various hospital throughout the country to see how this might be developed (BJHC January, 1987, p. 1 and p. 4). Prior to the policy makers within the NHS attempting to develop effective means of controlling the costs of medical care through the application of computer-based information systems, the medical computer specialists had been attempting

to improve the accuracy of medical decision-making (knowledge-base system) and clinical records (data-base system) by programming in control mechanisms that are intended to prevent medical mistakes occurring. These mechanisms included 'decision-support' and 'prompt' facilities (see above). In order for me to be able to address these issues of cost and quality accountability, and the role of the computer systems, it will be necessary to examine the issue of medical accountability within its historical and organisational context, and this will be done in Chapter Four. Before doing that, however, it will be appropriate first to clarify the theoretical issues and arguments involved in the analysis of professional accountability and control and this is the topic of Chapter Three.

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NOTES

1. Possibly the most prominent computer 'aficionado' among hospital doctors was Professor John Anderson at Kings College Hospital (and has since become chairperson of the Medical Specialists' Group of the British Computer Society). He played a leading role in the developments in medical computing the 'sixties (The Times 5th October, 1982, p.13).

2. Larson quotes the date for the establishment of the Royal College of Surgeons as being 1800 (1977, p.87)

3. The date given in the official and very brief evaluation report on the NHS Experimental Computer Programme by the DHSS (1982) was 1967, this date is also cited by Scrivens (1985, p.5.)

4. The hospitals are listed in the Interim Report on the Evaluation of the NHS Experimental Computer Programme (DHSS, 1977, p.3)

5. A *report generator* is a facility by which clinical and research data on groups of patients can be produced according to a common format (e.g. relating drug therapy to response of an infection, or blood pressure, etc.). The *query language*, on the other hand, enables one to ask specific *ad hoc* questions of the data-base. This facility is a more powerful instrument (technically) with which to interrogate the data-base than the report generator.

6. The intelligence of machine intelligence has been amusingly illustrated by Weizenbaum's ELIZA programme, which was an early development in this area of computer science. This programme apparently worked like a psychotherapist which, while it appeared to be very intelligent, had been programmed to operate more like a 'script' for a play. But instead of there being a set sequence of conversations between the 'actors', ELIZA's 'script' was composed of a

mosaic of sentences and sentence fragments, a repertoire with which the system was able to emulate the role of a sympathetic interrogator once activated ('cued') by 'keywords' in the users responses. The illusion created for the user was that of taking part in an intelligent psychiatric interview (Weizenbaum, 1976, pp. 188-191; Lodge, 1984, pp. 154-155 and 242-249).

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CHAPTER THREE

ORGANISATIONAL ANALYSIS, THE LABOUR PROCESS AND COMPUTERISATION

Introduction

In this chapter I review the prevailing forms of explanation relating to the consequences of implementing computer-based information systems within organisations and for the members of organisations. The chapter is organised into three sections each dealing with specific literatures on the subject,

1. Medical computing literature;
2. Organisational analysis;
3. Labour process analysis.

In treating the literature in this order it is possible to locate the specific studies relating to doctors in hospitals within the broader context of organisational analysis. The second section acts as both an extension to the first and as a necessary precursor to the consideration of Labour Process analysis of medical computing in hospitals. The underlying argument is that a labour process model can provide the theoretical leverage required to analyse developments in a way that can systematically relate the different levels of analysis (social and organisational) not found within the medical computing, or organisational analysis literatures. At the same time, the introduction of IT into

hospital clinics confronts labour process theory with fundamental problems. As has been pointed out in the Introduction (Chapter One), the labour process model is not readily applicable to the analysis of the organisation and control of non-industrial work processes within the non-market sector. It will, therefore, be necessary to reassess and develop the model prior to operationalising it.

1. Medical computing literature

Within the literature on medical (and more broadly, healthcare) computing there are essentially three basic models of analysis that have been adopted (1),

(a) Diffusionist

(b) Human Factor

(c) Systems.

Each of these will now be reviewed in turn.

(a) Diffusionist models.

In order to explain an *apparent* paradox as between doctors generally positive evaluation of computers in medicine and their lack of acceptance of the actual systems when they have been introduced many commentators and analysts, particularly in the USA, turn to diffusion theory for their explanation (Greer, 1977; Lindberg, 1979; Kaplan, 1982; Jay and Anderson, 1982) Before looking in any detail at the theory, however, I need first to present a little of the evidence from the literature concerning the hospital doctors' general lack of acceptance of these computer systems.

More than twenty years ago Sir George Godber, then the Chief Medical Officer at the DHSS, was advocating development and adoption of automated medical records systems in order that (among other things) case histories might be automatically and systematically retrievable and analysable

(Godber,1964, pp.1893-94).. Others within the medical profession have attempted to develop and introduce clinical and diagnostic systems of various kinds but hardly any have become widely accepted, or used,

> "Of 32 systems in clinical medicine surveyed in 1977, half had been abandoned or temporarily stopped and only 19% were used routinely (Friedman and Gustafson, 1977, Enormous numbers of diagnostic systems have been developed (Wardle and Wardle, 1978), yet the dissemination of any single system is limited." (Young, 1984, p.663)

This state of affairs had led to a number of studies being carried out, particularly in the USA, during the seventies and eighties aimed at identifying and measuring hospital doctors attitudes towards computers being used in medicine (e.g. Startsman and Robinson, 1972; Melhorn *et al.*, 1979; Teach and Shortcliffe, 1981; Singer *et al.*, 1983). These surveys, which covered both senior and junior medical staff, indicated that generally doctors have been

> "favourably disposed toward the use of computers in the health care field, (even though) their value is ... unproven" (Melhorn *et al., op cit.* p.327)

Although,

> "(they) tend to oppose applications in which they perceive an infringement on their management role" (Teach and Shortcliffe, *op cit.*, p.542)

These surveys presented descriptive statistical data on the doctors attitudes to the technology, but they could not go beyond that point and commentators have tended to turn to *diffusion theory* in order to explain the combined evidence of the attitude surveys and the high failure rate of medical and hospital computer systems.

Diffusion theory first became fully developed in the work of Everett Rogers. He utilised Merton's classification 'localites' or 'cosmopolites' to identify those persons most likely to be susceptible to new ideas and innovations and argued that, following Coleman *et al* (1966), the persons who adopted the innovations acted as the opinion leaders among their peer groups (Rogers, 1962; Rogers and Shoemaker,1971), The earlier classic study of Coleman *et al* (1966) is particularly relevant here for it concerned medical innovation, specifically the process by which doctors came to adopt and use new drugs in their clinics. The researchers found that it was the younger, better educated, more competent and geographically mobile *cosmopolite* doctors that were the first to be aware of new drugs, and then to use them. In a more recent and less ambitious study Anderson and Jay (1983, pp.45-52) came to parallel conclusions. In this more recent study a detailed analysis was presented of the progressive utilisation of computers in clinical practice among a group of 24 physicians within a teaching hospital in Indiana, USA. The authors utilised network analysis (Mitchell, 1971) and more especially smallest space analysis, a multi-dimensional scaling technique, to analyse and measure professional relations in diffusionist terms (Kruskal and Wish, 1978). The method did have some merit in terms of defining the variations in intensity and frequency of interactions between medical colleagues as well as identifying the relative levels of dominance possessed by each doctor. The authors concluded that their study,

> "demonstrate(d) the importance of peer influences ... in the introduction of computer technology" (*ibid.* p. 51)

However, the study was of only a small group of doctors (physicians) in one hospital. At best the conclusions can only be indicative and certainly not conclusive. Furthermore, quantitative studies on their own are not

capable of incorporating the participants own informed (if incomplete) reasoning and responses. Both Coleman (with his associates) (1966) as well as Anderson and Jay (1983) assumed that opinion leaders, at least among doctors (physicians), would always equate the new with the desirable and demonstrate a cosmopolite habit of promoting innovation. This assumption, however, is not necessarily warranted, for as Greer has pointed out,

> "..opinion leaders may use their influence to speed up or slow down the diffusion process. Similarly, cosmopolites may, in perfect accord with standards of their reference groups, distrust proposed innovation." (Greer, 1977, p.509)

But, she goes on to argue, even if the link between innovation, opinion leaders and cosmopolitanism matched the requirements of the diffusion model the theory could not adequately explain the *organisational* adoption of innovation, at least, not without shifting the focus of analysis away from the network of relations between opinion leaders and colleagues "toward organisational and political theory" (*ibid.* p. 506) which could then account for the negotiation of the organisational policies relating to innovation based on interests, resources and strategies (*ibid*) - a model that has much in common with Pettigrew's analysis of The Politics of Organisational Decision-Making (1973) (see below).

Both Pettigrew (1973) and Greer (1977) claim that diffusion theory requires further elaboration, but not in terms of the development, or application, of detailed quantitative techniques, as seems to be Anderson and Jays' position, instead they argue that recognition needs to be given to the interplay of communications and power,

> "that *decision makers* negotiate policies and determine the interests, resources and strategies which they bring to the decision process." (Greer, 1977, p.506)

Greer, however, has not gone beyond pointing to the desirability of developing a broad based model that can overcome the present limitations of diffusion theory (and as a necessary prerequisite to a more adequate interpretation of empirical data and hence policy formulation) (1977 e.g. p.529). Pettigrew, on the other hand, has developed a detailed theoretical formulation of the component missing from the classic diffusionist model, namely the decision processes (concerning innovation) within organisations. His solution was to develop the concept of *'gatekeeper'* derived from Allen (1966), coupled with the assumption that communication systems within organisations were power systems (1972, p.188). Pettigrew's revision of the diffusion model, however, was undermined by his commitment to a systems approach, to be discussed later, in which "actors operat(e) from one or more structural positions within a specific social system" (Pettigrew,1972, p.188) which in consequence meant that the negotiations and interactions involved in the adoption and implementation of innovation were preordained within the over-arching theoretical model.

(b) The Human Factor approach.

The diffusionist model is concerned with the social processes by which innovation, including information technology, is taken up and used within a community (or society). The human factor approach, by contrast, examines this process of acceptability from a psychological starting point. The adherents of this model argue that, in relation to computer technology, it is necessary to design human acceptability into the very systems themselves (Schneiderman, 1980). Within the computer systems design community the approach is referred to by the British Computer Society as Human Computer Interaction (HCI), and more chauvinistically as man-machine interface (MMI) as in the case of the Alvey Programme (discussed in Chapter Two).

The general approach has its roots in the industrial psychology of C.S. Myers and others associated with the National Institute of Industrial Psychology (NIIP) whose central concerns related to practical questions of ergonomics and the improvement of the psychological well-being of workers at work (Rose, M., 1978, pp. 65-87 *en passim*). In this earlier form "(p)sychology and biology were still intimately linked" (Rose, 1978, p.67) whereas for HCI this is no longer the case. Now the psychology component, which is principally of a cognitive kind, is applied on an *ad hoc* basis, with the objective of finding the best 'fit' between the human user and the computer system (cf Smith,H.T. 1980, pp.5-38) In practice a vast array of people from many disciplinary backgrounds now concern themselves with HCI, from the ergonomics engineer (e.g. Bailey, 1982) through to the philosophically inclined (Weizenbaum, 1984). HCI research is basically a pragmatic, multi-, or inter-, disciplinary and prescriptive enterprise (e.g Martin, 1980, pp.171-173).

Within medical computing it has been principally in the area of medical decision-making that cognitive psychology has contributed most and its practitioners have attempted to develop models of human reason and decision-making for the computer systems to emulate. In this country it has been John Fox who has been the most consistent champion of the Human Factor approach (1977, pp.669-686; 1979, pp.425-431). Fox's approach, at least in these articles, has been of a pragmatic and prescriptive kind: the theoretical or conceptual framework on which the approach was premised remained unstated. Instead, in the second paper (*ibid.*), the point was forcefully made that human factors are important to the good design and acceptability of computer systems. At that time Fox was working at the MRC Social and Applied Psychology Unit at the University of Sheffield where, more recently, Fitter, with others, has been researching and writing on

this subject (Fitter and Sime, 1980; and Cruikshank, 1983). These researchers "raise 'human factors' issues specific to the medical consultation environment" in their work (Fitter and Cruikshank, 1983, p.81) but they come to the view that user interface design needs to be based on more than human factors considerations (e.g. dialogues, task analysis, work station design) if only because of the "additional complexities of the three way interaction (doctor, computer, patient) in a sensitive environment" (*ibid.* p.91). This has led these researchers to explore conversational analysis, in association with Heath (ibid.) a development that indicates a growing interest in a particular kind of sociological analysis. Whether this indicates a recognition of the limitations of a wholly psychological approach and methodology, or whether it is just another form of HCI pragmatism, is not wholly clear, but on past performance it is more realistic to take the pragmatist interpretation.

(c) Systems models.

The systems model plays a paradigmatic role for both doctors and computer personnel. Both professional groups treat the model as a basis for action. Not for them the uncertainties of reification, or objectivity, expressed by sociologists (Brown, 1967; Silverman, 1970; Elger, 1975). Both medicine and systems analysis are heavily dependant upon assumptions of closed and partially closed systems (Silverman, 1970 pp. 32-35). Medical students are trained at medical schools to develop their diagnostic skills by assuming the patient is a combination of largely discrete systems (e.g. circulatory, respiratory, urinary, reproductive and even social). The practice of hospital medicine may vary considerably from the medical school model, but doctors rarely repudiate the model altogether (see Chapter Eight). Computer and systems personnel are, if anything, even more firmly rooted in the systems universe (see Rienhoff and Abrams, 1980;

Jenkins, 1981; Checkland, 1981). This paradigmatic allegiance to systems thinking is more than a commitment to a general theoretical orientation for it also has practical consequences for the control and organisation of the labour process it is supposed to explain. An example of what I mean here is the way in which systems analysts assess the user acceptability (and hence successful implementation) of a system. Success here is defined in terms of a set of agreed criteria established prior to the system's implementation (known as *systems specifications*). The criteria of acceptability also demarcate the boundaries of responsibilities for the systems personnel, once the criteria have been objectively met, whether the users are satisfied with the new arrangements or not, the job is defined as being satisfactorily completed (see also Chapter Six).

Systems theory is vulnerable to two major criticisms. The first concerns the inadequate attention given to the question of organisational power relations, a point already raised in section (a) in relation to Pettigrew's work. In the present context, the key example is the power hospital doctors (more accurately consultants) have to refuse to use a computer-based system if they wish (see case studies reported in Part II). The second criticism is that the systems model assumes only one level of organisational reality, that of the working system (Burns, 1966, pp. 165-178; Silverman, 1970, pp.26-43). A particularly appropriate example within the healthcare literature is the work of the Brunel Health Services Organisational Research Unit (BHSORU). In both 'Hospital Organisation' (Rowbottom *et al.*, 1973) and 'Health Services' (Jacques *et al.*, 1978) the health service is analysed according to the principles of 'social analysis' (*ibid.*, 1978, p. x) which are derived from the systems approach Jacques originally developed in his classic study of Glacier Metals (1951, c.f. Emery and Trist, 1981 (2nd edition), p.322; Clegg and Dunkerley, 1980,

p.204) and more recently defined in relation to its application to the health service by Rowbottom (1977). Within, this model the clinical autonomy of consultant doctors, for instance, is viewed not as the outcome of the doctors "dignity, status and power" (Tolliday, 1978, p.42) but as the means by which the necessary confidentiality and trust can be maintained in the doctor-patient relationship (*ibid*) and is subject to systematic monitoring arrangements, "to ensure that clinicians keep within the law, binding professional standards, and NHS policy and resource limits ..." (*ibid.* p.41). This functional interpretation is oversimplistic, for *clinical* autonomy is a crucial element of the *professional* autonomy enjoyed by doctors (cf. Freidson, 1970b, p.45) independent of the organisational imperatives of the NHS. It is true that the state and NHS management would wish to have matters different and that under the recent change to a system of general management doctors have been exhorted to "accept the management responsibility that goes with clinical freedom" (Griffiths Report, 1983, p.18), but one has reason to be sceptical as to the likely outcome of these new arrangements for previous reorganisations were never able to fully incorporate the competing interests of the doctors and the other occupational groups and the administration (Klein, 1984). In short, the systems model is flawed, it is over-simplistic and unable to satisfactorily account for the possibility that a work organisation (e.g. hospital) may contain a number of legitimate but conflicting interests as with clinicians and managers.

Recapitulation

The literature on medical computing then can be broadly organised under the three headings of Diffusionist, Human Factors and Systems. These approaches are not to be thought of as wholly discrete, or mutually exclusive, in their application to the analysis or assessment of the impact

of medical computing. They are commonly utilised in a pragmatic way to account for the present state of development and acceptability of computing in medicine. This state of affairs is hardly surprising given that this literature is principally and overtly prescriptive in intent. For the most part the concern is to explain the apparent resistance of doctors to the use of computers in clinical medicine. The concern, however, is too narrowly focused. Resistance may relate more to the lack of availability of systems that doctors find appropriate for their use (Kaplan, 1982; Young, 1984) and not the psychological predispositions of hospital doctors, nor the proximity of innovative colleagues (as argued by the diffusionists). And while these technical issues are addressed within the Human Factor/HCI approach(es) the question of organisational power, and its implication for individual choice relating to systems use, is largely overlooked. Given that the potential user group are members of the medical profession that appears strange, although this hiatus can be explained in terms of the implicit assumption within the literature that doctors can choose whether or not they adopt computer technology. Writers within the general field of organisational theory, on the other hand, have tended to place the issues of organisational power and control far more to the centre of their considerations of the implications of information technology. It is this topic, in relation to the development, implementation and utilisation of computer based-information systems, to which I now turn.

2. Organisational analysis and information technology

In this section I will present an overview of the organisational literature as it relates to the implementation and use of information technology (IT). My purpose here is to critically evaluate the organisational literature concerned with the theme of power and control in

relation to information technology. I will begin with a fairly detailed account of Whisler's influential argument and will follow this with a consideration of a range of further themes which point to an alternative approach to organisational analysis than that identified by Whisler.

Whisler on Centralisation

One of the first, and certainly a most influential, writer on the subject to offer a systematic analysis of the impact of information technology on organisational structures was Whisler, who since the fifties has been presenting evidence and an analysis that he argues points to the centralisation and simplification effect of information technology. Whisler argues, in one article, that decisions-taking can be literally programmed into the organisation's computer system. (Whisler, 1966). The person taking the decision is not the arbiter of the criteria (rules) which determine the decision-making but merely the agent of the system. His more general argument is that the introduction of IT, in the form of computer-based management information systems (MIS), would ensure a concentration of managerial control within a less complex, and less hierarchical, organisation. This, he argued, would consequently lead to a reduction in the number of managers employed (particularly in the middle ranks) (Leavitt and Whisler, 1958; Whisler, 1966; Whisler, 1970). This analysis suggested that the computer technology was being used to rationalise, and centralise, managerial control within work organisations with the result that the functions and status of middle management would be eroded in a parallel way to Braverman's labour process analysis of the work of manual and clerical workers (1974) (cf. also Crompton, 1979; Crompton and Reid, 1982, pp.173-175).

Whisler's argument, however, is vulnerable to a number of fundamental criticisms.

(a) The assumptions relating to organisational centralisation are problematic and "considerable conceptual difficulties exist as to what exactly constitutes 'centralisation' and how it should be measured" (Crompton, 1979, p.416).

(b) The analysis places too much emphasis on technology as the primary causal factor influencing organisational structures, and ignores the possibility of alternative management arrangements for utilising, or coping with computer-based management information systems

(c) At the same time Whisler failed to recognise that the development of computer technology in the seventies gave rise to the possibility of developing information systems of greater flexibility than previously.

(d) Whisler is too ready to claim a general, or universal, applicability for conclusions derived from the study of organisations within specific sectors.

To expand on each of these points.

(a) On the question of centralisation, Blau, a consistent critic of Whisler, has questioned the assertion that the automation of MIS systems necessarily results in the greater centralisation of management control. In an article in which he and his associates both reviewed the literature and presented empirical evidence, based on 110 New Jersey manufacturing companies, he attempted to demonstrate that Whisler's thesis was wrong. The evidence produced by Blau and his associates indicated that the introduction of information technology into "administrative support functions" (Blau *et al*, 1976, p. 20) tended to lead to a devolvement of decision-taking to lower levels of management (and an increase in the number of levels in the

organisational hierarchy) (Blau *et al*, 1976, pp. 32-33). However, it is arguable whether this delegation of decision-taking observed by Blau *et al* was, in reality, a matter of decentralisation, for as Blau has argued elsewhere,

> "...management decisions in organisations are significant, in which case they are not delegated, or delegated. in which case they are not significant." (1970, p.172)

Or, put in more pedestrian terms, delegated authority is usually found to be constrained by specific rules designed to ensure that decision-making at the lower levels within the organisational hierarchy will only be of a kind commensurate with the policies of higher management, thereby ensuring that control remains centralised (Child, 1984a, pp. 145-153). In any case higher management is unlikely to be directly involved with operational decision-making; their ability to exercise direct control over this process will normally be less than the managers and specialists employed directly within those areas of activity. Instead, their concern will be limited to ensuring that operational decisions do not jeopardise either any overall strategy or run counter to the organisation's missions or goals as perceived by the higher management (*dominant coalition*).

Nevertheless, the evidence produced by Blau and his associates is useful as an illustration of the limitations of Whisler's over-simplistic argument (cf. also Pfeffer and Leblebici, 1977). The main problem with Blau's argument, however, is that his analyses is concerned solely with the contingencies of organisational structure and effectively overlooks the issue of organisation power; the important questions relating to the exercise of strategic choice (Child, 1973a and b) and the implications this has for the politics of

organisational decision-making (cf. Pettigrew, 1973) are ignored. These aspects of the organisational implications of managements use of information technology will be explored and developed further within this chapter.

(b) On the question of computer technology Whisler has stated,

> "that the technology is sufficiently powerful to alter, in systematic and predictable ways, all existing organisational structures ... " (1970, p.33)

What he does not seem to be aware of is that the design of the technology embodies some degree of *social choice* (Noble, 1979) and that any tendency towards the centralisation and rationalisation of managerial control and structure identified by Whisler will have been, at least to a substantial degree, the result of conscious decisions rather than the inevitable outcome of technological determinism (Child, 1984b, 1985). Even the systems design typically reflects influence of Taylorism rather than technological necessity (see Hedberg and Mumford, 1975; Crompton, 1982, p. 177)(2).

(c) Moreover, the determinative role of the computer technology in bringing about any of the increased levels of centralisation (or re-centralisation) of organisational control reported by some observers (Child, 1984a and b) is undermined by the development of the technology, in particular, the development of mini- and micro-computer systems in the 'seventies. Some companies have chosen to use mini- and micro-computers in order to maximise the degree of decentralisation possible within an organisation (Burnett and Nolan, 1975; den Hertog, 1980, pp. 117-118; Business Week, 1985). And even when this is not official company policy individual managers do sometimes chose to run their own autonomous systems separate from

any organisation-wide MIS (if there is one) thereby controlling the access of others to their own departmental data-base and undermining any attempt of higher management to develop an integrated system for the entire organisation (Mc.1, Computer Marketing. Int. 1, July, 1980)

Another technical consideration has been the problems associated with the development of data-base management systems which have largely worked against effective centralisation based on computer-based MIS. While it is self-evidently true that the mainframe computer constituted a central source and store of organisational information and data for senior managers, the technology of data-base management has proven to be complex to master (Chandor *et al*, 1977; Business Week, 1985, pp.40-41). Furthermore, it has not been possible to ensure the provision of an integrated and accessible organisation-wide centralised system of management information because of the difficulties of maintaining the integrity (accuracy) of the data entered on the system (Chandor *et al, 1977, p. 108*) (popularly referred to as the "Crap In - Crap Out" syndrome) and the difficulties encountered in agreeing common data standards that are meaningful to both the departments, or functions, of origin and useful to higher management (Scrivens, 1985, p. 49; Dent *et al*, 1986). These problems are an important reason for the current attempts to develop artificial intelligence which is perceived by many within computer science and the industry as the means of overcoming this major limitation; expert systems (AI) rely on a leaner 'knowledge-base' programmed to simulate thinking rather than just storing and recalling masses of data (Immel, 1985; Business Week, 1985, p. 41)

In over-emphasing the role of technology as the determinant of organisational control structures Whisler's analysis also fails to

give sufficient weight to other factors (Whisler, 1970, p.33) such as environment and *size*, (Blau *et al*, 1976; Pfeffer and Leblebici, 1977) which with a little over-simplification, represent the remaining elements of the 'holy trinity' of organisational theory. This is a point which will be further developed in a moment for it demands more space and elaboration than is appropriate here.

(d) The criticism that Whisler's analysis is too universalistic means, in reality, that it is reasonably accurate with reference to a very limited number of work organisations, namely, large financial institution such as banks and insurances companies. It is largely within the financial institutions that large main-frame computer systems were first and most effectively introduced for storing, retrieving and manipulating great quantities of figures (money numbers). In short, 'number-crunching'. Moreover, it was precisely this capacity that gave computer technology its potentiality as an instrument of organisational rationalisation and the means of centralising control (Blau *et al*, 1976, p.36; Crompton, 1979, p. 417; Child, 1985, p. 152). Studies of banks and insurance companies have generally supported Whisler's findings on this point, for example, Mumford and Banks (1967) and Argyris (1970) (see also Mann and Williams, 1960; Hardin, 1960; Hoos, 1960; Mann, 1962). What is applicable to one type of organisation does not, however, automatically apply to other types. Any trend towards greater centralisation of organisational control results not from the application of computer technology but is contingent on other factors, not least being managerial *choice*.

Further Themes in Organisational Analysis

It is now appropriate to take up the discussion of the other

organisational factors that influence the structure and functioning of work organisations which were ignored by Whisler but are considered important by other organisational theorists namely organisational environment and size. Having considered these I will then be able to take up the issue of power (as distinct from control) in relation to computerisation and MIS systems.

(a) **Environment**

Environment as a causal factor in organisational analysis has been particularly associated with the open systems approach and it will therefore be useful to make a few general points regarding systems theory and its treatment of the environment. Attempts have been made to define the term environment in precise terms, most notably by Emery and Trist in the article on 'The causal texture of organisational environments' (1965). The concept, however, remains problematic in being too general and imprecise and in practice can become merely a residual category. Burn's critique of open systems models (including socio-technical models) can be usefully cited here. His argument is that an organisation is not one but three inter-related systems, (i) the working organisation, (ii) the political system, and (iii) the career structure (p.241) and the relationship between them is not one of potential technical integration but "must be a moral ordering" (p. 248) relating to the wider society (culture). In short, systems of action interpenetrate both the organisation and the society in which it is located and the distinction between organisation and environment is too simplistic (1969).

On the substantive issue that concerns me here - computerisation of MIS systems - environmental factors are, in practice, not perceived as being of more than passing or residual importance. The socio-technical analyses, for instance, are largely prescriptive in orientation and

frequently applied as part of a consultancy exercise with the result that the factor is not seriously considered. Instead the analysts are more concerned with intra-organisational 'problems' largely defined by management (Brown, 1967; Albrow, 1973; Elger, 1975). One good example here is the work of Mumford, particularly with regard to the ETHICS method. This approach is entirely prescriptive, concerned primarily with the development of a participative systems design (Mumford, 1980). This commitment to participation is essentially in the 'human relations' mould and concerned with the relationship between job satisfaction and efficiency rather than the issue of organisational control. The ETHICS method, however, was not designed as a tool of analysis but as a method of implementation and as an alternative to the 'Tayloristic' approach of systems designers and analysts noted by Mumford and mentioned earlier in this section.

(b) **Size**

Size, the other factor ignored by Whisler, is the dominant causal factor in strategic contingency theory. The basic argument was originally developed, at least in part, as a critique of Woodward's classic analysis in which she argued that different production technologies gave rise to different management structures (1965). The contingency theorists of Aston argued that, beyond a certain minimum, organisational size had a greater influence on the management structure of a company than did technology because large size gave rise to problems of coordination between the various functions and activities comprising the organisation, of which production technology was only one (Child, 1973b). The theory, however, does not claim that *size* is the only factor, but emphasises the point that each organisation has its own particular profile of factors (contingencies)

which together determine its performance (Pugh and Hickson, 1973). This assumption, as Child has argued, ignores the role of *choice* that also influences the structure and performance of organisations (1973b). It is for this reason that strategic contingencies theory can only be a partial analysis because it ignores the crucial role of the strategic choice exercised by management and the competition and conflict that thereby exists between the dominant coalition and other management forces present. Yet despite the criticisms of the strategic contingency model the factor, size, does remain important as a major influence on the structures of an organisation, for it is a truism to say that the coordination of a large enterprise is more complex than a small one (Child, 1985, pp. 58-61).

Strategic contingencies theory seems to have impinged very little on the analyses and evaluations of the organisational impact of computers. The notable exception to this is the work of Blau and his associates who have been directly influenced by the approach, and claim that their research "verifies the general findings of the Aston studies" (Blau *et al*, 1976, p.20). At the same time, as I have already stated earlier in this chapter, they have also been concerned to criticize the analysis of Whisler pointing out that there is no evidence to support the claim that the introduction of computer-based MIS leads to an increased centralisation of management control (Blau *et al*, 1976, p.36).

(c) **Power**

There has developed a loose knit European socio-technical school concerned with the implications of computer systems design and implementation, which includes Mumford, Eason, Pettigrew, Bjorn-Anderson and Hedberg (e.g. Bjorn-Anderson, 1980). This 'school' has not ignored the issues of organisational power and control although they are treated as unproblematic categories seeming not to recognise the processual aspects

involved (e.g. Eason et al, 1977; Bjorn-Anderson and Rasmussen, 1980, pp.108-113). However, not all these accounts use, or are based on, simplistic notions of power and control, Pettigrew while utilising a systems approach gives a central role to organisational power as both a resource and a relational phenomenon (1972, 1973, 1980, p.45) Pettigrew views organisations as open political systems the sub-units of which are based on specialised functions and tasks. The sub-units are necessarily inter dependant but nevertheless are sites of interest-based demands (1972, p.17, 1980, pp. 45-46). The study reported in the article and book published in the early 'seventies concerned the "changing patterns of status and control between systems analysts and programmers" (1972, p. 190) This was particularly so in relation to the decision-making process relating to the purchase of a new computer system. Significant here was Pettigrew's discussion of organisational power in terms of 'resources' and importantly, the tactics of resource use - relational aspects (1972, p.187). The strategic resource is that of information, and power is seen as resting with those who control the access to information. These persons are the 'gatekeepers'. The model is a compelling one for there is an attempt made to incorporate processual elements of negotiation and the active exercise, or attempted exercise of power and influence. Yet, insofar as it is rooted in systems theory, it remains vulnerable to the criticisms stated above. In particular, Pettigrew's study limits the analysis of *interest* to that of organisational status and career. Within the division of labour to be found in a work organisation other factors are also relevant, for example both the sexual division of labour (Stacey, 1981; Beechey, 1982; Davies and Rosser, 1984) and professional autonomy (Johnson, 1972,(3) 1977; Larson, 1977) have their bases outside the work organisation. Extending the point further these factors also relate to the

overall class, and gender, relations within society (Salaman, 1978, 1979, 1981; Clegg and Dunkerley, 1980; Abercrombie and Urry, 1983). Furthermore, these extra-organisational factors, which always require specifying and are not defined *a priori* as part of a system model, can have a causal effect on organisational outcomes.

Structures and process

The basic problem for much organisational theory relates to the issue of reification (Elger, 1975), or, "misplaced concreteness" (Donaldson, 1985, p.19). The utilisation of systems modelling, in one form or another, has rarely been qualified for being the heuristic device that it is but has come to be seen, erroneously, as the very reality the methodology is intended to reveal (cf. Silverman, 1970, p.50)(4). In order to capture the open and contingent character of work organisations it is necessary to adopt a perspective that focuses on the constructed, processual and contested aspects of organisational life. It is for these reasons, if not necessarily couched in precisely these terms, that considerable interest has been shown in labour process analyses (e.g. Clegg and Dunkerley, 1980). It is to labour process analysis that I now turn.

3. Labour process analysis.

There has been a consistent sociological and organisational interest since the late nineteen fifties concerning the role of new technology, including information technology. This interest has been in terms of both managerial strategies and the implications for the division of labour. Over recent years this work has been much influenced by labour process analysis which in its various forms has revitalised the study of management and work (Littler and Salaman, 1982, p.251; Wood, 1982, p. 16; Knights *et al.*, 1985, p. 3; Reed, 1985, pp. 82-90). In this section my aim is to review the

main developments in labour process analysis as it relates, broadly, to the discussion of the introduction of computer-based technologies. I will outline the agreements and disagreements among labour process theorists and provide a brief discussion of the limitations of labour process analysis in terms of its inability to theorise *adequately* the relationship between societal structures and organisational work processes. My particular resolution (or suggestion) will be that it is not a universally applicable labour process theory that is required. Instead the limitations of scope of the approach needs to be recognised and concern focused on developing the conceptual linkages necessary in order to locate the specific details of work processes within the wider analysis of capitalist society. I would assert that a labour process approach has an important contribution to make in extending our understanding of the organisation, control and execution of work processes. Nevertheless, I would also argue that it is necessary to move away from the 'top down' theorisation of Braverman and look more closely at the work processes themselves and find ways of theorising their integration into the broader model. My reasons for persevering with the labour process model is that it enables one to focus on two crucial and inter-related aspects of work and its organisation and control, namely, the dynamics of

(a) control and counter-control,

(b) shifts in effort and skill within the division of labour,

Further these two concerns directly relate to a third;

(c) the political economy.

It was, of course, Braverman (1974) who refocused interest on the labour process and managerial control within both marxist and sociological studies. This work generated a veritable industry of labour process analyses and studies. Wood, in fact, has suggested that we have seen at

least three waves of reaction to Braverman's 'Labor and Monopoly Capital'; the 'enthusiastic', the 'critical' and a third wave that might be termed the 'reappraisal' (1983, p.16). He also pointed to the potentiality of a fourth wave in which the connection between the logic of capital accumulation and the labour process is severely attenuated or denied altogether) (Littler, 1980, p.33; Littler and Salaman, 1982, p.257; Tomlinson, 1982, pp.128-129). The main point is that there now exists several versions of labour process analysis from marxist functionalism through to a model within which management control is contingent on factors other than capital accumulation narrowly defined (Littler and Salaman, *op cit.*, p. 256). Issues of worker resistance and consent to managerial control are seen as crucial, particularly in relation to the notions of 'craft' and 'skill' (Elger, 1979, 1982; Stark, 1982; Cockburn, 1983, pp. 112-122). Similarly, the external realities of the labour markets and the related development of career structures within the administration and occupational structures of the work organisations has also received attention in terms of their effects on the historical development, organisation and practise of managerial control (Edwards, 1979; Friedman, 1977; Clawson, 1980). Finally, the issues of legitimation and consent within the workplace have been studied from a labour process perspective, notably by Burawoy (1979, pp.75-120) and in this country by Hales, (1980; see also Thompson, 1983, pp.153-179).

Whatever form the reappraisal of labour process analysis has taken, a broad consensus has emerged around the point that the organisation of labour process is the outcome of more than economic forces. Also, it is clear that within this broad consensus two distinct and different approaches are discernible. The first, which might be referred to as the *integrationist*, is concerned with attempting to systematise the analysis so that *processual* and *structural* dimensions can be fully integrated one with

the other (e.g. Friedman, 1977; Burawoy, 1979). The other, which could be labelled the *social choice* approach is more concerned with organisational policies and issues than in the analysis of the wider structures within capitalism (5). A key figure in the development of the social choice version of labour process analysis is Child, who has utilised the concepts and findings of labour process analysis in order to develop an alternative model to strategic contingency theory, which he refers to as political contingency theory, specifically designed to take account of "managerial preferences, market conditions and political context" (1985, pp.230-233): labour process theory is here subordinated to organisational theory and design. The distinction between the two orientations hinges on the fact that the *'integrationists'* are concerned to analyse the mediated influences of the *economic* structures within capitalism upon specific labour process(es) while the analyses of the *social choice* theorists are almost wholly concerned with organisational considerations only. If, at the organisational level, particular political, or social factors are identified as determining the immediate outcome(s) relating to the organisation and control of the labour process that is sufficient, or all that is possible. The wider economic and class dimensions of the labour process are ignored, or at least set to one side. Wilkinson's study of the shopfloor politics of new technology would be an example of this approach (1983) as are the various studies of Buchanan and Boddy (1983) (see also Buchanan, 1984, 1985).

Whether the analyses have been developed within an integrationist or a social choice frame of reference there has developed a broad consensus that the implementation of new technologies and associated management strategies and worker responses are not simply the outcome of economic considerations. The difference between the two broad orientations to labour

process theory is that the integrationists (marxian. or neo-marxian) would argue that the economic considerations (i.e. the imperative for capital accumulation) are more complex than one of simple profit maximisation, or worker immiseration. Short term exigencies (e.g. in the field of industrial relations) may conflict with long term goals (Hyman, 1987), and capitalist society also, and necessarily, includes institutional arrangements more concerned with the reproduction of capitalist relations than with the production of surplus value directly (Poulantzas, 1975, pp. 13-35; Gough, 1979, pp. 39-54; Clegg and Dunkerley, 1980, pp. 540-543; Offe, 1984, pp. 119-129). Relatedly, economic relationships are frequently mediated by apparently non-economic considerations, such as occupational ideologies, relating to skill (Elger, 1982; Cockburn, 1983, pp. 112-122) and professionalism (Larson, 1977; Hales, 1980; Esland, 1980). Whereas those writers to whom the appellation social choice analyst is more applicable (e.g. Wilkinson, 1983; Child, 1985) tend to view the political dimension of organisational change as being the dominant factor in determining organisational outcomes.

The important point is not that certain writers have now got labels, but that the different orientations, or approaches, have different implications for labour process analysis. This can be pinpointed using the key example, both in wider debate and for the empirical focus of this thesis, of the public sector. How is one to make sense of the labour processes within the health service ? For the integrationist writers it is necessary for them to at least attempt to demonstrate the relationship between the imperative of capital accumulation and the role of the health service within capitalist society (Poulantzas, 1975; Carchedi, 1977, p.131). The social choice labour process writers, however, are confronted with a less daunting task (but not necessarily a less complex one), of detailing

the linkages between the organisational structures (size, technology and 'environment' - e.g. labour and product markets), control systems and, importantly, the politics of organisational decision-making and managerial choice (Child, 1985; Wilkinson, 1983, pp. 17-23; Buchanan, 1985).

Accounting for public sector activity in economic terms is not necessarily an impossible problem for an '*integrationist*' labour process analysis. One would anticipate that within capitalist society (Keynes not withstanding) costs will be subject to scrutiny and strategies of minimisation. However, this is too simple because moneys are in fact spent within the public sector for more than just the economic reasons of sustaining and reproducing capitalist relations of production. The general function of what O'Connor has referred to as *legitimation* is also crucially relevant (1973). Furthermore, it can be argued that not all forms of social expenses are effective, or even directly related to maintaining social harmony (*legitimacy*) as O'Connor suggested (1973), either because such projects and programmes are ineffective in that role, or because the state policy makers are prepared to risk disrupting existing levels of social harmony in order to favour specific social groups for some political advantage.

It is also important to note that management strategies within the private sector of the capitalist economy are not always, or directly, the outcome of the inherent necessity to accumulate, but can reflect "inter-managerial competition" (Storey, 1985, p.195) more concerned with "power, privilege and status" (Armstrong, 1984, p.101) of the participating managerial and professional groups than with any 'global functions of capitalism' they are supposed to perform. Nor is state intervention absent in the private sector, for example, in the case of research, development and investment in the computer industry which started with the support of

the Wilson government for the British computer industry in the 'sixties (see Chapter Two) and, more recently, the 'Alvey Programme' (6).

A possible solution to this problem for labour process analysis might be to adopt a sectoral form of analysis distinguishing between market and non-market sectors, state and non-state sectors or, with less exactitude, public and private sectors (O'Connor, 1973; Offe, 1984, pp.42-46; Clegg and Dunkerley, 1980, pp.522-545). This would, as Clegg and Dunkerley have argued, "enable() one to begin a structural .. analysis of organisations ..." (*ibid.* p.543), but it would not resolve the difficulty of relating public sector activities to capitalism in terms *directly* compatible with labour process analysis. A sectoral analysis would still subordinate the analysis of the strategies and struggles within the sectors to the overarching theorisation. It is arguable whether labour process analysis, with its emphasis on the organisation of the division of labour and work processes, *of itself*, is capable of supporting a fully adequate analysis of wider social and economic relations.

In the hands of Braverman, of course, the labour process is the central *component* of a marxian analysis of capital and in this way the analysis is part of a comprehensive theory of capitalism. On the other hand, if the labour process model is *processual* (Elger, 1975) - that is to say, designed to account for developments, interrelationships, competition, conflict and struggles within and around work processes (i.e. at the level of the work organisation) - then the conceptual 'fit' between labour process analysis and a theory of capitalism necessarily becomes less precise. Speaking figuratively, the conceptual 'magnification' required for the study of the organisation and control of work processes renders the wider structures 'fuzzy' (8). Theoretical integration can only be obtained by recognising that the wider structures influence (constrain or enable)

the specific labour process arrangements but do not determine them. Thus, the relationship between managerial control at the level of the work organisation and as the 'global function of capitalism', for example, cannot be analysed within the same model, although one can deduce conclusions from the one and input those into the other analytic model. Obversely, a concentration on the wider structures obscures the details of the labour process which need to be understood.

It is possible that the specific concept of *strategies* might be the means by which the 'processual' and the 'structural' aspects of the analysis begin to be integrated. Wilkinson (1983) has pointed out that ".. organisational structure can .. be seen as *referents* used by organisational members .. " (1983, p.18) and this particularly applies to management (see also Child, 1973b). I would want to extend the notion of strategy to include whoever might be involved in a 'dominant coalition' (Child, 1973b) and not to exclude the possibility that there may be a plurality of 'coalitions' (as in so-called 'clan' organisations - Ouchi 1980 p.837). This is not to argue that these strategies determine outcomes, rather that they constitute (whether managerial, professional, or union) a mediation between the imperatives of 'capitalism', the corporate objectives of the organisation and the labour process outcomes (Child,1985, pp.112-113). There is no implication that the strategies in practice will always be coherent, nor that the implementation of the policies will reflect precisely the intentions of those groups involved. But what can be asserted is that the labour process will be primarily affected (but not necessarily determined) by strategies employed by dominant groups within work organisations, whether they are managerial, as Child argues, or occupational, including professional, or a combination of both. It is the organisation and control of the labour process at the level of the work

organisation that is the crucial element of this approach to labour process analysis. Thus it is the conceptualisation of *strategy* that provides the conceptual linkage between structure, action and outcome, and thereby provides the integrative element to the theorisation.

Professions, autonomy and the new middle classes

Bearing in mind the previous argument, the concern here is with the National Health Service (NHS), and more particularly the profession of medicine. In the mid 'seventies there developed a labour process literature relating to healthcare services deriving not from Braverman but from Carchedi (1975, 1977). Within this theoretical model inter-relationships between workers, managers, professionals, and clients were subjected to a structuralist-marxist analysis. In the hands of Johnson (1977) the analysis proved a useful critique of both the professionalisation and the middle class proletarianisation theses (Freidson, 1973; Oppenheimer, 1973). Johnson argued that it was possible to demonstrate that some 'professional' work was free of external managerial control while other varieties of professional work were not. This analysis, however, owed more to Jamous and Peloilles' concepts of technicity and indetermination (1970) than to the formalistic nature of Carchedi's theorisation.

The study of professional work within a broadly labour process framework and with particular reference to the medical profession has also been developed in the USA (Larson, 1977; Mckinley. 1982; Derber, 1982, 1983a, 1983b). A focus here has been on the issue of proletarianisation, which according to Larson is analagous but not identical with the process identified as occurring in other types of work (e.g. manual work). In the case of the professions it is not deskilling but "The transformation of

professionalisation strategies into generalised credentialism" (1980, p.144) that leads to a general loss of occupational status that may be experienced as "proletarianisation" (*ibid* p.145). The reason is that organised professions have historically *controlled* the duration and content of the training process for their neophyte members and this relationship between the professional associations and professional training has been seen as part of the very definition of professional autonomy (Abercrombie and Urry, 1983, p.121-123). Consequently, to the extent that the appellation 'professional' is applied to managerial and organisational specialists (e.g. works study engineers, computer programmers), that have generally lacked comprehensive control over the selection and training of their members, the more there will be a general "proletarianising" effect on the concept of professionalism. (Larson, 1980)

'Proletarianisation' has not, however, been generally seen as the reality, or experience, for the members of the medical profession, for as Derber has argued, they have had the ability to be able to identify their own occupational interests with that of the ruling class and in consequence have been able to retain their control over the education and training of doctors and sustain their dominant position within the social division of labour (1983) (8). This interpretation derived directly from Gramsci's analysis of 'organic' and 'traditional' intellectuals (Larson, 1977, p.xiv; Glasner, 1979). However, while neither Larson nor Derber would argue that hospital doctors have been proletarianised, Derber has argued that members of the medical profession have had to come to accept certain changes in their work situation which involve an erosion of their work autonomy. This Derber refers to as sponsorship' (1983b) a notion remarkably like that of 'mediation' (Johnson, 1972), or 'heteronomy' (Johnson, 1977). Derber distinguished between 'patronage' where the client is dominant and

'sponsorship' whereby it is an influential third party who mediates between the doctors and their clients (Derber, 1983b, p.565). What is being described is similar to the notion of 'responsible autonomy' (Friedman, 1977). There are parallels here with the classic marxian concept of *formal* subordination (as opposed to the *real* subordination) of labour power *except* that in these classic terms there is an explicit assumption that within capitalist societies at least formal subordination will be followed by an attempt at a more real subordination, whereas 'responsible autonomy' relates to managerial strategies designed to incorporate certain occupational groups within the capitalist labour process while leaving them to organise their own methods of working (Friedman, 1977). Also, occupational groups thus organised are differentiated from other groups as having a strategic, or a central, role within the division of labour (*ibid.*). There remains an important difference, however, between *responsible autonomy* and *professional autonomy*. *Responsible autonomy* is the outcome of management strategies within the context of prevailing labour markets and specific worker resistance under monopoly capitalism (*ibid.*) whereas *professional autonomy* results from professionalisation strategies that historically predate monopoly capital (Johnson, 1972, p.52; Larson, 1977). In addition, *professional autonomy* primarily represents the outcome of competition and conflict between professional and managerial groups (Armstrong, 1984) and not directly the outcome of class struggle at the workplace - which is an essential component of Friedman's analysis (1977).

Professionalism, as Larson points out, is not unaffected by the strategies of the state (1977). Indeed paralleling the concept of *responsible autonomy* certain professions can be said to have been promoted by the state to unequivocally meet the requirements of both capitalist market organisations and public bodies. Examples are accountants (Johnson,

1972; 1982) and engineers (Larson, 1977). However, others occupational groups - such as doctors - have been able to define the collaboration between themselves and the state as ones in which the administrators are not their managers. The distinction might be said to be that between *Organisational Control* where the management is able to determine the limits of the autonomy of particular occupational groups (including professionals) and, *Institutional Control* where the ability to define the occupational group's autonomy regarding the labour process is largely in the hands of a professional association because it has the power and authority to do so. The distinction is, in reality, not that clearcut, for both types of control are the result of the particular form of state formation that has emerged in Britain and *mutatis mutandis* in other liberal democratic/capitalist societies, and the degree of autonomy enjoyed by any profession is historically determined as a condition of that state formation (Johnson, 1982, p.189). Accountants and personnel officers, for example, are usually more constrained by the imperatives of capital accumulation than are doctors and lawyers. This might have led me to argue that in the case of the doctors their autonomy is both dependant on and determined by the state in a manner analogous to *responsible autonomy*. However, the political negotiations that took place at various times between state and profession, for example, between Bevan and the BMA in the 'forties indicate that historically this cannot be true (Eckstein, 1958; Klein, 1983, pp. 17-25). Rather, their autonomy was a condition of the state formation and contributed to the legitimacy of the social and political arrangements that characterised the establishment of the post-war welfare state. Therefore, arguments that the legitimate autonomy of doctors is technically limited to the clinic only (e.g. Tolliday, 1978) are clearly erroneous even if that is what the state would prefer. Despite the

introduction of arrangements to bring such a state of affairs into being there is little attempt by the NHS., or government administration, to claim that the medical profession is acting illegitimately when they do otherwise. This is an issue which I will return to in detail in the next chapter.

Clearly the relationship between professional autonomy, organisational control and the state is complex. In figure 3.1 the relationships are presented in diagramatic form with regard to hospital doctors. The inter-relationship between general concepts and the specific organisational arrangements is indicated by a dashed line (---) appropriately labelled (i.e. Hospital Service, Hospital in District). The interconnecting lines indicate the separateness of *Institutional* and *Organisational* control and the places, or points in the organisation and control of the labour process where they become contiguous and potentially enmeshed; as in the principle of 'clinical autonomy' as formally defined, with the emphasis of a division of responsibilities between technical expertise and administration (DHSS, 1971 'Grey Book'; Tolliday, 1978). The relationship between the 'parts' is represented as being systemically dualistic, but it is not my intention to indicate that the two 'halves' of the system share some kind of equality. The best way of summarising the relationship between the two 'halves' of the diagram (*Institutional* and *Organisational Control*) is to say that the administration make available the organisational setting but the doctors dominate the work processes carried out within them. The diagram charts the context but not the detail of hospital medical work and consequently it does not analyse the organisation and control of the labour process(es) *within* hospital clinics. This aspect is to be discussed separately in the next chapter in terms of the consultants' *functional*

autonomy which as I shall argue is rooted in the routines and organisation of day to day clinic work (see pp.80-82).

FIGURE 3.1 : MEDICAL AUTONOMY AND LABOUR PROCESS ANALYSIS

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INSTITUTIONAL                                          ORGANISATIONAL
CONTROL                                                CONTROL
   -Professional        |            |                      -Responsible
    Autonomy            |            |                       Autonomy
      |                 |            |                          |
---------------------- THE HOSPITAL SERVICE ----------------------------
The Organised           |            |                  The NHS/DHSS
Medical Profession      |            |                  and RHA
(BMA/Royal Colleges)    |            |                      |
      |                 |            |                      |
      |      Institutional           Organisational         |
      |      Controls                Controls               |
      |      (e.g. training          (e.g. Budgetary        |
      |      peer review, etc)        controls)             |
      |                 |            |                      |
------------------- THE HOSPITAL WITHIN A HEALTH DISTRICT-------------
Medical Executive       |            |          District management
Committees and          |            |          decisionmaking systems
Divisions               |            |                      |
      |                 |            |                      |
      |                 |            |                      |
      |                 |            |                      |
      |            Organisation of                          |
                  doctors in hospitals
                        |            |
      Work in hospital clinics as a labour process in
      which consultants exercise clinical autonomy within
      a division of labour that also includes nurses,
      paramedical, clerical/secretarial workers and patients.
                        |            |
The Patient             |            |          The Patient
-as legitimation of                              -as a formal planning
professional autonomy                            priority
      |                                                |
INSTITUTIONAL CONTROL                            ORGANISATIONAL CONTROL
```

Implications for medical computing

Returning now to the specific issue of computers in medicine. What is particularly relevant here is the issue of contested *control*. If we were to follow Whisler's approach then the introduction of computer-based medical information systems could be interpreted as a device to enhance

organisational control over the doctors, particularly in establishing standards of care as, for instance, measured in terms of the number of days particular types of patients are kept in hospital ('inpatient stay') relative to other consultants/hospitals. There is some evidence (e.g. Godber, 1964), as was shown in Chapter Two, that this might have been the case in the 'sixties when the impetus for the 1974 reorganisation of the health service was gaining momentum. However, neither the technology nor the organisational politics (in which I would include resource constraints) developed in a way that enabled such a strategy to be followed. Acceptance or rejection of the use of computer systems was, and remains, entirely up to the doctors themselves (although the financing of the systems does not (a point that is developed in connection with the case studies later). Furthermore, it is clear from the preceding chapter that generally doctors welcome systems that enhance their clinical abilities (e.g.Durie, 1984) but not those that they perceive as bringing about an encroachment upon their professional autonomy.

Conclusions

In this chapter the theoretical models underpinning the literature on medical computing has been critically examined. First, the predominant models were identified (diffusionist, systems and human factor) and then discussed within their broader organisational framework. The discussion of organisational analysis demonstrated the limitations to the medical computer literature, in large part because of its lack of attention to the issues of power and control and the role these play in the introduction of new technologies. I argued, however, that the organisational models were themselves seriously flawed because they reified and oversimplified complex and variable work processes. This in turn led on to a

consideration of labour process analysis which, despite its own limitations concerning the integration of the analysis of work processes into a broader social analysis, can nevertheless be useful as a means of gaining theoretical leverage on the question of the usage and non-usage of computers by doctors, one which avoids simplistic notions of technical rationality and concentrates on the social and economic issues relating to the organisation and control of the work processes.

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NOTES

1. Other models have been used within the medical computing literature, but this does not alter the general point that it is the diffusionist, systems and human factor models that dominate this literature.

2. The inherent Taylorism in systems design has led commentators within the socio-technical school to argue for the adoption of participative approaches to the introduction of new technology and systems design, most notable of these has been the ETHICS method (cf. Mumford, 1980).

3. "A profession is not ... an occupation but a means of controlling an occupation." (Johnson, 1972, p.45) and a couple of pages further on

> ".. where a given set of *social conditions* is influential in affecting the development of occupations, there will emerge dominant institutional forms of control ..." (p.47 *emphasis added*)

4. The heuristic fiction 'systems' is being criticised here for its limitations as theoretical constructs, not in terms of any pragmatic use it may have, for example, in organising programmes of work, or designing computer programmes.

5. The label *social choice* refers to the use of labour process analysis independently of wider marxian theory and concepts.

6. The Alvey Programme aimed to develop industry-academic collaborative projects in advanced ('fifth generation') computer technology in order that the UK might remain competitive with Japanese developments (Alvey Committee, 1982; Feigenbaum and McCorduck, 1984, pp. 208-209).

7. Parallelling the concept as used in A.I. (Fitter and Sime, 1980, p.61)

8. Mckinley, by contrast, does argue that proletarianisation is taking place within US medicine with the doctors losing out to the administrators (1982).

***

CHAPTER FOUR

HOSPITAL DOCTORS, PROFESSIONAL AUTONOMY AND THE CONTROL OF MEDICINE

Introduction.

This chapter marks the end of Part I of the thesis. The purpose of Part I has been to to have set out the issues and develop the theoretical framework necessary to understand the material analysed within the case studies reported in part II. My concern has been to set out matters directly relating to the organisation and control of the medical labour process within the NHS hospital service, and to discuss the implications of the introduction of information technology as automated systems of control. This chapter completes this task without any further discussion of the question of computers because its twin foci of concern are the organisation and control of medical work within the hospital clinic and the role of the state in relation to to this work. These topics, which were not discussed in the previous chapter, require elaboration before moving on to present the case studies in Part II

The primary purpose of this particular chapter will be to extend the theoretical model developed in Chapter Three in order to provide the necessary conceptual linkage between the structural, institutional and processual dimensions/levels of the medical labour process. My approach here will be to explore the nature of the dominant role of hospital

doctors within the division of labour associated with clinical care (i.e. clinic work) through two lines of enquiry, addressing:

(a) clinic work as a social process

(b) the politics of medical autonomy and dominance

The discussion of clinic work is intended to demonstrate how the concept of *institutional* control and the organisation and control of clinic work can be theoretically linked to and incorporated within a labour process model. It includes a consideration of the role of the medical record, for this document plays a crucial, if peculiar, role in ensuring the consultants' control of clinic work, while being (potentially at least) a candidate for automation (see Chapter Two). The political dimension is examined in order to demonstrate that the 'frontier of control' (Goodrich, 1975) in relation to the organised medical profession is not a fixed one. In order to examine this issue I focus on the question of medical audit because of the important role it has played in the debates and negotiations relating to the issue of medical autonomy and accountability. In addition, it also enables me to discuss the role of the state as the equivocal guarantor of the medical profession's autonomy and (*institutional*) control.

The profession of medicine and medical work

The medical profession in this country is constituted of specific institutions, namely the British Medical Association and the Royal Colleges (Parry and Parry, 1976). The membership of the profession covers hospital doctors, community physicians, general practioners, anaesthetists, pathologists, and radiologists (cf. Körner (Third Report), 1984, Annexe I, pp.33-34). The profession is also stratified hierarchically as between consultants and doctors in training grades, commonly referred to as junior

doctors (Godber, 1969). Junior doctors are divided into four grades, House Officer, Senior House Officer, Registrar and Senior Registrar. House Officers are recently qualified medical graduates with typically less than 12 months experience of doctoring; by contrast the senior registrar can even be more qualified and/or experienced than many consultants waiting for an appropriate consultantship to become availible.

Sociological accounts of professionalism within healthcare , as Illsley has pointed out, have since the early 'seventies tended to concentrate on the issue of occupational control as opposed to expertise and altruism (1980, p.60). Notable examples here would be Freidson, 1971, Larson, (1977) and Johnson (1972). Freidson's structuralist definition of professional autonomy links together legal monopoly, restricted entry and the occupation's dominance within the division of labour (Freidson, 1971, pp.135-137). This structural analyses, however, does not provide the means of analysing the nature of day to day clinic work and it is necessary to interlink the processual (day to day work) and structural elements of professionalism in order to more fully account for the profession's autonomy. Doctors' independence from lay evaluation and control is also generated and sustained within the doctor-patient interaction of the medical encounter (Bloor, in Wadsworth and Robinson,1976, p.52). It is possible to interlink these two 'levels' of analysis by reference to the concept of *functional* autonomy, which Bloor adopted from Freidson (ibid.). In order to explain what is involved it is worth examining the studies of Bloor (1976 a and b) and Strong (1979; 1982). In both analyses the element that can be called 'functional autonomy' has been defined in terms that indicate a linkage between the institutional setting (of the clinic) and the interaction between doctor and patient.

Bloor's study concerned ear, nose and throat (ENT) clinics and his

conclusion was that it was the clinic 'routines' employed by the doctors that prohibited, or facilitated, participation by the patient (or, being a study of a childrens' clinic, the parent) (*ibid.*, pp.66-67). Strong's findings, were broadly similar. Instead of analysing *functional* autonomy in terms of routines Strong focused on the way the type of *institutional* setting systematically gave rise to different types of doctor-patient relations, or role formats (1979, pp.6-10) - his analysis being informed by Goffman's frame analysis (*ibid.*, pp. 10-13). The argument was that

> "(the) role format supplies merely a guideline of the overt form of events, not a detailed prescription.... (They) are not structures that totally determine action but are instead routinised, culturally available solutions which members (i.e.doctors) 'use' to solve whatever problems they have at hand." (*ibid.*, p.13).

Strong in his 1982 paper developed the analysis further in a way reminiscent of Johnson's typology of occupational control (Johnson,1972). He linked his typology of formats explicitly with the issues of power and medical authority. Bloor's analysis was less directly concerned with these structural aspects of the medical encounter, concentrating instead on the criteria that determines a doctor's decision to operate or not. But the point I wish to make here is that both researchers found that the variations in the doctor-patient relationship within the medical encounter both supported (*reproduced*) and were contained within structurally and institutionally determined ground rules. The doctors' freedom from subordination to the patient was the outcome of the *organised autonomy* of the medical profession (Freidson, 1971, p.136) sustained under the guise of *institutionalised expertise* (ibid., p. 137). In sum, it is possible to explain variations in the *functional autonomy* exercised by doctors in the

clinic in terms of the interplay between the structural, institutional and processual elements which are neither universally constant nor randomly structured but, exhibit identifiable regularities.

One aspect of clinicians' *functional autonomy*, not discussed in any detail by either Bloor or Strong, concerns the role played by the medical record. This is a crucial (if ambivalent) document which links the medical encounter and the institutional structure of the health service and for this reason alone would require attention here. In addition, however, the medical record had initially been a primary candidate for computerisation within the NHS experimental computer programme although, in the event, this failed to happen (see Chapter Two). Here then is a subject that constitutes a critical interface between clinical practice and computerisation. For these reasons I now turn my attention to the subject of hospital medical records.

The medical record

The subject of the medical record is not one that has gained great sociological attention, although this has begun to change (Heath, 1982, pp.56-57). The interest that has been shown has not been with the records as sources of objective statistical data, but rather with the records integral role in organisational processes - hence their relevance here (*ibid.*, p.57). The common feature of these studies has been the focus on the medical record as the substitute for the patient, for instance,

> "(m)any persons in ... hospitals, several who figure in decisions of grave importance, see the patient only through the oblique lens provided by the dossier and to them the patient has substance, a shape, a character, an identity based almost exclusively on what is recorded in

those files." (Erickson and Gilbertson, 1969, p.393)

At the same time it has long been known by those with an interest in medical records, whether doctors, administrators, or academic researchers, that the contents of the records are "... usually inadequate and their structure chaotic. It may be impossible to find required information at all, let alone quickly and easily." (McIntyre,N. 1979, cited in Rees, 1981a., p.4). Yet the medical record, formally at least, is designed to be both the archival record of the patient's history and the doctors' clinical findings, as well as the documentary instrument coordinating the various disciplines involved in the patient's care and treatment e.g. laboratory investigations, nursing, paramedical and social work support (1).

In their classic paper "'Good' Organisational Reasons for 'Bad' Clinic Records" Bittner and Garfinkel (1967)(2) demonstrated that clinical records are often of a cryptic nature and can only be 'read' with the 'insider knowledge' of the particular clinic concerned. Indeed the knowledge requirements necessary in order that the file can be deciphered are, according to the researchers, so complex that they leave the record decipherable only by a small coterie of *cognescenti*,

> "In order to read the (record) without incongruity... (one must) know and use knowledge (1) of particular persons to whom the record refers, (2) of persons who contributed to the record, (3) of the clinics actual organisation and operating procedures at the time the documents are being consulted, (4) of a mutual history with other persons - patients and clinic members - and (5) of clinic procedures, including procedures for reading a record, as these procedures involved the patient and the clinic members..." (1967, p. 206)

According to these authors the underlying reason for this cryptic quality of the medical records is that of economy, that is, whether the collection of the information, in whole or in part, is deemed to be worth the effort by those involved (*ibid.*, pp. 192-194). This was the major, but not the only, reason for the authors' also identified the desire to control the information available to the administration ("keeping the front office appropriately misinformed" *ibid.*, p.194), as also being a relevant consideration. This they saw, however, as having little to do with the issues of power and control, acknowledging only that there were,

> " ... well-guarded team secrets of cliques and cabals in (the) clinics, *as they are in all bureaucratically organised settings*" (p.195, *emphasis added*)

Instead they viewed the selection of data for inclusion within the medical record as being related to what was minimally necessary in order for the doctors' to function effectively (*ibid.*, p.194). The authors argued that clinic records could be read either as a record of a "therapeutic contract" or as an "actuarial record", but in reality the two readings were irreconcilable (pp. 198). The capacity for the records to deliver accurate data for acturial purposes (i.e. aggregate analysis for administrative or research purposes) was very limited (to the point of being useless), because the definition of the record as a medico-legal theurapeutic contract was the one that took precedence and was the main rationale for the medical records;

> "In our view the contents of clinic folders (medical record) *are assembled with regard for the possibility that the relationship may have to be portrayed as having been in accord with expectations of sanctionable performances by clinicians*" (*ibid.* p.199. *Emphasis in the original*)

in combination with a knowledge of the organisation of the clinic, that a clinician could reconstitute the information he, or she required, for either clinical, or legal, reasons (p. 206). (pp. 202-205). The clinical reader (the doctor) determined the meaning of the record according to the purpose to which it was being put. The technique, it was argued, was the same as a lawyer when he, or she, "makes a brief" from the evidence available (p.203), for the medical record file would contain a sufficient selection of items of information and clinical data to permit a case to be made, whether for clinical or medico-legal purposes (pp.202-205). This set of practices should not be read, it was argued, as being an attempt by doctors to misrepresent, or deceive anyone. According to Bittner and Garfinkel, the cryptic quality of the 'records' was "related to the demands of organised (clinical) practice" and not to any "personal considerations in advancing a cause" p.200). The point is an important one because it clearly indicates that the account was an analysis of normal arrangements and not an exposé of bad practice.

Despite not using the terms 'indexicality' and 'reflexivity' Bittner and Garfinkels' account clearly rests on the twin ethnomethodological concepts which mean, in summary, that meanings are dependant upon their situation, or practical context (indexicality) and are only comprehensible to the participants because they have the capacity to look back on their past activities (reflexivity). Indeed the concepts are intrinsically intertwined in the ethnomethodological account of social reality (Garfinkel, 1967, pp.1-10; Burrell and Morgan, 1979, p.248). Reality is seen as a practical activity constructed, negotiated and acted out by the participants. Clinic records can be seen as one aspect of this social and organisational reality. The ethnomethodological account is, however, only partial, for there is no adequate account of the role the clinic record

partial, for there is no adequate account of the role the clinic record plays in maintaining the configuration of power and control within the hospital and the clinics.

Recently discourse analysis, with its concern for the written text (and the medical record is a written text) has become increasingly interested in the topic of language as an instrument of power and control. As J.B.Thompson puts it, "(i)t is this increasingly sociological turn which has made discourse analysis relevant to...the study of ideology" (1984,p.99) including of course the ideologies of medical 'professionalism' (Larson, 1977, pp.220-232). This development, however, has not been incorporated within ethnomethodological analysis for, as Thompson has pointed out (in discussing the work of Sacks *et al.*, 1974), these researchers still persist in being oblivious to the probability that the constructions of meanings are achieved within asymmetrical relations of power (pp. 117-118).

In contradistinction to Bittner and Garfinkels' analysis my own research leads me to argue that it is more appropriate to typify medical records, at least in the British context, as possessing implicitly, four medical rationales, (i) research, (ii) training and monitoring, (iii) medico-legal, and (iv) as a decision aid. These rationales will be explored in detail in relation to the case study of the outpatients' clinics computer system (Chapter Eight). For the moment it is sufficient for me to assert that it is the *decision aid* rationale that is the paramount one. To explain, a doctor uses the medical record (by writing entries, and reading items and documents contained within the file) to aid him- or her-self to come to a decision regarding the patient, in such a way that he or she is simultaneously able to maintain a social ascendancy within the encounter (cf Waitzkin and Stoeckle, 1976, p.265). In practice this has little to do

with the technical details of medical decision-making and more with what Bloor has called "those indiosyncratically developed rules of thumb" (1976, p.45) that are nevertheless systematic in their particularity (*ibid.* p.55) and are constructed with the intention of avoiding what Scheff has termed a Type 1 error ("to dismiss a patient who is actually ill") (1978, p.609). Unlike 'clerking', neither the criteria for the use of medical evidence nor the line of reasoning adopted are other than the doctor's own (based on medical knowledge and clinical experience). This means that the experienced doctor is freed from the need to follow a rigid format of history-taking, examination and investigations but can approach those facets of the medical encounter with considerable flexibility in order to save time and reinforce the patient's confidence in the chosen course of treatment. The use of the medical record in this way facilitates and represents an aspect of what Goffman has referred to as 'face-work' (1972) at least in the way it has been utilised by Strong, (1979, p.40) and is an integral part of the process of maintaining *functional autonomy*.

There are also other lacunae of a more substantive kind in the Bittner and Garfinkels' account. Firstly, there is no attempt to present an analysis of the actual clinic notes themselves and as a result we have to take the authors' functionalist analysis on trust (see Rees, 1981a, pp.6-7, for a similar point). Secondly, while indicating implicitly that variations will occur in the contents of different medical records, no attempt is made to find out whether there is any systematic variation, for example, between clinic members, whether in terms of status or specialties. If one turns to more recent studies relating to clinic records, these issues do gain some recognition. Both MacIntyre (1976) and Rees (1981b), for example, in their studies, of antenatal and gynaecological clinics and of case note writing on inpatient wards respectively, clearly indicate that variations do

exist. In one case it is the difference between specialties that accounted for the variations (MacIntyre, 1976) while in the other was the difference in career status (Rees, 1981b). These factors are important when one is attempting to analyse the role and content of the medical record. It is possible, of course, that the psychiatric outpatient clinic which was the subject of the Bittner and Garfinkel study did not include sufficient variation of individual clinic members and disciplines for this aspect to be included in the account.

In this section my argument has been that the medical record plays a crucial role in sustaining doctors' *functional* autonomy in the clinic, not simply as a record of patient diagnosis and treatment - for which purpose the file may well only have a limited usefulness - but as a device for controlling the medical encounter (see also Chapter 8). Therefore it is necessary to incorporate the subject within any analysis of *functional* autonomy. This is especially so when the research is concerned - as it is here - with the question of doctors' responses to the introduction of computer-based medical information systems. The reason being that medical records constitute the doctors' manual medical information system and will, implicitly if not explicitly, influence (or be affected by) the introduction of any computer-based system.

Now that the relationship between medical record and *functional* autonomy has been established it is possible to turn to the broader aspect of medical autonomy concerning the relationship between the profession of medicine and the state. I shall concentrate on the issue of professional accountability and, in particular, the topic of medical audit. My justification for this is that medical accountability and audit have been key areas of negotiation between the profession and the British at least

since the 'sixties and, moreover, they impinged directly on the question of the role of the medical record and its relationship to *functional* autonomy.

Hospital doctors, clinical management and medical audit

Hospital consultants, as has already been indicated, enjoy almost complete autonomy (i.e. freedom from *organisational* control) in relation to their management of patients. Consultants, in turn, are formally responsible for the work of the junior medical staff (Godber, 1969). Medical autonomy is not, however, immutable and unchanging. It has largely been the outcome of explicit and implicit negotiations between the profession and the state. Other factors have also been involved, including changes in patients' expectations with the consequence, in the USA at least, to an increasing willingness among patients to sue their doctors for malpractice (Stimson, 1985, pp.147-148). In addition, other members of the hospital division of labour have also challenged the medical autonomy of hospital doctors and in particular its hegemonic effects on the division of labour (Elston, 1977; Manson, 1977. pp.195-214)

Some of the concerns informing state policy were particularly clearly articulated by George Godber, the Chief Medical Officer until the early eighties. He argued that traditional assump-tions about medical autonomy required revision and the reasons he gave were,

(a) changing patterns of diseases,

(b) increased medical specialisation and

(c) increased application of high technology to medicine.

These three developments necessitated, he argued, a more 'collective' interpretation of medical autonomy. Chronic illness, increasingly the major concern of the health services, necessitated an integrated service over time, at least if the problem was to be effectively treated. Similarly,

specialisation and the use of high technology in medicine necessitated extensive cooperation between the hospital specialist and a whole range of other skilled and professional personnel (Godber, 1975, pp.85-106). Academic analyses were also coming to similar conclusions, and a good example here would be Elston's analysis (1977). The most important difference between the two accounts was that Elston considered that the general developments were to be having an eroding (rather than a modifying) effect on the doctors medical autonomy. She too pointed out the effects of changes in population and morbidity patterns as well as extending her analysis to include consideration of the challenge of other health service workers and the pressure from the junior medical staff for better pay, conditions and prospects which were not central to Godber's considerations. In the event, while the organised profession did have to respond to these developments the net result was that medical autonomy *within* the institutions of healthcare remained undiminished. This is not the same, however, as saying that the autonomy had been unchanged for, while the *functional* autonomy of the doctor-patient relationship was not affected, *institutional* autonomy was subjected to continuous negotiations and modifications from the mid 'sixties onwards. In the event the biggest challenge to the medical autonomy of the profession proved to be the issue of *resource constraints* (Elston,1977, p.30 and p.44). Doctors, both individually and collectively, were increasingly expected to become more cost conscious and consultants were pressurised to accept responsibility as *resource managers* and responsible for the costs of running their particular clinics (Garner, 1979, pp.114-117; Merrison, 1979; Griffiths Report, 1983, para.8.2).

The limits of professional autonomy and medical audit

The particular issue that brought together the issue of professional accountability and systems of control (including computer-based systems)

and, at various points, linked them to the issue of resource constraints was that of *medical audit*. Therefore, looking at this allows us to explain the broader character and parameters of professional control. This subject is explored here through an analysis of the historical developments of *medical audit* in Britain over the last twenty years, from the time of the introduction of 'divisionalisation' into hospital medicine ('Cogwheel', 1967a and 1967b). This history will be dealt with in terms of the concepts of *institutional* and *organisational control* as developed in Chapter Three. There will be a brief digression in order to present an account of the developments in the United States, necessary in order to clarify the nature of medical audit, for it is from that country that the British profession learnt of the subject.

The term medical audit is a general one which covers a plethora of techniques relating to the evaluation of medical care. The term 'audit' has been seen by some advocates within the medical profession to have connotations of an external assessment in a manner paralleling the practice of accountants. This has led to the common practice within the profession of using the more anodyne term of 'quality assurance' (Duncan, 1980; Shaw, 1980a, pp.1256-1257). This practice will not be adopted here and '*medical audit*' will be used as the generic term.

Medical audit originated in the USA with the American College of Surgeons (ACS) national standardisation programme for hospitals as far back as 1919. The roots of the movement can be traced back directly to the Flexner Report on medical education of 1910 (Maynard,1978) and reflected a real concern regarding the often inadequate arrangements for both the quality of patient care and the organisation of doctors within American hospitals at that time (Roemer and Friedman,1971, pp.36-37). It was also the case, however, that the ACS programme was one of self interest being

the response of the private interest of the doctors to the competitive anarchy of the market in medical care in the USA at that time. By implementing the national standardisation programme the ACS was able to enhance the status and income levels of its members (cf. Maynard, 1978, p.7).

Originally medical audits were little more than case meetings where the management of the patient was discussed. In the case of surgical specialities mortality and morbidity meetings would be organised. Such a meeting was sometimes known as the 'Death Round'. In practice these meetings appeared to have functioned less as an audit and more as a carthetic exercise for those involved (Arluke, 1977; Millman, 1977). While these meetings still take place medical audit methodology in the United States has become more sophisticated. Instead of reviewing individual cases, explicit, written *criteria* for judging the adequacy of the care provided was now established beforehand by the senior medical staff for the medical audit committee. The medical records staff had the responsibility for monitoring the clinical records and when discrepancies were found they brought them to the attention of the medical audit committee (Sanazaro, 1974; Shaw, 1980b). The formal requirement was that doctors found to be consistently substandard in their work were recommended for remedial education (Sanazaro, 1974).

This more sophisticated *criteria* method of audit is premised on a systems model developed initially by Donabedian (1966). The model comprises of three key elements, *structure*, *process* and *outcome* which together defined the components of medical audit within modern medicine (see *Figure 4.1*). The methods of medical audit generally preferred by the profession, in Britain as well as the USA, were those concerned solely with the 'process' element, which referred only to the clinical care directly under the doctors control. In contrast to process, 'structure' referred to

FIGURE 4.1 : THE MEDICAL AUDIT MODEL

STRUCTURE >>>>>	PROCESS >>>>>	OUTCOME
The hospital facilities and equipment, skill and qualifications of staff.	The clinic work processes directly under the consultant's control.	The patient's condition after treatment (i.e. morbidity, mortality and quality of life)

the setting in which the clinical care took place; the facilities and equipment, qualifications of staff, administrative and technical support and suchlike (*ibid.*, pp.169-170). 'Outcome', as the name suggests, referred to whether, and how well the patients recovered. This compartmentalisation of the major components of health care meant, however, that the medical care (*process*) is viewed as being central to the whole system and 'structure', including the work of nursing and paramedical staff, as well as 'outcome' can only be treated as residual factors. There have been debates surrounding the issue of 'outcome' and its measurement that have threatened the ascendancy of process evaluation (e.g. Cochrane, 1971; Illsley, 1980). But a major practical problem is that *outcome* studies are notoriously difficult to carry out. Tracing expatients, for example, is difficult and usually expensive. Furthermore, in cases of chronic illnesses the 'outcome' may be more a matter of the alleviation of suffering rather than whether the disease has been cured or not and the alleviation of suffering is very difficult to objectively measure (Cochrane, 1971; Illsley, 1980; Butler and Vaile, 1984). It is also the case, as Cochrane has clearly shown, many 'outcome' studies indicate that at least some medical procedures are less effective than might be supposed (*op cit*). Similarly, the Scottish Home and Health Department has reported that more than one third of all patients were dead within two years of leaving hospital and if they were not dead, the medical condition in over a half of the discharged patients was unimproved (quoted in Garner, 1979, p.114). It is hardly surprising,

therefore, that those in the medical profession that supported the introduction of medical audit tended to favour the 'process' varieties (including Donebedian,1966, p.168), for these *audits* were not overtly concerned with *outcome*. Clinical work is the 'intervention' in the disease process and by focusing on this aspect alone had the effect of drawing attention away from the condition of the patient (i.e. *outcome*). Moreover, with *process audits*, the doctors define the rules of performance themselves.

Medical organisation and audit in Britain

Prior to the publication in 1967 of the two reports, later known as 'Cogwheel' (1967a and b) there was little obvious interest among the medical profession in medical audit. At the same time the Department of Health was committed to challenging the profession on the issue of the cost and effectiveness of medical work. The challenge first became public with the 'Cogwheel' recommendations concerning the organisation of medical work in England and Wales (1967a) and Scotland (1967b). Both reports recommended the introduction into the NHS of a "*divisional* system of staffing similar to that widely used in North America..." (BMJ., Leading Article, 1967), although it was only the Scottish report that contained any specific reference to medical audit *(ibid)*. Nevertheless, even the 'Cogwheel' report for England and Wales (1967a) made specific reference to,

> " the review of hospital bed usage against the background of community needs, the organisation of outpatient and inpatient services (and), the *review of clinical practice*,". (Quoted in Forsyth, G. *et al.*, 1971, p.5. *emphasis added*).

It was hardly surprising that the leading articles in the BMJ on the week of the reports publication did express concern that, whilst the divisional system (3) might well promote the,

> "more efficient use of beds, staff and equipment. The

> danger is that a doctors freedom to treat his patients as he sees fit (clinical autonomy) may be eroded by the adoption of *uniform* regiments of management" *(op cit)*.

In short, the essential ingredients of an institutionalised system of medical audit (the review of clinical practice) was contained within the 'Cogwheel' reports.

In practice the divisional system recommended by the 'Cogwheel' reports was often no more than groupings of the traditional consultant-led 'firms'. This led one hospital doctor, at least, to comment in a letter to the BMJ.,

> "One has been encouraged ...to find as expected, that there are many ways of playing Cogwheel - by various paper schemes... designed to satisfy the administrators..." (BMJ., 30th January, 1971, p.29)

In rather less cynical terms, Forsyth came to a parallel view that the reorganisation of hospital doctors into divisions had not necessarily led to the development of better controls over costs and quality of medical care. This he argued was because the doctors and others involved did not always fully accepted their new responsibilities (1971, pp.41-43).

The profession's strategy

Neither the BMA nor the Royal Colleges recommended, or accepted, the kind of medical audit contained within the 'Cogwheel' Reports. Any development of medical audit during the latter half of the sixties was entirely of a local and voluntary kind (4). Medical audit did not emerge as a major issue for the organised medical profession until 1971. And it did so because the profession was becoming disquieted by the lack of discussions between themselves and the Department of Health over the then proposed reorganisation of the NHS. In the words of a leader writer in the BMJ,

> "...there is ...serious concern among doctors about the virtual

> exclusion of the health professions from the management in the reformed NHS. They are concerned lest *clinical care* will take second place and patients will suffer... Medicine is not the same as business..."

And further on,

> " If the Consultative Document ("Grey Book",1971) is translated into legislation, then the Health Service is destined to have management based on *cost effectiveness* ... It is not the way to provide good medical care..." (BMJ.,
> Leading Article, 1971a *emphases* added).

It was in this pre-reorganisation period (1971-74) that the organised profession, or at least its leadership, at the British Medical Association (BMA), began to recognise the potential of medical audit as a basis of a counter strategy to thwart that of the state. The medical profession considered the proposed NHS reorganisation, at least in part, as constituting an unwarranted encroachment into a doctors proper area of autonomy; the organisation and control of medical work. This was no doubt in part because they were becoming concerned that if the profession did not take the initiative the DHSS would. The profession, for example, had to be reassured by the Permanent Secretary to the DHSS that the term "monitoring" which is used in the "Grey Book" (1971) (the consultative document relating to the NHS reorganisation) "did not entail the right to give orders (to doctors)" (BMJ Supplement 16th December, 1972, p.97) and later the BMA was able to tell its members that the new specialism of Community Medicine would not be used to operate as a system of clinical audit (BMJ Supplement, 3rd February, 1973, p.29).

One can clearly trace the rise and fall of the medical audit strategy of the organised profession in the pages of the BMJ. On the 20th November, 1971 the journal contained a leader article and the first of a series of (three)

articles which *directly* linked the then proposed reorganisation of the NHS with the issue of medical audit. The 'leader' was concerned with a book of essays, edited by G. McLachlan, entitled "Challenge for Change". Whereas previously the leaders had tended to emphasise the perceived excesses of the reorganisation proposal (e.g. BMJ, 1971a quoted above) this one asked, "But is what the Government has proposed ...enough?" and with reference to the introduction of the book argued for the then proposed reorganisation to become more than simply a reordering of management structures and functions. The leader writer clearly wanted the agenda of the book's authors, brought to general notice within the profession,

> "In their introduction... (the editors) put forward four proposals which specially merit the professions attention:
>
> (1) to develop a philosophy of health services... without political or professional bombast;
>
> (2) to develop 'series of objectives for the NHS... ;
>
> (3) *the monitoring of the quality of health care*; ..
>
> (4) the development of a coherent manpower policy"
>
> (BMJ Leader Article 1971b, p.443. *emphasis added*)

Here we have for the first time, medical audit being advocated as the means of defending the interests of doctors. The argument developed in the article was that if the profession could make "their concerted views, based on thorough research,.. continuously availible to local and central health authorities" they were more likely to be able to "claim .. a bigger share of national resources for the NHS ..." (*ibid.*). In other words medical audit was being promoted within the profession as a means of defending their interests and not as a means *per se* of improving the efficacy of medical diagnosis and treatment, although improvements in medical care might follow.

A primary reason for this proposal was that doctors were being criticised

by the DHSS for the problems clinical freedom gave rise to in relation to forecasting the annual budget of the NHS (*ibid*; Garner, 1979, p.30). The leader writer's response to this claim was to argue for a system of medical audit controlled by the profession, for it was the doctors'

> "*collective duty* to suggest improvements in health care, *within* resources likely to be available..." (*ibid*. Some *emphases* added).

This notion of professional responsibility, which relates to concern for the interests of the institution rather than the individual patient is a point doctors have not often made.

The actual strategy adopted by the BMA was not in the event a very coherent one. The problem was a lack of organisational unity within the BMA. The Association's leadership attempted to overcome this difficulty, which was a general one, by reorganising the BMA. The problem for the leadership was that the Association's Council had few executive powers and was considerably constrained by the Representative Body (of the membership) in its negotiations with the government particularly during the period of reorganisation of the NHS. The BMA attempted to remedy this by instigating its own reorganisation, Sir Paul Chambers was asked to investigate and make recommendations. This he did and the resulting report appeared in a BMJ Supplement (6th May, 1972, pp.45-67). The changes in the balance of powers between the Council and the Representative Body may well have had some effect on the efficacy of the organisation of the BMA, but if it did the issue of *medical audit* was an exception. The reason for this was that while the leadership (the Council) of the BMA were willing to accept medical audit in a number of forms (so long as it was totally under medical control) the membership took a very long time to be convinced.

From 1972 onwards the issue was discussed in one form or another at the Annual Representatives Meetings of the BMA and specifically from 1977, but it was not until 1981 was the policy of promoting medical audit organised and

administered by the medical profession finally accepted (5), despite the leaderships known preference on the matter over a number of years. This lack of firm policy and commitment gave rise to criticisms within the report of the Royal Commission (1979).

Other pressures

Pressure for doctors to be accountable for their mistakes has taken a number of forms over the last twenty years. The leadership of the profession intended the introduction of medical audit to be the means of defusing these various threats to the doctors' autonomy.

The profession was being made aware, by the early seventies, that there was considerable public and political pressure for doctors to be more answerable to the state administration (ultimately the government minister and parliament) for the quality of medical care delivered, particularly in the cases where mistakes were believed to have been made. There was between 1971 and 1975 the publication of three government reports that in different ways were concerned with 'medical mistakes', these were,

(a) the committee of enquiry into Farleigh Hospital (1971)

(b) the "Report of the Committee on Hospital Complaints Procedure" (Davies Report, London, HMSO, 1973)

(c) The Committee of Inquery into the Regulation of the Medical Profession (Merrison, 1975)

These three reports were in varying degrees evidence of the concern of the administration and other interested parties that doctors were too well protected against the complaints of patients, and others. To explain, the 'Farleigh Enquiry' recommended the appointment of a Health Service Commissioner ('Ombudsman'). The recommendation was implemented towards the end of 1972. Although the powers of the 'Ombudsman' did not extend initially to matters of clinical judgement (*autonomy*) this did change in 1981 when, in Klein's words, a "compromise was

cobbled up" (1983, p.163) which permitted complaints into the quality of medical treatment to be investigated although only in a form totally controlled by the medical profession (*ibid.* pp. 84 and 163). The BMA at the time of the report of the original enquiry experienced a sense of

> "'grave disquiet ' over many of the details. (and) did not believe that any convincing case had been made in favour of appointing a commissioner..." (BMJ Supplement, 29th January,1972, pp.29-30).

Nevertheless the 'Ombudsman' fared better than the recommendations of the 'Davies Report' which called for internal reforms. This report was an attempt

> "(T)o provide the hospital service with practical guidance in the form of a code of principles and practice...(relating to) matters affecting patients which go wrong in hospitals..." (p.3, para. 1.1.)

This guidance principally concerned the 'overhaul' of the system of handling complaints from patients and their possibly litiguous consequences. In addition, and pertinent to the issue of medical audit, the report also recommended that the system of external checks available through the services of the Health Service Commissioner, the Community Health Councils and the Hospital (now Health) Advisory Service should have their "functions, powers and constitutional status ... reviewed and ... reformed or supplemented as necessary" (*ibid.* p.104, para 60). This report despite being nominally accepted by the government was never implemented. Not only did the BMA oppose it but apparently no major group within the NHS lobbied for its implementation (Martin, 1984, pp.151-154).

Turning now to the Merrison Committee (1975), initially the organised profession (*institutional control*) was concerned that this committee might recommend a system of medical audit not fully under medical control (cf. BMJ Supplement 23rd June, 1972, p.133). For this reason the BMA called a Special

Annual Representatives Meeting (ARM) that year to consider their evidence to the committee of enquiry. The problem for the BMA was that if they simply said that there were already sufficient safeguards to maintain the professional competence of doctors the Committee might not believe them. Yet if they said that outside regulations were unnecessary because the profession was already dealing with the matter and were in the process of setting up its own committee of enquiry *(see below)* then that might also be seen as an admission that new forms of regulation and monitoring were required in the profession. The BMA were clearly pessimistic regarding their powers to convince. The dilemma for the profession, however, was not a very real one. By the December of that year (1973) Dr Merrison was seeking the advice of the BMA on the question of 'competence to practice' (one aspect of medical audit). The BMA chose to respond by telling Dr Merrison, possibly in less tortuous prose, that,

> "an advanced stage was being reached in preliminary arrangements for setting up the professions inquiry into the subject. Dr Merrison would be advised as to its progress" (BMJ Supplement, 22nd December, 1973, p.86)

This the Merrison Committee found satisfactory and were quite prepared to leave the matter of the "surveillence of doctors competence" (BMJ, 26th April,1975, p.156) wholly in the hands of the organised profession. The Committee touched upon this matter in terms of 'relicensure' (6) commenting only that,

> "We do not wish to prejudice the consideration of schemes of relicensure, especially because the medical profession is in fact mounting its own inquiry in this field..." (Merrison, 1975)

This internal committee of enquiry into "Competence to Practice" of the organised medical profession. The Committee was chaired by E.A.J.Alment (Consultant Obstetrician and Gynaecologist) and had 19 members; 7 were from the BMA., 7 from the Royal Colleges plus 4 more representing medical education and

postgraduate training (Alment,1976, Appendix 1; BMJ Supplement 27th April, 1974, p.30).

Too little too late

The Alment Report can only be described as anodyne, although the BMJ leader preferred to diplomatically ask, "Do these proposals go far enough?" and go on to point to the reluctance of some clinicians to change their ways and the DHSS's desire for clinicians to be responsible for the rationing of the limited resources availible for medical treatment (BMJ Leader, 'Separating the Sheep from the Goats', 20th November, 1976). This intertwining of the issues of clinicians' responsibilities for the *quality* and *costs* of medical care were to become increasingly pronounced, and certainly so after the Royal Committee's report (1979) *(see below)*

On the specific issue of medical audit the Committee found 'peer-group reviews' and 'self assessments' acceptable so long as they were solely for educational purposes and no sanctions were "deployed against those who appear to do less well than their colleagues" (*ibid.* p.55,para.9.12). Medical audit was thought to be "threatening to a professional" for the establishment of "norms" of good practice might be interpreted as rules for doctors to obey. Furthermore, these "norms" might be used by "employers and others to serve their own purposes..." (*ibid.*, p.37,para. 6.9). It was recommended that peer reviews should be encouraged by the Royal Colleges and their faculties who should also carry out such activities (p.39, para. 6.14). This the 'Colleges' did and the results were subsequently reviewed in 'Reviewing Practice in Medical Care' (McLachlan, 1981). Alment in the Prologue to this book indicated that the major reason for the cautious tone of his report was that the committee was concerned to avoid internal polarisation and antagonism within the wider profession. The committee had also been at pains to point out that a high standard of care was dependent on the "level of resource availability" (*ibid.*, p.55, para. 9.8) which was not seen

as being the responsibility of the doctor. They argued instead that "there is a level of resource availability below which doctors are not able to provide reasonable standards of care" (*ibid.*, p.30, para 5.20).

Baulking at these twin issues of quality and costs weakened the organised profession's influence in determining the future of the NHS, as the subsequent Royal Commission (Merrison, 1979) and the more recent organisational restructuring (Griffiths Report,1983) have indicated (*see above*). In short, the organised profession had great difficulty in 'cobbling together' a workable consensus and was in a state of some disarray on these issues long after publication of the Merrison Report (1975). This inability to develop and sustain a coherent policy on these issues was to have its implications for the profession when it again came under public scrutiny in the form of the Royal Commission which reported in 1979 (Merrison,1979). The BMA was unable to gain formal membership support until the appropriate motion was passed at the ARM in 1981 (*see above*). This only added to the leadership's problems and in its evidence to the Royal Commission the BMA were forced to equivocate over the issue of medical audit, commenting that "its place ...in health care is still controversial" but if it was to be inevitable it should be carried out by the profession as a whole (BMJ Supplement, 29th January, 1977, p.301, para. 2.5). The BMA also regretted "any suggestion that there should be 'medical audit' by the state" (*ibid.*). The Royal Commission had reservations about the medical professions will, if not its ability, to implement medical audit, for they commented,

> "...(W)e are not convinced that the professions generally regard the introduction of audit or peer review ...with a proper sense of urgency" (Merrison, 1979, p.176, para. 12.56)

and recommended that,

> "... (A) planned programme for the introduction of audit or peer

> review ... should be set up for the health professions by their professional bodies and progress monitored by the *health departments*" (*ibid.*, p.370. para.63, *emphasis* added)

The report also favoured doctors becoming their own resource managers and holding their own budgets - a proposal currently being implemented as part of the Griffiths reorganisation (1983). The overall tenor of the commissions report was that the profession would be required to give up some of its *institutional control* and for doctors to accept greater *organisational control*.

Medical audit: the outcome

The medical audit strategy of the leadership of the medical profession was intended to bring about the introduction of an effective system of peer review with the objective of ensuring the maintenance and improvement of the *quality* of clinical care within hospitals without reference to costs. There were those in the profession who supported this development as desirable in itself, but the principle aim of the strategy was to prevent, or make unnecessary, the introduction of externally designed control systems aimed at making hospital consultants more accountable to third parties (including the state) than previously either for medical mistakes or resource management. This strategy, as we have seen, never wholly cohered. This was largely because the membership were unconvinced of the merits of medical audit either as practice or policy as evidenced by the fate of the recommendations of the Alment Report and the BMA's inability to get formal support in time to counter criticism from the Royal Commission into the NHS of 1979. Even so, the strategy of the profession's leadership did postpone for over a decade any serious negotiations between themselves and the state administration over the matter of controlling clinical costs.

The long term managerial strategy of the state administration has been to attempt to incorporate hospital consultants more fully within the system of

organisational control. Earlier attempts to introduce a greater measure of medical accountability associated with the introduction of the divisional system of medical organisation of 1967 and the NHS reorganisation of 1974 were unsuccessful because no way was found to breach the profession's monopoly control of medical work. The DHSS (the state), and others that Klein (1983) has referred to as the *paternalistic rationalisers* wanted hospital consultants to become explicit resource managers. But it has been the *market reformers*, to adopt Alford's term (1972), who have brought about the changes in the NHS aimed at limiting the autonomy of hospital consultants by insisting they take responsibility for their clinic budgets (*resource management*).

It was the Körner Committee, set up to examine and make recommendations regarding the basic information systems required for effective management of the service (discussed in Chapter One), that re-established the issue of clinical budgeting as part of NHS policy (DHSS ('Körner') The First Report; the collection and use of information about hospital clinical activity, 1982). The Committee's recommendations were made mandatory by the Secretary of State in 1984 (BJHC, Summer, 1984, p.32) and reinforced by the recommendations of the Griffiths Report (1983),

> "Doctors should be closely involved in local management through the development of management budgets for which they would be accountable.." (Statement on the NHS Management Inquiry ('Griffiths'): Tuesday 25th October, 1983, p.2 Secretary of State to Parliament)

While the implementation of clinical budgeting has not proceeded very far, as yet, this development does show that the issue of doctors (i.e. hospital consultants) having responsibility for controlling clinical costs has remained on the administrations agenda for a considerable period of time. The medical audit strategy organised by the leadership, and some 'segments' of the profession

(Stelling and Bucher, 1973), has not changed that priority. While the doctors are not losing their dominant position in the division of labour of healthcare they have been, and remain, under considerable and sustained pressure to take managerial responsibility for their clinical budgets. It remains the case, however, that doctors collectively have never wanted the formal responsibility of allocating scarce and life sustaining resources according to *financial criteria*. It remains to be seen whether the formal requirements to adopt clinical budgeting will be carried through into practice, or whether the doctors will continue to prevaricate long enough for the circumstances to change sufficiently to become avoidable, or at least transmuted into ineffective "paper schemes" as happened with the Cogwheel arrangements (see page 96 above).

Conclusions

This chapter has extended the analytical discussion developed in Chapter Three in two specific ways. Firstly it has identified some of the control features of clinical (*functional*) autonomy as they are encapsulated in the activity of note taking and the clinical record, and secondly it has discussed the lengthy debate between the organised profession and the state about the institutional framework of clinical autonomy which has centred on the issue of medical audit. Having set out the these features of the patterns of clinical (*functional*) and institutional (*professional*) autonomy, I can now turn to the specific case study investigations of computerisation to be presented in Part II.

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NOTES

1. The medical record does not contain details of all aspects of the patients treatment for the members of the seperate disciplines maintain also maintain their own records (e.g. nurses, social workers, physio-therapists, etc.).

2. Organisational records have been a of interest to the organisational sociologist ever since Max Weber identified written documents ("the files") as being a key characteristic of legal-rational bureaucracies (Weber, 1957 reprinted in Gruskey and Miller, 1970, p.6. see also Albrow,1970, p.44). There is however a fundamental difference between the Weberian and the ethnomethodological analyses. Weber defined the role of the administrative records as an instrument of administrative control within monocratic systems of administration (i.e. bureaucracy), by contrast, Bittner and Garfinkels' analysis (1967) was concerned to show the limitations of clinic (i.e. organisational) records as information systems for administrative purposes.

3. The divisional system of medical organisation advocated by the 'Cogwheel' reports (1967a & b) entailed the organisation of hospital doctors into 'divisions'. These divisions would normally be according to medical specialities, or clinical areas. The chairpersons of the divisions within a hospital, or group of hospitals, would form the medical membership of the medical executive committee. The report also stressed the necessity of the divisions liaising with nursing staff, other occupational groups and the administration within the health service.

4 I do not refer to the various 'confidential enquiries' some of which have been in existence for decades (e.g. The Confidential Enquiry into Maternal Deaths (Godber, in MacLachlan (ed),1976). Whilst these

are directly related to the principles of medical audit they have been very much a separate development.

5 For items on medical audit between 1972 and 1981 see BMJ Supplements for,

24th June,1972, p.168. Motion 284, and p.133. "Competence to Practice"

29th July,1972 "ARM Professional Standards"

13th August,1977, p.474 "From the ARM: Competence to Practice.

17th June,1978 "ARM Agenda"

14th July, p.143 "From the ARM: Medical Audit"

14th June,1980, p.1467 "ARM Agenda"

July,1980, pp. 243-244

18th July,1981. "From the ARM: Medical Audit"

The motions and debates 1973 - 1976 subsumed medical audit under other issues notably the Merrison Inquery. See for example "From the ARM: Competence to Practice" 23rd June,1973.p.133 and more generally, "BMA Special Representatives Meeting" 16th June,1973.

6 'Relicensure' refers to a system of retraining or reeducation whereby doctors have their medical knowledge, and perhaps skills, updated at intervals. If a doctor fails such a course he, or she, could lose their license to practice medicine. However no such system exists in this country. And in the USA relicensure appears only to apply to the 'impaired physician' (Stimpson, 1985) despite earlier pronouncements that relicensure would apply to all physicians (Sanazaro, 1974, p.274)

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PART TWO

CHAPTER FIVE

METHODOLOGY AND THE RESEARCH PROCESS

Introduction

This chapter starts with an account of the 'natural history' of the research in order that the issues and the ethics of sponsorship and funding in relation to this research can be fully discussed. Only then, in the second half of the chapter, will the the methods used be discussed and their contribution to the final description and analysis be assessed.

The natural history of the research

My interest in hospital doctors and their usage of computers developed out of discussions I had with colleagues, Geoff Stanley and Tony Charles around 1979-1980. At that time they were carrying out research into the impact of a computer-based patient administration system at a district general hospital (DGH) (Charles and Stanley, 1983). It was from these discussions that I became aware for the first time the extent of computer developments within the NHS. There was also at this time great interest in labour process arguments particularly as they applied to the analysis of manual or routine clerical work in the market sector (see Chapter Two). What particularly interested me was whether the theory, in some form, could be utilised to analyse the labour process of NHS hospital clinics which, in contrast with industrial and clerical work, were,

(a) professional hierarchies,

(b) within non-market organisations,

(c) in the public sector.

It was not the doctor-patient relationship that principally concerned me but what Freidson has referred to as *medical dominance* (1970b), that is the central, and dominant, role of hospital doctors within the division of labour of hospital clinics. In this context, I judged the issue of the introduction of computer systems into hospital clinics to be an appropriate subject for study, for the following reasons,

(i) the hospital clinics as a professional work setting presented a critical - or strategic - case for labour process theory.

(ii) computerisation had exercised the minds of many sociologists and others working within the labour process 'tradition' (e.g Braverman, 1974; Kraft, 1979; Glenn and Feldburg, 1979; Crompton and Reid, 1982) as well as many within the discipline of organisational theory (e.g. Whisler, 1970; Blau, 1970; Blau *et al*, 1976) (see also Chapter Three).

(iii) the substantive issue of computerisation could also be anticipated to be of some interest to those working within the prospective research settings and this interest could aid the process of negotiating research access.

Bearing these points in mind I now turn to the discussion of the issues and difficulties involved in the selection of, and gaining access to, the research sites.

Sponsorship and accomplishing access

Access proved to be a difficulty. My first attempt, which was in 1980, involved a comparative study of two professional groups (hospital doctors and computer specialists) within one hospital complex, but my request to the hospital authorities for permission to carry out the research was turned down (1). My subsequent attempts were more successful, largely because I took a more considered and circuitous approach to gaining research access. First, I found out what I could about some of the major computer manufacturers involvement in the NHS. This I did by interviewing members of their marketing organisations (IBM, ICL and NCR) (2). Second, I followed the advice of Dalton, but without the explicit deviousness in his method, in that I cultivated contacts ('intimates') within the health service and involved in hospital computing (1959 quoted in Gruskey and Miller, 1970 p.162). One of these people was particularly helpful in (a) telling me about the NHS computer experimental programme and its evaluation and (b) directing me to two senior officers, one at region the other at the DHSS, directly involved in the NHS computer programme who might possibly be able and willing to assist me in identifying suitable sites for my research project. These two senior officers gave me a lot of information regarding the history, policies and a little on the politics of healthcare computing from a 'top down' perspective (i.e. regionally and nationally). One of them did give me the name and telephone number of a hospital consultant, Dr Old, who was at that time, just in the process of introducing a computer-based medical information system which is the subject of Chapter Eight of this thesis (below). This officer knew from talking with Dr Old (they were members of the same regional computer committee) that he was on the look out for someone interested in carrying out research into the doctors attitudes to

the computer system.

All of these initial interviews were taped and fairly lengthy (typically 1½-2 hours). My objectives were to find out about (a) the history of computer developments (and the involvement of the manufacturers), (b) the then current situation within the region as well as (c) to follow up leads that might lead to an introduction to a doctor or group of doctors in the process of introducing a computer system within a clinic or group of clinics within a hospital. The strategy did eventually work both in terms of a familiarisation process and as a means of building up contacts with a network of people directly involved with computer developments within the NHS and especially within the region.

The first research site: St Giles Outpatients' Department

I met Dr Old for the first time in May, 1981. The first meeting took the form of my interviewing him. In this way he was able to make his own evaluation of my request to carry out research relating to the introduction of the computer system he was about to introduce into the outpatient department of the hospital. Following my interviewing him he asked me to send him copies of any material that I may have published, but as I had none I sent copies of relevant student handouts. He then proposed in a letter that we collaborated on the research. This proposal initially flummoxed me as I was unsure what would be involved, whether it would constrain the fieldwork, raise problems of confidentiality (discussed below) or would limit my ability to publish details of the resulting research unhindered. What Dr Old intended by the proposal was that he could use the research for inclusion in any papers and articles he might publish as his own, while I might publish accounts of the research as and where I wished. Having clarified the matter I agreed to this rather odd collaborative arrangement; there were no plans to publish papers jointly.

Dr Old had been involved in developing medical computing for more than a decade. He had now become interested in gaining a better understanding of the psychology and sociology of the issues involved and I was the only 'half way decent' social science researcher to show a direct interest his particular project despite his own contacts with a number of universities and researchers. I seemed to have had a certain scarcity value. To start with I entertained suspicions of Dr Old's motives in terms of his using me as a free research assistant, manipulating research access, and possibly restricting publication of any results. In the event none of this happened. We would argue and discuss methodology, the role of consultants, medical dominance, bureaucratic vs professional control, patients and the medical encounter, the role of community medicine, and of course developments in medical computing particularly the CORES system. There was never any attempt to influence my work or its interpretation except through argument and debate which was always very useful for me and did not prejudice my autonomy. One crucial aspect of the collaboration was that Dr Old won a research award in January 1982 for my work from the Region's Research Committee to cover my travelling expenses (3).

To gain access to the hospital in order to carry out the research it was necessary for me to write to the chairperson of the CORES Steering Committee (Dr Old) requesting permission, stating my research intentions and methodology. Permission was granted in June, 1981. Dr Old also offered me access to the District's Computer and Information Advisory Group, which he also chaired, as an observer at about the same time. This allowed me to both understand the CORES project within the broader district context and monitor the decision making processes at district level regarding the CORES system. This latter arrangement was of little advantage to Dr Old

but very useful to me. In short, this consultant was an extremely helpful (facilitative) gatekeeper and sponsor in providing access and support for the research (cf. Hammersley and Atkinson, 1983, pp.63-68 and 72-76; Burgess, 1984, pp.194-197). Initially he had hoped the CORES project would prove to be a successful innovation but even when his consultant colleagues had stopped using the system he made no attempts to influence my work. In part this was because he found the conclusions intrinsically interesting both in terms of the account of collegiate solidarity and as an analysis of the use of medical records/clinical notes (and the relationship between the two with regard to the specific CORES project) (see Chapters Six and Eight). More fundamentally, however, Dr Old was committed to the precepts of good ethical practice in the conduct of research, I at least could not fault him.

I did encounter one awkward problem in negotiating research access. A regional management services officer viewed my presence as a threat to his own project of developing a new system of computer evaluation. As a means of resolving this conflict of interest we negotiated a 'treaty' in which I would not interview secretarial or clerical staff (at least during the period of the officer's evaluation period of six months). At the time I did not see this as being more than of nuisance value. My larger concern was to maintain good and open communications with both hospital and regional staff. I had plans to carry out further research in the NHS. However, what it did mean was that research material on the clerical and secretarial staff was gained by observation and informal conversations and questioning, not taped interviews. One result of this compromise was that I failed to monitor fully the reluctance of most of the medical secretaries to the implementation of the CORES system and this was a key reason why the data entry was carried out by clerks (see Chapter Eight).

Comparative analysis

Having organised the research for the CORES element of the project I needed to look for (an)other research site(s) for comparative purposes. At first I had seriously considered remaining with the single case study for it seemed to me to have particular strengths; it enabled me to study the variations between clinics and specialisms within the broader organisational framework of the hospital, health district and region. Moreover, I thought the study could be extended to include consideration of the involvement of the DHSS and the computer manufacturers in the development of medical computing generally. Another reason was that I believed that it would be quite difficult to include a suitable comparative case study (or studies) because,

(a) medical computer system for use by hospital doctors were not in common use,

(b) even if I did find a suitable site there was no guarantee that the computer system would be implemented within a time scale synchronous with my own research timetable.

My general strategy would have been to put greater emphasis on the policy, decision making and politics of the relationships between doctors, health service and DHSS than, in the event, appears in this thesis.

I came to realise over time and with prompting from my supervisors that a comparative element was needed on the grounds that,

(a) the variety and types computer systems and doctors experiences could not be indicated from one case study and

(b) it would at least enable an assessment to be made as to the uniqueness of the St Giles setting and the comparison would make possible the identification of any *disconfirming instances*.

Without the inclusion of another case study any conclusions drawn from the CORES case study would be limited. Only by comparing the St Giles case study with another site, or sites, would it be possible to begin to come to any general, theoretically informed, conclusions regarding the medical labour process and the implications of the introduction of information technology into hospital clinics.

Given the qualitative design of the research it was not desirable to simply replicate the St Giles study. One of the main objectives was to search out *disconfirming instances* to the analysis and conclusions from the first case study. To do this most effectively I thought it best to find a hospital setting and computer system sufficiently similar to the CORES system to make comparisons meaningful but different enough in the clinic organisation, specialties and the computer system to be able to ascertain whether the labour process analysis, as applied to hospital doctors, had any general applicability.

The selection of the comparative case studies

The task of finding a comparative site proved to be very time-consuming. Between January, 1982 and July, 1983, I explored the possibilities of three different systems for use by hospital clinicians before committing myself to the Renal System. It will be useful here to present, at least briefly, details of all the three systems considered for inclusion in order that (a) the methodological problems associated with finding an appropriate case study, or studies, can be discussed and (b) in order that the system selected for study might be understood within the broader context of the choice and variety of systems (then) being developed and introduced within the region

1. <u>The A & E System</u>

In January, 1982 I was told, during the course of an interview with

a senior administrator, of the existence of a computer-based Accident and Emergency (A & E) system being introduced within the region. I visited the Accident and Emergency Unit involved in the March (1982), was shown the unit and and computer system, met some members of staff and interviewed the consultant concerned. The A & E system was one the consultant was familiar with having used it in his previous post which had been in another region. One of the main objectives of the system was to improve the system of patient records in the unit in order that patients and their injuries could be better monitored for patient management and research purposes. Under the manual system of patient records a new record card was made on every occasion a patient presented themselves for treatment and there was no easy way of identifying the number of times a person might present themself or their child(ren) for treatment. The main reason for this was that the unit, like all A & E clinics, was organised on the assumption that patient visits were exceptional not routine and once the immediate cause of the patient being presented had been dealt with the patient record was closed. Only patients transferred onto a ward or given an outpatient appointment would have their cases written up in the hospital medical records (i.e. in addition to the A & E unit's own records).

There would not have been any difficulty in gaining research access to this site. As a comparative case study to St Giles, however, it was limited for the system only involved one consultant (plus the medical, nursing secretarial and clerical staff) in a single A & E unit and what I was looking for was a site, or sites, with several consultants using or committed to using a computer system in their medical work.

2. Orthopaedics Information Retrieval System

In December, 1982, I was made aware from references made to it at

the CORES Steering Group Meetings that the CORES system was also to be implemented in an orthopaedic hospital elsewhere in the region. I interviewed the consultant responsible for the systems introduction in the spring of 1983 and found out that six consultants intended to use the system for both clinical and research purposes. Moreover, the system was being introduced to replace and improve upon the pre-existing computer-based medical information system that had been in existence for fourteen years. Again research access was readily arranged.

There were two factors, however, that prevented this hospital becoming the comparative study. First, the system was exactly the same as that being used at St Giles, and therefore, presented no opportunity to compare variations between different types of computer-based medical information systems. Secondly, the timescale for implementation was inordinately slow, and eventually (towards the end of 1983) I gave up the any idea of this site being included within the study. I continued to attended their computer project steering group meetings regularly until about a year ago and have organised a separate research project at this site that started in 1987.

3. The Renal Computer System

Back in 1982 I was made aware from conversations with Dr Old, of the intention of the Regional Health Authority to fund and give technical support for the introduction of a region-wide computer system in the renal units. The proposal was to introduce a computer 'package' providing a comprehensive clinical data system to all of the five renal units in the region.

My introduction to the consultant who had been responsible for introducing the system (Dr Earl) was made by Dr Old over the telephone and immediately followed up by my visiting the renal unit in July, 1983. The

relevance of this detail was that Dr Old and Dr Earl were in opposite 'camps' in the then regional debate as to what computer system was to be used to support the Renal Computer System (see Chapter Six). Yet despite my association with Dr Old, Dr Earl was quite happy for me to carry out my research - he readily believed my protestations that I was not a 'fifth columnist', or a St Giles system 'mole' committed to undermining the credibility of the Renal Computer System but a hard working sociologist trying to complete a research thesis. Furthermore, this consultant was to be of great help to me in gaining the formal support I needed from the Regional Renal Computer System Steering Group in order to carry out the research at the renal units within the region. It was he who advised me who to write to as well as explaining my interest and involvement at the meeting (at which I would not be present). My interpretation of the reasons for Dr Earl's cooperation and support is as follows,

(i) like many consultants, he was not antipathetic to research.

(ii) the renal unit for which he was responsible was to be the 'pilot site' for the system. It was to be evaluated by the region's management services division, but my project gave him the prospect of an independent research report.

(iii) any report I might produce would not cost anything to the consultants.

I eventually came to accept that the renal computer system was to became the focus of the comparative case study, although the decision was not a clear-cut one for the timescale for the implementation of the system at all the five renal units was too long for the purpose of inclusion in this thesis. In the end (mid 1984) I compromised and included only the first two renal units to use the computer system in this study.

The case studies selected: similarities and differences

Clearly the selection of the Renal Computer System as the comparative study to the CORES system at the St Giles Outpatients' Department was, to large part, dictated by what was available. Pragmatism, however, was not the only criterion, for what was being sought were cases that offered contrasting settings to the various specialisms working within the outpatients' department. This was required in order to find out what was generalisable from the the specific work processes of the St Giles outpatients' clinics to medical work generally. To do this most effectively within a qualitative methodological framework it was necessary to find comparative sites and systems that contained elements that distinctly contrasted with the St Giles setting, particularly in relation to the clinic work processes and division of labour. The full list of the criteria for comparison is set out in Table 5.1 (below). These similarities and differences (see also Chapter Six, Figure 6.1) were such as to offer broad scope in examining, comparing and contrasting, doctors' methods of using different types of computer-based medical information systems within different specialties including importantly the *intended* and *unintended* consequences for the clinic labour process. Nevertheless, as qualitative research it would not be possible to make any universal generalisations from the subsequent research findings, but it could go some way to fill the hiatus within the medical computer literature in detailing the reasons why clinicians seemed to be generally reluctant to routinely utilise computer-based medical information systems (see Chapter Two). Moreover, it would be possible to identify *disconfirming instances* - for example concerning the role of case notes within clinic work - that might contradict the convential wisdom of those involved in developing computer systems for hospital doctors. Lastly, the field research was part of the

TABLE 5.1 CRITERIA FOR COMPARISONS

1. The case studies were broadly comparable in terms of the numbers of medical staff involved. There were 8 consultants plus 16 junior medical staff included in the CORES study and 6 consultants and 15 junior medical staff within the Renal Computer System study (see also Tables 5.2 and 5.3).

2. The CORES system was implemented on an experimental basis whereas the Renal Computer System was a turnkey system. The two systems were, however, sufficiently similar in design to warrant comparison.

3. The coordination and control of the computer implementation process was different in the two cases; the CORES system was implemented under the direction of a multi-disciplinary steering group while the Renal Computer System remained under the control of the consultants computer steering group

4. The division of labour relating to the data input and accessing the systems' outputs was very different in the case of the two systems.

5. The CORES system involved a number of medical specialties, while the Renal Computer System was designed and implemented within a single specialism (renal medicine).

6. The two renal units were, in turn, markedly different in terms of size and complexity.
   (a) the first unit (Haemo) was employed a smaller number of medical and nursing staff than the second unit (Dialysis and Transplant)
   (b) The first unit offered haemodialysis therapy only while the second also offered Continuous Ambulatory Peritoneal Dialysis (CAPD) and facilities for kidney transplantation.

   This further level of comparative analysis gave a richer texture to the research, for it was then possible to compare between
   (i) different specialties within the same setting (St Giles),
   (ii) between the same specialism in different settings (the two renal units) and,
   (iii) Between different specialisms at different sites (St Giles and a renal unit

broader research strategy of evaluating and revising labour process theory and in this role the research would contribute to the broader debates within sociology and organisational theory.

Funding and sponsorship

Even before I had finally decided on the Renal Computer System as the focus of the comparative study I had persuaded the regional management services to subsidise the study of the five renal units. This study would provide them with information on which they might assess the impact of the Renal Computer System on the renal service within the region. My reasons for seeking minimal funding from the region was that

(a) the consultants could not provide any financial support,

(b) it would be very difficult to carry out the research without funds to pay for the travelling expenses,

(c) if, as seemed possible at one time during 1983, the system was not going to be included as part of the thesis research then I either had to withdraw or find some other rationale for continuing. Funded research is a reason in itself and it permitted me to keep this (renal) option open.

The access and sponsorship arrangements in the case of the renal units were different from that arranged at St Giles. Dr Earl, the senior consultant at the first ('Haemo') unit sponsored my research at the Regional Renal Consultants' Computer Advisory Committee in terms of supporting my request to carry out research at all in the five units. I subsequently, and additionally, had to make separate applications to each site. Access to carry out the research was granted in all cases subject to my guaranteeing confidentiality of all respondents and agreeing not to present any reports to the regional management services or anyone else

within the NHS without the consultants having the opportunity of studying the report first; I made no agreement about them having any right of censorship, only of prior knowledge. The same arrangements existed for all the occupational groups, my original intention had been to give a presentation of my findings at each unit. In the event, it was only possible to organise presentations for the first unit (Haemo) and the renal consultants, as part of one of their regular regional seminars. None of the other units took up my offer to give a presentation to take place, but the consultants did all see the subsequent report in the spring of 1986 before it was submitted to the Regional Management Services. The then new chairperson of the Regional Renal Consultants Computer Advisory Committee was very critical of this report. He argued that it was inaccurate, particularly in relation to the renal unit for which he was responsible. In the report I pointed out that the nursing and junior medical staff found the system generally acceptable. This was a conclusion that offered little support to his critical view of the system which was founded on its limitation as a tool for clinical research and audit (see Chapter Seven for further details). He telephoned me to tell me of his criticisms, but did not ask me to withdraw it, or to modify it in any way. What he did say, however, was that he was going to be very critical of the report and that I should not take the criticisms personally. My interpretation of this development was that his hostility to the report was related to its being produced at just the time when he was pressing for major changes to the system, in order that it could be used more readily for research and audit as well as for clinical purposes, and was pressing the region for more funds and additional technical support for these purposes. This consultant's antipathy towards the report (but apparently not towards me) was not universally shared, while only one consultant ever pointed this out

the consultants and nursing staff at two renal units have been quite happy to cooperate in further research (4) even after reading the report. What use the Region has made of the report is unclear to me at this point in time: I was told by the officer concerned that s/he did not know what use to put the report because of the conflicts the chairperson consultant had generated between himself and the computer services personnel; no computer specialist wanted to work on the renal system for any reason. The report, however, was circulated among the region's computer specialists involved with medical computing.

The methods of investigation

The general methodological strategy adopted was derived from Denzin's triangulation method (1978). I did not assume that 'triangulation' enabled one to identify an underlying social reality as Denzin has argued (*ibid.* p.308) for, as Silverman has pointed out, the assumption that 'triangulation' is the means by which a *single* reality can be identified from methodologically being multiply mapped is problematic (1985, p.105). In order to avoid any positivistic implications I now tend to use the more neutral term 'multiple strategies' (Burgess, 1984, pp. 143-146). Each method was used to supplement and corroborate or, conversely, *disconfirm* the findings of the others in order to gain as full and as accurate an account of the introduction of the computer systems and their impact on clinic work as possible. The methodology was designed to achieve two very different objectives, first, to detail the processes and events associated with clinic work and the introduction of the computer systems and second, to seek out *disconfirming instances* that would force me to modify and possibly even reject the particular labour process analysis I was developing either wholly or in part. This method of searching out

disconfirming instances evidence has some parallels with that of analytic induction (cf. Burgess, 1984, pp. 179-180) although my use of this technique was more directly influenced by reading Bloor's study of ear, nose and throat (ENT) specialists (1978) in which he identified both the necessary and sufficient conditions to explain the variation between consultants practices (decision-making rules) (cf. Hammersley and Atkinson, 1983, pp.202-204).

In general terms my objectives were to,

(i) study the work of clinicians and their responses to the computerisation of patient data and information within the broader division of labour associated with hospital clinic work,

(ii) identify the division of labour and clinic work processes involved within each clinic,

(iii) identify and describe the documentary records to be computerised,

(iv) monitor the course of events associated with the introduction of the computer systems over as long a period as possible

(v) identify the reasons for the course of events and the consequences associated with the introduction of the computer systems.

By focussing on the issue of the introduction of information technology and the related organisational changes would, I suspected, highlight both the organisation of the work processes and the politics of innovation within a professional setting. Essentially I was concerned to carry out field research, that is a methodologically qualitative natural history of people socially interacting within a particular social setting over a

period of time. I was influenced in part by the methodological approach adopted by Pettigrew who also adopted a multiple (triangulated) research strategy (1973, p.65). His study of 'Brian Michaels' seemed to me to have some parallels with the research I was undertaking particularly in relation to the issues of innovation and organisational power and control. However, both the methodology and the theoretical concerns are sufficiently different that the present thesis is not to be judged as being, in any way, a replication of Pettigrew's study (c.f. Chapter Three above for further discussion of Pettigrew's study). My commitment to using multiple strategies derived from my need to organise the collection and recording of data that was flexible enough to be responsive to,

(a) changes in the fieldwork setting (the clinics),

(b) changes, or refinements, in my own developing analysis of the the research material.

At the same time it had to be sufficiently comprehensive and structured to permit me to analyse and cross compare the data systematically and relate the findings to the broader theory informing the research. This is the very stuff of anthropology and the methodological orientation derives from that source (Pettigrew, 1973, pp.52-55; Burgess, 1984, pp. 12-30). The research methodologies adopted were,

(a) Observations.

(b) Interviews

(c) Documentary data

and these will now serve as subheadings for the discussion on the methods that follows.

(a) Observations

The distinction between participant and non-participant observation is not a particularly useful one in the context of the fieldwork for this

research. My field role was that of an academic researcher, but the findings contributed directly to the evaluation of the systems as reports and presentations were offered by, and required of, me for the consultants and unit staffs and the authorities funding the computer projects. My fieldwork strategy was, as far as possible, to adopt a 'participant as observer' role (Gold, 1958). The observational work was never intended as the primary source of field data, limitations on time available for research prevented that being the case, but it nevertheless had a crucial role to play, giving me the opportunity to,

(a) understand better the work processes involved and,

(b) check the validity (i.e. identify any contradictions between what was told me in interviews and described in the reports, minutes and related literature.

Observations were either 'formal' or 'informal'. In the case of formal observations I would arrange an invitation to the various meetings and clinics as an observer. Notes were normally recorded on the spot, except where this was thought to inhibit the participants and then the fieldnotes would be written up immediately afterwards. These observations were of,

(i) meetings relating to computer policy or implementation;

(ii) case meetings and ward rounds,

(iii) direct observations of the clinic work of nurses and/or doctors;

(iv) direct observations of dialysis work.

In the CORES case study there were no direct observations carried out of clinic work (although some interviews were carried out in the clinics either prior to or after the completion of a clinic). The focus of the observational work here was on the workings of the computer steering group and relatedly the health district's information and computer advisory

group as well as other *ad hoc* meetings of doctors and other hospital staff. The routine meetings of the steering group constituted the main source of observational data within the CORES case study. It was through following the deliberations of this steering group that it was possible to monitor the process and outcome of decisions relating to the implementation of the system; issues that I did not understand would be discussed with Dr Old and/or another member of the committee afterwards.

The fieldwork notes were recorded in spiral bound journalist-secretaries note pads in date order and preceded by a small chart identifying all persons present (and sometimes absent) and where they sat. The pages were subsequently numbered. All aspects of the meetings and later, in the case of the renal studies, clinic work were noted. In recording the fieldnotes it was necessary to avoid becoming too involved in the technical detail of the hospital organisation, or the computer system. These details could be gained separately, often from the minutes of the meeting, and always by asking individuals directly involved. What was necessary was for me to write sufficient detail so as not to preclude alternative interpretations to my initial conclusions. An early example of this 'alternative reading' related to my change of interpretation of Dr Old's strategic role within the project. At the beginning I assumed that he was a clear demonstration of medical dominance as applied to technical innovation for he had been able to set up the project and organise the necessary authorisations from the region and district and had even won a grant for my contribution to the project. However, as time went on it became increasingly clear that the project was very much under-resourced as a clinical system which led to there being few direct benefits for the consultants involved. It was only by recording sufficient observational information at the time of the meetings was it possible for me to go back

to the fieldnotes after about twelve months and re-assess my initial interpretation.

Before presenting any further details of the observational work it is important to comment on the question as to whether my presence affected the ways in which the participants behaved, and related, to one another and to me. Initially at St Giles my presence did give rise to participants being a little selfconscious, but as time passed - over several visits - I became seen as part of the same world as themselves and related to accordingly. This 'naturalisation' process resulted from the nature of my relationship with Dr Old, the fact that the CORES project was seen by the participants as a positive development, and that it gave a sense of kudos to the members of the steering committee. At the same time, those who were antipathetic towards the system were less open and accessible and this did affect the organisation and carrying out of interviews, but not the observation of meetings, and will be discussed later in more detail.

In the cases of the renal units, 'naturalisation' did not develop to anything like the same degree. My presence at meetings and in clinics was always in the role of an outside researcher carrying out research, but again as the number of visits increased I did become more accepted and interaction between staff more natural (i.e. less selfconscious, or premeditated) and of equal importance I could begin to understand more what was being discussed. At the same time the observational work at the Renal Units had a different focus than that at St Giles. Instead of studying the computer steering group it was the meetings concerned with the organisation of clinic work I focused upon i.e. case conferences, ward and graph rounds, as well as nurses reports at the change of shifts. The reasons for this relate to the following points,

(a) the local steering group within each unit was primarily

concerned with technical matters of implementation and staff training, the policy issues were matters for the regional renal consultants' computer system advisory committee (see Chapter Six for further details),

(b) the purpose of the system was different, it was designed in order that the clinical data and information *(outputs)* to be used by all members of the clinic staff, and not solely or principally by the doctors as was the case with the CORES system.

The renal case studies presented, and were intended to present a different set of opportunities and constraints to the CORES case study for observational fieldwork (see the earlier section on Comparative Analysis). In the case of the CORES study the politics of the introducing computer technology into clinic work was particularly apparent because of the nature of the system - it directly replaced the medical records (see Chapter Eight). In the case with of the renal computer system this was not the case, at least not initially, and instead the case studies presented me with the opportunity to study the system in use within the unit and clinics (See Chapter Seven for details).

In both renal units the computer terminals and VDUs were to be used directly to replace, or at least supplement, the manual systems of recording, accessing or analysing patient data. At the first renal unit I was able to observe several multi-disciplinary case meetings (3 occasions) covering both the period prior to computerisation and afterwards. Here the renal computer system was used to access patient data directly. The equivalent meeting at the second renal unit were the weekly combined case conferences and ward rounds where the computer system was not used (5). Nevertheless, these events were crucial components of the unit's labour

process and as such warranted observation (observed 2). At the first renal unit the senior consultant used a VDU and terminal in his clinic to directly access (but not to input) patient data rather than using the clinic notes. I was able to observe this clinic on two occasions. At the second renal unit it was the nurses who used the computer system in the weekly clinics so it was the work of the nurses I observed. Thus, the key feature of the formal observational element in the renal research was in order to gain firsthand knowledge of the work processes within the unit and clinics. It would have been desirable to have spent more time on observing the work of the renal units, but there were strong time constraints on me to complete the research. It was also the case that I was studying the work of two of the other units in the region, necessitated my rationalising the formal observational work to strategically important events rather than attending an extensive number of ward rounds or clinics in order to be absolutely sure that I had seen and recorded the work of the units in their natural state. But it also meant that I had the fieldnotes from these other units (not included here) to draw upon.

When carrying out observational work I would always have a number of questions requiring clarification, for example I was particularly interested in the case conferences and ward rounds at the second renal unit (Dialysis and Transplant) because they demonstrated, particularly clearly, the ways that data records (medical record, graphs and charts) underpinned the division of labour and hierarchy within the unit (see Chapter Seven).

Turning now to the topic of *informal* observations. This refers to the general observations of all aspects of clinic and related activities that were noted while visiting the hospitals, but not covered by the heading of 'formal observations'. The fieldnotes here were kept in the form of a

journal (diary) alongside the formal observational notes, in the same notebooks, and therefore in date order and page numbered. The fieldnotes collected under the heading of informal observations included details of all visits to the hospitals and in particular any episodes relating to computerisation, medical or dialysis work. To illustrate, there was the occasion when a junior doctor sought reassurance from a colleague (who I was talking with following an research interview) having just previously injected a very ill patient with a particularly powerful drug. Previously, this same situation had been discussed in conversation with a consultant in terms of how one comes to terms with just such a situation as a junior doctor in which a patient may die. Clearly junior doctors were, on occasions, presented with very difficult decisions and I needed to bear that in mind when interpreting the interview data. Whether this was directly relevant to the working of the outpatients' clinics or the CORES system was not immediately clear, but as contextual information it was very useful, and ultimately informed my interpretation of some of the doctors criticisms of the computer system. Similarly, a discussion between a registrar and nurses over what 'tender loving care', abbreviated to TLC, meant when written in the case notes. To the renal nurses it meant to take special care of the patient in addition to carrying out the normal procedures. The doctor's understanding of the term was that the patient was going to die and all that can be done is to reduce the pain and suffering as far as possible. The doctor's interpretation came from working on an neuro-surgical ward, the nurses from the experience of the renal units; here was a clear example of variations in the implied meanings of cryptic case note entries which was discussed in Chapter Three - and will be further elaborated in the case study in Chapter Eight. In Gold's terms these were cases of the *participant as observer*, people knew of my role

and purpose within the hospital, or clinic (cf. Burgess, 1984, pp. 80-82). Within the St Giles study these informal observations had only a limited role to play, but in the case of the renal case studies the *informal* observations were a crucial element of the research. Only by my treating each 'trip' to the hospitals as an exercise in fieldwork was it possible to develop any comprehensive datum within which to locate the information collected from the formal observations and the interviews. These events were recorded because of their usefulness in building up an account (narrative) of the introduction of the computer system and its ramifications for the clinic work processes, and the associated social relations between the various participants in the process.

The fieldnotes for all three casestudies were made in summary form during the course of the day. These would be written up later the same day either prior to driving home, most usually in a medical library, nurses rest room or the staff canteen or, alternatively, in the car before arriving home. My objectives were to identify the main substantive issues involved as well as adding comments relating to theoretical issues and indicating the implecations for the next stage in the research (e.g. who to ask for clarification of some detail, line of questioning to be followed in interviews, documents to be obtained).

(b) Interviews (see Appendices I-III)

Here I need to discuss three main aspects to interviewing, these are,

(i) criteria for selection

(ii) timing of interviews

(iii) structure and purpose of interviews.

I will not use these points as subheadings as the three aspects tend to run into one another. My aim was to interview all the doctors on three separate occasions (see Table 5.2). The intended timing was to have been

one month (approximately) prior to the installation of the computer system, one month

TABLE 5.2 ST GILES OUTPATIENTS' CLINICS (CORE SYSTEM)

(a) NUMBERS OF CONSULTANT CLINICIANS INTERVIEWED (BY SPECIALITY) (5)

	MEDICINE	SURGERY	UROLOGY	GYNAECOLOGY	TOTALS
First Interview	3	1	2	2	8
Second Interview	3	1	2	2	8
Third Interview	2	1	2	2	7
TOTAL NO OF INTERVIEWS	8	3	6	6	23

(b) NUMBERS OF DOCTORS IN TRAINING GRADES INTERVIEWED (BY SPECIALTY)

	MEDICINE	SURGERY	UROLOGY	GYNAECOLOGY	TOTALS
Registrars	–	–	2	4	6
Senior House Officers	6	–	2	3	11
House Officers	–	3	–	–	3
TOTALS	6	3	4	7	20(*

(* Included within this total are 3 SHOs who were interviewed once prior to the system being implemented plus 1 Registrar, 2 SHOs and 1 HO (total 4) who were interviewed twice, once before and once after implementation)

after implementation and again five months, or more, later (i.e. six months after the installation of the computer system). The reasoning, which is probably self-evident, was that I wanted to be able to compare the doctors (and other members of the clinic staff) *expectations* of the systems with (a) the experience of accommodating to the demands computer systems immediately following implementation of the system and then (b) a more considered view some months later. In the case of the CORES study this

procedure worked reasonably well with regard to the consultants but was impracticable for use with the junior doctors; very few house staff and registrars were in post longer than six months. I therefore modified the timings of the interviews for these junior doctors - once the system had been installed - to once during their stay, trying to organise this interview for between 4 and 8 weeks after s/he had joined the particular clinic. This timing was not always possible to arrange because some consultants would bring junior staff from the nearby DGH to assist in the outpatients' clinics and because they did not appear on the hospital administrations list of junior staff in post were unknown to me. It was necessary, therefore, to supplement the official list with information gleaned from the doctors themselves. Despite these constraints some of the junior doctors were interviewed twice, once before and once after the implementation of the computer systems, where they were still in post at the appropriate time.

The members of the CORES steering group were all interviewed individually usually adopting an unstructured format. I conducted semi-structured, tape recorded, interviews with the hospital administrator and the senior nursing officer, the former on two occasions and the latter once (because s/he was a recent arrival to the hospital following the implementation of the system). I spoke with the other members of the committee conversationally as well as directly questioning them as and when I needed to gain new information. The computer specialist was a particularly useful informant regarding (a) the CORES system, (b) similar computer developments elsewhere in the region and (c) the changing politics of medical and hospital computing over the period of the study.

The nurses at the St Giles Outpatient Department were interviewed as a group in the clinic in October, 1982, also the sister was interviewed once

more in December, 1983: neither of these interview sessions were tape recorded and the sister always expressed reluctance to participate. In terms of gaining a broad assessment of the nurses responses to CORES system this approach was adequate, although in retrospect it would have been useful to have gained more direct data concerning the nurses role in familiarising the junior doctors with the organisation and practices of the clinics. The main focus of the study, however, was on the clinicians and their use of the computer system. By contrast, it was the nursing staff at the renal units who were intended to be major routine users of the Renal Computer System, for it was they who were principally responsible for the care and training of the patients on dialysis, and the recording of the biochemical and haemotological data relating to those patients. It was beyond my time resources, however, to interview all the renal nurses, I therefore compromised by arranging to interview all the senior nurses (Assistant Director of Nursing Services, Nursing Officer and Ward Sisters) plus a selection of nurses from each grade (excluding auxillaries). In the end I interviewed very nearly half of the nursing staff on two separate occasions (see Table 5.3 below). The other members of the renal units as well as the 'other disciplines' (e.g. dieticians) were nearly all interviewed twice at the about the same time as the consultants (6). In the Renal Computer System studies the sequence of 3 interviews over approximately six to seven months 'broke down'. This was because I was only able to interview the doctors, nurses and other staff involved either just prior to implementation, or during the implementation period itself (i.e. on one, not two, occasions) and then again eight or nine months later. There were two main reasons for this (a) my delay in committing myself to using the renal units as the comparative case studies and (b) the extended period it took to implement the system at the second renal unit. To expand on the first point (a), it was my procrastination over several months that delayed the second round of interviews at the first renal

TABLE 5.3

NUMBER AND OCCUPATIONAL CATEGORIES OF STAFF INTERVIEWED (INCLUDING APPROXIMATE DATES OF INTERVIEWS) (THE RENAL COMPUTER SYSTEM)

OCCUPATIONAL GROUP		FIRST UNIT	SECOND UNIT
Doctors			
(a)	Consultants	2	4*
(b)	Junior doctors	4	11
Nurses			
(a)	Senior Staff (Sisters and above)	2	3
(b)	Nurses	4(total staff 9)	11 (total staff 24)
	(RGN and EN)	1(night shift)	
Administrative and Clerical			
		1+1**	1
Other Disciplines (Dietetics, Social Work and Psychology)			
		4***	2
Computer Support Staff			
		Interviewed (unstructured) twice.	
Dates of Interviews			
(a)	First round of interviews	September-October, 1983	May-September,1984
(b)	Second round of interviews	May-June, 1984 (Interviews of doctors spread over the period December, 1984 to December, 1985)	Jan-May,1985

(Notes: * 1 consultant appointed during the period of the research and as a result interviewed only once
** Unstructured interview
*** 3 posts, one change of personnel and one interviewed only once)

unit. During this period I maintained contact with all the units and visited the first unit in December, 1983 in order to talk with the senior consultant as well the senior nursing staff. In addition I arranged to sit in on a case meeting to find out how they were adapting to the new system but I did not systematically

interview the doctors and nurses nor the other occupations until May - June, 1984.

The computer system was already installed at the second renal unit (Dialysis and Transplant) when I first contacted them in May, 1984. Here I adopted the strategy of distinguishing between those staff who had received training in the use of the system and those who had not. This divided the nurses (other than the senior grades) approximately equally into 'trained' and 'awaiting training', while all other clinic staff and the 'other disciplines' had not received any training at this point, except importantly, the unit administrator (who had a key role in managing the system). The second round of interviews were started eight months later (January, 1985).

I interviewed the cohorts of junior doctors on the same basis as I had done at St Giles (i.e. one month after they joined the unit). The one exception here was the senior registrar who was on a three year contract and s/he was interviewed twice over a period of nine months. The nephrology consultants I reserved until near the end of my fieldwork because I was aware from comments of various persons and attending meetings (as well as interviewing the person supplying the computer technical support) that

(i) these consultants did not use the system directly themselves and

(ii) the consultant with the responsibility of overseeing its installation was very critical as to the facilities provided by the system and the service provided by the region's computer specialists.

I believed it was more useful to interview those more directly involved with the day-to-day clinic work processes (i.e. nurses, junior doctors etc.) and left the consultants at this second unit for as long as possible in order that there would be plenty of time for the politics of regional - professional conflicts to

be as fully worked through as possible. The transplant surgeon, and his colleague (appointed during the course of the study) were also both interviewed, the first surgeon at the same time as the other clinic staff.

The interviews were designed in order to achieve two basic objectives ,

(a) to monitor developments in the implementation and usage of the computer systems, including the responses to the systems;

(b) to carry out extended interviews over time detailing the doctors, nurses, administrator and 'other disciplines' clinic and related work.

To expand on this second point (b), the time lag between each interview permitted the matters raised in the previous interview(s) to be explored further in subsequent interviews (e.g. the role of the medical record in clinic work), it also meant that information, and attitudes given or expressed in the interviews could be checked against interviews with other respondents (e.g. comparing consultants' and junior doctors' descriptions of clinic organisation) and observational data (e.g. ward rounds). The strategy was to attempt to identify any contradictory evidence or *disconfirming instances* to the responses given in the interviews. If such discrepancies were identified then the task was to explain the reason for it.

The interviews were semi-structured and tape-recorded; only two persons declined to be tape recorded and all persons asked for an interview accepted. The semi-structured character of the interviews meant that there were a number of topics to be covered in all interviews, the order the topics were taken and the time and detail each covered depended on the the particular respondent and the prompting from the interviewer. In practice I used a model interview schedule (Appendices I-III) for, at least to begin with, I could not guarantee that I would be confident enough to extemporize appropriate questions around the topics. The responses of the doctors were in line with their views there

was little attempt on their part to be disingenuous. Their behaviour was compatible with stated attitudes. The junior doctors were in a different position. Here it was the case that the consultant involvement could have been expected to influence the responses of these doctors. What tended to happen was that the answers to questions regarding details of adjustment, training, use in clinic and so on were given straightforwardedly, but the overall assessment of the system would tend to match what was thought of as the consultants 'line'. The house staff tended to be the most defensive, the registrars the least. In fact this latter group of doctors were particularly informative regarding the workings of clinics and what practices and processes were viewed as usual and what viewed as unusual. Consultants, by contrast, generally refrained from commenting on each others clinical practices.

An opportunity arose for me to to assess (at least in a 'rule of thumb' way) whether my judgement on the deferential bias of junior staff was accurate or not. Two consultants (in different specialties) on separate occasions asked whether I would like to interview both themselves and their junior medical staff as a group. I could have refused but thought that the arrangement presented an opportunity to assess the relationship that existed between these consultants and their junior medical staff. At one interview there were two registrars, one SHO as well as the consultant. At the other interview there was just one registrar in addition to the consultant. The first group of junior staff were officially located at the nearby DGH but they routinely worked at the St Giles outpatients clinics. The SHO and more junior of the registrars were clearly deferential and they hardly said anything during the course of the interview. The more senior registrars, however, were willing to express independent views. The consultant involved here did not feel threatened by the expression of independent views and he readily engaged in a dialogue and banter with them. This was not the case in the second instance, for while the senior registrar

was also willing to express independent views regarding the system the consultant clearly felt less secure. In consequence he avoided as far as possible discussing in any detail any aspects of the system with this registrar. To illustrate, the senior registrar was particularly critical of the sequencing of the 'history taking' section of the computer forms (*encounter forms*). The consultant broadly sympathised with the difficulties the registrar was reporting, arguing in general terms that his humanistic approach to medicine was not readily susceptible to computerisation. During the course of the interview, however, it became apparent to the consultant that what the registrar was reporting was not a point of fundamental medical philosophy but rather that the order of the pages of the forms (*encounter form*) had become mixed up and pages 3 and 4 had become pages 5 and 6 (*and vice versa*). On finally realising this the consultant felt his authority was, at least to some extent, undermined by his not realising earlier that the cause of the registrars criticisms resulted from the inaccurate compilation of the *encounter forms* and not on any more fundamental medical reasons. From then on he adopted a very formal attitude to the interview (an earlier interview had been relatively relaxed and informative).

In the case of the Renal Computer System there was some imperative on the part of the consultants to present a positive view of the system. The first unit was the official pilot site for the system within the region which meant that the consultants at the second unit felt aggrieved at what they saw as the region's favouritism. The result was that the consultants at the first unit (Haemo) were keen to make the system work well while those at the second unit were concerned to demonstrate that their ability to adapt and develop the Renal Computer System to their own medical requirements was even better. This sense of inter-unit rivalry on part of the second unit was also to be found among the nursing staff and shared by the administrator.

It was also the case that the computer system was for most consultants (5

out of 6) peripheral to their day to day work. It was either the nurses, or the junior medical staff who used the system on a day to day basis. I found in consequence that with these consultants the interviews tended either to become more formalised (3 consultants) or concentrated on particular issues that concerned the consultant directly even if it was only a minor part of either the system or the work of the unit (2 consultants). As mentioned earlier, it was the junior doctors and in particular the registrars who were the more informative interviewees. Interviews of the junior doctors were organised similarly to those conducted at St Giles although the tape recorder malfunctioned on one occasion and the two interviews affected were written up from notes immediately afterwards.

In the case of St Giles I was able to follow developments at the hospital between interviews via attendance of the CORES Steering Group meetings and the associated opportunity of discussing developments Dr Old. In the case of the Renal Computer System the opportunity of continual involvement did not present itself. Instead I had to rely more on multiple and disparate methods of 'tapping' the natural history of the renal units and the implementation and usage of the computer system. In the first renal unit (Haemo) I relied on informal conversations with unit staff, particularly the senior consultant and senior nurses. At the second renal unit (Dialysis and Transplant) the consultants were rarely available for informal conversations and here information on computer developments and clinic work tended to come from the nursing staff during episodes of field observations. Although it was the unit administrator who was the most informative respondent having had a background in renal nursing as well as being very interested and involved in the introduction of the computer system. S/he was a particularly crucial source of information relating to the history, overall workings of the unit and the developments relating to the computer system. I was also able to interview members of all the various

occupations that comprised the renal dialysis and transplantation labour process at both renal units and this permitted me to corroborate the information gathered to a greater extent than had been possible at St Giles.

Unlike the situation at St Giles (see above) the interviews with the senior nurses at both renal units were generally relaxed and informative. These nurses were concerned to demonstrate that the computer system was being implemented as effectively as possible. This commitment did not appear to lead to any evasiveness on their part during the interviews and their responses were in line with the observational data collected. The issue of nurse training, for example, was a problem at both units (for different reasons), but there was no attempt to hide, or misrepresent, the issues. This was also true of the registered and enrolled nurses at the second renal unit although not at the first unit where during the second round of interviews the nurses responded with formality and implicit resistance which was in marked contrast to the first round. When interviewing the fourth and last nurse, who had been particularly informative and cooperative in the first interview and who was now being terse and noncommittal, I asked for an explanation for this interview resistance. The reasons, it turned out, were that the computer system had increased their workload (with no obvious benefits) and had led to the unit being subjected to visits from a great number of people interested in the computer system who generally got in the nurses' way. All of this they disliked and, by association, my interviewing was seen as part of this general 'interference' in their unit. No similar problem occurred at the second unit.

The interviews with the dieticians, social workers and psychologist showed little sign of any obvious defensiveness or evasiveness and were for the most part very informative particularly in rounding out the details of the renal labour process within the wider hospital context.

(c) Documentary information

In the cases of two of the sites (St Giles and the Haemo Unit) I was able to obtain copies of the minutes for the Steering Group Meetings while at the second renal unit I was able to look through the minutes and take notes from them, it was not possible to arrange for them to be photocopied. In the case of the St Giles study I also had access to the Dr Old's correspondence and other documents relevant to the introduction of the CORES system. This documentary evidence (minutes and correspondence) was utilised,

(i) to trace the history of the CORES project from its inception,

(ii) to monitor the organisational and professional politics relating to the computer system and its use.

(iii) as a source of corrobation and triangulation to my own notes in terms of comparing my interpretation of the events with the 'official' version contained in the minutes,

(iv) as a source of the particular technical details of the computer system that I needed to know about and was likely to come up in an interview or conversation.

(v) to identify names of relevant individuals involved with computer policy or the process of implementation and running of the computer system.

In the case of the renal units I only had access to the implementation committee minutes (the steering group did not keep minutes) and they were used to trace the history of the system and to check out the accuracy of points made during interviews, usually relating to the chronology of events. Documentary evidence, in short, played a lesser role in the renal case studies than in connection with the St Giles study.

The other important type of documentary evidence were copies of forms relating to the work of the clinics. In the case of the outpatients' department

the most relevant documentation of this kind were the encounter forms I was able to accumulate. In the case of the renal units I found it particularly useful to be able to refer to the patients data sheets and diaries (which were the raw data for the computer system). The EDTA form I was given by a senior nurse was similarly very useful (7); this was not only because it meant I had a better understanding what was involved in the completion of this annual return, but because the form contained details of the principle diagnoses and similar medical information which aided my education in this area. In addition, I accumulated copies of examples of the kinds of reports the computer system could produce. These served best as reminders of what I had observed or had been told about rather than constituting an independent source of evidence.

Concluding comments

The three strands of observations, interviews and documentary data constituted the three interdependent sources of research data. The main source of information came from the interviews while the collection and analysis of the other two strands was organised primarily in order to both contextualise and check the integrity of the information gained from the interviews. This was particularly true of the study at St Giles, while in the case of the renal study the observational fieldwork did play a slightly more autonomous part in the research. The observational fieldnotes constituted an ongoing narrative of events in the case of the St Giles study. Interviews were transcribed and summarised by topics and occupational subgroups at particular stages in the fieldwork. The resulting mosaic of responses would then be supplemented by reference to the observational fieldnotes. The documents further supported, or illustrated, the other evidence. At the renal units the observational fieldwork provided the detailed descriptions of the work processes to which the interview data related.

Having constructed an account (or while constructing an account) the data sources were checked for counter-examples that would disconfirm the developing analysis. The underlying strategy of the comparative studies was to extend the detailing of clinic work and the decision-making and related political processes involved in the introduction of the two computer systems (and any research of that process) as well as to search out any disconfirming instances that would force me to reassess the conclusions arrived at at the earlier study at St Giles. In particular I was interested in finding out whether my general conclusions regarding the role and use of the medical records, within the context of the politics of technical change within a professional setting, could be sustained in the context of the other two case studies.

The story of the implementation of the two computer systems at the three hospitals is the subject of the next three chapters. The first chapter deals with the analysis of the professional politics of medical work and computerisation, while the following two deal with the impact of the computer systems on, first, the renal units and, second, the clinics in the outpatients' department, particularly in terms of the division of labour associated with the clinics and the methods of recording medical information and the implications these have for medical dominance.

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NOTES

1. I later learnt from an administrator that the reason for my being refused research access was because the director of the computer department was experiencing industrial relations problems.

2. I interviewed one person, at least, at each company spending at least half a day with each. At ICL and IBM I spoke with one other senior marketing officer (in one case, this took the form of a telephone conversation). The information gained from these interviews included detail of the companies strategies and experience in selling computer systems to the NHS. I realised that the talking to me was, at least in part, a marketing exercise nevertheless the information gained was very useful; from the interviews I learnt much about the organisation of the companies in relation to the healthcare computing market, details of the history of the developments of the relationship between the NHS the state and ICL and the implications this had for the other two companies.

3. The ESRC also awarded me a project grant for 3 years. Grant No. GOO 230077 (see *Acknowledgements*)

4. The research project concerns patients' adjustments to ESRF and the role of the nurse in the context of changes in the 'treatment of choice'.

5. The CORES system was introduced into the eight clinics over a period of fifteen months with the a result the interviews of clinicians, *excepting* those carried out pre-implementation, were also spread over an equivalent time period.

6. The psychologist was interviewed only once and that was prior to the implementation of the Renal Computer System for it proved impossible for me to arrange a time for the second interview amenable to the

both of us.

7. EDTA stands for the European Dialysis and Transplant Association

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CHAPTER SIX

THE POLITICS OF INNOVATION AND PROFESSIONALISM: THE INTRODUCTION OF COMPUTER SYSTEMS INTO HOSPITAL CLINICS

Introduction

In Part I the the impact of medical information technology was discussed in general terms and subordinated to the discussion of professional autonomy and labour process analysis. In this second half of the thesis the focus shifts from the general review of computing developments, professional autonomy and theoretical analysis to the specifics of the case studies. I start with the issue of the organisational politics of the computerisation process at the three hospitals. The central dilemma for the consultant sponsors of the systems was one of negotiating the resource support from the district and regional authorities whilst maintaining the support of their colleagues as users of the systems. For while the nurses, administrators and clerical staff as well as members of 'other disciplines' were also involved they played a lesser role in the politics of decision-making associated with the introduction of the two computer systems.

The purpose of this chapter is to analyse the politics of the decision-making processes within the theoretical model developed in

Chapter Three in particular in relation to the distinction *institutional* and *organisational* control. This will be done by detailing the constraints and choices the doctors introducing the new systems faced in their dealings with the health service management (organisational control) and their own medical colleagues (institutional control)The consultant sponsors of both the systems studied (Renal Computer System and CORES) had to develop strategies and tactics in order, first, to gain support of their consultant colleagues and then to ensure that this support was sustained once the systems were implemented. At the same time they had to negotiate with the appropriate district and/or regional authorities in order to get the systems implemented and the hospital staff using them. It is with these processes with which I am particularly concerned in this chapter for they enable me to explore the dynamics of the relations between the organisational control of management and the institutional control of the doctors. Moreover, by focusing on the issues surrounding the implementation of the systems at the clinic level I am able to identify in some detail the day to day ways (processes) in which the relations between the two are sustained.

The chapter is divided into four parts,

1. a description and comparison of the two computer systems and three case studies,
2. an account of the specific relationship between the regional computer services and the computer projects within the context of regional computing and information policy,
3. accounts of the politics and decision-making processes associated with the introduction of the two computer systems,

4. a comparative analysis of of the politics of professionalism in relation to the introduction of clinical computer systems.

Both computer systems studied here were capable of being operated as automated medical records systems. It should be noted that the Renal Computer System was only ever intended as a *supplement* to the case-notes, whereas the CORES system was designed to *replace* the case-notes. The difference is an important one and contributes to the explanation as to why one system was found to be more acceptable to the doctors than the other. However, acceptance or rejection of these systems was not solely a matter of whether the clinical case-notes were supplemented or replaced, but was also found to be related to the strategies and tactics pursued by the consultants sponsoring the introduction of the two computer systems.

1. <u>The case studies and the computer systems</u>

The case studies fell into two groups :

(a) two renal units in the midlands which were part of a larger regional dialysis and transplant service of five units. One of these units was equipped and resourced to carry out kidney transplants ('grafts') the other was not.

(b) the outpatients' clinics at a small acute hospital (120 beds) again in the midlands. There were eight clinics which encompassed three surgical and three medical specialties.

The renal units introduced a clinical data system, which as the name suggests automated the system of collating, storing, analysing and retrieving clinical data. The system also and importantly possessed the facility to present patient data in the form of time-related graphs. The outpatient system was known as a medical record system and was designed

to replace the pre-existing manual procedures for maintaining the medical records, both clinical and administrative. The system did not remove the need for the medical record files, but replaced the handwritten and typed contents with computer-printed documentation. Unlike the Renal Computer System, there were no graphics facilities available at the time of the research. This system will be referred to here by the fictitious acronym CORES (to stand for Computerised Outpatient REcord System).

There are a number of distinctions to be made between the two systems and between the two clinical contexts which are set out in Figure 6.1. These distinctions summarise the crucial similarities and differences between the case studies. An explanation of these similarities and differences will be undertaken in the following two chapters, but the critical distinction which I wish to highlight immediately concerns the issue of resourcing. In the official parlance of the health service the distinction is that between *corporate* and *non-corporate* status. Corporate status meant that a system was part of the regional health authorities programme of computer development and was consequently heavily subsidised. The renal service was funded by the region directly and it was for this reason that the renal consultants were able to make a case to the region that the Renal Computer System should be adopted as a corporate system. In other words the rationale of the corporate systems was not solely in order to improve the effectiveness of the organisational control from the 'centre' as might be supposed, although with the implementation of the Griffiths and Körner recommendations this is certainly an important consideration (see discussion below and in Chapter Two). In some cases - as with the Renal Computer System - corporate status of the computer system resulted from the fact that the renal service was regionally and not district coordinated. However, even when the renal consultants had

gained corporate status for the system the funding was not one hundred percent. There was instead a subsidy of fifty percent of costs of implementation the remaining costs had to be paid for from district and trust funds. There was one exception which was the pilot site - the Haemo Unit - where the subsidy was one hundred percent of the basic system.

TABLE 6.1 THE COMPUTER SYSTEMS: SIMILARITIES AND DIFFERENCES

	Renal System	CORES System
Similarities		
(i) the introduction of the system was the result of the initiative of a consultant	+	+
(ii) the system was designed to support clinic work and directly involved doctors	+	+
(iii) the introduction of the system was not intended to change the clinic work processes*	+	+
Differences		
(iv) doctors could input or access data direct from a computer terminal	+	-
(v) the system replaced the clinical case notes	-	+
(vi) the system involved one hospital only	-	+
(vii) the system involved one specialty only	+	-
(viii) the system directly involved nursing	+	-
(ix) the system directly involved other disciplines**	+	-
(x) the system was principally regionally resourced	+	-
(xi) the system was principally district resourced	-	+

(Notes: * this refers to the clinical work and not to the administrative, clerical and secretarial processes; ** the other disciplines were social work, dietetics and psychology).

Dr Old also attempted to get the CORES system ascribed corporate status. In his case the reasoning was less to do with the resourcing of the specific CORES system than with attempting to exploit the

organisational control of region to ensure an expansion of the system in other hospitals and specialties within the region. The strategy, if it had been successful, would have guaranteed the long term survival of the CORES system. Dr Old failed, for unlike the renal units the work of outpatients' clinics were the responsibility of the district health authorities and funded out of their resources.

2. Consultants, computer specialists and computer policy

The two computer systems, as I have already indicated, were implemented during or just prior to a period when the computer policy within the region was changing. The emergent policy of the region was one of commitment to a major programme of implementing a range of standard corporate systems within all districts. These systems were designed, or adapted, in order that might be able to support the health service information systems recommended by the Körner Committee and which have become mandatory following the implementation of the recommendations of the Griffiths Report (see Chapter Two for details). These large-scale changes did not have any major impact in the districts until after both the Renal Computer System and the CORES system had been implemented. Nevertheless they did influence the decision-making processes involved for both systems and were seen to present both opportunities and problems for all the participants in the setting up of the Renal and St Giles computer projects (i.e. doctors, computer and management services personnel and the administration).

The Renal Computer System

The Renal Computer System was designated a *corporate system*. It had been identified in the Region's computer and information systems programme for 1982-85 as the second highest priority to the implementation of the

patient administration system (PAS) throughout the region. What this meant, in practice, was that the Renal Computer System was intended to be installed and operational with very little technical support from the region's computer services specialists because they were fully employed implementing the PAS system. The Renal Computer System was implemented with the support of one senior programmer; it was this persons responsibility to ensure that the system was satisfactorily implemented and that all the staff at the renal units were appropriately trained. This programmer was also the specialist adviser to the steering groups at each renal unit and had the responsibility of carrying out any modifications to the system requested by these groups. The programmer was directly responsible to a project manager who had overall responsibility for the provision of the technical support. The main responsibility of this manager had been to advise the consultants on all technical matters relating to the selection and implementation of the computer system. This work included, (a) the drawing up of the specifications of the system the renal consultants required, (b) organising the call for tenders from computer systems suppliers, (c) ensuring that the system selected met the technical criteria and (d) provided the facilities laid down in the system's specifications.

Soon after the Renal Computer System was installed in the first site some of the consultants at other sites began to pressurise the project manager to provide more resources and to provide better facilities. Under this pressure the relationship between the Regional Renal Consultants Computer Advisory Group and and the project manager worsened. This decline in amity between the region's computer specialist - the project manager - and the renal consultants directly resulted from a change in the chairmanship of the Renal Consultants Computer Systems Advisory Group and

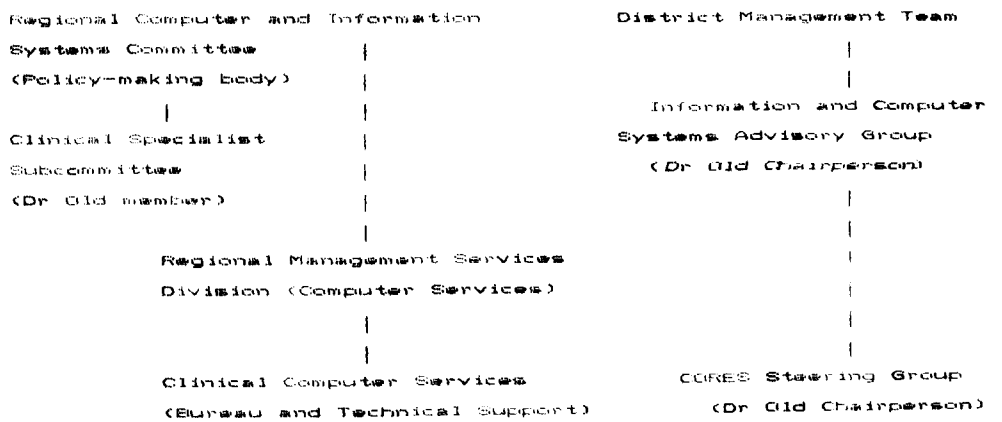
a coincidental with the change in the project manager. The new consultant chairperson was critical of the system and wanted additional facilities provided while the new project officer was new to dealing with hospital consultants. This aspect of the computerisation process is to be further discussed in the third section of this chapter which is concerned with the details of the decision processes. The reason for raising the issue here has been in order to make the point that regional computer specialists seriously under-estimated the level of technical support the system needed to ensure that it was implemented to the satisfaction of all involved. It was not that the system was difficult to implement, it was not, rather it was the case that the renal service was the problem for the computer specialists. Instead of a uniform service the renal units related to one another in an organisationally complex way constituting as they did an intermeshing of various interests which were dominated by the consultants who themselves exhibited conflicting expectations of the computer system.

The CORES System

The CORES system had been implemented earlier than the Renal system and was only tangentially affected by the Körner and subsequent Griffiths reorganisation during the period of the research. In contrast to the renal consultants, Dr Old, the consultant who introduced the CORES system, was active in the politics and practice of introducing computers into the health service both regionally (as a member of the clinical specialist subgroup of the Regions Computer and Information Systems Committee) and at district level (as chairperson of the Information and Computer Systems Advisory Committee which he established in 1981) in addition to chairing the CORES Steering Group. The role of the district committee was to advise both the District Management Team and the Medical Executive Committee on

computing facilities that involved district resources (source: Minutes of First Meeting). While, similar to the renal case,
one of the regional computer specialists, at least, always attended the district committee and the computer steering group, their role being that of technical support and advisor of regions policy (see Figure 6.2). The district advisory committee was subsequently replaced by a committee chaired by the then newly appointed information officer as part of the district's implementation of the then new information management structures required as part of the Griffiths/Körner reorganisations, but this was not until after the CORES system had been accepted as the then long term system for the St Giles Outpatients' Department.

FIGURE 6.1 Regional and District Committees Relating to the CORES System



Being a non-corporate computer system CORES had to be wholly funded out of district funds, but Dr Old adopted the strategy of implementing the system experimentally, which in resource terms meant that the system could be run off the regions clinical computer bureau service virtually free, except for costs of the peripherals, cabling and telephone and electricity use. Similarly, the technical support of the computer services initially

came free as part of the experiment. In contrast to the Renal Computer System, Dr Old had principally to convince the district, and not the regional, authorities to continue to support the system and to provide resources for its development. As shall be seen, the system continued to be supported by the district but events eventually overtook the CORES system: initially the proposal was in line with the region's practice of being supportive to local initiatives, but with the growth of 'corporacy' in computer developments (following the Griffiths Report,1982) the organisational climate for the CORES system became far less favourable and computer resources were were increasingly monopolised by the resource demands of the *corporate* systems.

3. The organisational politics and decision-making processes

Both computer systems - the renal and outpatients (CORES) - were introduced as a consequence of the initiative taken by individual consultants. These doctors took the leading role in the initial decision to introduce systems within the hospitals. However, whereas one was working within a single specialty (renal medicine) in association with colleagues at other hospitals throughout the region, the other was a physician within the multi-specialty setting of an outpatients' department within a single hospital. What this meant in practice was that it was less complex for the renal consultant to gain the committed support of consultant colleagues, given they were of the same specialty and incorporated within the same regional service; whereas the physician was unable to maintain the committed support of his colleagues from different specialties despite their working within the same hospital. It was not simply that in one case the consultants were all of one specialty and in the other they were not, but rather that the consultants in renal medicine and transplantation had

a stronger - and more centralised - organisational base on which to build their *institutional control* within the hospital service than were the consultants at St Giles. In the case of the renal service the consultants had their own *regional* body, the Regional Renal Medicine and Transplantation Committee, which simplified the task of gaining and maintaining the commitment of the consultant's colleagues prior to gaining the official support of the hospital and district authorities. By contrast, the equivalent decision-making body for the St Giles consultants (CORES system) was the Hospital Medical Committee (HMC), a 'division' of the Medical Executive Committee (MEC), but the influence this body could wield was much less than that of the Regional Renal Medicine and Transplantation Committee, for its decisions were mediated by the MEC as well as the DMT, if they were of sufficient import to reach them. The renal consultants only had to convince themselves and the regional information and computer systems committee for the decision to computerise on the Renal system to become a firm policy commitment which no individual district, or hospital, was going to disregard lightly (see Figure 6.3). The CORES system, by contrast, was a small project supported by a coalition of interests, not just the consultants, and it had to survive on a year to year basis competing with other computing and other priorities within the district. Under these circumstances the exercise of *institutional control* was to be equivocal.

In the following sections the processes by which the two systems came to be selected and implemented, and what happened subsequently, will be described. The focus will be on the the politics of the decision processes; my intention being to clarify the reasons for the differences approaches of the sponsoring consultants. The renal consultants as has already been indicated constituted a fairly stable coalition whereas the

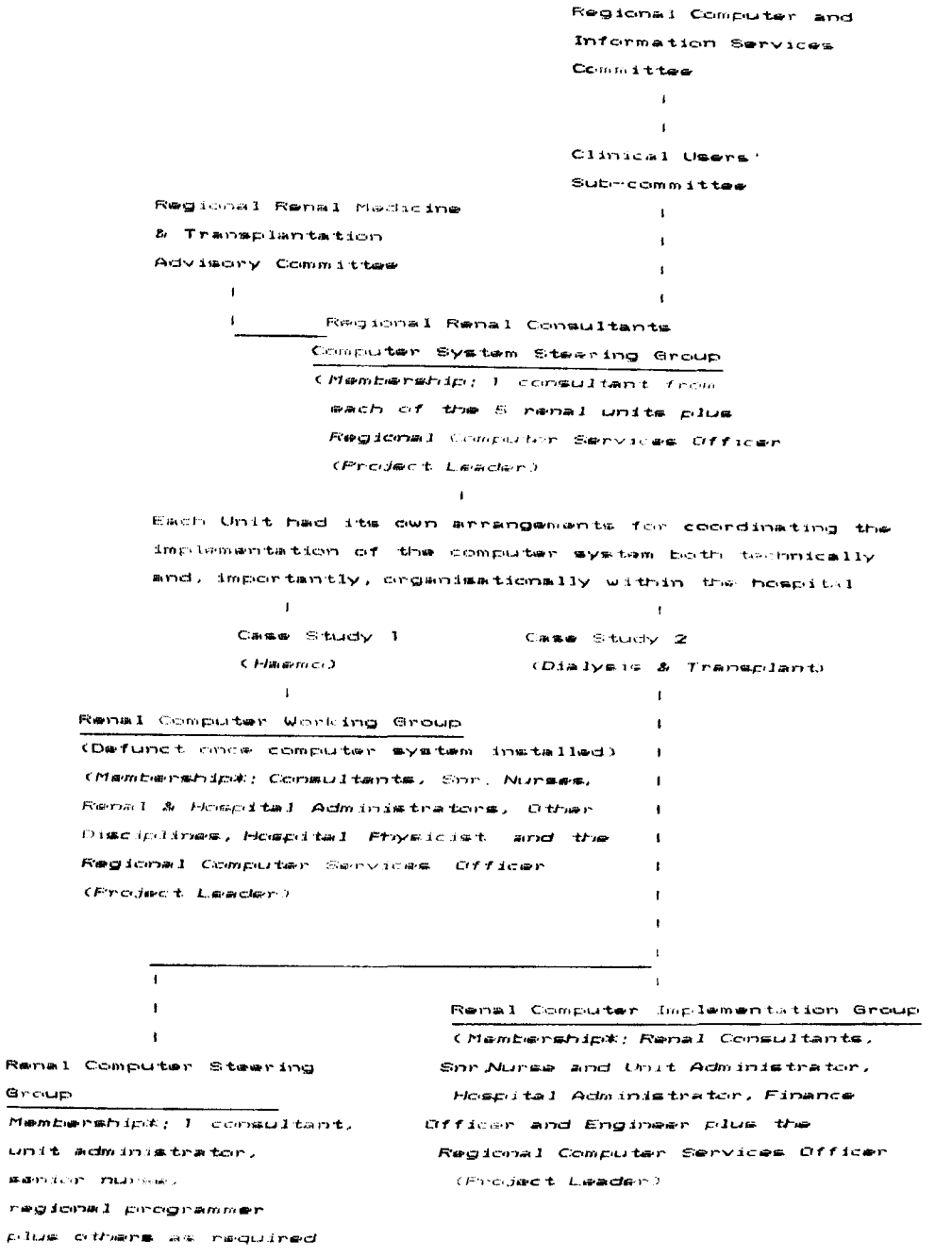
consultants involved with the CORES system were not. I start with the case of the Renal Computer System.

Renal Services and computerisation.

The Renal Computer System was initiated by the senior consultant, Dr Earl, at what was to be the 'pilot site' for the system, referred to here as the Haemo Unit. The system was designed primarily to aid the nurses who had the responsibility of collecting and collating the clinical data on the renal patients. The system was also designed to aid the clinicians in monitoring the well-being of the patients and it was intended that the system would be used to analyse the aggregate clinical data (a necessary facility if the system was to be used for clinical research). The logic of the system was that computerisation would save time and effort in recording patient data (the input side) and would speed up the accessing of the data (output side). Moreover, the system was designed to offer an improvement on the manual systems of data presentation particularly in terms of time-related graph. The overall intention, as far as the sponsoring consultant was concerned, was that the system should save time and effort on part of the nurses and doctors while at the same time getting a more accurate and timely patient data record. The Renal Computer System constituted a renal patient database including not only clinical but also details of diets and summary information on social work or psychological counselling.

Dr Earl's initial idea had been to develop a system 'inhouse' just for the Haemo Unit. The inspiration came after trying out the Commodore Pet microcomputer of a consultant colleague in another specialty and wondering why "we can't do this in the renal unit" (Earl: Interview 1). He then turned for technical help and support to the hospital physicist who worked on developing systems and programmes for the renal unit. The consultant was

FIGURE 6.2 RENAL COMPUTER SYSTEM: COMMITTEES INVOLVED IN THE FORMAL DECISION-MAKING PROCESS



* The sources for the memberships were the minutes.

not himself knowledgeable about the technical intricacies of computers and computer systems nor was he involved in the policy making and decision

taking regarding computing developments regionally or locally (in contrast to Dr Old, the sponsor of the CORES system). Sometime in 1981-82 Dr Earl, with other members of the Haemo Unit, was invited to see the Renal Computer System in operation at a renal unit in another region by the senior consultant concerned (Earl: Interview 1). He was sufficiently convinced of the system's usefulness (in comparison with the system they were developing 'inhouse') to set about convincing his colleagues - and the region - that the region's renal service required such an integrated computer system for a number of reasons, including the following three which appealed in particular to the consultants,

(a) to improve the accuracy of the doctors' prognoses and consequent management of renal patients,

(b to provide good facilities for research purposes

(c) to permit patient data to be networked between the region's five renal units.

The subsequent implementation of the Renal Computer System did see the first two issues addressed, the third one, however, was never to be seriously developed despite it having a practical appeal to many of the consultants; it would have made the communication of patient data between units easier, a facility of particular advantage to those renal units referring patients for kidney transplantation. Moreover, once a network facility was implemented the system would have been capable of automatically matching donor kidneys with a compatible recipient from among the dialysis patients on the transplant waiting lists at the different renal units. However, the consultants at the main transplant unit in the region (not the Dialysis and Transplant Unit) refused to cooperate because they did not believe that the implementation of the Renal Computer System would have been of any great advantage to them in their work.

Whether the reasons for this were entirely related to their perception of the limitations of the computer system or whether it was concerned more to resource constraints was never wholly clear, although both factors were relevant. One point was clear, however, and that was that the collegiality of the renal consultants had its internal rifts and that not all the renal consultants were prepared to support Dr Earl's strategy.

In addition to any desire simply to improve the renal service there were two other considerations of an even more practical kind,

(a) if Dr Earl could convince his colleagues at the four other renal units, the system would be substantially funded by the region;

(b) the demands for renal care and kidney transplantation were known to be on the increase (Dowie,1984; Williams *et al*, 1984). The renal service was to be expanded (RHA, March,1983) to meet this increase in patient numbers and this would mean an increase in the clinical data to be collected, collated and monitored. A computer system could be used to handle this increased data without having to increase the number of unit staff.

Dr Earl's first move was to invite the renal consultant of the computerised unit to give a talk on the Renal Computer System to his consultant colleagues at one of the Regional Dialysis and Transplantation meetings (known as the 'Kidney Club'). Out of this came the initiative to set up a Regional Renal Computer System Steering Group (as the initiating consultant had intended) composed of renal consultants from all the five renal sites in the region plus a regional computer specialist. All this happened in 1982 (Earl: Interview 1; minutes and internal memorandum). The senior nurses and the 'other disciplines' (dietetics, social work and

psychology) were also consulted from an early stage but none participated in the decision-making process at the regional level.

The renal consultants, with help and support from the project manager/computer specialist, drew up a list of criteria which any system had to meet if it were to be considered for acceptance ('Operational Requirement', November, 1982). This in fact would have been drawn up by the computer specialist for it was this person's responsibility to translate the consultants' stated requirements into what computers could reasonably be expected to do. The document was probably have been the outcome of several meetings and discussions between various individuals but without fuller knowledge of the discussions at the Regional Renal Computer System Steering Group it is not possible for me to be more definite on the matter. What can be ascertained, however, is that it was at the pilot site, the Haemo Unit, and not at the Regional Renal Computer System Steering Group where the 'Operational Requirement' document was actually agreed and approved as the basis against which tenders should be submitted. This approval was given by the Haemo Renal Computer Working Group in December, 1982 (source: minutes). The reason for this action on the part of the Haemo Unit steering group was in order to ensure that the system could be ordered and implemented within the time frame within which the regional funds were available to pay for the project. In the event, and as will be explained in a moment, matters did not initially work out as Dr Earl had anticipated and for a time it looked as if the renal consultants were going to have to accept a system they did not want, or lose regional funding of the project. It is the case, however, that in agreeing the criteria listed within the 'Operational Requirement' document the Haemo Unit steering group pre-empted any prevarication on the part of the consultants of the other units. To start with this strategy seemed to

have worked, but as time went on the differences of opinion concerning the Renal Computer System began to surface. The first reports I came across concerned the main transplant unit in the region (not the Dialysis and Transplant Unit) which was not going to implement the system unless they were given substantially extra funds from region to do so (Princess Unit fieldnotes, 9th August, 1984, pp5-6; MSC, May, 1985, 130-160). This was followed by the consultants at the Dialysis and Transplant Unit complaining that the system was very inadequate for what they required. I have already touched upon this issue in the methods chapter (Chapter Five) in connection with criticisms of my report on the Renal Computer System and the matter will be discussed in detail in the next chapter which is concerned specifically with the implementation of the system at the renal units (Chapter Seven).

To return to the beginnings of the process of the renal unit automation. The companies submitting tenders were asked to offer discounts if the system selected for the Haemo Unit proved acceptable to the regional authority and the other four renal units. The selection of the Renal Computer System, however, did not result so much from the computer company offering a system that fitted these criteria but rather the criteria reflected the facilities and capacities of the computer system that Dr Earl and the hospital physicist had come to most favour - any doubts about its limitations had been overtaken by the awareness that none of the other systems on offer could do as much. This can be asserted in the light of what happened when the contract was put out to tender.

It was at this time that other systems were brought to the notice of the Renal Consultants Computer System Steering Group. As far as I am aware there were two contenders besides the Renal Computer System Company itself that responded when tenders were invited. One was quickly rejected

because of doubts concerning software support. The second system was known to the Renal Consultants Computer Systems Steering Group largely because "a leading figure in the computer company ... was himself a patient on home dialysis." (Earl: Interview 1). The system on offer was rejected because it was essentially a business system and was considered to have required too much development to be suitable for use in the renal units. There was also a third contender, the CORES system, which was proposed (rather than tendered) by Dr Old. This system was not seriously considered by the steering committee until after the Renal Computer System's company had apparently 'gazumped' the renal steering group. What happened was that when the companies were invited to submit their tenders, the price quoted by the Renal Computer System company was much higher than had been anticipated and far beyond the renal group's budget (in fact all three companies submitting tenders quoted prices higher than the £30,000 the Region had allocated for the purpose). This new high price was therefore not acceptable: the Steering Group simply did not have the resources, and the renal consultants had to look for an alternative solution. It was at this point that the CORES system was brought to the attention of the Renal Consultants Computer Steering Group by Dr Old, who was a member of the clinical specialist sub-committee of the Regional Computer and Information Systems Committee which was responsible for authorising the regional funding of the renal system (see Figure 6.2).

Dr Old mounted a vigorous campaign to convince the renal consultants that CORES was their best option. The renal consultants and in particular Dr Earl remained unconvinced, for the CORES system was not custom built for handling renal data as was the Renal Computer System. In particular, the CORES system lacked any graphics facility and that was the *one* facility the renal consultants agreed the system *had* to have if it was to

improve patient care. The reason for this was that access to graphs would enhance the doctors' appreciatian of trends in the patients' haemotological and biochemical profiles (for reasons that will be made fully clear in the next chapter). Nevertheless, the CORES consultant was insistent and even arranged for the system to include a graphics 'package'. Thus the situation arose after the tenders had been submitted, where it appeared that the renal consultants would be forced to accept a computer system not of their choosing because the Renal Computer System was too expensive, and if they did not accept the CORES system they would not have any regionally supported computer system at all. Dr Earl, as sponsor of the Renal Computer System, soon found a way out of this impasse by himself phoning up the Managing Director of the Renal Computer System Company in early 1983, who explained that the price quoted in the tender was a mistake and that, given an opportunity, the company would want to submit a revised tender quoting a price within the renal group's budget. The reason given by the managing director for the 'overpricing' was that he was out of the country at the time and those responsible for submitting the tender were unaware of the cost constraints on the renal service and the intention of the company's management to win the order (sources: Dr Earl, Interview 1; Working Group Minutes). The Regional Renal Computer System Steering Group had then to go back to the Regional Clinical Users Sub-Committee (see Figure 6.3) to get the necessary authority and funds to go ahead. This was achieved, but only after much argument and discussion between the supporters of the Renal Computer System and Dr Old as the advocate of the CORES system.

I do not know whether the computer company had any knowledge of the amounts allocated to the renal system. What is transparent, however, was that Dr Earl and his colleagues were committed to introducing the Renal

Computer System and would give priority to the company's bid so long as it remained within their overall budget. A 'strategic choice' had been made by the renal consultants, following the initiative of the senior consultant at the Haemo Unit. While it was the case that the selection of the computer system was based on technical and economic considerations these were not the only ones and it is clear from what has just been described that the final decision to select the Renal Computer System related principally to the politics of choice.

In the episode where Dr Old tried to get the renal consultants to accept the CORES system instead of the Renal Computer System there are some pertinent parallels with Pettigrew's analysis of the role of gatekeepers (1974, p. 233). In many respects Dr Old had qualities attributed to 'Kenny' (*ibid*) both had based their careers on the development of computer systems within their respective organisations (although Dr Old, as a consultant physician, was far less vulnerable than Kenny if any of his strategies failed). Similarly, both had based their commitment to computerisation in terms of particular computer systems. Kenny's commitment was to a particular manufacturer whereas Dr Old was committed to a particular medical computer language and systems based upon it, of which the CORES system was one major development. Dr Old had established his 'gatekeeping' role at both regional and district levels by membership of appropriate committees and by establishing new committees within the district health authority and other initiatives (below). Yet, unlike Kenny, Dr Old was unable to achieve his goal of getting the CORES system established as the regional renal computer system (and therefore a *corporate* system) because Dr Earl had been able to establish a strong enough collegiate power-base through the establishment of the Regional Renal Consultants Computer System Advisory Committee to resist the

proposition to introduce the CORES system into the renal service. Moreover, the Renal Computer System was already in use at renal units in other health regions, and professional colleagues in the field of renal medicine were working to make the system the national standard (Selwood and Will, 1985, BJHC). The CORES system lacked the necessary collegiate support of the renal consultants and the credibility of being an 'industry standard'. One final point is that, though the CORES system would have been considerably less expensive to implement and maintain than the renal system (see below), the renal consultants remained unanimously supportive of the Renal Computer System and were able to present a strong case for that system, and thus the great difference in costs between the two systems did not become a key issue in the decision-making process.

The Renal Computer System was finally accepted as the Regional Renal Services Computer System in the first quarter of 1983 and was implemented at the Haemo Unit (being the pilot site) in October,1983. The pilot site was 100% funded while the other units received the then standard 50% funding from the region. This was to have ramifications for the different units either in terms of the level of clerical and technical support they were able to afford or in terms of their commitment to the system.

The CORES system

Turning now to the other computer system, CORES. This system was introduced into the outpatients' clinics of the small acute hospital (referred to here as St Giles) in 1981. It was sponsored by one particular consultant, Dr Old. The objective of the system was to replace the handwritten case notes with printed, structured reports, flowcharts and clinical summaries on patients, and to make available facilities for analysing clinical data on groups of patients in order to facilitate higher standards of patient care and to stimulate medical research. Initially the

computer system (CORES) was introduced on an overtly experimental basis. The hardware and technical support was, as a consequence, made available by the regional health authority at a very low cost (details below) while the programmes were supplied from the USA completely free of charge. The system was introduced into the first outpatients' clinic towards the end of 1981 but it was not until the following October (1982) that all the consultants had been introduced to the system.

The CORES system was based on a medical computing language known as MUMPS (Massachussetts General Hospital Utility Multi Programming System). MUMPS is in fact described as being a

> "combined operating system, high level interpretative programming language and data base management system" (Perfect *et al*, January,1979, WMRHA).

Dr Old had previous knowledge of systems design and programming using MUMPS facilities for these were available within the region. As has been explained earlier in this chapter he had a long history of research and development work with computers in medicine. The origins of his work with MUMPS can be traced back to contacts with a research colleague who, while visiting the USA in 1969, had made use of a MUMPS-based system within the hospital where she was working and was very impressed by it. This research colleague considered the system to be superior to any she had come across previously in the medical computing research she had been engaged in, and it was this message she brought back to her colleagues in the UK. Later, in the mid 'seventies, the DHSS announced it was to introduce the MUMPs system in the NHS on an experimental basis. The system, and the resources to run it, was to be awarded to the region that demonstrated that it had the most need for it and this was to be measured in terms of the number of medical computer projects designed to use the

MUMPS system. It was in this context that Dr Old was asked, by his now former working colleagues (he had since become a consultant), to design a suitable system to be run on MUMPS. The result was the 'Junior Doctors Information System' which was, in effect, an electronic guide to good clinical practice for house officers working on the wards, and doctors of that grade attached to Dr Old were expected to make use of the system. A number of other projects were also developed and together convinced the DHSS to award the MUMPs system to this Region. This meant that there was now a computer centre (bureau) entirely dedicated to supporting experimental medical computing projects based on MUMPs. It was staffed with at least two full-time computer personnel (analyst-programmers), and it gave bureau computing support to medical computing projects more or less free. This meant that the doctors who have used the system have paid very little for the use of the facilities: all the hardware, including the peripherals (within an agreed configuration), the computing processing and access to the mini computer came free as well did the technical advice and support of the computer specialists (during the CORES project the policy regarding charging for the technical advice and support changed but that comes later).

Having established the Junior Doctors' Information System, Dr Old became interested in developing a new and more ambitious computer project, using the CORES system. This system was to be implemented as a medical records system for the outpatients' department. It was designed to provide a clinical database from data recorded during the *medical encounter*, from which case notes, structured reports, summaries and flowcharts could be derived either for routine clinic purposes, or for research and medical audit. In addition, requests for *ad hoc* searches could be fairly easily dealt with (e.g. what proportion of patients, by what speciality, were

hypertensive) and 'prompts' could be readily programmed into the system, so that patients' records would be automatically 'flagged' if certain procedures, drugs or investigations were normally required by the consultant. The CORES system was modular in design and provided, in addition, full patient administration facilities as well.

The CORES system was known to Dr Old through the newsletters of the MUMPS users group and the medical computing literature. By the middle of 1981, following correspondence and telephone calls with the CORES systems people in the USA, Dr Old was sent - completely free of charge - the manual and computer 'tapes' for the CORES system. The reason for this magnanimity was that the system was supported by the US Government who wanted it made available as widely as possible in order that it might be fully tested and, if appropriate, become the health industry standard (at least in the USA).

The selection of the CORES system was not the outcome of corporate decisions at regional level as was the case with the Renal Computer System. It was instead the result of,

(a) a consultant's research interest combined with,

(b) his involvement in the regional politics of medical computing (i.e. lobbying the DHSS for the MUMPs system, active involvement on the regions computer committees) and

(c) there being available the very heavily subsidised computer facilities at the MUMPs computer centre.

However, this prehistory does not explain why the consultant's colleagues and the hospital and district administration supported his experiment. To take the administration first, at the time (1980-1981) the district lacked any regionally supported computer projects and his proposal was relatively inexpensive at an estimated cost of about £5,000 per annum (the capital

cost was less than £500). The formal decision making process was as follows,

(a) proposal goes to the Hospital Management Team and receives support,

(b) passed to the District Management Team who refer it to the District Planning Committee. The proposal is supported and funded initially for one year.

(c) at the same time the proposal is submitted to the MUMPS steering group which decides what projects are to be supported by the MUMPs facilities. The project is to be supported and resourced for three years (1981 - 1984) subject to an annual review.

The proposal, despite its relative inexpensiveness, did not proceed unopposed. The Finance Officer was reluctant to agree to the funding of the project and initially the funding was only for £2,000 for one year (CORES steering group minutes, June, 1981) and then only after the Finance Officer had been persuaded informally by the Assistant District Administrator (Fieldnotes 5th August, 1981).

The formal decision-making processes took place between January and June, 1981, but had been preceded by the less formal process of gaining collegiate support for the project from the other consultants who held clinics in the St Giles Outpatients' Department. Only one consultant indicated any reticence (and that informally only) and he expressed an unwillness to prejudice a colleague's research. The consultation process was carried out on an individual basis by writing and talking to each consultant in turn. This process was carried out during the second half of 1980 and the resultant support was formalised through the Hospital Medical Committee (Fieldnotes 5th June, 1981). The submissions to the hospital and

district committees therefore were in the name of all the consultants collectively, although no one at any time confused this formality with the reality that it was Dr Old's project. What his colleagues had done was to indicate that they did not object to participating in the CORES project; this arrangement is quite usual in cases were a system is designed to be used in several clinics and, as we have seen, the adoption of the Renal Computer System followed parallel lines. It is a practical example of *collegiate control* and reciprocal support (Johnson, 1972). Without the support of his consultant colleagues Dr Old's project would not have happened, yet he was not able to do very much with their support for there was to be a fine distinction drawn between not obstructing the project and actively supporting it. Details of the how this distinction manifested itself in practice are discussed in some detail in Chapter Eight which deals with the outcome of the system's implementation.

Even before the formal decisions to support the CORES project had been taken the CORES Steering Committee was established with Dr Old in the chair. This was in May, 1981. This committee was primarily concerned with the technicalities of setting up the system, developing the system's facilities and organising the evaluation of the project in order to meet the district managements requirements. The meetings were run along participative lines, but always with the objective of getting the system implemented as soon as was possible. Membership of the committee was between six and nine people including the unit administrator, computer personnel, senior nursing officer, management services personnel and the medical records officer.

It should be noted that the one occupational group not mentioned has been the medical staff who were to use the system for although they did have a representative he never attended any of the meetings. Nevertheless,

despite this lack of active participation the steering committee functioned well enough as the instrument by which the professional dominance of the consultants was translated into an organisational, or administrative form. No other doctor needed to be on the committee Dr Old would act on their behalf and anyway the consultants were seen by Dr Old to require a "more personal treatment, very gentle, very different" than other members of the hospital staff (Fieldnotes, 7th September, 1981). To this end Dr Old maintained a rigorous gatekeeper role regarding access to his colleagues. Only he was to organise and carry out the implemention of the system for the consultants and junior staff.

Parallelling the events at St Giles was the setting up of the Information and Computing Advisory Group which had its first meeting in July, 1981 at the nearby District General Hospital. Like the CORES Steering Group it too was set up at the instigation of Dr Old, who also chaired the meetings. The main role of the committee was to develop a coordinated strategy for computing and information systems in the district, to advise both the District Management Team and the Medical Executive Committee and to liaise with the Region on these matters (Minutes 10th July, 1981). This the committee did until its demise in 1985 when, following the implementation of the Körner and Griffiths recommendations, it was replaced by a committee chaired by the Information Officer - a process that was happening in other districts too. The committee, however, also served as the district's monitoring body for the CORES project, ensuring or at least enhancing, the project's continued acceptability to the district authorities. In short, the Information and Computing Advisory Committee institutionalised Dr Old's gatekeeping role regarding the CORES system *vis a vis* the District Management Team and because it was the district's

specialist committee on the subject of computer systems, the Regional Health Authority.

4. The politics of professionalism: comparisons

The two computer projects (Renal and CORES System) were the initiatives of individual consultant clinicians. The two systems both involved hospital clinicians accepting some changes in the presentation of clinical data and information but these changes were intended to be improvements on the pre-existing manual/handwritten systems for these doctors. In addition, both systems were designed to facilitate the monitoring of patients conditions and their treatment as well as offering facilities for research and audit purposes. While both were real-time systems the CORES system was designed on the assumption that the clinicians would prefer to work from printed outputs ('hardcopy') while the Renal Computer System was designed on the assumption that the medical user might wish to directly access data and information via a terminal keyboard and VDU. The more crucial differences, however, related to organisational, rather than technical, factors. The single specialty/multi-site, regionally funded corporate status of the renal dialysis and transplant service was a simpler organisation to be computerised than the multi-specialty/single-site, district funded, outpatient department. These organisational differences had major implications for the politics of implementation. There was a marked contrast between the approaches of the two sponsoring consultants. Dr Earl's approach, was based wholly on gaining organised collegiate support for the project and, once that was established, allowing (or not being able to prevent - see Chapter Seven) other consultants taking a leading role in coordinating and controlling the project. Here was a strategy of *collegiate solidarity* designed to ensure

institutional control of the consultants. In contrast, Dr Old adopted a strategy that, while it was dependent on collegiate support, was orientated more to constructing and maintaining coalitions within and between the district administration and regional computing and systems specialists. This approach I have called the strategy of *organisational coalitions* which involved the sponsoring consultant in working within the framework of organisational control in order to mobilise the resources for the CORES project whilst intending to retain the support of his colleagues. These strategies, were in part predicated on the different organisational realities that confronted the renal units and the outpatients' department. These realities, in turn, greatly influenced the chances of the systems being implemented within the clinics and used by clinicians. In summary form one can say that in the case of the Renal Computer System the doctors had a real, tangible, commitment to the system whereas in the case of the CORES system they did not. For in the latter case the doctors were expected to modify their routines regarding their writing of case notes and use of the medical record, while the renal consultants were to directly benefit from the system's introduction whether they personally modified their methods of working or not (for details see Chapter Seven).

Whichever strategy was adopted both sponsoring consultants were able to rely on the *formal* support of their consultant colleagues. In general terms this was related to the consultants' collegiality, but this could be further disaggregated into four sub-categories,

1. Technological Rationalism: when the doctors believed they should not stand in the way of what they perceived as progress;
2. Collegiate Commitment: when doctors believed that, in the interests of professionalism, they should always formally

support research projects of colleagues;

3. Instrumental Commitment: some consultants saw the implementation of the computer systems as being directly useful to themselves in carrying out their own projects;

4. Protectionism: some of the consultants believed that the existence of the experimental computer project gave additional protection against closure of the hospital (an ever-present threat to the small hospital)

These sub-categories were initially derived from the analyses of the transcriptions of the first interviews with the doctors at St Giles hospital, but, with the exception of *protectionism*, these rationales were also found to be applicable to the renal service. The strategy of *collegiate solidarity* adopted by Dr Earl ensured that the *collegiate* and *instrumental* commitments were welded together, ensuring a high-level of *institutional control*, with the result that the introduction of the Renal Computer System succeeded in a way that the CORES system did not. In the case of the CORES system there were insufficient resources available to meet the specific *instrumental* interests of the consultants and this meant that the main rationale for supporting the project could only be that of *collegiate commitment*, little mediated by other considerations, and this was a rather weak form of *institutional control*. This meant the degree to which Dr Old could rely on the practical support of his colleagues was limited; they were prepared *not* to oppose his project, but they were to find little in CORES system that appealed to them. Against this background the strategy adopted by Dr Old was to build an *organisational coalition* with the computer specialists and the administrators and this makes sense for, unlike Dr Earl, he lacked any cohesive constituency or power base for his strategy. The implications of the adoption of these strategies for the

day to day use of the two systems are developed and analysed in detail in the following two chapters.

Conclusions

In this chapter we have seen how two individual consultants have attempted to mobilise the *institutional control* available to them in order to implement two computer-based medical information system. In the case of the Renal Computer System Dr Earl was able to adopt a strategy that subordinated the organisational control of regional computer policy to his and his colleagues institutional control, something Dr Old was never able to do. This was partly, and importantly, because Dr Old lacked the active interest and support of many of his consultant colleagues. Yet these same consultants never withdrew their official support for the CORES project they simply found ways of not using the system. In consequence the clinical facilities of the system were never *formally* recognised as having been rejected by the consultants.

I have also argued that that the consultants commitment to the systems implementation were to be categorised according to four empirically grounded rationales, these were,

1. technological rationalism,
2. collegiate commitment,
3. instrumental commitment and
4. protectionism.

Moreover, these rationales had an important influence on the degree to which the sponsoring consultants could mobilise the *institutional control* of the doctors. Dr Earl was able to mobilise stronger colleague support for the Renal Computer System than was Dr Old with the CORES system because he could summon up both collegiate and instrumental commitment to

the system, and sustain those commitments to a considerable extent. Initially Dr Old was able to draw upon all four rationales to some degree but soon after the system was introduced the consultants support was reduced to one of collegiate commitment which proved to be insufficient for the system's survival as a replacement for the traditional medical records. The collegiality of these consultants ensured the system was not withdrawn because of their lack of formal support, but it was not real enough to have supported the system's general acceptance in the clinics. This was related to the practical experiences the consultants had with the system which are discussed in Chapter Eight.

The very limited success of the CORES system's implementation was also related to the changes in the region's computer policy which moved rapidly towards a commitment to developing the *corporate* patient administration system - in order to meet the priorities established by the Griffiths and Körner Reports - and away from supporting other independent computer developments. This trend reflected the greater commitment at the 'centre' - the DHSS - to strengthening the states' organisational control of the health service. The Renal Computer System also suffered from this policy, for despite its own corporate status the system was implemented on the assumption of the regional computer specialists that it would be with only a minimal level of resource support because of the high priority given to the development of the PAS corporate system. Unlike the PAS system the Renal Computer System was not intended to be part of the developing corporate information system designed to underpin the new management structures of the health service of the 'eighties and 'nineties. The system's corporate status reflected the consultant's ability to exploit the arrangement rather than the region's intention to extend its organisational control over the service.

The implementation, survival and development of the two computer systems depended less on *technical* factors and more on the interplay between the *politics* of institutional and organisational control within the hospital service.

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CHAPTER SEVEN

INTRODUCING A COMPUTER SYSTEM INTO TWO RENAL UNITS: A LABOUR PROCESS ANALYSIS

Introduction

This chapter is concerned with the introduction of a computer system into two hospital renal units. The objective is to elaborate on,

(a) the division of labour involved in renal work and the role played by patient records,

(b) the consequences of the introduction of the Renal Computer System, and

(c) the reasons for any variations in impact of computerisation on the two renal units.

In the last chapter the concern was to describe and analyse the politics of the processes of introducing computer systems into clinic work and this necessarily ignored examining in any detail the nature of the clinical context in which the computer system was intended to operate. The intention here, and in the next chapter, is to make up this deficiency by examining in detail the labour process of clinic work in order to

(a) understand the role the computer system was intended to play in this context and

(b) the reasons for any limitations in the system and its use.

In this chapter the concern is with the Renal Computer System and its implementation at two renal units.

It is the case that patients on renal dialysis regularly undergo haemotological and biochemistry investigations which produce a wealth of numerical data, as does the routine recording of the patients temperature, weight and blood pressure, it is relatively straightforward, *technically*, for this patient data to be computerised (Will and Selwood,1985, p.11). However, my concern is not simply with the process of computer implementation in these terms, but with the implications or variations in the organisation and control of renal work between the two renal units for the ways in which the system came to be used (a point made in Chapter Six). The purpose here will be to develop further the labour process model set out in Chapter Three, in particular with regard to the issue of medical dominance *vis a vis* the other healthcare professions involved in the delivery of hospital healthcare.

The chapter begins with an account of the organisation of the division of labour associated with renal work, particularly as it involves the doctors, nurses and patients, but also including consideration of the work of the dieticians, social workers and clinical psychologists. This provides the necessary background knowledge of work processes and the division of labour associated with renal units, in order to be able to analyse the organisational outcomes and users' responses to the introduction and use of the Renal Computer System, which in turn forms the subject of the second part of this chapter.

Renal work and the labour process

The division of labour associated with the care of patients with Chronic End Stage Renal Failure (ESRF) is schematically represented in

Figure 7.1 (below). This diagram relates the work of each discipline to the stage in a patient's career of renal failure (at the bottom of the diagram) and illustrates the dominant role of the doctors (consultants) in diagnosing the disease and consequently categorising the patient as in need of:

(a) advise from the dietician,

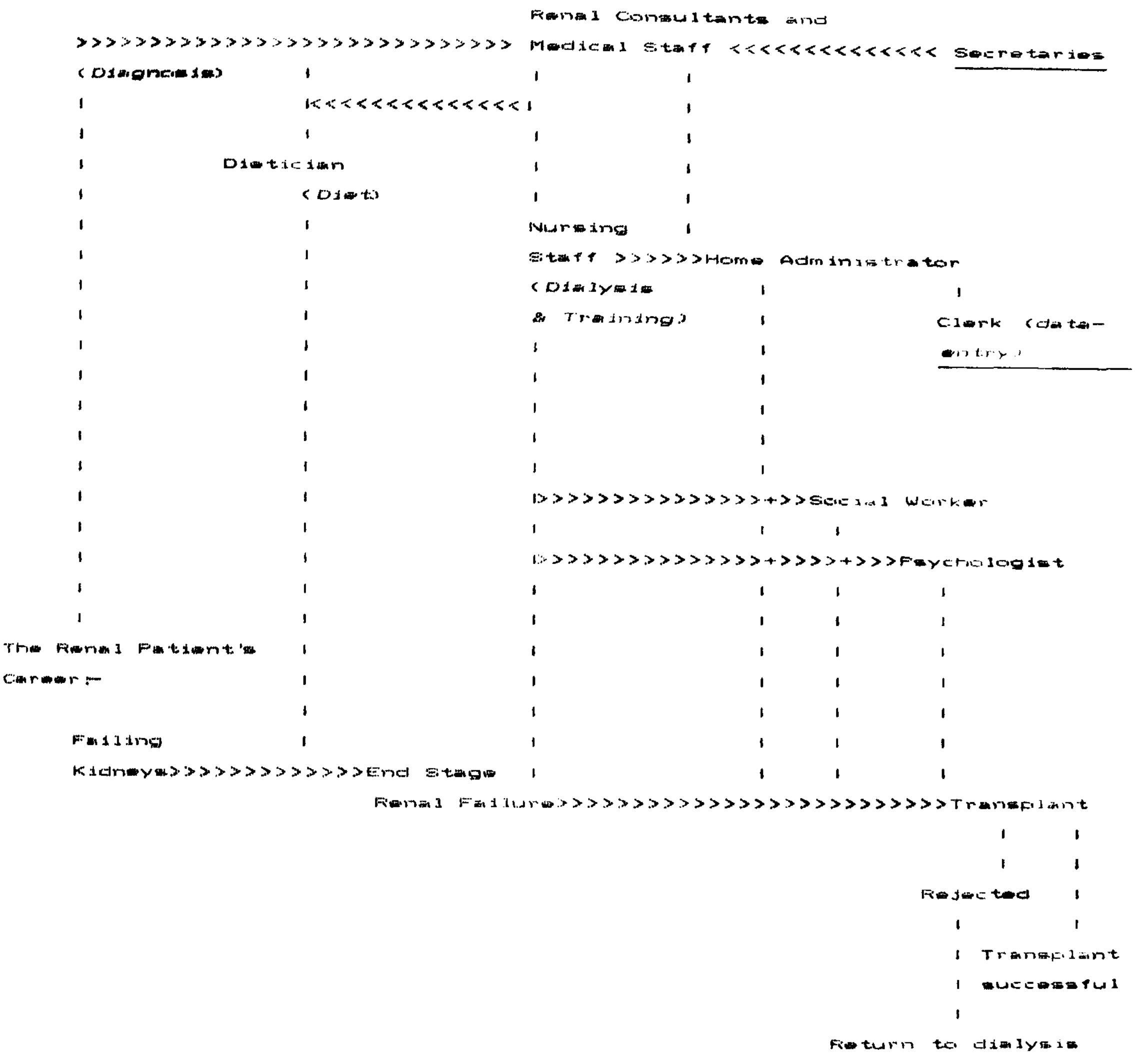
(b) dialysis and training in dialysis techniques by the renal nursing staff,

(c) support and guidance of social workers and/or psychologists (as recommended by the nursing staff),

(d) facilities for carrying out renal dialysis in their own home to be organised by the home administrator,

While the renal labour process represented in Figure 7.1 is common to all renal units in the region there are nevertheless important differences as between individual units. Thus, only one of the units (Haemo) made regular use of a clinical psychologist; this same unit was one of two which provided only haemo-dialysis facilities while all the other units also provided peritoneal dialysis (CAPD); and one unit provided the renal (kidney) transplantation service for three of the other four as well as for its own dialysis patients, leaving the remaining centre with independent transplant facilities. It was not possible to include all the renal units in this study, because the timescale of computerisation was much too long, and continued well after the time available for fieldwork had passed. Thus the two units that have been included here were those whose computerisation programme was completed within the time available for this study, but the two sites were markedly different in terms of size and complexity. This meant that illuminating comparisons could be made of

FIGURE 7.1 : THE ORGANISATION AND CONTROL OF THE RENAL LABOUR PROCESS (simplified)*



Notes

* (a) The diagram only refers to chronic ESRF

(b) The role of the transplant surgeons is ignored.

(c) The inter-section of the vertical lines with 'The Patient's Career' indicates a sequence of involvement only and the distances between the lines have no other temporal significance.

(d) The +s indicate the vertical lines (I) crosses over the horizontal lines (>>>) and do not join them.

their distinctive clinic division of labour and the roles of the doctors within them (see also Chapter Six). As already indicated, the Haemo Unit was the smaller of the two units studied in terms of space, staff and patients (details

presented below). Moreover, it only provided facilities for haemo-dialysis (and follow-up care for patients who had undergone kidney grafts). The Dialysis and Transplant Unit, by contrast, had the facilities and the space to bring patients into the unit for investigations, treatment and to stay overnight if necessary (the unit had 13 beds). The unit also employed the services of a transplant surgeon. In both the renal units the patient data was kept in tabular form in the medical record folder, while only the Dialysis and Transplant Unit routinely presented the data on graphs (known as 'charts') which were filed separately from the medical records. The staff in each renal unit adapted to the new computer system differently and this related to the pre-existing manual system of data collection, collation and presentation as well as, more fundamentally, to the underlying medical rationales (or ideologies) of the consultants. In this first part of the chapter it is the different methods of patient related data collection and usage that form the primary focus, for they constitute the data-bases for the medical management information system within the units. This will be followed by a consideration of the differences in *medical rationales* to be found in the two units and the inter-relationship these have with the organisation of the collection and retrieval of paient-related data.

End stage renal failure and dialysis treatment

To understand the control and coordination of the work processes associated with the care of chronic end stage renal failure patients it is necessary to examine the nature of renal work in more detail. We start with the patient: chronic end stage renal failure (ESRF) is of a different order from most, if not all, other chronic diseases. The patient can only be returned to a *self-sustaining* condition of reasonable health if he or

she has a kidney transplant (1). While waiting for a transplant, or as an alternative thereby to transplantation, patients are kept alive and well through the regular dialysis of their blood by means that emulate the function of the kidneys. This is necessary because the kidney function of these patients has declined to such an extent that very little, if any, waste products are being filtered out of the blood circulation, so that without dialysis urea would accumulate in the blood stream to such an extent that a patient would die within one or two weeks (Gallagher, 1976 p. 64).

Renal dialysis takes basically two forms,

(a) haemo-dialysis

(b) peritoneal dialysis

which will now be described in turn.

(a) Haemo-dialysis

Haemo-dialysis involves the patient's blood being pumped through an artificial kidney whereby, through a process of osmosis and filtration, the patients blood is cleansed of urea and its electrolyte balance is maintained in an approximation of natural kidney function (*ibid.*). This procedure is normally carried out twice or three times a week for 3-6 hours (Haemo fieldnotes Book I, 16th August,1983, pp.5-6; Dialysis and Transplant fieldnotes, Book I, 18th June, 1984, pp. 39-40). New patients first have to undergo minor surgery in order that an artery and a vein in the forearm can be conjoined to form a 'fistula' large enough to be accessible for connecting (via tubing) to the artificial kidney within the haemo dialysis machine. The 'kidney' is a filter, typically cylindrical in shape with the blood passing through many fine tubes while the dialysate passes over these tubes and draws off the toxic elements that have accumalated in the blood.

The cleansed (dialysed) blood is then returned to the patient's own circulatory system. The blood is prevented from coagulating ('clotting') whilst outside the body of the patient by the automatic addition of the anti-coagulant, heparin. The blood is also warmed to maintain it at body temperature. (Fieldnote Book I, Haemo Unit 16.8.83, pp. 5-7; Dialysis and Transplant fieldnote Book I, 27.7.84. pp. 60-62).

(b) Peritoneal dialysis

Peritoneal dialysis systems exploit the osmotic quality of the peritoneum to cleanse the patients blood of toxic material. The most common peritoneal technique is that of Continuous Ambulatory Peritoneal Dialysis (CAPD). Where the patient has his or her abdominal cavity loaded with an appropriate quantity of dialysate, and this dialysate is changed about every three hours during the patients waking life via a plastic tube (*Tenchoff*) embedded through the abdominal wall (Dialysis and Transplant fieldnote Book I 27th July, 1984, pp. 63-65). One variation of this technique is the system where the dialysate changes take place automatically throughout the night while the patient sleeps - a process known as Continuous Cyclic Peritoneal Dialysis (CCPD) (Dialysis and Transplant fieldnote Book I, 27th July, 1983, p.62). This system had not been used within either renal unit previously, in part because it was a more recent development than CAPD, but one patient did 'switch' from CAPD to CCPD during the time of the fieldwork (Dialysis and Transplant fieldnotes Book 1., 24th July, 1984, p. 40; Book 2, 1st August, 1984. p. 14; 11th September, 1984, p. 23).

Renal dialysis is an expensive therapy, costing - at 1981 prices - between an estimated £7.900 and £12,245 a year for each patient (Wing *et*

al quoted in Dowie, 1984, p. 990). However, the difference between home haemo-dialysis and CAPD is to be measured in hundreds and not thousands of pounds (£) while, according to Dowie and perhaps surprisingly, CAPD is the more expensive dialysis system (£8,650 compared with £7,900 for home haemo-dialysis) (*ibid*) (2). The question of costs was not, however, the key consideration of the consultants when they decided on the dialysis regime they generally preferred. The senior consultant at the Haemo Unit was very committed to haemo-dialysis because it was a tried and tested technique whereas CAPD was a, relatively, new system that had been dogged by problems of peritoneal infections (Fieldnotes Book 1, 13th August, 1983, p. 5). By contrast, the consultants at the Dialysis and Transplant Unit favoured CAPD because it took less time for patients to learn to use (two weeks compared to a minimum of six weeks), the dietary restrictions were less onerous and the process of dialysis was viewed by them as being more 'natural' than haemo-dialysis for it exploited the osmotic properties of the peritoneum rather than that of an external artificial kidney (Con. DT1, Int. 1, May, 1984, 146-192). The preferences of the consultants at the two units to the two different types of dialysis regimes (haemo-dialysis and CAPD) not only had implications for the division of labour within the renal units they also reflected an underlying difference in philosophy between the senior consultants at the two units. In order to be able to explain the differences between the units in any detail, and to identify the underlying *medical rationales* of the consultants it is necessary to examine more closely the work of the Haemo and Dialysis and Transplant units.

The Haemo Unit

Doctors, nurses and patients

The renal unit was established in 1970 and was physically small relative to the other units in the region, the total space available being approximately 20 x 30 square metres (including corridors, staff changing rooms and store rooms). The unit consists of two wards (containing reclining armchairs and not beds) for dialysis and training sufficient for 8 patients at any one time. During the period of research the patient numbers at the unit were as follows (Table 7.1),

TABLE 7.1: DIALYSIS PATIENT NUMBERS (HAEMO UNIT)

Under training	10
Home dialysis	31
Unit patients	23*
Patients on dialysis	64
plus transplants	33
TOTAL	97

Note: * Unit patients were those patients who were unable to haemodialyse at home. The main reason for this was because the patients lacked the necessary back-up support of a spouse, other relative or some other person who could help in case of emergency.

(Source: SN2, Int. 1, October, 1983)

There were two consultants, one registrar and two house staff. The consultants were officially described as general physicians with a special interest in renal medicine (Con. HM1, Int. 1, October, 1983, 001-014). This meant that they were also involved with patients on the general medical wards and at outpatients' clinics. The registrar would be expected by the consultants to take a special interest in renal medicine and take responsibility for the day to day medical requirements of the renal patients but this was not the case with the two house staff.

The nursing staff were employed full time on the unit on two shifts (early and late) (Haemo fieldnotes, Book I, 16th August, 1983, p.6). At the

time of the research the nursing complement was 14 (see Table 7.2 for details).

TABLE 7.2: NURSING STAFF (HAEMO UNIT)

1 x Nursing Officer,
2 x Sisters,
9 x Nurses (both staff and enrolled)
2 x Auxiliaries

(Haemo fieldnotes Book Two, 21st May, 1984, p.32)

The Nursing Officer had organised the work of the nurses in line with the criteria of the nursing process (Hunt and Marks-Maran, 1986; Yura and Walsh, 1973 cited in Saba and McCormick, 1986, p.117; Walton, 1987;). In the context of this renal unit this meant that each nurse was individually responsible for the *total nursing care* of specific patients. In part this was done to increase the work interest for the nurses and thereby improve the quality of care to the patients (SN3, Int 1, September, 1983). The nurses' main responsibility was to train patients to haemo-dialyse independently at home (3) and the training also involved one other member of the patients family, typically the spouse, who would be given some training sufficient to act as a 'backup' in case of difficulties or emergencies during haemo-dialysis. Dialysis training at this unit was judged by all the staff to involve more than patients learning to carry out the technicalities of haemo-dialysis; they also had to become accustomed to the necessity of living with the discipline and routine of haemo-dialysis. The training period, which was often in excess of the six weeks, gave time for the patient, and the patients family, to adapt to the regime (Int. SN1, Int.1, September, 1983, Side 2: 001-061).

Much of the nursing work, as organised at this unit, was of the kind

classified by Strauss *et al* as 'sentimental work' (1982; 1985) and more particular the sub-types, composure and identity work. Composure work is that of "helping, or enjoining patients to keep their composure" (1985: p.136) while undergoing dialysis and *identity work* "of getting ... persons to face the realities of their physical conditions and prepare them for their post-hospital lives" (1985: p.138). The Sentimental work was not carried out solely by the nurses, for other members of the clinic division of labour (e.g. social worker and psychologist) also had a direct role to play, but the nurses took the key role in ensuring the work was carried out.

Alongside the work of dialysis and patient training the nurses had the parallel task of recording patient data. The patients' blood pressures, temperatures and weights were recorded at the time of each hospital dialysis (home patients kept their own records). In addition, biochemical and haemotological profiles were kept on all patients and blood and urine samples were taken, or collected, by the nurses each month. The collation of this data was carried out by the senior nurses only (i.e. Nursing Officer and Sisters). In addition these senior nurses kept the patient data on those patients with renal disease but who had not reached end stage failure, even though formally this was the responsibility of the doctors alone (Nurse 3, Int.1, September, 1983, 224-235; Dr HMC, Int.1, September, 1983, 56-102).

The remaining member of the renal unit's staff to be considered here is the Home (or Renal) Administrator. The person had the responsibility of organising the installation of the haemo-dialysis equipment in the patients home, ordering and supplying the necessary supplies (e.g. dialysate, artificial kidneys, etc.), and organising any maintenance work that might be required. The Home Administrator was also responsible for the general

administration of the renal unit (Ad.1, Int.1, September, 1983, Int. 2, June, 1984). As we shall see (below) the administrator also played an active part in 'identity work' with patients, or at least the recalcitrant ones who did not want to take on the responsibility of dialysing at home (Ad.1, Int.1, September, 1983, 019-047; Haemo fieldnotes, 22nd August, 1983, pp. 26-27 re case no.27). In the context of computerisation the home administrator, in common with the administrators at the other renal units in the region, was to become designated the systems controller.

The 'Other Disciplines'

Other staff that were routinely and directly associated with the care of haemo-dialysis patients were the dietician, psychologist and social worker. They constituted what were referred to by all involved with renal work as the 'other disciplines'. Unlike the nurses, however, these people were not members of the renal unit but were part of separate specialist departments, and thus they were also responsible for other types of patients within the hospital.

The dietician's role in the ESRF division of labour was a particularly important one. This was firstly because dietary controls were the means by which *end stage* renal failure was postponed, often by many months and secondly, because patients had to remain on a restricted diet in order to control the disease, as the artificial 'kidney' within the haemo-dialysis machine was less effective than a healthy human kidney and as a result was unable to remove toxic elements as effectively as its organic counterpart (4). In consequence it was vital for patients, starting months before they required dialysis, to avoid certain elements in their diets (notably potassium) and to maintain an ideal body weight (Dt 1, Int.1, September, 1983, 001-026).

The role the social worker was fairly limited. Most of her casework

concerned patients' financial problems, although she would also try and deal with "personal problems" as well, "but they are time consuming and I don't always have the time to see to them" (Non-Med 4, Int.1, October, 1983, 008-021). She would have liked to have adopted a broader role and to have included the assessment and counselling of all new patients. However, over time she had found that other work pressures (unspecified) had prevented the work being routinely carried out.

Turning now to the last of the 'other disciplines', the psychologist was, in his own words,

> "involved in seeing a select number of patients who appear to have psychological problems (in) ... adapting to the machine ... (or) patient difficulties (with) learning their diets" (Psychologist, October, 1983)

His general approach was to teach the patients relaxation techniques as a means of coping with dialysis, in particular the requirement to stick large syringe-type needles into the forearm (i.e. fistula) twice a week to facilitate haemo-dialysis. Patients would be referred to the psychologist at the request of the senior nurses, who considered it part of their nursing responsibility, in line with the precepts of the nursing process, to assess all patients in terms of whether they would benefit from the therapy available from the psychologist (Nurse 1, Ints 1, October, 1983, 029-050).

The case conference

The work of the individual occupations was coordinated through the weekly case conferences held most Monday mornings at 11.00 a.m., to which all members of the healthcare team were invited and mostly attended. The one regular non-attender was the psychologist whose official commitment to the renal unit was only half a day a week (P1, Int.1, October, 1983, 030-

035). The nurses were represented by the Nursing Officer, who chaired the meeting, and the Sister for the early shift. The subjects covered at these meetings would include,

(a) the training of patients,

(b) matters relating to the installation of a haemo-dialysis machine in the patient's home,

(c) any problems (medical or social) relating to the patients' chronic ESRF status (5)

In addition, the opportunity was also taken by those attending to use the meeting for informing or consulting other members of the healthcare team on related topics. It is appropriate to interject that it was this meeting that the senior consultant chose to use as the means of communicating developments relating to the introduction of the Renal Computer System and to discuss the arrangements for its implementation.

At the case conferences virtually all discussions of the ESRF patients and their management started with an examination of the biochemical and haemotological results and only then would non-medical explanations be considered. Nevertheless, much of the discussions at these meetings related to matters not strictly medical, but to problems with particular patients lack of progress in training, to patients dietary indiscretion and to problems of installing dialysis equipment in particular patients homes and even on one unique occasion whether a patient should be recommended to marry or not. The issue here was whether marriage for this atypical patient would improve her quality of life and in consequence her willingness to be a good haemo-dialyser or not. After some extensive discussion and subject to a satisfactory social work report on the affianced the proposal of marriage had the support of the 'Monday Morning Meeting' (Haemo fieldnotes Book 1, 30th September, 1983, pp. 50-51,

13th December, 1983, p.64). One case that illustrates particularly well the way in which the meetings worked to coordinate the contributions of the medical, nursing and 'other disciplines' was the *'case of the oven cooked chips'*.

A male patient in his twenties whose potassium level was high, which clearly indicated that he had not been adherring to his diet. This was seen as one sign of his immaturity , "He will have to toe the line and grow up" (Registrar, fieldnotes 22nd August, 1983, Book 1, p.11). The nursing sister reported that the patient saw the unit's rules relating to dialysis and the dietary restrictions as arbitrary and had failed to become sufficiently proficient to carry out haemo-dialysis at home. There were also other problems for the unit's staff relating to the fact that the patient had no one where he lived reliable enough for training as the 'back-up' support, but first they decided to tackle the problem of recalcitrance. The staff at the meeting decided to adopt a two pronged strategy of reward and social isolation, if the patient could get his potassium level down to a medically tolerable level he would be rewarded with oven cooked chips being included in his diet. The refrigerator on the unit was kept well stocked, according to the dietician with oven chips, sausages and ice cream largely to be utilised as incentives to patients finding difficulty in staying within their prescribed diets (p.26). The other part of the strategy was that this patient would be socially isolated when he was dialysing on the unit until his dietary discipline had improved and he had consciously set about learning to dialyse effectively on his own. This decision was taken during August (p.26) and in the December the notice instructing nursing staff to socially exclude this patient unless he was complying to the house rules

regarding dialysis was still on the nurses' notice board, but at the unit meeting one of the sisters was able to report that he was now "very co-operative" (Fieldnotes, book 1, 13th December, 1983, p.65, case no.5).

At this unit the concern was with good patient discipline as the means of delivering good patient care. Haemo-dialysis was viewed as a procedure that the patients had to come to terms with and the medical and nursing staff, with the support of the dietician and 'other disciplines', would attempt with some success to bring about behaviourial changes in their charges (patients) with altruistic, or humanistic, intent. This preoccupation contrasted with the concerns of those working at the second renal unit.

The Dialysis and Transplant Unit

The Dialysis and Transplant Unit was designed to incorporate all aspects of ESRF patients nursing and most of their medical care. If ever an ESRF patient required hospital treatment, whether related to their renal condition, or not, they would be located on the unit. The renal unit included a number of individual rooms and small wards (3-4 beds), plus one larger room (ward) with 5-8 beds. In total the unit had 18 beds available for inpatients (D & T fieldnotes, Book 1, 22nd May, 1984, p.9., 18th June, 1984, p.39). All transplant patients were cared for on the unit, both pre- and post-operatively, as were all patients undergoing investigations requiring an inpatient stay.

The unit offered three types of dialysis therapy

(1) haemo-dialysis

(2) continuous ambulatory peritoneal dialysis (CAPD)

(3) continuous cyclic peritoneal dialysis (CCPD)

At the time of the research there were a total of 119 patients (see Table 7.3 for details.

TABLE 7.3: DIALYSIS PATIENTS (DIALYSIS AND TRANSPLANT UNIT)

	60	x patients who haemo-dialysed at home
	12	x patients who haemo-dialysed on the unit*
	40	x patients on CAPD at home
	6	x patients on training (CAPD)
	1	x patients on CCPD at home
Total	119	Patients on dialysis

(Nurse C., fieldnotes, Book 2, 18th June, 1984, p. 38 except * Nurse D, Int 2, January, 1986, AQ.2a)

CAPD was the therapy most favoured by the consultants (it was the 'treatment of choice' throughout the region) (Fieldnotes, Book 1, 22nd May, 1984., p.12; Con. DT1., Int.1, May,1984, 144-192).

Medical work

The Dialysis and Transplant Unit had been established in the late sixties by the now professor of nephrology, and had a larger medical and nursing staff than the Haemo Unit. There were two consultant nephrologists and one transplant surgeon (later increased to two). In addition, there was one senior registrar (on a two year contract) plus one registrar and two senior house officers (SHOs) who worked for the consultant nephrologists for six and four month 'placements' respectively as part of the hospital's rotation scheme. The consultants also held general medical clinics which the registrar and SHOs also assisted. The majority of the doctors work was related to renal medicine including 'dialysis' and 'transplant' patients. In contrast, the transplant surgeon was principally employed as a urologist, although kidney transplantation surgery was his particular interest. Unfortunately, however, there was an insufficient supply of donor kidneys to keep him fully occupied as a transplant surgeon (Con. DT3. Int. 1, September, 1984, 004-010, 212-235). This consultant surgeon had no junior

medical staff officially allocated to him for his work on the renal unit but the junior medical staff attached to the consultant nephrologists were also 'shared' with the transplant surgeon. This transplant-patient-related work of the junior medical staff involved the preparation and more particularly aftercare of 'transplant' patients as well as the maintenance of the patients' laboratory and clinical data.

In marked contrast to the practice at the Haemo Unit, the day to day medical work associated with this renal unit was almost wholly delegated to the senior registrar and the junior medical staff. Cases might be brought to the attention of the consultant nephrologists at one of the bi-weekly ward rounds (see below) but this would happen only when the patients concerned were presenting *medical* problems and even then it would be unusual if the consultants took any active involvement in the management of the patients involved.

Nursing work

Renal dialysis was wholly the responsibility of the nurses as was the training of the patients. The unit was headed by an Assistant Director of Nursing Services (ADNS): this was largely an administrative post which also carried responsibilities for the organisation of nursing work throughout the hospital. The day to day supervision of nursing work was the responsibility of the two nursing sisters. The full complement of nursing staff 28 including the ADNS (see Table 7.4 for details). This was considerably larger than that of the Haemo Unit which functioned with 9 nurses - RGNs and ENs - while the difference in patient numbers between the two units was less than might be anticipated given the relative nursing staffing levels. The Haemo Unit had 10 dialysis patients being trained and 23 who dialysed on the unit (see Table 7.1), whereas the Dialysis and Transplant Unit had only about 6 patients undergoing training

TABLE 7.4: NURSING STAFF: DIALYSIS AND TRANSPLANT UNIT

1 x ADNS
2 x Ward Sisters
24 x Nurses (RGNs and ENs)
1 x Auxiliary

(Fieldnotes, Book 1, 18th June, 1984, p.30)

and a further 12 patients who dialysed at the unit (see Table 7.3). The Dialysis and Transplant Unit patients dialysing at home, however, numbered 100 as opposed to the Haemo Unit's total of 31, and all these patients required routine monitoring and investigation. Moreover, the Dialysis and Transplant Unit nurses worked a 24 hour three shift system, as opposed to the Haemo's 2 shifts - early and lates - and this additional shift obviously involved the employment of more nurses than if the unit had been open on a day/evening basis only. Most dialysis work was carried out during the day and the nurses on the night shift were chiefly concerned with the care of patients awaiting, or recovering from operations or who had been 'called in' for investigations (Nurse T/N Int.1, July, 1984, 014-059).

In relation to the work of haemo-dialysis and training patients, the nurses were organised similarly to the Haemo Unit (i.e. according to the principles of the nursing process approach) (SN2, Int.1, July, 1984. 012-134 + 077). The other regular nursing duties were organised here by the sisters on a group basis and in contrast to the Haemo Unit these activities were organised either in terms of a 6 months rotation or in terms of time of day. The rotation comprised of,

1. CAPD patient training.
2. Clinic work. Nurses acted as receptionists at the clinics and supplied the doctors with the medical records and laboratory results of patients as they were individually seen.

3. Tissue typing. Nurses were responsible for the organisation of the collection and dispatch of blood samples to the haemotology laboratory of renal patients as well as the entering of the 'results' onto the charts and in the medical records (Nurse K., Int. 2, 30th January, 1985, 142-210)

4. Graph and Ward Rounds. Nurses allocated to these meetings were responsible for supplying the doctors with the medical records or patients charts (6).

(SN2, Int.1, 19th July,1984).

The 'time of day' organisation refers to the entry and presentation of clinic and laboratory data. Each nurse was responsible for the entry of dialysis related data, weight, blood pressure and temperature pre- and post- haemo-dialysis or morning and evening in the case of CAPD. However, the collation of this data was organised collectively. The sister would allocate the duty to a group of nurses on an *ad hoc* basis every evening (SN3, Int.2, March, 1985, 120-142). At the same time the laboratory results would also be entered into the medical records. Then, uniquely, within the health region the nurses would draw up graphs of all the patient related data, both clinical and laboratory data. These graphs were known as the *charts* and were checked each month at the Graph Round by the senior registrar. It was, however, the responsibility of the SHOs to maintain the graphs (i.e.the 'charts') for the patients who had undergone transplant surgery. This was in part because of the need to closely monitor the patient during the critical recovery period, but it was equally the case that transplant patients were no longer on the dialysis programme and in consequence no longer the formal responsibility of the renal nurses. A similar situation existed in relation to patients with renal failure, but

not, at least not yet, in end-stage failure. In practice the demarcation line between what were nursing responsibilities and what were the responsibilities of the doctors was not an immutable one, but one subject to negotiation (implied as well as explicit) between the doctors and senior nurses. This is a point to be developed later in relation to the introduction of the computer system.

The Home Administrator

The home administrator's role was formally very similar to that existing at the Haemo Unit, *except* that there was also CAPD (as well as haemo-dialysis) supplies to order and arrange to be delivered to patients' homes. There were, however, important differences of emphasis between the roles in the two renal units which were related to the coordination and control of the division of labour. Whilst the Haemo Unit had one weekly meeting to deal with virtually everything, here there were three distinct forums (meetings). Two of these were controlled by the doctors while the third was the responsibility of the Home Administrator. This last meeting was scheduled bi-monthly and was concerned with the conversion of patients' homes to accommodate dialysis equipment and supplies. The doctors never attended the home conversions meetings (as they were known) and the administrator never attended the medical meetings, a point that illustrates the division between the medical and non-medical domains existing within this unit but not at the Haemo Unit. The home conversions meetings would involve, in addition to the administrator, the social worker, dialysis technicians, and officers from the works department as well as the senior nurses, in principle all the disciplines necessary for coordinating the completion of the modifications to the patients' homes with that of the patients' dialysis training (7). (Ad.1, Int.1, 28th June, 1984, 260-276)

Renal unit medical meetings

Turning now to the other routine meetings concerning patients and their wellbeing. The monitoring and review of patient cases was carried out at regular meetings organised directly under medical control. There were two ward rounds every week and one chart review, known as the *Graph Round*, every month. All these meetings were held in the patients' lounge.

(a) The Ward Rounds

Ward rounds were held every Wednesday and Friday morning. It was here that decisions regarding those patient cases requiring medical attention were taken by by the consultants and resulting instructions to medical, nursing, dietetic staff were given, The rounds were concerned with renal cases generally and ESRF patients except on Fridays when transplant patients and the suitability of patients for inclusion on the (kidney) transplant list would be discussed. It was normally only at one of the ward rounds would the consultants have any direct involvement in the management of a dialysis patient (8) and only then if there were some medical complication (Fieldnotes, Book I, 24th July, 1984, pp.52-55; Book II, 11th September, 1984, pp.37-39). The ward rounds were in two stages, first, there was the case conference and only after decisions had been taken as to individual patients was the ward round 'walked'. This second stage was largely a matter of meeting the patients and telling them what had been decided by the medical team (*ibid.*). The typical procedure at the case conference stage would be for an SHO or registrar to present details of specific cases with the aid of the case notes and occasionally the graphs (supplied by a nurse). One of the consultants would comment on the doctor's chosen course of action and make specific recommendations as to the patient's management. The nurses,

dietician and social worker sat around the room (not at the table where the doctors sat) and would take note of what was required of them when the consultants so directed.

(b) The Graph Round

The medical condition of the dialysis patients were monitored routinely on a monthly basis and this was the central rationale for the nurses graphing of the patients' haemotological, biochemical and clinical data. The checking of the graphs was carried out by the senior registrar, usually with the aid of one of the junior doctors, and always with the help of three or four nurses. One nurse would hand the graph to the doctor for scrutiny, the second, the relevant medical record file for possible further examination. The third nurse was the sister on duty, who noted down any changes in the patient's dialysis regime (Fieldnotes Book II, 11th September, 1984, pp.30-33; Book III, 12th February, 1985, pp.1-7). If the senior registrar was satisfied with the patient's condition, as represented by the graph, he would endorse the case-notes with the acronym 'GROK', being short for 'Graph O.K.' If that was not the case then he would enter details of the therapies, investigations (etc) that were to be adopted. The meeting was, in fact, an example of medical audit (*chart review*) (see Chapter Four), although no doctor seemed to be aware of this fact despite being specifically asked about the subject

Patient training and counselling

The work of the dietician at the Dialysis and Transplant Unit was almost identical to that carried out at the Haemo Unit. She made an initial assessment of a patient's dietary requirement several months before the patient came onto the dialysis programme. Once on the programme the dietician would provide the patient initially with a more or less standard

diet (in terms of protein, additives permitted, fluids etc.) which she would then modify in light of the patient's experience and the monthly laboratory results. The dietician attended all the ward rounds as well as being advised of suspected "dietary indiscretions" following the monthly graph round (Dt., Int.1, August, 1984, 011-021). The dietician would then contact the patient by telephone, or meet the patient at the clinic in order to advise them (Dt., Int.1, August, 1984, 200-217).

The work of the social worker, however, was organised rather differently to the the practice on the Haemo Unit. All new ESRF patients were interviewed for the purpose of assessing their ability to accommodate to dialysis (SW., Int.1. August, 1984, 016-063). Some of the patients would also require further help and advice at different times in their career as dialysis patient, which could relate to money problems and social security entitlements (e.g. disability allowances), or to work, or even to the patient's ability, psychologically, to cope with dialysis. The Dialysis and Transplant social worker was firmly committed to avoiding the limited 'fire-fighting' role that her colleague at the Haemo Unit had adopted (SW. Int.1. August, 1984. circa 200). It was not entirely clear why this social worker was able to develop a broader role in relation to ESRF patients than her colleague at the Haemo Unit although an important part of the reason was that the senior nurses depended on the services of the social worker at this unit (SN2 Int. 2. January, 1985, circa 272) in a way not found at the previous unit. At the Haemo Unit, the senior nurses relied on the services of the clinical psychologist rather than the social worker to help patients with difficulties coping with being on dialysis (*see above*).

Patients who found it difficult to accommodate to haemo-dialysis could in principle change over to CAPD, and *vice versa*, although this rarely happened. The consultants preferred patients to be counselled (by

doctors and nurses) in the alternative technologies and then committing themselves at an early stage of their ESRF career. CAPD, as the 'treatment of choice', would be the technique recommended when a patient was judged (by the doctors, nurses, or social worker) to be likely to have difficulties in adjusting to the dialysis regime, it being the easiest of the dialysis systems to learn to use.

Once a patient had selected the dialysis system there was, unlike at the Haemo Unit, little attempt to initiate behaviourial changes in the cases of recalcitrant patients beyond giving advice and recommendations. There was even some evidence, among the doctors at least, of a certain admiration of the independence of recalcitrant patients. Patients who failed to haemo-dialyse regularly, or sufficiently long enough, or were guilty of dietary indiscretions would only cause themselves discomfort (due either to the retention of fluid or the build up of toxic elements in the blood stream, or both). The probability that these patients were increasing the medical risks to themselves was not seen as sufficient reason to be interventionist beyond giving advice (Fieldnotes, Book 1, 22nd May, 1984, p.12; Con. DT1., Int.1, May, 1984, 144-192). To illustrate and, in the process, bring out the contrast to the approach adopted by the Haemo Unit staff (in the case of the 'Oven Cooked Chips') here is the case of the 'Miner and his Beer'.

There was a patient, a miner, that earned himself a special respect among the doctors because of his ability to 'work the (dialysis) system'. Unlike most recalcitrant dialysis patients, he did not reject the system but utilised the technology of haemo-dialysis to,

> "dialyse right down, then go down the miner's club for six pints" (SR., Fieldnotes, 11th September, 1984, p.26).

During haemo-dialysis fluid is extracted during the filtration

process, however, after a certain point the patient on haemo-dialysis experiences painful bouts of cramp which patients try to avoid. This miner, with hedonistic intent, had developed his own technique of first dialysing himself until he is "as dry as a bone" (*ibid.*) this meant dialysing for about 6 hours and - presumably - suffering some discomfort from cramp. He would then go out for his social evening drinking beer with his mates. On returning he would haemo-dialyse once again this time to remove the excess fluids resulting from drinking beer (*ibid.*)

There are two reasons for including this story here, firstly, because it indicates the contrast in styles of medical management between the two renal units. The Haemo Unit healthcare team would view the patient as requiring re-education (see the case of 'oven cooked chips' above), whereas the Dialysis and Transplant Unit medical staff did not. As one consultant put the point, " ... patients rarely kill themselves because of ill-discipline" adding,

> "one patient ignores all the rules and dialyses in his own bad way - even forgets to dialyse. *Seems to suit him* even if he does feel bad in himself" (Fieldnotes, 22nd May, 1984, p.13 *emphasis added*)

Secondly, the example illustrates the different approaches of the consultants to the doctor's role in the care if ESRF patients. At the Haemo Unit the senior consultant interpreted his responsibility to this patient group broadly, seeing himself responsible, as the head of the renal health care team, for the patient's total well-being. Given that there was little in the daily life and routine of a patient that renal dialysis does not affect, the role of doctor as 'patriarch' was a particularly extensive one. By contrast, the consultants at the Dialysis and Transplant Unit

interpreted their role in the care of ESRF patients narrowly, limited to supervising their junior medical staff who were responsible for the management of specific medical conditions and pathologies. Anything else was the responsibility of other disciplines, or the administration, or it was not the responsibility of the hospital. Unlike their colleagues at the Haemo Unit, holism was not their approach to medical care.

The introduction of the Renal Computer System

Having described the two renal units and the organisation of the work processes, indicating the basic similarities and differences between them, it is now possible to address the question as to what were the consequences of the introduction of the Renal Computer System into the two units in terms of both the organisation of renal work and the responses of the medical, nursing and other staff? The use of the system will be described as will the responses of each occupational group prior to an analysis of the similarities and differences of the implementation process and its consequences for the two units.

1. The Haemo Unit

This unit was took delivery of the computer system towards the end of 1983. The system was used principally to display time related patient data in both *graph and tabular* forms at the weekly case meetings. The laboratory and related patient data was entered (i.e.input), both for dialysis and pre-dialysis patients by the newly appointed computer clerk. This clerk was supervised by the home administrator, now designated as the systems controller. Most of the computer-related functions were, however, carried out by the computer clerk and the responsibilities of the controller was limited to administrative functions, with little day to day

involvement with the system's operation (Ad. Int. 2, AQ2a, June, 1984). This was a situation was in marked contrast to that at the Dialysis and Transplant Unit (see below). Turning now to the occupational groups for whom the Renal Computer System was designed to support.

The doctors

Neither of the consultants entered any data onto the system, they did however, use the system directly in clinic to review patient data (system output)

> "At clinic I review each patient who is coming on to dialysis, or is actually on home dialysis, or has been transplanted, because .. it is a very convenient way of seeing what the current data is and comparing it it with previous data" (Doctor HM1, Int.2, May, 1984)

In the case of the senior consultant the system was used as an added aid for patient education (by showing the patient the appropriate graph, on the VDU, particularly if the 'result' are medically unsatisfactory) (Fieldnote Book II, 21st May, 1984, p.26).

> "I think (the graphs are) especially valuable because you can show the patients their own results on the (VDU) screen, while you are interviewing them and they can see immediately that you point it out where alterations in their treatment ... or diet, etc., have produced visible changes in their blood results I think this has an important educational value ..." (Doctor HM1: Int.2, May, 1984)

The consultants were well content with the systems facility to produce time-related graphs of the patient data. This they found particularly useful in relation to renal patients not yet in ESRF, for the graphs

illustrated the decline in the patients kidney function far more clearly than tabulated figures would,

> "Its nice to be able to see, at a glance, all the overall results and be able to recognise trends and this is particularly useful when I'm seeing 'outpatients' (i.e. renal patients not yet in ESRF) where you only get to see them probably once every month ... and you can't remember all previous results ... All you do now is press a button and see the whole lot (of results) (Doctor HM2, Int. 2, May, 1984)

Moreover, the consultants were able to monitor for medical problems more closely than previously and any changes in a patient's condition would show up on the graphs as a sharp peak, or dramatic dive in the appropriate datum line,

> "It is useful to be able to look at patients who are having particular problems ... (S)omebody whose condition has been changing over the last week, or so, it is particularly valuable. We use it for *acute* renal failure patients ... because (their) conditions do change very rapidly, it is important to make predictions where possible and here the computer has been very valuable." (Doctor HM1, Int.2, May, 1984)

Only one registrar, among the junior medical staff, made any regular use of the Renal Computer System, and he became seen by the nurses as an expert who they could turn to for help (Nurse Interviews May, 1984). This doctor's interest in computers stemmed from his specialising in medical computing when a student and subsequently buying a microcomputer system of his own (Dr D, Int.1, September, 1983, circa 035)). He was readily able

to design screens and used these skills, on behalf of the consultants, in order to enter 'interesting' cases onto the system for presentation at case meetings. It is pertinent here to note two points, one, these 'interesting cases' related to renal patients not in ESRF; these were the patients with which the doctors were *medically* most interested. The second point, was that the computer system was being used passively, the data was being entered in order that it could be 'presented' rather than so the data might be analysed. The doctors' objective was to make a good impression on colleagues and demonstrate that the computer was being used, for research related purposes (Con. HM1, Int. 2, May, 1984 circa 090-150).

Nursing staff

It was the senior nursing staff who benefited most directly from the introduction of the system. Their previous chore of collating and recording patient related data was now carried out by the computer clerk. Furthermore, the presentation of this data on the VDU screen was found to be easier to interpret than was previously the case,

> "(B)efore, each patient, as their results came back, I had to pick through ... I was recording everywhere, four or five times ... Now at the end of each month, I can literally spend half an hour just flicking through each patients results ... on the screen ... I just take notes on what I have to act on and that's it" (Nurse 3: Int.2, May, 1984)

The RGNs and ENs, however, found the system of little advantage over the previous system. They still had to complete the recording of dialysis data and had little need to access data routinely.

> "We are still doing charts (i.e. dialysis record sheets) and everything as before. I thought it would stop us having to do the Nursing Cardex. I hoped it would stop us from

> having to do all these charts every day. " (Nurse 5: Int.2, May,1984)

There were, in addition, facilities for presenting summarised textual information in chronological sequence were also available for the nurses. These 'events screens', as they were known, were similar to the ones used by the registrar for medical meetings (described above). In the case of the nurses, it was the Nursing Officer and Sisters who at the time of the second interviews (April-June, 1984) were responsible for designing these 'screens' and teaching their staff how to enter the data themselves. The 'screens' were thought, by the nurses, to be of no benefit for additional time and effort was required in order to enter the information which was already entered daily onto the nursing record (referred to as the 'Cardex'). The nurses reported that,

> "On the nursing screen we are not putting as much information ... (we) write fully in the Nursing Cardex"

and the reason for this double reporting was that

> "we have got to have the *written* (record) on a *legal* footing" (Nurse 3: Int.1, May,1984).

In consequence, the senior nurses believed they had to continue with the handwritten nursing record and saw the need to utilise the 'events screens' simply in order to show that the system was being fully utilised even though it was perceived by the nurses as being of little or no benefit (SN1 Int.2, May, 1984., circa 180-230). By contrast, the events screen was seen by the nurses and junior medical staff at the Dialysis and Transplant Unit as being a very useful facility (see below).

The 'Other Disciplines'

In the cases of the social worker, dietician and psychologist it was

originally intended *by the consultants* (Internal Document 'Operational Requirements' November, 1982) that they would maintain files on their ESRF patients. These files were to have contained only limited information sufficient to the needs of the renal unit staff (doctors and nurses) rather than being the detailed records of 'other disciplines'. In the event only the dietician complied with this requirement. The other disciplines did not, on the grounds that,

(a) the offices of the persons involved were elsewhere in the hospital complex without direct computer links

(b) these disciplines maintained their own record systems adequate for their needs.

The Renal Computer System would have entailed these disciplines, had they complied, maintaining *two* sets of records, one for the renal unit and the other for their own departmental files (*ibid.*). Furthermore, they would only have been able to enter and access information when visiting the renal unit. Neither social worker nor psychologist actually refused to use the system they simply failed to find the time to be trained (SW Int 2., June, 1984., circa 070). This non-compliance, however, did not in any serious sense threaten the success of the system's implementation as the psychology and social work 'screens' would have provided 'static' information only, which did not directly affect the clinical data. The purpose was to provide additional information as to whether the patient had been referred, or not, for counselling, or was in receipt of certain social security allowances and so forth (cf. Appendix IV).

Despite the limitations of the system the dietician did enter the dietetic information on patients. Unlike social work and psychology, dietetics was a crucial element of ESRF treatment (see above). The doctors and senior nurses found it useful to be able to have access to details of

the patients' dietetic regimes when considering their cases. Moreover, the dietician would routinely want to know details of the patients' investigation results in order to identify the dietetic requirements of patients. Given this centrality of dietetics in the treatment process it was not surprising that the dietician agreed to routinely to use the system. The implementation of the computer system did not, however, overcome the need for the dietician to keep additional files on the renal patients within the Dietetic Department; these files covered a 'case-mix' that included patients other than those with ESRF (e.g. diabetic and coronary), and to exclude the ESRF patients because they were already on the computer system would leave the departmental records incomplete. Furthermore, the dietetic 'screens' on the Renal Computer System were static (cf. Appendix IV) and offered no facilities for calculation and analysis while it was hoped by the dietician that a separate computer system would be available to the department in the near future that would offer just such facilities (Dt Int 2., June, 1984.

Haemo Unit implementation: summary

The consultants liked the new computer system, it was useful to them in clinic and it gave them ready access to patient data including graphs. The senior nurses also found the system useful for it eased the burden of collating the patients' results. The nursing staff generally as well as the 'other disciplines' (with the partial exception of the dietician), however, found the system of little or no benefit,

It was the senior consultant who dominated the whole process of implementation (the systems controller played a very small part) and it was he who was keen to get as much of the system operational as quickly as possible and this meant utilising the 'events screens' for case meeting presentation (rather than as an ongoing temporal record) and pressing for

the implementation of the nurses 'screens' even though the nurses saw this as a duplication of effort.

2. The Dialysis and Transplant Unit

The computer system was introduced at the Dialysis and Transplant Unit in the first quarter of 1984, only a few months later than at the Haemo Unit. The responses of the doctors and nurses were markedly different to that found at the Haemo Unit. In part this was because of the different implications the system had for the work of the doctors and nurses at this unit resulting from the more systematic way in which the collation and presentation of patient data had been previously organised (described above). This difference, however, reflected an underlying difference of approach (*rationale*) to the organisation and delivery of care to ESRF patients which led to there being a dichotomy in responses between the consultants and the other unit staff (medical and nursing). The 'other disciplines' showed a similar, but not the same, response to those at the Haemo Unit.

The person within the unit who had the responsibility as local coordinator and 'on the spot' technical support was the home administrator in the role of systems controller.

The Systems Controller

As was the case at the Haemo Unit the home administrator was given the responsibilities of systems controller. Unlike the situation at the Haemo Unit here the administrator had to take much more of the responsibility for the implementation process. The administrator, however, was judged by the nursing staff, in particular, to have been particularly effective in this role and it was to her they would depend on for help when they needed assistance (Nurses: Int. 2, 1984/85). The time

commitments involved in carrying out the responsibilities of systems controller - while not arduous - conflicted at times with those as Home Administrator (Ad, Int. 2, January, 1985, circa 063). These responsibilities included both the technical tasks of file maintenance and similar chores and the administrative ones of organising whatever temporary computer clerical support that could be arranged for there were insufficient resources funds to employ a computer clerk on a permanent basis as had been the case at the Haemo Unit (Ad, Int. 2, January, 1985, circa 125-175). One consequence of this lack of clerical support was that no data relating to pre-ESRF (renal) patients was entered onto the system, a situation that was to contribute to the consultants negative judgement of the system.

Nurses and doctors

In the absence of a permanent computer clerk the entry of dialysis patient data was carried out by the nursing staff. Nevertheless, the nurses found the system a definite improvement on the previous manual system of data collection (*input*) for it saved them work, "It's easier, a tremendous improvement on the (handwritten) graphs" (Nurse SN2, Int.3 (2), January, 1985). The benefit of saving time in entering data was appreciated more by the nursing sisters, who organised the work of the unit, than the RGNs and ENs who did the work of data entry. In addition the nurses also found themselves also entering data relating to the transplant patients whereas previously the medical staff had been responsible for the collection and recording of this data

> "Initially the transplant results were fed into the computer by the doctors, but when the path. lab. results arrive in the evening ... it is an automatic thing now for the nursing staff to put it all on (including 'transplants'). ... (The doctors) don't put (the data) on the

> computer at the moment and I can't envisage it being done by them, because the change-over (of junior doctors) is so great" (Nurse SN2, Int.3(2), January, 1985)

Even if they did not input data the registrars and house staff would access data themselves (e.g. Dr J. Int.3, Dec., 1984., 067-080; Dr L. Int.2, May, 1985, circa 094), although some would still rely on a nurse to do it for them if one was available (Dr M. Int. 2, December, 1985, circa 074)

The junior doctors did come to use one facility in particular and this was the events screens that the nurses maintained (cf. Events log (1) Appendix IV). On these 'screens' were recorded all the medically significant events in the patients medical career within the unit. Typically this would include,

- diagnosis
- date Tenchoff tube fitted (9) , or fistula created
- infections, treatments (etc).

The junior medical staff tended to find this facility an invaluable and timely source of information, equating to a *medical record summary*. Furthermore, these events screens were much more readily accessible than the medical record folders, being available literally at the touch of a button. This facility was not used during the clinics and ward rounds (when the medical records were readily available), but at other times when on the unit.

> "(The events screen) speeded things up, *especially* in terms of extracting someones 'previous renal history' from the computer rather than the 'notes' ... If people (patients) were coming in the middle of the night that I didn't know I would .. go through the events records (screens) to see what was going on with them" (Dr L, Int. 2(1), May,1987)

The availability of this events screen facility was pointed out to each successive generation of junior doctors by the nursing staff, who were *de facto* responsible for showing these doctors how to access and, occasionally, input data and information.

The consultants never made use of the system at all, the medical work of the unit, as explained earlier, was delegated to the senior registrar. What the consultants had wanted the computer system to be able to do was to analyse aggregate data for research and audit purposes. "In other words, how many patients have we taken on this year? How many on CAPD? How many have died?" (Consultant DT1, Int. 3(2), April, 1985). The regional computer staff failed to develop this facility and did not believe it was their responsibility to do so, despite it being listed in the *Operational Requirement* document (Para. 1.3., November, 1982). Instead they concentrated on getting the patient data facilities operational (MSC, May, 1985., circa 030). Nevertheless, the consultants, with the exception of the transplant surgeon, did allow the nurses to replace the hand-drawn charts on dialysis patients with the computer produced graphs even though they gained no direct benefit from the change. The transplant surgeon, however, insisted that the charts relating to transplant patients (which were completed by the house staff) continued to be hand-drawn. His reason for this conservatism was that,

> " .. for day to day running I don't think you need a computer, because you have the results on most patients either in your head or on the numerical flowcharts which are what I mainly use"
>
> (Consultant DT3: Int.3(2), May,1985)

And this consultant did not see why he should therefore change over to using a computer generated graph. His rejection of the computer was by no

means total and the surgeon, in collaboration with the senior registrar, planned to develop precoded medical events screens (using a limited vocabulary of medical terms) for research and audit purposes. This facility was initially only to include transplant patients, but later it would have been extended to include renal patients generally. Progress, however, was very slow for,

> "the programming (was) proving a problem because its complicated to ... design and also it still ha(d) to be written ..." (Consultant DT3, Int 3(2), May, 1985)

The major problem here, however, was not really a technical one but related to resources for as mentioned above the regional computer staff were not giving research developments any priority so, in order to get the project started, the surgeon had looked elsewhere for technical support, in the event a computer student from a distant polytechnic.

Graph rounds and clinics

- The graph round

The Senior Registrar's main use of the Renal Computer System was at the monthly Graph Round which he directed. The nursing staff in attendance operated the two VDU/terminals to access the graphs. There had to be two VDUs - one for weights and B.P. the other for biochemistry and haemotological results - as the computer's response time was very slow (especially when compared to the manual method of unrolling large charts). By alternating between the two VDUs the procedure was speeded up, but the round still took approximately twice as long as had been the case with the hand-drawn charts. Previously the Graph Round occupied one morning a month, but following computerisation the meeting had to be spread over two half days at least (SR1, Int.2, March, 1985, circa 012; SNB, Int.3(2), circa 059; Fieldnotes 12th February, 1985, pp.1-8 esp. 4). Nevertheless, this

extra cost in time was more than compensated, according to the the senior registrar and senior nursing staff, by the system's benefits, described by the senior registrar in the following terms,

> "(Firstly) the computer enables me to look at the patients in more detail (than was the case previously) because of the way the data is presented by the computer, particularly the *graphics* ... (Secondly), any *results* that are put down wrongly are more obvious on the computer system than they were on the Chart (manual) System and easier to spot. (Thirdly) ... it is less time consuming for the nurses to prepare for the computer for the Graph Round than it is the charts ... All in all I consider (the system) a bonus (for) both the nurses and ... the patients ... providing the doctor ... doing the Graph Round is prepared to take more time to do it " (Doctor E, Int 3 (2), March, 1985)

This view, however, did not have universal support among the nurses, and some argued that

> "although its time-consuming (hand drawing a graph) you could see everything there all at once" (Nurse SEN(C), Int. 3(2), January, 1985)

while, as another nurse commented, with the computer system

> "its just fiddly going from one screen to another just doing one patient, we (have) one screen for the B.P. and weight (and) about 3 different screens for the 'blood' " (Nurse SEN (J), Int. 3(2), January, 1985).

Clearly, at least some of the nurses operating the VDUs found the new 'graph round' procedures more complicated ("fiddly") and time consuming.

-The clinics

The computer system was also routinely used at the clinics for dialysis and transplant patients held every week in the Nephrology Department. This department was some distance away from the renal unit so in order to use the computer system a VDU/terminal had to be taken on a trolley to the the nurses office in the department prior to the clinics along with the medical records files. The major function of the computer system during these clinics was as a communications link with the renal unit, rather than a means of accessing the systems data-base. The reason for this was because laboratory results would be received at the renal unit during the course of the clinic where they would be entered on the system ('keyed in') by a nurse. The nurses at the Nephrology Department clinic would then access the screens for the specific patients attending clinic to find this up-to-date data and *then transferred the data, by hand, onto the medical record* for the doctors' reference. The doctors would occasionally look for the patient data on the VDU but mostly relied on the medical record file. The dietician, who also regularly attended these clinics would also ask the nurses to access data on particular patients at these clinics in relation to her own work (Fieldnotes Book II, 3rd January 1984, pp. 52-67; Junior doctor interviews including Dr. J., Int. 3(1) December, 1984, circa 073; Dr.L., Int.2(1), May, 1985 circa 090; Dr M., Int 2(1), December, 1985, circa 090; Dt, Int. 2(3), April. 1985, circa 015)

'Other Disciplines'

Both the dietician and the social worker were intended to include at least some minimum data on the renal computer system (Operational Requirement, November,1982, para/appendix 3F; cf. APPENDIX IV)). Yet, just as at the Haemo Unit, dietetic and social work data was never included on the system and for the same kinds of reasons, namely, the geographical

remoteness of their offices from the renal unit and the need to continue separate departmental records. In addition, they too had not taken the opportunity to be trained in using the system (Dt. Int. 3(2), April, 1985; SW. Int. 3(2), March, 1985). In addition, the social worker was seriously concerned over the issue of confidentiality and was discussing the matter with her senior officer and had yet to take a decision over the matter (Int. SW 2(3), circa 063).

While not being prepared - at least for the time being - to enter data onto the system both the dietician and social worker found the output facilities of benefit to themselves. The dietician quickly recognised the advantages of asking the nurses to access data at the weekly clinics rather than personally searching out the medical records as had been the procedure previously. The social worker found that the system's report generating facilities particularly helpful in that it permitted the Home Administrator to respond more quickly to social work queries than previously (e.g. supplying lists of patients being currently trained for CAPD).

The computer implementations compared

cui bono?

The staffs at the two renal units adjusted differently to the demands of the new computer system. Most of the staff associated with the Haemo Unit found little in the way of benefits from the systems implementation. Those that did benefit were the senior medical and nursing staff. The senior nurses found the computer system made their tasks of recording, retrieving and analysing patient data easier and quicker than previously. The doctors also directly benefited from the availability of the system's facilities in clinic and on the unit. By contrast, it was the ordinary

nurses (and junior doctors) who benefited most from the implementation of the system at the Dialysis and Transplant Unit. Here the input of data onto the computer system was experienced as less onerous than the previous manual system of hand-drawing the charts for the consultants. At this unit (Dialysis and Transplant), however, the consultants became increasingly critical of the system and never used the systems *outputs* directly themselves.

What emerges from a comparison of the two renal units is a paradox whereby the unit in which the consultants were most supportive of the system had the least support of the unit staff while at the other unit the reverse was the case. The explanation of this paradox lies, in part at least, in the difference between the two units pre-existing manual systems and the requirements of the computer system relating to data collection and retrieval. In the first unit the computer system involved the nurses (RGNs and ENs) in more work with no obvious benefits, while at the second the new system was experienced as saving the nurses time in inputting data as well as saving both doctors and nurses time in accessing the information (even when taking into account the extra time involved in carrying out the monthly Graph Round). The one common element was the passive resistance of the 'other disciplines', for in both units the operationalisation of the system's facilities were found to require extra work with no obvious benefits in return.

The value with which the staff endowed the Renal Computer System was not only the result of whether it saved them time and effort, it was also very much influenced by the consultants' commitment to the system which in turn related to their own commitment to particular *medical rationales*. It is this issue of *rationales* that now requires further exploration.

Medical rationales

The two renal units were organised according to different principles. The explanation for the differences lay in the medical rationales of the consultants to the management of chronic ESRF patients, rather than to any particular structural factors, such as the difference in the size of the units (in terms of patients numbers and nursing and medical staff) or the technology employed for dialysis. In the case of the Haemo Unit 'good patient care' was seen by the senior consultant as involving giving support to the patients in the process of learning sound haemo-dialysis technique and dietary practices and helping them to adapt to their new lives. The priorities of the consultants at the Dialysis and Transplant Unit were very different. The consultants did not recognise it as part of their responsibility to help the patients adapt to their condition, nor particularly to maintain standards of good dialysis and dietary practice, these were seen as the responsibilities of others. Instead, they emphasised the role of renal medicine (nephrology) as a scientific enterprise. Dialysis patients were only of interest if they had interesting medical problems, otherwise they could be safely left to the nurses and junior medical staff to deal with.

The senior nursing staff had, in turn developed compatible systems of nursing organisation to that of the consultants. In the case of the Haemo Unit, the nursing officer, had implemented a version of the nursing process that emphasised the development of strong links between patients and nursing staff (SN3, Int. 1, September, 1983), the latter having the responsibility of assessing the patients social and psychological 'problems' (SN1, Int.1, September, 1983) which received a great deal of emphasis. Moreover, the approach at the case conferences was an inter-disciplinary one, with each discipline contributing its own information and professional

opinion on the case being discussed. This is not to suggest that democracy was at work here, rather that the senior consultant exercised a benevolent paternalism that found its reflection in the nurses approach to their role in the care and training of ESRF patients.

While the doctor-nurses relationship at the Haemo Unit was inter-disciplinery, at the Dialysis and Transplant Unit it was not. Nurses were delegated the responsibility of dialysing and training patients, as well as carrying out a number of other tasks indicated earlier, there was neither partnership nor paternalism only an occupational hierarchy. The consultants made the basic medical decisions on the patients, from information presented principally by the junior medical staff (under the supervision of the senior consultant), the nurses carried out whatever was their duty in consequence of the medical decisions. The senior nurses would ask for clarification, or advice, but that was all. In fact, there were no institutional arrangements which brought consultants and nurses formally together. There was, surprising as it seemed to me, little antagonism between the nurses and consultants despite the hierarchical relationship between them. There were two main reasons for this relative harmony, firstly, the nurses liked being involved in the work of a department (nephrology) which had gained a reputation for research (e.g. SN2, Int. 3(2), January, 1985). Secondly, the work was organised on a clear-cut monthly cycle culminating with the graph round and this gave a coherence and completeness to the nurses work. The graph round was for the nurses the major cross-over point between doctors and nurses. The nurses carried out the data collection and presentation exercise which was then evaluated by the senior registrar as to its accuracy and whether it indicated any medical intervention.

The *medical rationales* are not to be considered as wholly the

outcome of unfettered medical *choice* for the historical developments of the two renal units were important constraining influences upon the consultants involved. In the case of the Haemo Unit, which was established in 1969 as a satellite of another unit which had too many dialysis patients for the doctors and nurses to cope with (Consultant HM1, Int. 1., September, 1983). The unit then became fully autonomous the following year and the then sole consultant was made the unit's director. The historical background to the Dialysis and Transplant Unit was very different. The status of the consultants here was based on the Nephrology Department and not on the renal unit. Renal dialysis developed at this hospital as a necessary subsidiary to nephrology. The unit was bequeathed all the renal patients the nephrologists were unable to cure. The dialysis unit had originally been physically part of the Nephrology Department and later, in the mid 'seventies, the separate renal unit had been built and equipped (Ad.1, Int. 1, June, 1984).

The *medical rationales* were embedded in the organisational routine of the two renal units. This was most apparent in the case of the systems of meetings employed to monitor patients' cases. At the Haemo Unit the monitoring of the dialysis and transplant patients was carried out at the weekly inter-disciplinary case meetings while at the Dialysis and Transplant Unit no such inter-disciplinary meetings were held. Instead, new patients and patients with medical problems were dealt with at one of the weekly ward rounds and old patients were reviewed monthly at the graph round. In neither case was there any direct reference made to the nursing staff or 'other disciplines' except to ask for information. Although it is worth mentioning that the graph rounds were decidedly convivial affairs compared to the ward rounds which may have related to the senior registrar's own approach not being in complete congruence with the

consultants. In broad terms the two units can be seen as typifying the classic dichotomy in medicine. In the Haemo Unit, patient care and management was viewed as a *humanitarian* (and inter-disciplinary) enterprise while the Dialysis and Transplant Unit had been established and developed by the senior consultant on the clear principles of *scientific* medicine, and the treatment of ESRF patients as a multi-disciplinary enterprise. Here the benefits of treatment and therapy were the byproducts of advances in medical research.

Summary and conclusions

The division of labour associated with the management of ESRF and renal dialysis was a relatively extensive one, routinely including 'other disciplines' in addition to doctors and nurses. Moreover, within the units, the nurses role was rather different than that to be found on the general wards. In part this was because the patients were mainly outpatients undergoing training but also because the nurses played a crucial role in the collection and collation of patient data. It was this patient data that the doctors tend to refer to, rather than the case notes, when seeing patients.

The renal consultants relied on the nurses (and clerks) to enter the data onto the renal computer system. This arrangement was found to be generally an improvement among those nurses whose job it had been to collate the figures previously. The accessing of patient data was also, on the whole, found to be much easier than always having to search out the medical record files. Although this was conclusion has to be qualified in relation to the *graph round* where the process took considerably longer than the previous manual system. There were variations between the two units as to the methods of utilising the system and the doctors' and

nurses' responses which related to the different modes of organisation and control of the clinic work processes rather than in terms of the acceptance or rejection of computerised patient records. This was not to be the situation at the outpatients' clinics reported in the following chapter.

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NOTES

(1) The survival rates on dialysis is now comparable with survival rates following transplantation (cf Dowie, 1984, BMJ Vol 288, 31st March, p.990).

(2) Williams *et al*,1984 ("ESRF: coping with demand" Health Trends No.1 Vol.16 Feb) presents a figure of £5,510 for the annual cost of CAPD (the figures for the other dialysis therapies are approximately the same as Dowies, (*op cit.*).

(3) The nursing staff were also responsible for the dialysis of patients with *acute* renal failure. These were patients whose kidneys had ceased to function as a result of major shock (trauma). These patients were located on wards away from the renal unit and were few in number.

(4) Dialysis patients also had to limit the amount of fluids they could drink, for with little facility to urinate the patients had to rely on haemo-dialysis to take off any excess fluid (e.g Dt. Int 1, 30th September, 1983, 086-100).

(5) The cases of both pre-ESRF renal patients and the acute patients were also discussed as were transplant patients.

(6) The Sister who described the rotation scheme did not include the Graph and Ward Rounds in her account, but this must have been an oversight for nurses were allocated to the Rounds for a number of months at a time. The rotation scheme was designed to cover 2 years (SN2 Int. 1, July, 1984) with the nurses spending 6 months on each type of work and 3 time 6 months does not equal two years.

(7) In the case of CAPD this was not a major exercise, as all that was required was adequate storage space for the patient's bags of dialysate, but with haemo-dialysis a whole room had to be converted,

or a portacabin supplied, to take the haemo-dialysis machinery (e.g Ad. Int. 1, June, 1984)

(8) The Tenchoff tube was the plastic tube giving access to the patients abdominal cavity for the purpose of exchanging dialysate. The name is that of the person who initially developed the procedure (Fieldnotes, 27th July, 1984, p.64)

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CHAPTER EIGHT

CLINIC WORK, CASE NOTES AND COMPUTERS.

Introduction

In contrast to the the previous chapter, where the concern was with the division of labour between doctors, nurses and others within a particular specialist unit and related clinics, here the focus will be on the work of the clinicians in several specialties and will thus give little attention to the work of the nurses, secretaries, clerks and administrators who were also involved. The renal clinics were organised on a multi- or inter-disciplinary basis, whereas the work carried out within the outpatients' clinics was almost wholly the province of the doctors. Furthermore, whereas the renal computer system provided facilities that *supplemented* the medical record the system to be discussed here was designed to *replace* the medical record. In the renal setting the computer system was introduced by the consultants but designed principally, if not solely, for use by the nursing staff while the outpatients' computer system (CORES) was introduced by a consultant especially for the use of other consultants and their junior medical staff (Fieldnotes, 20th May, 1981, Notes of Preliminary Meeting).

The concerns of this chapter are with the dynamics of medical work within an outpatients' department, and the consequences for the clinicians

(particularly in terms of *functional autonomy* and collegiality) of the implementation of a computerised medical records system and their subsequent responses to the system. The computer system - referred to here as the Computerised Outpatients' Records System (CORES) - was introduced into the outpatients clinics of a small acute hospital in the midlands in 1981 under the leadership of one of the consultants (referred to here as Dr Old) and with the initial support and cooperation of his colleagues (see Chapter Six). In connection with the work of the clinicians the objective of the system was to replace the handwritten case notes with printed, structured reports, flowcharts and clinical summaries on patients and to make available facilities for analysing clinical data on groups of patients in order to facilitate higher standards of patient care and to stimulate medical research (internal document, dated December,1980). One of the primary intentions of Dr Old was to establish a clinical database for research and medical audit purposes as well as well as for routine clinic use. The system was intended to be an improvement on the traditional medical records designed as it was to provide more accessible, more accurate and printed (as opposed to hand-written) clinical information (Fieldnotes, 20th May, 1981, Notes of Preliminary Meeting).

The chapter is sequenced as follows,

1. the organisation of the clinics, including the division of labour between the consultants and their junior staff, will be described.
2. an account of the doctors' use of the medical record will be presented, for it is these files that were computerised.
3. the computer system itself will be described in terms of how it aided or impinged upon the clinic work of the doctors.

4. the doctors responses to these innovations will be discussed and analysed.

The Organisation of the Clinics

The Functions of the Outpatients' Department

The outpatients' department (OPD) at St Giles acute hospital was not a large one but it did cover a reasonably wide range of medical and surgical specialisms, covering general medicine and surgery, rheumatology, urology and gynaecology. St Giles functioned for the consultants as a satellite to the nearby DGH where they also held clinics and they would, too varying degrees, use the facilities of St Giles to give themselves flexibility in their management of patients, for example, moving some patients from one hospital to the other for surgery, or a bed, or for outpatients' appointments, depending on availability, or preference. As one consultant commented,

> "St Giles does play a useful role at times if only because (the DGH) hasn't got enough beds and facilities to cope with all the things we're dealing with ..." (Con.6, Int.1, 207-218, October,1981)

As with any other acute hospital the OPD served four basic functions,

(a) a GP diagnostic service where patients are referred for specialist diagnosis. Once the diagnosis has been confirmed the patient would normally be referred back to the GP for treatment,

(b) the anteroom to the hospital wards and operating theatres. Investigations can be organised and carried out without the necessity of the patient occupying a hospital bed as can the patients initial recovery (Godber, 1975). These

patients also would normally be GP referrals,

(c) monitoring the long-term outcome of treatment of discharged patients who have undergone major surgery (e.g. masectomy),

(d) The long-term medical treatment of chronically ill patients.

Functions 1 and 2 refer predominantly to 'new' patients, while 3 and 4 relate to 'follow-up' patients. Approximately 25% of patients attending the clinics were new patients referred by their GP (Management Services Report, p.3, October, 1981).

Outpatients' Clinic Work

There were eight consultants who held regularly clinics at the St Giles hospital, three were physicians, two urologists, two gynaecologists and one general surgeon. The consultants normally worked with at least one other doctor in the clinics (each seeing patients separately). Mostly these other doctors were senior house officers (SHOs) although registrars were also employed in the urology and gynaecology clinics. The junior medical staff consist of House Officers (HOs), Senior House Officers (SHOs) and Registrars, these house staff were allocated to the consultants of a specialty for six months, while the arrangements regarding the registrars were more variable. The HO's and SHO's also worked on the wards in the hospital while the registrars also worked at the nearby District General Hospital.

There were, on average, 120 patients attending the outpatients' department each week, of which 25% attended the medical clinics, 17% general surgery, 15% urology and 43% gynaecology clinics (Management Services Report, p.3, October,1981). Outpatients' consultations lasted between an average of 6 and 43 minutes (both times relate to the same

surgical speciality) with an average time of 23 minutes for all clinics (*ibid.* p.17). The patients came from three sources, a GP or consultant referral or following an inpatient stay. New patients in all the clinics had their medical history taken and a physical examination. There was considerable variation in the organisation of the outpatients' work of these doctors as between clinics which reflected both the nature of the specialism and the preferences of the consultants. While the research was being undertaken the usual arrangements (by specialism) were as follows,

(a) **Medicine**

There were three consultant physicians, a rheumatologist, a bronchial specialist and a general physician. The two specialists shared the services of one SHO who would see both new and 'follow up' patients, although the bulk of the work would be with 'follow up' patients. A large proportion of the workload involved the monitoring and medical care of the long term chronically ill. The junior doctor functioned basically as an assistant who helped the consultants deal with these 'follow up' patients and there was little emphasis on medical training.

The other consultant physician was allocated one SHO who worked on the outpatients' clinics (as well as on the wards). This junior doctor would see new patients only (i.e. new referrals from GPs or from other consultants) to 'clerk' them, arrange any investigations and arrive at a preliminary, *presumptive* diagnosis one week prior to the consultant seeing the patient (e.g. Jnr. 1, Int. 2, December, 1981 192-213). This meant that there was a training element in this arrangement for it approximated to the division of labour found on the wards where the house officers 'clerk' new (or readmitted) patients, allocate the patient to a diagnostic category, however tentative, and present their findings to the consultants at the ward rounds (see also discussion of ward rounds on renal units in

Chapter Seven) (Rees, 1981b, pp. 56-59).

(b) **Urology**

The two consultant urologists shared the services of one HO and one SHO, or Registrar (who was based at the nearby DGH). The HO would not be employed in the outpatients' clinics (Con.6, Int. 3, Side 2: 026., June,1983). The HO would only remained with this specialty for three months, completing his or her six month period at the hospital in General Surgery (see below). When the HO left urology the SHO (or Registrar) would be transferred to the second consultant and the first consultant would be allocated the HO who had just completed 3 months in General Surgery. The actual division of labour between consultant and junior doctor was variable depending on the experience of the junior doctor, but both consultants took responsibility for seeing "the majority (of) the new patients" (Con. 4, Int. 2, 104, June, 1982). One consultant monitored the work of 'his' junior staff by "always get(ting) the (case)notes afterwards and check(ing) what they have said ... and .. writ(ing) all the doctors' (*clinic*) letters ..." (Con. 6, Int.1, 037-039, October, 1981), this was a very unusual practice (see below); registrars and SHOs expected to have to write their own clinic letters to the patients' GPs.

(c) **General Surgery**

There was only one general surgeon and he shared an HO with the urologists (above), changing over every three months. Unlike the urologists this consultant did make use of the house officer for outpatients' clinic work. The doctor's main work in the clinic was to see patients recently discharged from hospital (following surgery) to check they were recovering satisfactorily, there were, in addition, a number of patients (unspecified) who had undergone major treatment for cancer in the past and whose cases were reviewed annually (Jnr. 27, Int. 3, circa 120, December, 1983). The

consultant would be principally concerned with new patients. (Jnr. 2, Int. 2, circa 201, April, 1982)

This outpatients' clinic functioned very much as an anteroom to the hospital wards and operating theatres. The consultant described the typical routine in terms of "... one tends to see cases in black and white ... a straightforward diagnosis, investigation, to 'come in' for surgery, or drug treatment (chemotherapy)" (Con. 5, Int. 2, 033, April, 1982) and would reattend the outpatients' clinic later following their discharge in order to ensure that the post-operative recovery was satisfactory.

(d) **Gynaecology**

As with urology and general surgery the gynaecology clinics functioned largely as an anteroom to the operating theatres and wards. There were two consultant gynaecologists who held outpatients' clinics at this hospital. Both were allocated one SHO each for their work at the hospital (including 'inpatients') (Internal Memorandum, 28th January, 1983). Neither consultant would normally make use of this local SHO to cover any of the outpatients' clinic workload. Instead the consultants would share the clinic work with their registrar from the district general hospital (DGH). In addition, the consultants would have three medical students with them at the clinics (Con. 1, Int. 2, 247-268, October, 1982; Con 2, Int. 3, 078-160, June, 1983).

The main difference between the two consultants organisation of these clinics related to the fact that the second consultant was an honorary consultant, being also a senior lecturer in the medical school at the nearby university (Con. 2, Int. 1, 068 (side 2), September, 1981). This doctor also had extensive research and some teaching commitments and these demands meant that the consultant was less often in attendance at these clinics than the other consultant. Instead he would leave the work

under the control of a senior registrar with the assistance of a registrar and/or SHO (all from the DGH).

Clinic work and the junior doctors

The medical specialties employed the junior staff allocated on the hospital rotation scheme while the surgical specialties (with the exception of general surgery) tended to rely on the more senior of the junior doctors available to them at the nearby DGH. One reason for this was that the 'new' patients in the surgical specialties tended to be candidates for surgery and in consequence the consultants believed that these patients were best seen by the more experienced clinicians in order to limit the room for possible errors in diagnoses and treatment. In the case of medicine, however, the patients were more likely to be suffering from chronic illness which required long term treatment, any errors on the part of junior doctors could normally be corrected by the consultant before any serious consequences occurred. Another related consideration was that the surgical specialties saw rather more patients in outpatients' clinic than the medical specialties, 75% of the total number of outpatients were attending the surgical clinics (Management Services Report, p.3, October,1981). This meant that the work was itself more intensive than was typically the case in the medical clinics. In the surgical specialties it was a general rule that the HOs would only see 'follow up' patients; this meant that the training element of the work was much less than work on the wards. Even so, the consultant gynaecologists did use the clinics in order to train medical students, particularly " .. to do the *clerking*" (Con 2, Int. 3, 080-160, June, 1983). Similarly, only one of the medical clinics was clearly organised with some eductional and training intent (see above), here the SHO saw the 'new' patients for the purpose of *clerking*, diagnosis, at least of a preliminary (*presumptive*) kind, and ordering any

investigations they might believe necessary (Jnr 23, Int.2, 323, May,1983). It was, nevertheless, the view of the other physicians that there was an educational content to OPD work, "in general terms (at least) ... Basically, the more the junior staff are involved in the clinic the more the teaching role" (Con. 3, Int. 3, 153-162, June, 1983) While only three of the consultants structured the outpatients' work for their junior staff, or students, to include specific elements of training (physician and gynaecologists) the other consultants would claim that the work contained an educational element, in that a consultant could not utilise a junior doctor effectively in these clinics without first telling them what they wanted them to do.

The medical record

Given that the CORES computer system was designed to replace the traditional medical record, including the case notes, it was necessary to examine the doctors' methods both of selection and structuring the information they wrote in the outpatients' case notes and for using that information and data. Only by understanding the actual practices of the doctors was it possible to understand and explain their responses to using the CORES system.

The case notes were only part of the medical record. In common with other NHS hospitals the a typical medical record at St Giles would include,

(a) letters from the referring GP and/or consultant;

(b) the patient data entered by the nurses (i.e. height, weight, blood pressure *etc.*);

(c) the handwritten case notes relating to any previous outpatients' visits;

(d) the laboratory results (biochemistry, haemotology, *etc.*)

which were were written on colour coded slips of paper;

(e) copies of the letters sent to the GPs (or referring consultants) concerning the patient seen in the outpatients' clinic. (*clinic letter*).

In addition, the medical records on patients who had spent a period of time as an inpatient, would include,

(f) the handwritten case notes relating to the inpatient stay(s), include details of a full 'clerking' carried out by a member of the housestaff

(g) the handwritten operation notes in the case of patients who had undergone surgical procedures

(h) a copy of the *discharge summary*, a document that gave the date and diagnosis on discharge of the patient

(i) any referral letters to members of any 'other disciplines' involved with the care of the patient (e.g. social workers, physiotherapists).

These documents were kept in the standard medical record folder which bore the patient's identifying number and were filed in the medical records office when not being used by the doctors, nurses, or the medical secretaries. The medical records were numbered in common with the records held at the the nearby District General Hospital (DGH).

Writing case notes

In principle, a doctor writing case notes would record details of the patient's *history* (basically the presenting complaint of the patient, past medical history, social history, drug history) and *physical examination*. At which stage he or she would decide on an initial (*presumptive*) diagnosis, or some other equivalent assessment of the patient's condition. On the basis of this the doctor would order any laboratory or clinical

investigations s/he believes necessary, recommend medically appropriate therapy and write a letter to the patient's general practioner (the *clinic letter*) (Jnr. 9, Int.2, 215-237, April, 1983). Patients returning for further visits ('follow up' patients) would typically only warrant brief entries in the case notes concerning any changes in the patient's condition or treatment.

There were, however, considerable differences as between the principles and practice and many case notes were apparently incomplete, or indecipherable. Moreover, there was considerable differences as between the methods adopted by consultants and the junior doctors.

The rationales for case notes

The over-riding priority for the clinic records, according to the Bittner and Garfinkel (1967), concerned the medico-legal responsibilities of the clinic (see Chapter Four, p. 84-89, for a fuller discussion). This interpretation of the reasons for incomplete clinic records, however, was inadequate for the understanding of the degrees of completeness or incompleteness of the case notes pertaining to the outpatients' clinics at the St Giles hospital. The concept of the medical record as a *therapeutic contract*, the key to Bittner and Garkinkels' analysis, was not the one that impinged to any great extent on the NHS doctors' own understanding of the rationale for the existence and maintenance of these clinic records. In consequence the major reasons for the cryptic nature of many of the case notes were not related to medical defensiveness but, as it turned out, ***pragmatism***.

It was possible to identify four rationales that informed the clinicians use of case notes within the outpatients' clinics. These were found to be,

(a) case notes as **medico-legal documents**,

(b) case notes as a **research** resource, an archive of medical knowledge, or *acturial record*

(c) case notes as an instrument of **medical training**

(d) case notes as a **decision aid**.

(a) ***Case notes as medico-legal documents:*** The hospital authorities are required to preserve medical records for they are legally owned by the Secretary of State and not the property of the doctor who makes the record (Lindop, 1978, para. 7.11) When the case notes are signed by the doctor they constitute evidence that the medical work referred to in the record has been carried out, or planned for the future. Yet only one of the consultants interviewed allowed the legal status affect the way he recorded case notes. This consultant would record his criticisms of other doctors who had previously seen his patients to,

> "protect myself from litigation because someone has given absolutely the wrong treatment" (Con. 2, Int. 3, 278-290, June, 1983).

Although one other consultant did point out,

> "that something may happen (to a patient) and ultimately end in the coroners court ... Then (the clinic record) needs to look reasonably clear" (Con. 3, Int. 3, June, 1983)

No other consultant, however, expressed concern regarding the possibility of litigation. Medico-legal considerations played little part in the way the consultants or the junior medical staff wrote their case notes.

(b) ***Case notes as a research resource:*** In order for the case notes to be of use as a research resource they would need to be recorded systematically and comprehensively, (in Bittner and Garfinkels' term an *acturial record*). Some hospitals are renowned for the completeness of their medical records. One famous example from the USA is the

Massachussetts General Hospital which has maintained detailed records since 1821 (Reiser, 1978, pp. 206-208). On this side of the Atlantic no hospital has earned a similar reputation, although Dr Old did tell me that the Hammersmith Hospital, for a time did follow a policy similar to the Massuchussetts General Hospital. Individual and groups of consultants within certain hospitals have implemented, at different times, a policy of comprehensive, detailed records. Where this has occurred, as for example in the case of the Department of Surgery at Guy's Hospital in the mid seventies (McColl et al, 1976, pp. 1342). There was no policy at St Giles, nor at the DGH, regarding the maintenance of detailed and comprehensive records, a situation which was neither unique nor without consequences.

There was a practical need for the medical records (and case notes) to be maintained sufficiently systematically in order they might be of some use as a research resource. Registrars were expected (as part of their training) to carry out research which would involve them analysing, retrospectively, the case notes of particular groups of patients. These doctors had little anticipation that the case note records would be complete, or reliable, and relied far more on any systematically recorded *numerical* data available within the medical record folder, such as laboratory results. But even this data could be unreliable because it was often misplaced or lost (Jnr. 8, Int.1, July, 1982).

Case-meetings also caused the registrars to turn to the case notes as a research resource. Registrars, in the surgical specialties, were expected to regularly present cases at the weekly case meetings held at the DGH (selected from both the DGH and St Giles patients). The urologists, for instance, were asked to present cases about every four to six weeks (Con.4, Int. 2, 370-392, June, 1982). The objective of these meetings was primarily educational and the criteria adopted for selecting a 'case' for

inclusion was that it should be medically 'interesting',

> "Essentially it is one of student teaching, interesting and abnormal cases (which can be) shown well on x-rays ..." (*ibid*)

The existence of these meetings did not entail the necessity of doctors routinely writing systematic and comprehensive case notes, *at least not in the outpatients' clinics*. 'Interesting' cases invariably involved an inpatient stay and the opportunity for a comprehensive 'clerking' to have been carried out (Jnr. 19, Int.2, II 104-123, April, 1983). Hence it was not necessary for the doctors to ensure that comprehensive records were kept just in case they might be required for some unspecified future case meeting. If a case showed any signs of being 'interesting' there was always enough time for the patient to be brought into hospital for a full set of investigations and the documenting of a full and comprehensive 'history' and 'examination' (see also Chapter Seven, p. 211).

Prior to the introduction of the CORES computer system none of the doctors ever wrote case notes *qua* case notes in the outpatients' clinics with research in mind (with the exception of Dr Old, whose research involved the computerisation of the case notes). The consultants, however, ensured that the capture of data for research, or audit, purposes were organised *prospectively* and recorded on documents other than the case notes kept separate from the medical records,

> "... I have .. a diagnosis index cabinet in which I put all letters and patient records - *not the patient record* - my own copies .. because to get (data) from the hospital (system) takes weeks but I (can) go and ... pick-up gall-stones (for example) in the last ten years" (Con.5, Int. 1, September, 1981)

Other consultants also maintained their own separate record for research or audit purposes (Con. 3, Int. 2, September, 1981; Con.4, Int.1, September, 1981; Con. 7, Int. 1, October, 1981). This practice of maintaining *dual systems* of clinic records clearly was not an uncommon one. It was also the case, as will be discussed later, that these consultants (as well as the junior doctors) would adopt a *dual system* strategy in order to cope with the CORES system.

(c) ***Case notes as a means of training and monitoring junior medical staff:*** on the wards the house officers were responsible for 'clerking' the new patients. Much of the junior doctor's training centred on learning how to conduct a history and examination in order that a diagnosis, even if of a preliminary (*presumptive*) kind, can be reached and the patient categorised (Rees, 1981b, pp. 56-59). In the outpatients' clinics this training element was not present to anything like the same extent, although clearly from what has been said earlier (concerning the organisation of the clinics), outpatients' work was seen by some consultants (physicians and gynaecologists) to contain an element of medical training for at least some housestaff (and students). But for housestaff to have spent additional time 'clerking' all new outpatients would have reduced the number of patients that could have been seen during a clinic session and so the training element in outpatients' work tended to be about managing the patients, rather than diagnoses and the structured recording in the case notes of medical information, knowledge and opinion.

Even without adopting 'clerking' procedures within the clinics, the case notes might still have played an educational, or training role, if the consultants examined the entries of the junior doctors, but this again was not the usual practice. The SHO who 'clerked' the 'new' patients one week prior to the consultant physician seeing them would seem to be an

exception, however, none of the SHOs' involved who were interviewed saw arrangement in this light, largely because the consultant rarely discussed the case notes in any detail with the junior doctors concerned (Jnrs. 1, 9, 12, 23 and 26). The only exceptions, in fact, were the consultant gynaecologists and one of the urologists. The gynaecologists used the outpatients' clinics as settings in which to train medical students in the art of case note writing. The students' work was also of some assistance to the consultants for they provided them with a structured report of a patient's history and medical examination. As one of the gynaecologists explained,

> " ... I've got the students to do the 'clerking' then I've just struck out what is wrong in the (case) notes and added my comments on the side." (Con.2, Int. 3, 080-092, June, 1983)

The other consultant to monitor the casenotes of the junior doctors was urologist who did so because he wrote all the *clinic letters* to the GPs following the clinic,

> " I always get the (case) notes after (the clinics) and check what they (SHO, or registrar) have said ... And I write all the doctors (*clinic*) letters, I don't leave it to the junior staff."

But this direct monitoring of the junior staff had no educational intent

> "This is my way of controlling what goes on between the GPs and the junior staff." (Con. 6, Int. 1, 037-044, October, 1981)

It was a unique method and no other consultant adopted the practice.

(d) ***Case notes as a decision aid:*** the case notes written by junior medical staff did tend to constitute a more complete record than was the case

with the consultants, but neither the junior doctors, nor the consultants, wrote as they did in the casenotes for medico-legal or research reasons, nor was the issue of education and training a key factor influencing the practices adopted. Rather, it was the process of clinical decision-making that most influenced the doctors' methods of recording casenote. It is this aspect of writing casenotes that is to be expanded upon in the following sub-sections.

The junior medical staff

In the outpatients' clinics the junior doctors would typically write case notes in relation to 'new' patients similarly to the procedure they would adopt on the wards, so a registrar in gynaecology would,

> " ... ask the patient about (their *presenting*) complaint, and then, after that, we go to the menstrual history, obstretic history, past medical history and social history ... " (Jnr. 10, Int. 2, 128-162, October, 1982)

Although, the degree of detail a junior doctor would write up in the case notes would vary according to,

a) the nature of the problem,

b) the seniority and experience of the junior doctor

So, for example, a registrar reported that,

> " ... if (a patient) comes in with a lump under their arm, you write down "cyst" and that is probably the end of it, but if it is more serious then a more comprehensive record is made" (Jnr 25, Int.2, 211-233, January, 1984)

Even so, this doctor would not,

> " ... write such detailed notes at 'outpatients' as a houseman would when they are admitting a patient. I only ask questions relevant to the particular problem" (*ibid.*).

It was, however, the usual method of the house staff " ...(to) go through every ... system in the body" ((Jnr. 23 (SHO), Int. 2, 099-108, May, 1983) when dealing with new patients. This method of approach, "taught at medical school" (Jnr. 9, Int. 2, 215-237, April, 1983), was algorithmic in that it helped ensure that the doctor would not overlook any important factors relating to a patient's condition, diagnosis, or proposed management. Registrarship was, according to those interviewed, the stage at which clinicians moved from the narrative completeness of the house officers to the idiosyncratic brevity of many of the consultants (see below), for they would begin to look for ways of abbreviating their casenotes in a way similar to the consultants, and for the same reasons.

The consultants

The consultants (and some registrars), by contrast, never took full patient histories. Instead, they focused their attention on patients' *presenting complaints* as the organising principle. As one consultant explained,

> "... physicians more than surgeons are likely to do notes in 'outpatients' more on the ... systematic format of the archetypal clerking of a patient ... The discipline of medicine ... will also make a very much more structured primary data recording in the outpatient clinic. I'm afraid the majority of surgical clinics ... are too big to devote much time to each patient ... I go straight into the *main complaint* then take any relevant ... history ... " (Con.1, Int.3, 082-100, March,1983)

The point about the physicians was only moderately accurate, for as one explained,

> "... I make notes which are meaningful to me ... for instance on *examination*, most people will split it up into

> systems, but I tend to have a statement to begin (with) how a person looks ... then I go for *the particular things* that are important... To get to the guts of the case quickly ... " (Con. 7, Int. 2, 048-079

The consultants used the case notes to briefly *note* observations in order to help them to arrive at a conclusion regarding how best to manage the patient and in the process these notes would form the basis of the *clinic letter* which would be dictated after the the clinic.

The only common denominator regarding the consultants case notes was that it was the writing of them that aided their clinical decision-making (*decision-aid*) and the contents would be as complete or otherwise depending on how easily the consultant came to a conclusion regarding the *disposal* (diagnosis or other categorisation) of the patient. The case of the junior doctors was different and as has already been explained they wrote case notes, on 'new' patients, in terms of history and examination ('clerking') just as they would on the wards, for this algorithmic method gave them confidence in reaching clinical decisions regarding the patients.

The consequences

Whether the case notes were written extensively, as in the case of the housestaff, or, as with the consultants, cryptically, they were rarely *systematically* referred to again. Instead, the doctors would almost always refer to the *clinic letter* for a summary of the patient's condition. The following registrar's comment was not atypical,

> "I ... rely on the *clinic letter* ... If I am looking at a set of 'notes' and want to know exactly what happened to that patient I will read (the clinic) letter" (Jnr. 16, Int. 2, 170-178, December, 1982)

While the *clinic letter* was usually the first point of reference it was

not, however, the only document referred to. Doctors would also refer to investigation results, discharge summaries, operation notes and the inpatients' notes (Con. 5, Int. 3, 123-128, July,1983). Similarly, the doctors would often read through the previous case notes, and most consultants had developed techniques of speeding up this procedure, typically by "the actual paragraphing ... " (Con.7, Int. 2, 023-025, December, 1982) or notations and underlining important points (Con. 4, Int.2, 007-056, June, 1982) and even using coloured paper to distinguish between their own case notes and those of of the junior doctors so the latter could be ignored, for as one consultant commented,

> "Trying to get information out of the body of 'notes' which is in somebody elses writing and someone elses paragraphing is extremely difficult ..." (Con. 7, Int. 2, 90-100, November, 1982)

If the consultant really wanted to know the full details of a patient's condition then that patient would be brought into the hospital as an 'inpatient' for a full medical examination and array of tests. As one consultant explained no doubt with iconoclastic intent,

> "Outpatients' clinics are notoriously dangerous places for missing out information (in the clinic record). Any patient being admitted has to be reassessed on admission ... to make sure we are doing the right thing ... " (Con. 1, Int.2, 084-089, October,1982)

There was little systematic difference between medical and surgical specialties on central role of the *clinic letter* although one consultant, commented that surgeon colleagues at the DGH were not commonly renowned for the regular writing of clinic letters (Con. 6, Int. 3, 422-424, June, 1983).

In contrast to Bittner and Garfinkels' findings the present research indicates that the information contained within the clinic record was not necessarily sufficient to be read as a *therapeutic contract*. The consultants documentation of the history-taking and diagnosis (or other categorisation) of patients and their subsequent management within the outpatients' clinics was idiosyncratically documented; it was not possible for other clinicians to reconstitute with confidence the process from the evidence of the case notes. As shall be seen shortly, this common practice was to have major implications with regard to the utilisation of the CORES computer system.

The organisation of the computer implementation.

The CORES computer system was introduced on an overtly experimental basis. The programmes were supplied from the USA completely free of charge while the hardware and technical support was made available by the regional health authority virtually free of charge. The system was introduced into the first outpatients' clinic towards the end of 1981 but it was not until the following October (1982) that all the consultants had been introduced to the system.

The CORES system involved replacing the handwritten case notes by a form, known as the *encounter form*. These *encounter forms* consisted of precoded lists of signs, symptoms, diagnoses, operations, investigations and drugs and included a space for narrative (Appendix V). The procedure for capturing the clinic data was that the doctors would complete the *encounter form* at the time of seeing the patient in the clinic (*medical encounter*). At the end of the clinic the medical records and *encounter forms* would be collected together by the nurses and passed to one of the computer clerks (there were two, part time, female, computer clerks who

also had other - general clerical - duties to carry out). The data on the forms would then be entered on the CORES database via the VDU and terminal and the medical record folders passed to the medical secretaries who required them in order to complete the *clinic letters* and to incorporate the laboratory results as they became available. Then prior to the next clinic, printed, structured reports and summaries of the patients' case notes and investigations would be printed and placed within the medical record folders for use in the clinic (Appendix VI). In addition, the system could produce flowcharts of the temporal course of the disease process as well as being able to automatically analyse aggregate data for doctors wishing to carry out research or medical audit. The new (CORES) system presented patient information in a format that was much more systematic and comprehensive than was previously the case. At the same time the system demanded the doctors changed the way they *recorded* patient information and data in the clinic.

In the beginning

Each consultant was invited by Dr Old to design their own *encounter forms*, with his help. The actual task of translating the consultants' requirements into the printed form was carried out by a member of the management services department. In practice one consultant in each of the specialties carried out this work and the others in the same specialty adopted the resultant format. This was not a consciously agreed strategy, but a compromise. The consultants were generally prepared to try and use the system, but less prepared to be involved in designing the forms,

> "... we have been variously less committed than Peter (Dr Old) in setting up a good encounter form ... particularly in (this) department. ... (I) said that it would be impossible (for me) to do any of the 'spadework' and that I would go

> along with it (only) if Mr (other consultant) .. agreed to do all the 'spadework' and he did ... " (Con. 1, Int. 2, 027-040, October, 1982).

The consultants were brought on to the system singly and in pairs over a period of twelve months. The system was further developed and modified during the implementation period, either to attempt to improve the facilities available or as the result of comments and criticisms of the consultants and other users of the system.

Adapting to the system

The responses of the consultants to using the system, changed over time. At the outset all the consultants supported the proposal, although one had indicated to Dr Old that he was unlikely to be able to use the system in his clinic (for reasons that will be explained later) (Con. 7, Int. 1, 049-060, October,1981). By July, 1982, however, all the consultants (excepting Dr Old) had decided not to continue to use the system routinely in their clinics. The responses of the junior medical staff, whilst not the same as the consultants, tended to reflect a similar trajectory.

As explained in Chapter Six (The Politics of Innovation and Professionalism) the consultants' commitment to the introduction of the computer system was based on one, or more, of the following reasons,

1. technological rationalism,
2. collegiate commitment,
3. instrumental commitment,
4. protectionism,

These reasons for being committed to the system were, however, insufficient to maintain the continuing *practical* involvement of the consultants for, as has already been indicated, the consultants eventually rejected the system. There is an important distinction to be made between

the politics of (collegiate) commitment and the pragmatism of recording case notes. The junior doctors also stopped using the system as it was originally intended, but only after the consultants had done so. The doctors' responses (both consultants and junior staff) to the system can be categorised according to a fourfold classification,

(a) **acceptance**

(b) **compliance**

(c) **resistance**

(d) **rejection**

In broad terms, this reflects the stages in a trajectory from (a) to (d) which the doctors went through. There was considerable variation between the consultants in terms of the pace at which they moved through the stages. There were also considerable differences in the manner in which the doctors responded to the system even within the broad categorisations of *acceptance, compliance, resistance* and *rejection*. In the case of the consultants the variations related to two basic factors,

-the type and degree of commitment(s) (*technological, collegiate, instrumental, protectionist*).

-the compatibility with previous system of case note recording.

The junior doctors were never asked to commit themselves to the system as the consultants were; they were, nevertheless, expected by the consultants to comply with the demands of the system in terms of capturing the clinical information on the encounter forms. In consequence the level of commitment of the junior medical staff was not an important factor, but the system of case note recording was. Generally, the junior doctors would always prefer to revert to using the standard structures for patient history taking rather than persevere with the CORES system of completing an encounter form.

In this section the doctors' responses to the CORES system will be explained in some detail, in order that the the *acceptance-rejection trajectory* may be described and the variation between consultants and specialisms and between consultants and junior medical staff can be analysed.

(a) ***Acceptance***: This refers to the willingness, or at least acquiessance, of the doctor to using the CORES system in the outpatients' clinics (rather than simply accepting the *principle* of the systems introduction). Six consultants, in addition to Dr Old, agreed to use the system (acceptance) (1 physician, 2 urologists, 2 gynaecologists and 1 surgeon). The remaining consultant officially supported the proposal for reasons of *collegiate solidarity*, " ... because of Peter Old's interests" but,

> " (I) didn't really have a need for the thing myself because I have a system of my own which is not computerised but is pretty well streamlined over the years" (Con. 7, Int. 1, 296-310, October, 1981)

This consultant's card system had been originally established in 1972 and contained data on drugs and laboratory tests as well as a clinical scoring system for assessing any improvement or deteriation in a patient's condition. The cards were also divided temporally in order that trends could be monitored (Con. 7, Int. 2, 019-036). The main point for the consultant was that he was not prepared to risk the integrity of his clinical data system by taking on the additional burden of using the CORES system which would duplicate the data collected and thereby adding to the workload of the clinicians without offering any obvious benefits. The odd thing about this matter was that the manual card system was based on numerically data

and sufficiently rationalised to be *technically* very accessible to computerisation yet Dr Old and the CORES Steering Group were unable to include this data on the system because the project lacked the resources, only the contents of the medical record could be included.

Whether a consultant agreed to use the system (acceptance), or not (rejection) was not, however, simply a response to whether the CORES system could be adapted ('customised) to meet the requirements of specific consultants. To illustrate, one consultant, a urologist, found adaptation extremely difficult yet remained with the project throughout. The problem stemmed largely from the fact that the *encounter form* was designed by his colleague, who described himself as ".. a technician" (Con.4, Int.1, 108, September,1981) and whose method of writing of case notes was more focused because "patients usually complain of only four or five symptoms .." (Con.4, Int.2, 056-060, June,1982). Whereas, this consultant adopted a very different perspective on history-taking which caused him problems when adapting to the demands of the CORES system,

> ".. the patient is a *patient as a whole* and there is an awful lot that is not urological that comes into the history-taking section (of the encounter form) and this I find very difficult ..." (Con. 6, Int. 2, 060-067, June, 1982)

This particular consultant literally struggled to complete the forms during each clinic and his explanation for this diligence and perseverance was not very clear, for while stating categorically that he would continue to use the system (Int.2, 379, June, 1982) and that he could see the benefits (Int.3, 267, June, 1983), even after using the system for over a year he still found that,

> "... as regards the day to day (work) in the clinic and

> afterwards in writing the (*clinic*) letter I find it ... makes everything that much ..longer and (more) complicated" (Con.6, Int.3, 267-274, June, 1983)

The paradox here is that this consultant accepted the CORES system and routinely attempted to use it despite it clearly being unsuitable for his method of recording and retrieving, clinical information. While the consultant whose clinical data system was *technically* accessible to computerisation decided after only one week not to continue with the system (Con.7, Int.2, December, 1982). The main reason for this latter consultant not actively cooperating with the project was that he saw it as a threat to his well established system, whereas this was not the case with the urologist. In consequence, he lacked what he considered a creditable excuse for withdrawing. In the case of both consultants the issue of *collegiate solidarity* was recognised as being of importance, hence the one with the 'card system' did go through the motions of trying the system for one week before, as Dr Old anticipated, he declined to continue to participate, but agreed to the clinical data in the case notes being entered onto the CORES database.

(*b*) ***Compliance***: The junior doctors, being only temporary members of the hospital staff, were not consulted regarding the introduction of the CORES system they were expected by the consultants to comply with the requirements of the system. In consequence, it would be more accurate to define these doctors' acceptance of the system as *compliance*. Ten of the twenty-two junior doctor users of the system interviewed by August, 1983, were able to identify practical benefits resulting from the systems introduction (see Table 8.1),

TABLE 8.1 BENEFITS FROM USING CORES SYSTEM
(Junior medical staff only)

No.	Benefit
4 =	Saves time - useful when seeing 'follow up' patients
2 =	Useful aid when taking patient histories
1 =	Improvement in the organisation of appointments & clinic lists
2 =	Presentation of laboratory results improved
1 =	Useful for research purposes
10	TOTAL

These comments were gleaned from the interview transcripts, they relate to answers to the question " Have you noticed any particular benefits to the system as yet?". One SHO (a *locum*) reported that,

> "I prefer to use this (CORES) system because it is easier for me, saves time and energy as well" (Jnr. 9, Int. 2, 060-064, July, 1982)

But this was an atypical response, often the response was a variation on "No nothing very much, except (laboratory) results" (Jnr. 24, Int. 2, 114-118, May, 1983). In other words, the benefits were largely seen as compensations for having to use the system. And for the other twelve doctors who were unable to identify any benefits the pithy comment of one particular SHO captured the general opinion,

> "When the present system (of writing case notes etc) works perfectly well its hard to see benefits ..." (Jnr. 11, November, 1982, side II 022-025).

A point which needs to be noted is that some doctors who reported no benefits may well have overlooked to mention some aspect they found an improvement on the manual system because the system *as a whole* was inconvenient to them. Similarly, among those doctors who reported benefits were those such as the one quoted a moment ago (Jnr. 24) who generally did not like using the system but acknowledged that it

was not all bad.

(c) ***Resistance***: In the case of the junior medical staff resistance was either *overt* or *covert*. The first was viewed by Dr Old and his consultant colleagues as an act of rebellion that was never tolerated. Only one junior doctor, an SHO, ever took this course of action. This doctor would 'clerk' new patients in the traditional narrative format on the encounter form completely ignoring the listing of coded signs, symptoms (etc), there being no other paper to available in the clinic to write on. The matter was brought to the attention of the CORES Steering Committee by one of the computer clerks (Fieldnotes, Book 3, p.23). Dr Old (chairperson) informed the consultant concerned and the junior doctor was admonished (Fieldnotes, Book 3, p.23). Later junior doctors would take paper with them to clinic so as to be able to *covertly* 'clerk' prior to transferring the information to the encounter form,

> "I tend to clerk the patient on a piece of paper and then put as much of it as possible as I can (on) the computer (form) ... it doesn't take long ...
>
> <u>Question</u> And the piece of paper, does that go in the notes?
>
> "No *that* goes in the bin, I got the impression that they didn't want see my scribing ..." (Jnr.23, Int.2, 026-036; 125-130, May,1983)

the reasons for the resistance were, firstly, the doctor felt more in command of the *medical encounter* 'clerking' the patient rather than filling in a form, and secondly, the technique of writing patient histories and examinations was of far greater use in the longer term to the junior doctors. One doctor reported that "Quite honestly we

(housestaff) treat it rather as a joke." but "Because the consultants are using it we obviously get on with it" (Jnr.20, Int.2, 302-308,April,1983).

The tactic of writing case notes and then transferring the information to the encounter form was the same as that adopted by the consultant (No.6) discussed in the previous section (*acceptance*) but, in his case, the claim was that it was the only way he could adapt to the system (which he supported) whereas in the case of the junior doctors it was the only means they had of resisting the system

(d) ***Rejection***. The fate of the CORES system was closely related to the ability of Dr Old and the Steering Group to deliver, within a reasonable period of time, facilities useful to the consultants, but which were not definable as outpatients' clinic work in any narrow sense. What was expected of the system was that it would provide computer support for various consultants particular research and (self) audit systems. As has already been shown in the case of the consultant with the 'card system' some consultants maintained a separate (*dual*) record, in addition to that kept in the medical record folder, for clinical, research and audit purposes. While no other consultant maintained such a sophisticated system, three did maintain some form of *dual system*. These consultants were, initially at least, *using* but not *accepting* the CORES system as a clinical information system because the information they were most interested in was kept separately both from the CORES System and from the medical record folders. The four examples of *dual system*, including the 'card system' were,

(i) a statistical database, held on index cards, on one

relatively large group of chronically ill patients dating back 15 years,

(ii) a similar, but less complex, set of records on a relatively large set of urological patients,

(iii) a detailed record, for research purposes, relating to a small group of gynaecological patients,

(iv) surgical audit records.

Except for the first case, discussed previously, these consultants were the strongest supporters of the CORES system, who, with the help of Dr Old, designed the *encounter forms* for their specialties. These were the *instrumentally* committed doctors who had anticipated that their clinical, research and audit records would be eventually transferred onto the CORES system. It was only when it became obvious to these particular consultants that the CORES experimental programme was not going to be able to provide such facilities within the resources available that they finally agreed with the other consultants to withdraw from the experiment, but in a manner that made it appear that the *rejection* was in fact only a *modification* to the system of data capture (see also Chapter Six, pp.176-181).

The reason given for the ultimate rejection of the system was not because it failed to deliver additional facilities for analysing aggregate clinical data, but because the system was contrary to the established patterns of recording and retrieving clinical information, as one of them said,

> "It gradually dawned on me ... (in) clinic after clinic I have to 'skip' the (computer printed) status reports and (laboratory) results and go to the (original) investigation form ... and ... my letter to the GP (*clinic letter*). And I

> really miss writing outpatients' notes in my own *handwriting* (and) looking at this in my next clinic, this to me conveys continuity, somehow sheet after sheet of computer data means nothing when it comes to clinical work" (Con.6, Int.3, 028-043, July, 1983)

This notion of writing and reading case notes being an integral part of the clinic process was also reported by the other consultants, one argued that the CORES system interfered with his

> "thought process in clinical diagnosis .. the system of recording the database (on the encounter form) seem(s) to act as a wedge" (Con.1, Int.3, 004-012, March,1983)

This consultant even when officially part of the CORES programme did not complete the encounter forms in any systematic way but relied on his SHO to acted as his *emanuensis* and complete and correct the forms for him after the clinic (Int.2, 248-272, October, 1982). This arrangement started when the encounter forms were being returned by the CORES clerks because they could not make sense of them

> "Initially (they) came to me, but I threw them on the floor and stamped on them and rushed out, so (the) poor old (SHO) is getting them now" (*ibid.*).

While this particular consultant never was able to accommodate to the system and was the first to withdraw (in the first quarter of 1983), his argument against the CORES system of capturing clinical information found resonance among the other consultants as the quotes of the other consultant (Con.6) indicate. The consultants found it inconvenient using the system for reasons relating to the mismatch between what the system was designed to do and what the consultants actually wanted to do; they simply did not write case notes in the

way the CORES system was designed to emulate.

The collective rejection of the system was more *real* than *apparent*, however, for it took the form of a decision of the Hospital Medical Committee that the encounter forms would be replaced by the traditional form of case notes and that the computer clerks would encode this information,

> "It had appeared that certain consultants did not necessarily wish to continue using the system as originally designed. After further discussion it was quite apparent that support for the system still existed ... (I)t was agreed that the future use of the Encounter Form would be reviewed and if possible a system designed that was perhaps less invasive in terms of the preparation of patients notes." (HMC Minutes, 15th July,1983)

This minute encapsulates the ambiguity of the consultants towards the project. On the one hand, they have no wish to undermine a colleagues research (*collegiate solidarity*), while on the other, they have no desire generally to continue with the CORES system. The project had failed to deliver the computer support that some of the consultants had reason to believe (from Dr Old) would have been made available, while the system of data capture and reports was totally alien to their own well established methods of recording and retrieving clinical information. The compromise arrived at was that the consultants agreed to the computer clerks entering the clinical data from the case notes onto the CORES database, these consultants also agreed to accept some of the printed computer reports being inserted into the medical record file. There is some evidence from the interviews of around that time that neither the consultants nor

the junior staff made any real use of these printouts (except on the occasions that the medical records folder was missing) preferring to refer to their own handwritten records. To illustrate,

> "... It (*encounter form*) is now arranged so that I now have a blank sheet and I just write ... what I want recorded ... I have investigations at the back and drugs I just put down at the end of my blank sheet - that is perfectly satisfactory ! What I do not like ... is the printout" (Con. 2, Int. 3, 019-029, June, 1983).

As will be noted the date of this interview was earlier than the HMC minutes and indicates that the compromise had already been tried out prior to that meeting in order to keep this consultant within the CORES experiment and the subsequent meeting simply extended the arrangement to all the consultants with the same result, the CORES system appeared to be acceptable to the clinicians whilst in practice it had been rejected.

Pragmatism, case notes and computers

The CORES computer system, as has been explained, was designed to capture clinical data in a systematic way by means of a preprinted form listing the relevant items likely to be discovered, or decided upon, by a doctor when interviewing and examining a patient. As has also been explained consultants tended not to record case notes either comprehensively, or necessarily systematically, rather they took notes to *aid* their clinical decision-making ('thought processes') based on the patient's *presenting complaint*. The clinical information would then be rendered into a systematic record only when, typically, the letter to the patient's general practioner (the *clinic letter*) was written. A copy of this

letter was filed in the patient's medical record folder and served as the summary of the patient condition and its current management. This system, with individual variation as between consultants, was thought of as adequate by the consultants when compared with what the computer system offered. The computer system was experienced by these doctors as offering no practical improvements and little in the way of benefits. Unlike the renal system the CORES system demanded that the doctors changed the way they recorded patient data. The *encounter forms* had been designed to capture most eventualities in a way that was easiest to input into the computer system. The system's criteria, however, contradicted with the doctors' own method of recording patients histories. Whereas the traditional techniques allowed for the patients to be questioned at the same time as the case notes were being written the CORES system did not. The doctors either had to be entirely fluent with the structure of the encounter form, as one consultant remarked.

> "I still find it rather bewildering particularly when I am faced with a patient and I find I am looking around for where the symptoms are (on the form) ... I feel very much like a chinese waiter ... " (Con.2, Int 2, 003-017, October,1982).

Or, as was more usual with the junior staff, the doctors used the form as a checklist, which most found unhelpful, to quote on registrar in gynaecology,

> "When a patient sees you for the first time, she wants to tell you what is wrong with her and ... you have to stop her and tell her .. I have to fill in this sheet (*encounter form*), so ... when she is an 82 year old lady I ask her when she had her first period ... when her *last* period was about 30 years ago ... The patient wants to tell you her

> *problem (presenting complaint)*" (Jnr.10, Int.2, 132-162, October, 1982)

In one instance (mentioned also in Chapter Five, p. 144), the *encounter form*, which was an eight page document, was incorrectly collated. The centrefold was reversed with the result that it seemed to be asking for the *investigations* to be ordered *before* the *physical examination* had been carried out with the result that one registrar, in particular, was very confused (Jnr.4, Int 2 (joint with Con.6) 018-026; 248-275,June,1982)

Case notes and medical work: further analysis and conclusions

Earlier in this chapter the rationales for writing case notes was discussed in order to clarify what the consequences of implementing the CORES system might be. The conclusion reached was that the writing of case notes in outpatients' clinics was for the consultants an aid to their clinical decision-making and not principally as a therapeutic record. This rationale is commensurate with Bloor's use of the term *decision rules* in his analysis of medical work at a number of adeno-tonsillectomy clinics. These rules he defined as being,

> "(T)hose idiosyncratically developed rules of thumb concerning those particular symptoms and signs which the specialist feels to be typically minimally acceptable criterion for allocating (patients) to the various alternative forms of therapeutic intervention at his disposal" (Bloor, 1976, p. 45)

Bloor does not make mention of the use made of the medical record during the medical encounter, but from the evidence from the case study reported here it is in the writing down of the case notes that typically aids the consultant in deciding on which of "the various alternative forms of therapeutic intervention" (*ibid*) to adopt. In other words, case notes are

the consultants 'thought processes' (or some of them) on paper. These are written down, not for posterity but, to assist the doctor in assessing whether the "minimally acceptable criterion" (ibid.) had been reached, or not.

Whilst the case notes were not a *complete* record they did constitute a *sufficient* record to ensure the consultants ascendancy within the medical encounter (Waitzkin and Stoeckle, 1976, pp 265). They were the tangible expression of the consultant's *functional autonomy* (see Chapter Four) and were, in a strict sense, only accessible to his interpretation. This selective approach gave the consultant greater flexibility within the medical encounter. It could be utilised either save time in a busy clinic, or reinforce the patients confidence in the doctor and hospital simply because the doctor concentrated on the patients own perception of his or her complaint. One consultant physician, for example, would include in his case note records,

> "... other things that are domestically relevant that patients (mention) ... so that next time you can say '.. you went to Blackpool last year' and the patient suddenly thinks you're wonderful .. and any treatment you give is more likely to work ..." (Con. 3, Int. 2, November, 1982)

Unlike 'clerking' proper the medical evidence and the line of reasoning is not predetermined, nor are the notes recorded in any consensually agreed abbreviated form either. One consultant, was known by his colleagues on occasions not to write a word on a patients history sheet, other than the date and his signature (Fieldwork Analysis, January, 1982, Ref. II:6., No.2). But whatever form the case notes took the consultant remained the arbiter of his own medical performance (*medical autonomy*).

If a doctor wanted to find out what a colleague had decided

regarding a particular patient it was not to the case notes he or she would first refer, but to the *clinic letter* in which all medically relevant details were usually summarised. Depending on the reason for the looking into the medical record folder, the *clinic letter* might deliver up all the information the doctor might want, or could get in the time available (for instance, a junior doctor working in a busy clinic). If the doctor was not satisfied with the information contained in the *clinic letter* then time, if available, might be spent in searching through the file in a general way looking for further clues, or answers, to the patients condition, therapy (*etc*). But if the doctor was still concerned over the patients condition and the scrutiny of the medical record had not produced sufficient information the patient would be brought into hospital for a full clinical assessment and investigation.

In the case of junior doctors, as has been explained earlier, case notes were written comprehensively and structured according to the principles of inpatient clerking. Even so, doctors when referring to these case notes later usually preferred to look to the *clinic letter* because it usually delivered up the information they required and it saved time.

It was because of the incompatibility between the CORES system and the doctors methods of writing and accessing case notes that the system eventually failed. At the level of the clinic the consultant found that the system lacked the flexibility of the traditional form of case notes writing in the outpatients' clinics with the consequence that it neither contributed as a *decision aid*, nor could it be used as effectively to underpin the doctors ascendancy within the *medical encounter*. Furthermore, the system's outputs, in the form of reports, summaries and flowcharts, were regarded by the consultants as less useful to them in clinic than the traditional case notes and *clinic letter*. Only those consultants who

anticipated being able to utilise the CORES system for their own purposes rather than just as a medical record system *(instrumentally committed)* were able to deal with the apparent encroachment on their *functional autonomy* brought about by the introduction of the CORES system. They remained committed to using the system more on the grounds of *collegiality* than practicality until it finally became clear that Dr Old, as the iniating consultant, would be unable to deliver the desired extra facilities. Only then, after a period of more than two years, was the system was finally rejected as a practical clinical information system and accepted as *only* a colleague's research project.

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CHAPTER NINE
CONCLUSIONS

Introduction

This is the chapter where I bring together and summarise the preceding eight chapters. Here I shall set out once again, but in summary form, the main points to emerge from the substantive chapters relating to the implementation of information technology in hospital clinics. I will then relate these to the underlying theoretical arguments concerning the issues of professional control and autonomy and the applicability of labour process analysis to medical work.

Whereas in the development of the thesis it was appropriate to start from a general description of the institutional arrangements as well as an assessment and development of the theoretical arguments before moving on to the case studies, it is now possible to focus more directly on the implications of the case studies. I will therefore start with the substantive issue of medical computing and draw out the similarities and differences between the case studies, and I will then integrate these findings into the general theoretical framework. As a preliminary to the overview of the case studies, however, I must comment briefly on the more general issue of the development of computing and computer policies within the NHS.

The issue of computerisation in the health service was examined in

Chapter Two for two principle reasons. Firstly, in order to be able to describe the history and current situation relating to healthcare computing in general, and medical computing in particular, within the health service; and secondly, in order to identify the primary motives, or rationales, for the identified developments. It became apparent from examining the literature and speaking to individuals involved in computer developments in the hospital service that the reasons for these developments had little or nothing to do with enhancing organisational control, or relatedly, efficiency, but rather reflected the research and development interests of individuals within the health service including importantly the computer departments that were set up at particular major hospital sites in the 'sixties. This early, and long lasting, experimental stage (DHSS, 1977) was sustained by DHSS funding and directly reflected the government's desire, or willingness, to make available to Britain's vulnerable computer industry a captive market.

In relation to the involvement of hospital doctors in this general development of health care computing, it was noted that hospital doctors proved to be generally unwilling, or unable, to adapt to the demands of the systems available for use in hospital clinics. Moreover, even where computer systems have been introduced, hospital doctors have been able to choose whether to use them or not. The medical interest in the development of specific clinical applications has been almost wholly research orientated rather than concerned with the production of work-a-day operational, or information, systems. It was against this general background that the introduction of the two computer systems was studied.

The case studies

The case studies were discussed in Part II and comprised of three

chapters. The first (Chapter Six) dealt with the politics of innovation and professionalism as they applied to the introduction of both the Renal Computer System and the CORES systems, while the remaining two chapters were concerned with the specific processes of implementation of the two systems and their outcomes for the organisation and control of clinic work processes. Chapter Seven, which was concerned with the introduction of the Renal Computer System, the focus was on the implications for the clinic staff as a whole, and not just the hospital doctors (clinicians). In the case of the outpatients' medical record system (CORES) (Chapter Eight) the focus was on the doctors' work processes and, in particular, on their methods of recording and referring to case notes and related medical records documentation (e.g. laboratory results). These differences in focus between the renal and outpatients' clinics were in part dictated by the design of the systems, but they also resulted from my particular concern to explore the realities of professional control within different settings and in relation to different, but related, types of computer systems. In relation to the theoretical concerns of the thesis the objective was to examine the workings of *institutional* and *functional* autonomy and control in their clinical context, and I now turn to a summary and assessment of the case studies in these terms.

The politics of innovation and professionalism

The relative success or failure with which the two computer systems were introduced was as much the outcome of the decision-making and related political processes as it was of any intrinsic technical merit of the computer systems. In the case of the Renal Computer System the consultant who introduced the system (Dr Earl) adopted a strategy based on what I referred to as *collegiate solidarity*, while Dr Old who introduced the CORES system was constrained by circumstances to employ a more

pragmatic strategy of *organisational coalitions*. The renal units were organised and funded regionally, and this meant that Dr Earl was able to seek the support of his consultant colleagues at the other renal units in the region, and then request collectively for regional funding and technical support for the system's implementation at all the renal units. In all respects he was successful in this strategy, for it was facilitated by the fact that the renal consultants had a long established renal forum and they were well used to working together to gain additional resources for the renal service.

In the case of the CORES system, Dr Old had to rely on district rather than regional funding, although he was able to utilise regional technical support. Moreover, he had to coordinate the system's introduction through a multi-disciplinery steering committee (which he chaired), rather than an influential group of fellow colleagues as in the case of the renal consultants. The consequence for the CORES system was that it was generally under-resourced, because it lacked the priority that the renal consultants were able to claim for the Renal Computer System. This in turn meant that Dr Old was unable to ensure that his consultant colleagues got the additional specialised facilities they had been led by him to expect when he initially canvassed their support. The result was that the consultants' commitment to the system wavered and then within two years collapsed.

While the CORES system was in the process of being introduced Dr Old had to rely on support from administrators and computer personnel, with whom he developed pragmatic *coalitions* in order to ensure that the system was actually introduced and funded, at least minimally. In the end, however, the lack of commitment of the other consultants ensured that the system would be rejected as a routine medical information system. By

contrast, the strategy of *collegiate solidarity* that the renal consultant, Dr Earl, had adopted meant that even when colleagues were critical of the system, they would not withdraw their support of it, but would rather attempt (successfully as it happens) to take over the consultants' regional computer committee, by installing one of their number as chairperson, and then vigorously press the regional computer services to extensively modify the system to meet *their* requirements.

Both the computer systems were introduced by individual consultants and without this sponsorship it is unlikely that the hospital consultants would have considered directly using either of the computer-based medical information systems. This willingness to accept the proposal of a consultant colleague was a component of *institutional autonomy*, for both systems were intended to have some effect on the clinic work of the doctors even though consultants vary greatly in their methods of working. On the face of it this support would seem unusual for, on the one hand, the introduction of a computer system would tend to involve some standardisation, at least in relation to data-capture and reporting and, on the other, hospital consultants organise collectively in order to sustain their individual right to *functional autonomy*, that is to practice medicine differently from one another. On this basis, my argument ran, the rules of collegiality that sustained *institutional control* ensured the consultants were constrained to try to use the systems, but in practice were insufficient to ensure they would find either system acceptable. The reason that the virtually all the consultants found the systems unacceptable related to the fact that they did not provide the facilities these doctors particularly wanted (see the next section for details). As a result most of the consultants either stopped or never started using the systems. This did not become translated into formal rejections of either

computer systems but was expressed in terms of regret (in the case of the CORES system) or criticism (the Renal Computer System) that the systems lacked the necessary levels of resources for them to be utilised as the consultants wanted.

Automation and renal work

Dialysis work on the renal units was the province of the nurses. It was therefore their responsibility to ensure that the patient data was collected and recorded, originally on manually kept records and subsequently on the computer system. Unlike the CORES system the renal doctors did not have to enter any data onto the computer system and could, if they wished, rely on the nurses or the computer clerk to access the data for them. A similar situation existed with relation to the dieticians. In the case of the other 'other disciplines' their component of the system was never implemented at either unit, because (a) it would involve them in entering data twice, once onto their own (manual) record system and then again onto the computer system, (b) they failed to get themselves trained in how to use the system, and (c) some had reservations regarding the issue of confidentiality of data.

Within these commonalities, however, substantial differences existed between the two renal units studied which I have summarised in terms of (a) inter-disciplinary and humanistic (Haemo Unit) and (b) multi-disciplinary and scientific (Dialysis and Transplant), which encapsulated the different modes of organisation and ethos that the senior consultants had engendered within the different units. Medical control was exerted through two related means.

(a) The mode in which the consultants required the patient data to be recorded and presented.

(b) the form in which information and instructions were passed

between the medical, nursing and 'other disciplines'.

In the case of the *multi-disciplinary-scientific* unit information and instructions were passed formally through the medium of traditionally organised ward rounds, which ensured that the consultants were organisationally ascendant. At the *inter-disciplinary-humanistic* unit information, instructions and advice were interchanged at the weekly case conferences, chaired by the senior nurse and to which all disciplines were invited. Here the medical control of the consultants was maintained through a generalised and benevolent paternalism. The systematic variation of organisation and ethos between the two units was not simply the result of the consultants' own preferences, although they did play a significant role, but were the outcome of the history of the units' origins and development. The *multi-disciplinary-scientific* unit was situated within a hospital complex in which the consultants had over many years aspired and pressed for teaching hospital status, with all the accompanying commitment to teaching and original research. The renal unit itself was developed as an adjunct to the nephrology department and good patient care was viewed largely as the result of the patients' receiving the most advanced treatment. The *inter-disciplinary-humanistic* unit, by contrast, had been originated as a satellite of another unit, and only later became autonomous within the region's renal service. There was little pressure on the consultants to become competitively *scientific* as in the case of the other unit - rather the priority was on dialysing and caring for ESRF patients. Under these circumstances it was not surprising that the clinic staff were organised and orientated towards a *humanistic* ethos, for this gave most meaning to what was technically fairly routine clinic work.

As already suggested, the rationales of the nursing organisation at the two units reflected the general orientations of the consultants. In the

case of the *inter-disciplinary-humanistic* (Haemo) unit the emphasis was on the training and management of individual dialysis patients, whereas in the other (Dialysis and Transplant) unit nursing work was organised on a weekly and monthly basis as a support function of the doctors' clinics and ward rounds, in particular the monthly 'graph round' when the patient data was scrutinised and monitored by the senior registrar.

It was these systematic differences between the two units that led to the differences in the manner of adaption to the Renal Computer System by the staff involved. Only the senior nursing staff (i.e. senior nursing officer and the two sisters) at the Haemo Unit found the system an improvement on the previous manual arrangements because, in addition to the task being automated, the data entry work was carried out by a computer clerk with the staff and enrolled nurses entering some of the patient data collected during the late shifts, weekends and over holiday periods. These staff and enrolled nurses found the demands of entering data onorous because, firstly, they never had to carry out any of the work related to the collation or presentation of patient data before and, secondly, the computer system offered no other facilities that directly aided them in their work. At the other unit, however, because the nursing staff had previously been required routinely to maintain extensive graphs (charts) on all dialysis patients, the computer system was found to be of great help to them. In contra-distinction the consultants at the Haemo Unit found, for the first time, that they could now have ready access to up-to-date patient data in both tabular and graph form, via a VDU screen which they found of great benefit when reviewing patient cases when in clinic, on the unit, or at the case conferences. Moreover, they now had, as far as they were concerned, the supporting facilities for carrying out clinical research. By comparison the consultants at the other unit found the system

totally inadequate for their research and audit purposes, for they wanted to be able to carry out studies on aggregate groups of patients, and to compare therapies (etc) rather than perform detailed studies of individual cases. The Renal Computer System's limitations in this area resulted from (a) the nature of its implementation, (b) the priorities for the development of it's facilities and (c) the technical support available.

(a) The Renal Computer System had been initially implemented (piloted) at the Haemo Unit and consequently its customised design reflected the requirements of that unit, which were different to those of the Dialysis and Transplant Unit;

(b) The priority for the implementors of the system was on matters relating to the input of data and setting up the output *formats* ('screens') for the various users (nurses, 'other disciplines' as well as doctors), and thus they were concerned only with basic patient, and patient related, information necessary for the general management of these patients;

(c) The regional computer services personnel were not prepared to give the development of research facilities the priority being demanded by the consultants at the Dialysis and Transplant Unit.

Here was a straight forward 'tried and tested' computer 'package' designed almost specifically for use in renal units. It was readily implemented as a system for the routine processing of patient data and its presentation, yet it failed to gain full acceptance (although it has not been rejected). The reasons for this lay in the variations in the organisation and control of the renal work processes as between units. In the *multi-disciplinary*

(Dialysis and Transplant) unit, the consultants were not concerned with how the nurses coped with maintaining the patient data they require, but they were concerned with gaining facilities to aid them in carrying out their research and audit work. In the other unit, because of its *inter-disciplinary* organisation, the consultants readily accepted, in fact advocated the introduction of the Renal Computer System even though it was expected mostly to benefit the nursing staff - although the consultants did rightly anticipate that the computer's graphics facilities would be of great benefit to themselves as well.

The nurses involvement with the computer system and its introduction acted as a crucial counterweight to the doctors' less routine and more specialised demands on the system. It was the nurses relative willingness to accept the new arrangements that ensured the automated system would operate reasonably effectively. In the case of the *inter-disciplinary* (Haemo) unit, it was the practical support of the senior nurses that ensured the routine patient data was regularly and accurately entered onto the system ready for the doctors, or others, to consult. At the *multi-disciplinary* (Dialysis and Transplant) unit, the system functioned because the nurses wanted it to do so, despite the consultants criticisms of the system and unwillingness to use it. Clearly, there were variations between the two units in the ways in which the *functional autonomy* of the doctors related to their dominance within the two settings and the organisational space this left for the exercise of the nurses' own autonomy. In the case of the *inter-disciplinary* unit with its predominately *humanistic* ethos the senior nurses were dependant on the consultants' active support and leadership to enable them to carry through the changes in the nurses methods of recording and retrieving clinical data. By contrast, at the *multi-disciplinary* unit, it was precisely because the consultants did not

give direct support and leadership in those work areas with which the nurses were concerned that the computer system was effectively implemented. The nurses did have some impact on the introduction of the computer system, either in facilitating or limiting the ease with which the system was implemented, and they did so relatively independently of the consultants' own preferences. These responses of the nurses were not formally stated positions or policies, rather the preferences of the nursing staff once they had used the system. If they found the system eased the burden of their work, they liked it; if not they did not like it and would avoid using it. In the rationalised environment of the *multi-disciplinary* unit the experience of computerisation was largely positive for the nurses, for all patients had their cases checked routinely, once a month, a process that occupied many hours of the nurses time in preparation during the month. At the more humanistically-orientated *inter-disciplinary* unit cases were dealt with on far more an individual basis; patients were not routinely audited but rather discussed by the team on an *exceptional* basis. If anyone of the unit's team was concerned about any aspect of a patient's condition, medical, psychological or social, then the case would be discussed and a therapy, or other response, agreed. If no one identified any problems the patient would not be discussed. This arrangement was not technically conducive to computerisation, for it was not standardised and there were no previous manual systems for collating and presenting this data for review purposes. Under these circumstances the staff and enrolled nurses were disappointed in what the Renal Computer System offered them. Rather than easing their burden of work it intensified it, by creating a demand - for the benefit of others - for data which they had not previously collected (although their senior colleagues had) required them to learn new skills to do so.

CORES and case notes

Turning now to the outpatients' system (CORES). The purpose of this system was rather different to that of the Renal Computer System; whereas the renal system *supplemented* the medical records, the CORES system was designed to *replace* them. Here my concern was with the work of the clinicians. The problem that emerged for the initiator of the system (Dr Old) was that CORES was to founder because of insufficient commitment from colleagues and the lack of 'fit' between, on the one hand, the system's encounter forms (*inputs*) and reports (*outputs*) and, on the other, the clinicians own methods of recording and retrieving clinical information from the medical records. The consultants varied considerably in the way they recorded their case notes, and generally had developed ways of abbreviating on the method of full note-taking adopted by the junior medical staff. Moreover, this abbreviated method also reflected a common approach of the consultants to concentrate on the patient's *presenting complaint* and not to attempt a full 'clerking' of the patient. The CORES system could have been customised to meet all these peculiarities, but this did not happen. Where there were two or more consultants in a speciality one would design a form he believed was suitable for himself, which was then adopted by the other consultants who had evolved different techniques of writing case notes. Another problem to emerge was that the junior medical staff maintained fairly comprehensive and structured clinic notes and they found the designs of the *encounter forms* at variance with their usual and preferred approach.

The central problem for the CORES system was that few consultants routinely looked at the clinic notes referring to previous patient visits, but instead looked at the *clinic letter* in which the details of the case

were summarised (ostensibly for the benefit of the patient's GP). In turn this meant that the consultants did not usually write their case notes for future reference, but only as a *decision aid* to facilitate their clinic 'thought processes', and to remind them what to include in the *clinic letter*. The CORES system was not designed to cope with these circumstances for its central rationale was to ensure that case notes were easy to read (printed) and well structured in order to facilitate future reference.

The reasons behind these consultants' various approaches to cryptic clinic note-taking in outpatients' clinics related to their evaluation of the practical role of the case notes. For them these documents served, as already mentioned, as *decision aids* which both reflected and in turn helped them sustain their *functional autonomy* within the clinics. Often only they alone could interpret their own case notes. Moreover, they used the process of writing and referring to them to control the *medical encounter*. The junior medical staff had similar objectives, but sought to attain them by relying on the 'clerking' format as far as possible, for this ensured they carried out all that could be required of them and ensured they did not forget to carry out any element of the diagnostic process. For this reason a number of junior doctors were only reluctant users of the CORES system, but the main reason why the majority of the junior medical staff stopped using the system was because the consultants told them to: they lacked the authority to take the decision unilaterally.

In sum, what I have argued here is that the *functional autonomy* of consultants was (a) characterised by a strong individualism sustained within the collegiate support of the hospital doctors generally and (b) this individualism was embedded in the case notes and the idiosyncratic way their were written, a reality which made their direct automation impossible. The Renal Computer System avoided these problems because the

system depended principally on either clerical or nursing staff to enter data on the system and not the doctors, moreover, most nurses who previously collated the patient data manually found the automated system of data-capture and recall an improvement. The CORES system, by contrast, relied on the clinicians changing their method of recording case notes and being prepared to use printed reports instead of the previous medical record documents. These changes in methods of working were too great and were experienced as undermining their *functional autonomy* and led to their ultimate rejection of the computer system.

Labour process analysis and hospital doctors

I now turn to the question of the relevance of labour process analysis to medical work generally. It is the case that, whereas systems designers can expect their systems to be implemented in relation to clerical, technical and managerial staffs, this expectation does not hold in connection with clinicians. This difference relates to the nature of the control and autonomy doctors collectively, and consultants individually, possess. It was necessary, therefore, to clearly set out a general theoretical argument which could account for the professional organisation of hospital doctors and their particular working arrangements within the clinics. Following a critical review of the literature in Chapter Three, I went on to develop an alternative theoretical model based on recent developments in labour process analysis. In the discussion of the theory I argued that there was now a broad consensus that the analysis needs to be more complex than the deterministic model Braverman originally presented. Moreover, the theory required elaboration, firstly, to take into account professional and managerial work as well as that of manual and routine clerical workers and, secondly, to be applicable to more than the market

sector of industry.

I went on to argue that within the consensus on such points there were now two broad approaches to the theory: one I termed the *integrationist*, the other the *social choice* approach. The first was engaged in a programme of attempting to develop the theory so that non-economic factors might be integrated within one unified marxian model of capitalism, while the second has as its objective the detailing of the contingencies that shape the particularities of specific labour processes and avoid any attempt at macro-model building. My own conclusion was that there are linkages to be made between particular labour process analyses and the analysis of capitalism, but that these 'linkages' are not predetermined by the structure of capitalism but are sustained by specific practices within work organisations and social institutions generally and thus are subject to change and modification. Furthermore, the conceptual apparatus required to adequately analyse work processes is too detailed for any easy aggregation to the macro-level, for the conceptual 'magnification' needed to analyse particular work processes will be technically inappropriate to the analysis of the wider social relations. The conclusion I reached was that it was not possible to present a unified model, but that one can develop *compatible* models at the micro and macro levels.

The primary concern of this thesis, however, has not been with the revision of labour process theory *per se* but with the question of its applicability to professional work, namely that of hospital doctors, for, as has been demonstrated above, here was an occupation whose practioners, (a) exercised individual autonomy within the framework of collegiate control, (b) subordinated the work of other professional occupations to their particular authority and, relatedly, (c) enjoyed an influential gate-keeping position within the organisation of hospital health care and heavily

influenced the kind of innovation that was taken up within hospitals. These were realities that an unreconstructed labour process model would not be able to adequately analyse for it would be unable to take into account the existence of autonomies rooted in the dual power bases of the doctors' *institutional* and *functional* controls. What was needed was a micro-level analyses of the work processes involved within a context of a local collegiality which was in turn a component part of the profession's strategies for maintaining their *institutional autonomy*. The rest of this chapter will be given over to setting out how these different 'levels' of professional autonomies were analysed, in relation to the introduction of computer-based medical information systems, and how I saw their inter-relationship and possible integration.

The nature of clinic work was analysed in order to identify whether and by what means hospital doctors maintained their *functional autonomy* and ascendancy within the doctor-patient relationship (*medical encounter*). Within this specific relationship I was also intrigued to find out details of how the doctors' utilised the medical record and, in particular, case notes because these practices were directly affected by the introduction of the computer-based medical information systems. Moreover, the process of recording and retrieving information from the medical record folder was found to be particularly pertinent to the structuring of the medical encounter and the related division of labour involving nurses, 'other disciplines' and so on. Thus, in relation to the medical encounter, the hospital doctors at St Giles reported their particular ways of dealing with patients in their outpatients' clinics (i.e. diagnosing, disposing, treating and monitoring) and the role the medical records played within this context. It became clear that the medical record was particularly crucial as much for the information it concealed as for what it revealed, for the

doctors would adopt practices which enhanced their control over the medical encounter without incurring excessive time constraints; the consultants generally chose a selective approach focusing upon the patients' presenting complaints, while the junior medical staff preferred to keep to the standard history taking, or 'clerking', model. A particularly important point here was that the emphasis was on *writing* the case notes as a *decision aid* rather than reading them; most doctors, most of the time, were content to consult the summary contained in the clinic letter, operation notes and/or investigation results. Patients were processed, as it were, one encounter at a time, even though their files could be long standing ones.

In the renal units the systems of recording and retrieving patient data were organised in such ways that the nurses recorded the data largely to inform the doctors so that they could monitor the patients and consider, if applicable, referring any of them for advice from the 'other disciplines'. This arrangement was most clearcut within the Dialysis and Transplant Unit, but it also existed in a less formalised form within the other unit studied. The case notes, as a narrative, tended to play a role subordinate to the investigation results and the patients' weights and blood pressures recorded usually monthly on all patients. The *medical encounter* was where the patients' results would be discussed with the patient in terms of whether they were 'good' or 'bad', and whether these evaluations related to diligent dialysis, or not. Any patient choosing to be ill-disciplined in relation to either diet or dialysis soon found out that the unit staff would usually learn of these indiscretions when the next round of blood (haemotological) tests were taken, which was every month. In this respect, the investigation results represented information as medical power. The patient data system, whether manual or automated, was

at the core of any renal units' routine and it was that which underpinned the doctors' ascendancy both in relation to the patients and within the renal division of labour.

Functional autonomy, however, was insufficient to account for the doctors' responses to the computer-based medical information systems. It was necessary also to take into account the collegiality of the consultants, for it was this that sustained the *autonomy* of the individual consultants, as much as their specialist expertise. In the three case-studies this was demonstrated by the ways in which the consultant doctors continued to support the use of the computer systems even when they had rejected it for use in their particular clinics, and this was the case for both the outpatients' and the renal clinics.

It was against this background that the question of linkage was also addressed and I concluded that the theorisation of *management strategies*, presented by Wilkinson (1983) and more particularly by Child (1985), was particularly pertinent. In contrast to Child, however, I argued that management were not the only grouping able to exercise *strategies* that influenced the labour process and that occupational groups, including those organised as professions, could influence the organisation and control of work processes. These *strategies* were not always unified and coherent in themselves (Child, 1985, p. 108). These circumstances ensured that institutional arrangements and structural consequences were not readily predicated on capitalist structures even though they would constrain the *strategies* available at any particular time. At the level of the case studies, it was possible to show how the *institutional control* of the consultants' collegiality brought about changes in the clinic labour processes resultant on the introduction of the computer-based medical information systems, for example in terms of the collection, recording and

presentation of renal patient data (see Chapter Seven).

It was also possible to offer a glimpse of the wider processes involved in sustaining *institutional autonomy*, and to tie it into the general issue of the introduction of information technology into medicine. I refer here to the discussion of medical audit in Chapter Four where I set out the recent history of the strategies of the organised profession in their negotiations with the state concerning the issue of clinical autonomy. The state wanted to develop an effective means of measuring the quality and cost of medical care, while the organised profession wished its members to be the sole arbiters of the quality of care without reference to costs. The information supposedly systematically recorded and filed in the medical record might have played a crucial role had it proved amenable to computerisation, for then some basis for assessing medical performance might have been established. This was not possible, however, for the *functional autonomy* of the consultants meant they recorded case notes as they thought best for their purpose, which was for patient management and not aggregate statistics. In any case, the consultants outside the teaching hospitals were very suspicious of medical audit even when it was proposed by the organised profession as a defence against state pressure to make consultants increasingly accountable for the quality and costs of their medical care. My conclusion was that the autonomy and control possessed by hospital consultants have been constantly open to renegotiation and were not simply 'givens' within the health service. This is not to argue that the medical profession lacks the hegemonic power implicit in the notion of professional dominance (Freidson,1971b), for the *organisational control* of the state and NHS management is itself premissed on the ascendancy of the clinicians within the hospital service. Rather, it is the nature and degree of that ascendancy that is always open to renewed negotiation.

In sum, hospital doctors can be characterised as being able collectively to exercise an *institutional control* in contra-distinction to the *organisational control* possessed by the state and NHS management. This control is formally legitimated by the doctors' membership of the organised profession (i.e. BMA and Royal Colleges) but is sustained on a day-to-day basis by the hospital doctors' *functional autonomy* (Bloor, 1976a). The latter refers to the day to day work of the doctors as clinicians that puts them in a position of ascendancy, or dominance (Freidson,1970b) within the hospital organisation, for it is the clinic work on patients that is the *raison d'etre* of the hospital service. All these features of control have been made particularly visible in connection with political processes through which the computer systems were chosen, implemented, used and rejected.

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APPENDICES

APPENDIX I	SEVEN SEMI-STRUCTURED INTERVIEWS FOR DOCTORS
APPENDIX II	FOUR SEMI-STRUCTURED INTERVIEWS FOR NURSES
APPENDIX III	TWO SEMI-STRUCTURED INTERVIEWS FOR 'OTHER DISCIPLINES'
APPENDIX IV	RENAL COMPUTER SYSTEM (EXTRACTS)
APPENDIX V	TWO ENCOUNTER FORMS FOR THE CORES SYSTEM (GENERAL MEDICINE AND UROLOGY)
APPENDIX VI	CORES FLOWCHART (GENERAL MEDICINE)

SEVEN SEMI-STRUCTURED INTERVIEW SCHEDULES FOR DOCTORS

1. DOCTORS FIRST INTERVIEW (CORES SYSTEM)

Date:

Time Start:

Finish

Ask permission to use tape recorder

Confidentiality

Check Name and speciality

1. Have you had experience of computers in hospitals before ? (or elsewhere) (Details)

2. Have any particular expectations as to how the proposed computer system will affect your work ?

   (Included here could be:

   - research
   - work (organisational) relations with,
     - junior staff
     - laboratory & scientific services
     - radiology
     - administration
     - nurses
     - medical secretaries

   in addition to more direct changes to the work situation related to accessibility and legibility of the casenotes.

   NOTE: not necessary to cover all the points, only on those the respondent sees as important.

(*aide memoir*) CORES: Encounter Report; Status Report; Flowchart (individuals); Report Generator

3. Will the new system (CORES), in your view have any particular implications for your patients ? (benefits or disadvantages) Details

4(a) The CORES system has the facility to (provide) programmes of '*Quality Assurance*' * How do you view this possible development? (* By automatically reporting any deviations from pre-set rules governing the standards of care).

4(b) More generally, how do you view the prospectof 'Quality Assurance' (or medical audit) in medical care ?

(*aide memoire*) Quality Assurance: Structure (input) - Process - Outcome plus, possibly, Social Acceptibility (Mclachan (1976), Shaw (1980)

5. How would you define good patient care ? (particularly relating to your own specialty)

6. Do you think the proposed computer system (CORES) will have more, or less, effect on your specialty than on others in this hospital? (Why?)

7(a) Would you mind telling me why you supported the proposed introduction of the CORES computer package at St Giles hospital Outpatients' Department?

7(b) Is there any reason that would lead you to withdraw your support for the (CORES) system? (e.g. disturbance of OPD)

8. At the risk of being repititious, what do you think will be the major implications of the new computer system (CORES) at St Giles' hospital - or even - more generally?

9. Have any questions of me?

Thankyou

Mike Dent, 22nd September,1981

2. DOCTORS' FIRST INTERVIEW (RENAL COMPUTER SYSTEM)

Date:

Time:Start:

Finish

Renal Computer System

Sociological/Organisational Evaluation

(a) Permission to use tape recorder

(b) Confidentiality

Name:

Consulant/ Registrar/ SHO/ HO

Time in post since graduation?

1. Briefly, what does your work (in relation) to the renal unit entail? (e.g. inpatient-outpatient; relationship to other work)
2. Have you had experience of computers in hospitals before? (or elsewhere) (Details)
3. Will the new system, in your view, have any particular implications for your patients? (benefits/disadvantages) (cue Medical Audit function)
4. Have you any particular expectations as to how the proposed computer system will affect your work? (cues: nurses/dialysis sheets; lab. results; x-rays etc; admin-home admin; med.secs; other doctors; GPs; Research)
5. Any problems envisaged for your own work or more generally?
6. How would you define good patient care?
7. To what extent have you been consulted on the question of the implementation of the proposed computer system?
8. When referring to the medical record ... to what do you particularly refer ... and what sequence do you adopt? (e.g. handwritten clinic notes;

doctors letters; lab. results; graphs; x-rays etc; dialysis sheets)

9. What is the role of casenotes/medical records with regard to the work of the renal unit?

10. Have any questions of me?

Thankyou

Mike Dent, 1983 - Haemo: Aug, 1984

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3. DOCTORS SECOND INTERVIEW: CORES SYSTEM

Date:

Time: Start

Finish

CORES: Sociological/Organisational Evaluation

Consultant/registrar/SHO/HO

Permission to use casette tape recorder?

Confidentiality

Check name and specialty

Introduction: This interview focuses on matters relating to the transitional period immediately following the implementation of the CORES system in your clinic

PREFACE (Junior doctors not interviewed before only)

- Have you had any experience of computers in hospitals before? (Details?)
- Where were you before prior to working at St Giles?

PART I (All doctors)

1(a) Would you outline for me your experience of adapting to the CORES system? (e.g. prior preparations; adjustments to encounter form; use of CORES reports as part of casenotes. Surgery vs Medicine?)

1(b) Have you noticed any particular benefits of the system as yet?

1(c) Are there any particular problems that you are finding with any aspect of the CORES system? (e.g. Encounter form; Encounter/ Status Reports; Flow diagrams, etc.)

2. If you do experience any difficulties with any aspect of the CORES System, who do you turn to *first* for assistance - and why? - And then who do you go to next?

3. Have you found that using the CORES system has led you to modify, in

any way, the way you deal with patients in the OPD clinic? (If yes: Do you think this will be a *short-term* or a *long-term* change? e.g. resulting from encounter form design, legibility and availability of medical information, etc.)

4. Are you finding that the other members of the hospital staff are adapting to the CORES system, at least as far as it affects you work? *Details* (e.g. Nurses, Medical Records Staff, Clinical Support (laboratories, radiology etc.), Medical Staff (Consultant /Juniors, other clinicians, Administration (including admissions/ appointments)

5. Are you finding the system of the encounter forms being processed by the CORES clerks, satisfactory, or not? *Details?*

6. In light of your experience with the CORES system, so far, are there any modifications that you would like to see considered for inclusion in the system?

PART II (Supplementary questions for junior doctors not previously interviewed only)

1(a) The CORES system has the facility to support programmes of Quality Assurance* How do you view this possible development? (* by automatically reporting any deviation from preset rules governing the standards of care)

1(b) More generally, how do you view the prospect of quality assurance (or medical audit) in medical care? (Check whether familiar with the term and degree of involvement (past and present)

2. Would you tell me what direction you expect your career to progress? (Consultant (specialty?); GP; Community medicine; Other)

Mike Dent

18th April, 1982

4. DOCTORS' SECOND INTERVIEW (RENAL UNITS)

Site:

Date:

Time: Start

Finish

Consultant/Registrar/SHO/HO

Permission to use cassette tape recorder?

Confidentiality

Check name and details

Preface: (clinicians not previously interviewed)

- Have you had experience of working with computers in hospitals before? (Details)
- Where were you before coming here (renal medicine)?
- And how long since you left medical school?

PART I

1. Would you outline for me your experince of adapting to the computer system? (e.g. prior preparations-especially re junior staff; adjusting to the computer outputs, both VDU (especially graphics) and 'hardcopy')
   NB Have there been any *modifications* made to the system since its introduction here? (Details)
2. Do you use the computer directly to access information/data? - or to input data? - or to carry out any other procedures (etc) e.g. 'programme'; write reports (etc)

3(a) Are there any particular benefits, for you, (resulting from the implementation) of the computer system, as it is currently operating? (Details)

3(b) What facilities yet to be operationalised do you think will be particularly useful to you in your work? (Details) e.g. laboratory results; GP letters ...)

4. Are there any particular problems that you are finding with any aspect of the system?

5. If you do experience difficulties with any aspect of the computer system, who do you turn to *first* for assistance? - and *next*?

6. Has the introduction of the computer system led you to modify the way you deal with patients? (e.g. patient management ...) (Details-beneficial or not for the patient, doctor, other members of the team? (specify) - short or long term modifications)

7. Have you as the result of the introduction of the computer system modified the way you record clinical information? (Decision-aid; education; medico-legal; research)

8. What has been the effect - as far as you can judge - of clinical data being processed/input by a clerical officer ... and not by a nurse, or doctor? (Details)

PART II

Junior Staff Only

9. When referring to the medical record to what documents do you refer to and in what order - and why?

10. Would you mind telling me what direction you expect - or hope - your career to progress? (e.g. hospital consultant; community medicine; GP etc)

All Doctors

11. Now that you have had experience of the computer system for some time

(5-6 months) what is your judgement of its usefulness for renal patient management both within this unit and more generally?

12. Any questions of me?

Thankyou,

Mike Dent 25th April,1984

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5. THIRD INTERVIEW: CONSULTANTS (CORES SYSTEM)

Date

Time: Start

Finished

CORES: Sociological/Organisational Evaluation

Third Interview

Permission to use cassette tape recorder?

Confidentiality

Name and Speciality

1. Now that you have had experience of the CORES system for some time (6/12/18months) what is your judgement of it's usefulness in the Outpatients' clinic - in your specialty? Details? Long term commitment?
2. How useful are you finding the various printed reports and flowcharts that are available? (reports, status report, flowchart, report generator, query language), Which ones do you use?
3. When referring to casenotes do you tend to look up the printed reports, the clinic letter or the handwritten notes? (encounter form?)
4. *If relevant*: How far does the modified ('Open Plan') Encounter form meet your requirements?
5. How are (the) junior medical staff in your clinic familiarised with the system? (encounter forms, reports...)
6. Has the introduction CORES made doctors work in your outpatient clinic more, or less, difficult?
7. Have there been any implications for the quality of patient care? (e.g. follow-ups, drugs, ...)
8. What is the role of casenotes in an outpatient clinic? (education, research, decision aid, medico-legal)

9. What would your views be if the CORES system at St Giles was extended,

   (a) to become a linked hospital-GP system?

   (b) to include the inpatients at St Giles?

   (c) to include the DGH Outpatients' clinics?

10. Any questions of me?

Thankyou

Mike Dent, June, 1983

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6. THIRD INTERVIEW: JUNIOR DOCTORS (CORES SYSTEM)

Date:

Time: Start

Finish

CORES: Sociological/Organisational Evaluation

Permission to use casette tape recorder?

Confidentiality

Check name and specialty

1. Have you had any experience of computers in hospitals before? Details?

2(a) Where were you before (working at St Giles)?

2(b) How long since your left medical school?

3(a) Would you outline for me your experience of adapting to the CORES system? (e.g. prior preparations; adjustments to encounter form; use of CORES reports as part of casenotes. Surgery vs Medicine?

3(b) How much of an improvement are the current arrangements than those existing prior to July/August, 1983 (relating) to the CORES system?

4(a) Would you tell me what CORES facilities you currently use and are available to you? (*cues*: Encounter reports; status reports; investigation results; flowcharts; QL (research); 'prompts')

4(b) When referring to the medical record, to what documents do you refer and in what order?

4(c) Has the fact that the casenotes are a source of data for the CORES computer system caused you to modify in any way the way you record clinical information? ... or deal with patients in the OP clinic?

5. What is the role of casenotes in an outpatients' clinic? (education, research, decision aid, medico-legal)

6. The CORES system has is capable of being developed to include a

facility of Concurrent Quality Assurance (i.e. a system by which any deviations from pre-set consultant rules governing the standards of care are brought to the doctors notice). How would you view such a development?

7 More generally, how do you view the prospect of quality assurance (or medical audit) in medical care?

8. Would you tell me what direction you expect your career to progress?

9. Any questions of me?

Mike Dent

June 1983

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7. DOCTORS' THIRD INTERVIEW (RENAL UNITS)

Site:

Date:

Time: Start

Finish

Consultant/Registrar/SHO/HO

Permission to use cassette tape recorder?

Confidentiality

Check name and details

Preface: doctors not previously interviewed

1. What does your work with regard to the Renal Unit entail?

2(a) Have you had experience of working with computers in hospitals before? (Details)

(b) Where were you before coming here (hospital? specialty?)

(c) How long since you left medical school?

PART I

All doctors

3(a) Would you outline for me your experince of adapting to the computer system? (e.g. prior preparations especially re junior staff; adjusting to the using VDU etc

3(b) Have there been any *modifications* made to the system since you have been here? (Details)

Doctors not previously interviewed

3(c) Do you use the computer directly to access information/data? -or to input data? - or to carry out any other procedures (etc) e.g. 'programme'; write reports (etc)

3(d) Are there any facilities still to be operationalised that you think will be particularly useful for renal work? (Details e.g. laboratory

results; GP letters etc.)

4(a) Have you experienced any problems using the system?

4(b) If you do experience difficulties with any aspect of the computer system, who do you turn to *first* for assistance? - and *next*?

All doctors

5. Now you have had experience of the computer system for some time (5-6 months?) what is your judgement as to its usefulness for renal patient management both within this unit and more generally? (benefits-problems)

6(a) Has the introduction of the computer system led you to modify the way you deal with patients? (e.g. patient management, treatment plans)

6(b) Has the routine use of the computer system had any direct implications for your patients?

PART II

Doctors not previously interviewed

6(c) How would you define good patient care?

6(d) Role/experience of medical audit?

7. Has the existence of the computer system caused you to modify the way you use the medical record/clinic notes? (Details?-recording/retrieving data - decision aid; education; medico-legal; research)

Junior staff only

8. Would you tell me in what direction you anticipate your career developing? (hospital consultant; community medicine; GP., etc).

9. Any questions of me?

Thankyou,

Mike Dent

25th April, modified 17th December, 1984

FOUR SEMI-STRUCTURED INTERVIEW SCHEDULES FOR NURSES

1. NURSES FIRST INTERVIEW (CORES SYSTEM)

GROUP INTERVIEW

Nurses

Date:

St Giles Hospital

Objectives

(a) Find out whether (etc) the nurses are as unaffected by CORES as has been assumed by Dr Old and others

(b) At least some nurses have expressed doubts about the systems effectiveness as it concerns the running of the OPD. Find out details.

Explain purpose of interview.

NB All information non-attributable. Concern with the clinicians

1. Name and position of nurses (and length of time at the hospital?)

2. Any previous experience of a computer system? (details)

3(a) In what ways has the CORES system affected the running of the OPD as it concerns yourselves? (and between specialties)

3(b) Consultation/training?

4. Are there any ways in which the CORES system - as it concerns your work - might be improved?

5. Have your any questions of me?

Mike Dent, October,1982

***

2. SENIOR NURSES SECOND INTERVIEW (CORES SYSTEM)

Time: Start

Finish

Date:

CORES Evaluation: Nursing Staff

Permission to use cassette tape recorder

Confidentiality

Name/position

1. Have you had experience of computers in hospitals? (Details)
2. In what ways does the CORES system affect your work? (cues: availability of medical records; front sheet information; investigation results)

3(a) Now that you have had experience of the CORES system for some time, what in your view has been its long-term impact on the running of the outpatients' clinics? (cues: between specialties; pre-computer ...)

3(b) What modifications, if any, would you like to see introduced, or extended? (cues: access to CORES when office closed)

4. How far do you think that the views and requirements of nursing staff have been included in the design; of the CORES system at St Giles? (Any changes since the appointment of the new Director of Nursing?) Details
5. Have any questions of me?

Mike Dent, 26th November, 1983

***

3. FIRST NURSE INTERVIEW (RENAL UNITS)

Date: Nurses

Time Start Renal Unit

Time Finish First Interview

Permission to use tape recorder

Confidentiality

Name

Rank

Length (of time) in nursing/renal unit?

1. Briefly, what does your work on the renal unit entail? (including proportion of time, nursing records, case/patient reviews)
2. Have you had experience of computers in hospitals before? (Details)

3.(a) Have you any particular expectations as to how the proposed computer system will affect your work ? (benefits/disadvantages) (cues: dialysis running sheets; graphs; lab.results; Xrays; Admin (incl home administrator); medical secretaries; doctors (consultants/ registrars/ juniors); GPs; Sister/Nurses)

3(b) Any problems envisaged for your work, or more generally?

4. Would you mind telling me to what extent you have been consulted on the question of the implementation of the proposed system?
5. Will the proposed system, in your view, have any particular implications for your patients? (benefits/disadvantages) (details).

Have any questions of me? Time Finished:

Mike Dent, 1983

***

4. NURSES SECOND INTERVIEW

RENAL COMPUTER SYSTEM

Site.

Date:

Time: Start

Sociological/Organisational Evaluation

Finish

Nurse: Grade

Permission to use casette tape recorder?

Confidentiality

Check name (etc)

Preface: nurses not previously interviewed

-How long have you been working in this Renal Unit?

- Where were you before coming here?

-Do you intend to stay in renal nursing?

PART I

1(a) Would you outline for me your experience of adapting to the new computer system? (e.g. preparations/training; adjustments to computer requirements (formats); getting used to the outputs, including the VDU

1(b) Have there been any *modifications* made to the system since its introduction here? (details, especially nurse/doctor d.o.l.)

2(a)In what ways has the introduction of the computer system meant you changing the way you record patient/dialysis data for the medical record - or the nursing record? (details)

2(b) Is the data on the computer system more - or less - reliable and up to date than the manual system

2(c) Do you ever input or access data from the system direct (via VDUs)?

- for nursing purposes
- for doctors (e.g. graph meetings? renal? transplants?)

- other

(details - including reports/ letters etc)

3(a) Are there any particular benefits for you as a result of the introduction of the computer system? (details)

3(b) What facilities, yet to be made available, do you think will be particularly useful to you in your work? (details)

4. Are you finding any particular problems concerning the computer system? (details)

PART II

Mainly Sister(s)

5. If you do experience any difficulties with any aspect of the computer system who do you turn to first for assistance?

   And next?

6. Has the introduction of the computer system had any direct influence on the quality of patient care and training? (e.g. more time to talk with patients; home visits ...) (details: beneficial, or not, for patient, nurses, doctors and other members of the team; short, or long, term influence)

7. *Haemo Unit*

   What has been the effect - as far as you can judge - of data being processed/ input by a clerical officer (*stoker*) and not by a nurse or doctor?

   Dialysis and Transplant Unit

   In so far as it affects your work, are you finding that other - non-nursing members of hospital staff are adapting well to this computer? (cue: administrative and clerical; medicAl staff - consultants/ registrars/ SHO; clinical labs. etc.

8. Now that the system has been running for some time (5-6 months) what is your judgement of its usefulness for the Renal Unit, the patients and staff (particularly nurses)?

9. Any questions of me?

Thankyou

Mike Dent

25th April, 1984

APPENDIX III

TWO SEMI-STRUCTURED INTERVIEW SCHEDULES FOR 'OTHER DISCIPLINES'

1. FIRST INTERVIEW (RENAL COMPUTER SYSTEM)

Site

Date:

Time Start

Time Finish

(a) Permission to use tape recorder

(b) Confidentiality

Name/Role

1. Briefly, what does your work on the renal unit entail? (including, how long in present post)
2. Have you had experience of computers in hospitals before?
3. Have you any particular expectations as to how the proposed computer system will affect your work ? (benefits/disadvantages)
4. To what extent you have been consulted on the question of the implementation of the proposed system? (details of the steering committee work)
5. Have any questions of me?

Mike Dent, 1983

***

2. <u>'OTHER DISCIPLINES' SECOND INTERVIEW</u> (RENAL COMPUTER SYSTEM)

HAEMO UNIT

Date:

Time: Start

Finish

Sociological/Organisational Evaluation

Name/Position

Permission to use cassette tape recorder?

Confidentiality

1. Has your work in relation to the renal unit been affected at all by the introduction of the renal computer system?

   If 'no' - double check. (Cues: medical records; running sheets; lab. results; admin. files)

   If 'yes' - details

<u>As relevant</u>

2(a) Would you outline for me your experience of adapting to the requirements of the new computer system? (e.g. relevance of preparations /training; adjustment to the computer outputs including screens/formats

2(b) Have there been any *modifications* made to the system since its introduction here? (especially if it results from your experience with the system)

3. Do you use the computer directly to input, or access, data (via VDU)? (or for any other purpose e.g.'programme')

4(a) Are there any particular benefits, for you, as a result of the introduction of the computer system? (Details)

4(b) Are there any facilities yet to come into operation that you think will be particularly useful? (Details) e.g. laboratory results; GP letters ...)

5. *Haemo Unit*

Are there any particular problems that you are finding as a result of the introduction of the computer system? (details)

Dialysis and Transplant

In so far as it affects your work, are you finding others are adapting well to this computer system? (cues: nurses; medical staff - consultants/ registrars/ SHO; clinical labs; clerical etc).

6. Now that the computer has been running for some time (5-6 months) what is your judgement (or impression) of it's usefulness?

7. Any questions of me?

Thankyou, Mike Dent

June,1984

***

RENAL COMPUTER SYSTEM (EXTRACTS)

PATIENT IDENTIFICATION

Surname SMITH
UNIT No. D.o.B. 23.11.48

Forenames Joan Susan
Title
Status HD

Address 3, Queens Terrace,
Rummidge,

Religion C.E.

Post Code
Marital Status M
Sex F.

Telephone Nos.
Home Rummidge 537591
Work
Blood Group A+

Renal Physician P. Dutton

Date in Computer
Renal Surgeon

Retrieval Identity 17.01.85 ! Patient ID GP & NoK Dial. Ad
Function: ! Key Refs Diagnosis
! Occupation Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

G.P. AND NEXT OF KIN

General Practitioner

Name Dr N.K.N.Choundry

Address Church Fields Health Ctr.
Rummidge

Postcode
Telephone

Next of Kin

Name Mr. Smith
David

Relation Husband

Address 3,Queens Terrace
Rummidge

Postcode
Telephone

Retrieval Identity 17.01.85 ! Patient ID GP & NoK Dial. Ad
Function: ! Key Refs Diagnosis
! Occupation Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

KEY REFERENCES

Identification Nos:

EDTA Number 100357

UKTS Code No.

RHA Renal No. 45678

Date of First:

Contact

Dialysis 11.10.71

CAPD

Home Dialysis 10.11.84

Referring:
Consultant — Transplant List
Source
Type — Transplant
Unit No.
Speciality

Retrieval Identity 17.01.85 ! Patient ID GP & NoK Dial. Ad
Function: ! Key Refs Diagnosis
! Occupation Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

PRINCIPAL DIAGNOSIS

Date Diagnosis EDTA Diagnosis code 10
Pyelonephritis

Retrieval Identity 17.01.85 ! Patient ID GP & NoK Dial. Ad
Function: ! Key Refs Diagnosis
! Occupation Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

OCCUPATION OF PATIENT

Employer: Name
Address

Postcode NO DETAILS ENTERED ON THIS SCREEN

Telephone

Industry Type

Patient: Occupation

Working capacity

Employment status

Retrieval Identity 17.01.85 ! Patient ID GP & NoK Dial. Ad
Function: ! Key Refs Diagnosis
! Occupation Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

HAEMODIALYSIS PROGRAMME

Dialyser

Make Travenol Hours/Session 3.5

Model 12.11 Sessions/week 3

Heparin 3,000

Mls/hr 1.5

Needles

Gauge

Make

Retrieval Identity 17.01.85 ! Programme Access 1 Access 2
Function: ! Dialysis Post OP
! Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

ACCESS (1)

Type	Start	Stop	Type	Start	Stop
1. A/V Fistula	LA 11.10.71	23.05.72	4. Refashioning		
2. Bovine	LA 12.08.79		5. Shunt		
3. Gortex			6. Resiting		

Retrieval Identity 17.01.85 ! Programme Access 1 Access 2
Function: ! Dialysis Post OP
! Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

ACCESS (2)

7. Umbilical
8. Femoral Cath
9. Tenckhoff
10. Int. Jugular
11. Sub-clavian
12. Transplant

Retrieval Identity 17.01.85 ! Programme Access 1 Access 2
Function: ! Dialysis Post OP
! Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

HAEMODIALYSIS EQUIPMENT

	Type	Number	Date
Machine			
Single Needle			
Service Hours			
Path lab results	Na K Ca		
Softener			

Day 3

Duration (hrs) 3.5

R.O. Unit

Last Visit - Date
- By

Retrieval Identity 17.01.85 ! Programme Access 1 Access 2
Function: ! Dialysis Post OP
! Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

CAPD REGIME - POST OP

Catheter Insertion		Travenol	Dylade
0.5 Litre	Leakage Drainage Overflow	2.0 Litre	Leakage Drainage Overflow
1.0 Litre	Leakage Drainage Overflow	2.5 Litre	Leakage Drainage Overflow
1.5 Litre	Leakage Drainage Overflow	3.0 Litre	Leakage Drainage Overflow

Home Date

Retrieval Identity 17.01.85 ! Programme Access 1 Access 2
Function: ! Dialysis Post OP
! Last Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

TIMELINE - CHANGE OF STATUS

Date	Event
10.11.84	Home dialysis
14.03.80	Hospital haemodialysis
14.09.80	Patient transferred to Renal Unit from Princess Hospital
03.08.79	Hospital haemodialysis
03.08.79	Transplant ceased to function adequately to sustain life
24.07.79	Transplantation at Princess Hospital
24.07.79	Patient transferred to Princess Hospital
12.03.79	Hospital haemodialysis
12.03.79	Transplant ceased to function adequately to sustain life
05.11.78	Transplanted kidney functioning ok
05.11.78	Patient transferred to 'Renal Unit' from Princess
07.08.72	Transplanted kidney functioning ok
18.06.72	Transplantation at Princess hospital
17.06.72	Patient transferred to Princess Hospital
11.10.71	Hospital Dialysis

Retrieval Identity 17.01.85 ! Events EDTA Transfer
Function: !
! None

```
SMITH          Joan Susan                23.11.48  100357  HD  23773
-----------------------------------------------------------------------
                              E.D.T.A. 1985
EDTA number    100357                HD frequency          3
Sex            F                     HD duration           11
Date of birth  23.11.48              HD type               552
Diagnosis      10                    Reuses                0
Transferred:
         from  22AE   date 12.03.79  CAPD:
         to           date                Peritonitus
Date of death
Cause of death                     PTX            N       date
Transplant func?
Transplants    1  2  3  4  5        Malignancies           Site      Date
  source          1                   First primary        00
  CyA                                 Second primary
  failure         2                   Third primary

Creatinine end 85

-----------------------------------------------------------------------
Retrieval Identity       17.01.85   ! Events     EDTA          Transfer
Function:                           !
                                    !                          None
SMITH          Joan Susan              23.11.48  100357  HD  23773
-----------------------------------------------------------------------
                              E.D.T.A. 1985
CONTAINS CODE OF DIALYSIS UNIT - LEFT BLANK

-----------------------------------------------------------------------
Retrieval Identity       17.01.85   ! Events     EDTA          Transfer
Function:                           !
                                    !                          None
SMITH          Joan Susan              23.11.48  100357  HD  23773
-----------------------------------------------------------------------
                              EVENT LOG (1)
  Date         Event Details
11.10.71 First dialysis at the Renal Unit
18.06.72 To Princess Hospital for cadaver transplant
05.11.78 Referred to Dr xxx for follow up
12.07.79 Dialysis attempted without success. T/F to Princess Hospital for
         assessment of fistula
03.08.79 Recommenced dialysis at Renal Unit
10.11.84 Commenced home dialysis

-----------------------------------------------------------------------
Update - Episodes 1      17.01.85   ! Events 1   Events 2      Events 3
Function:                           ! Nursing 1  Nursing 2     Nursing 3
                                    ! Clinic/OP1 Clinic O/P 2  Next Menu
SMITH          Joan Susan              23.11.48  100357  HD  23773
-----------------------------------------------------------------------
                         Review by Doctor (1)
```

Date	Comments
	First review home dialysis - very well.

Update - Episodes 1 17.01.85 ! Events 1 Events 2 Events 3
Function: ! Nursing 1 Nursing 2 Nursing 3
! Clinic/OP1 Clinic O/P 2 Next Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

SOCIAL REPORT

	Rel	Name	Address	D.o.B.	Occ/Sch
Family					

Accomadation

Employment

Leisure Acts
Benefits

Domestic Support
Notes

Update - Episodes 2 17.01.85 ! Social Wk Drugs 1 Drugs 2
Function: ! Admin Dietician X-Ray
No data avaiable ! Last Menu Next Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

DRUGS SCREEN (1)

Date Started	Drug	Dose	Freq	Date stopped
	Ferrograd folic	1	od	
23.10.85	Alucaps	2	tds	

Update - Episodes 2 17.01.85 ! Social Wk Drugs 1 Drugs 2
Function: ! Admin Dietician X-Ray
! Last Menu Next Menu
SMITH Joan Susan 23.11.48 100357 HD 23773

DIETICIAN

Dietary Allowances	Advice to Patient
Protein (g/24hr)	
Potassium (mmol)	
Sodium (mmol)	
Calories	
Fluid (ml)	
Dietary Supplements	

Notes

Date of last update

```
Update - Episodes 2        17.01.85    ! Social Wk  Drugs 1        Drugs 2
Function:                              ! Admin      Dietician      X-Ray
No data available                      !            Last Menu      Next Menu
SMITH          Joan Susan                23.11.48  100357  HD  23773
```

X-RAY

Date	X-Ray Comments
17.09.81	CXR & Hands: Heart enlarged with considerable increase in CT ratio since December 1980. Hands show slightly poor bone density.
18.03.83	CRX & Hands: Lung field appear clear. Cardiac enlargement as before.
25.08.83	CRX & Hands: Lung fields appear clear. Slight increase in heart size. No bone abnormality seen in the hands.
12.02.84	CRX & Hands: Lungs clear, cardiac outline within normal limits. Heart has decreased in size. No significant bony changes in fingers.

```
Update - Episodes 2        17.01.85    ! Social Wk  Drugs 1        Drugs 2
Function:                              ! Admin      Dietician      X-Ray
                                       !            Last Menu      Next Menu
SMITH          Joan Susan                23.11.48  100357  HD  23773
```

PSYCHOLOGIST

Presenting Problem
  Date

Treatment-Type

  -Duration

Notes

Re Referral
  Date

Treatment-Type
  -Duration
Notes

```
Update - Episodes 3        17.01.85    !            Psychology     Problems
Function:                              !
No data available                      ! Death      Last Menu      None
SMITH          Joan Susan                23.11.48  100357  HD  23773
```

DEATH

Date of Death

Status (D/T/N)

Cause of death EDTA code

Transplanted kidney functioning at time of death (Y/N)

Necropsy (Y/N)

Report

Update - Episodes 3 17.01.85 ! Psychology Problems
Function: !
No data available ! Death Last Menu None
SMITH Joan Susan 23.11.48 100357 HD 23773

BIO-CHEMISTRY

Date	Time	Urate	Urea	Crea	Sodm	Pot	T Co2	Calcium	Phos	Bili	T Prot

TWO ENCOUNTER FORMS FOR THE CORES SYSTEM (GENERAL MEDICINE AND UROLOGY)

TONSTALL HEALTH DISTRICT — GENERAL MEDICINE

ST. GILES HOSPITAL

A. FIRST VISIT ENCOUNTER FORM

1. DATE
2. CLINIC
3. CONSULTANT 1
4. REGISTRAR/S.H.O.
5. TYPE OF ENCOUNTER | SCHEDULED | A | OTHER | O
6. CLINIC VISIT CLASSIFICATION

FIRST ATTENDANCE - G.P. REFERRAL	1	RE-ATTENDANCE	5
" " - WARD DISCHARGE	2	D.N.A. - NO AMBULANCE	6
" " AFTER DOMICILLIARY VISIT	3	D.N.A. - OTHER	7
" " OTHER CONSULTANT REFERRAL	4		

7. HOME TELEPHONE NOS | ACCX1 | WORK TELEPHONE NOS | ACCE2
8. MARITAL STATUS ARDC2

SINGLE	S	MARRIED	M
DIVORCED	D	SEPARATED	P
WIDOWED	W	OTHER	O

9. OCCUPATION AND NATURE OF WORK | ASAP2*

10. VITAL SIGNS | HEIGHT CAJC1 | cms

NURSING STAFF

WEIGHT | CAKH1 | kgs | TEMP | CACV1 | °C

URINE DIPSTICK WNAH4

SPECIMEN NOT PASSED	O	P.H.	E	PROTEIN	F
		GLUCOSE	G	KETONES	H
		BLOOD	I		

DISPOSAL	AACQ1	ADMIT	E	DISCHARGE	D
		NEXT APPOINTMENT			

ENCOUNTER FORM (GENERAL MEDICINE)

N.B. Enter ✓=minor I=inactive D=do not display Y=status post M=major R=rule out
P=presumptive H=history of S=condition of short duration

PRESENTING COMPLAINTS AND OTHER MAJOR SYMPTOMS

	ALIMENTARY SYSTEM	
1	ABDO. PAIN	QCAE1
2	APPETITE POOR	QCAL2
3	DIARRHOEA	QCJY1
4	DYSPEPSIA	QCAA7
5	DIZZYNESS	VCBH3-1
6	FUNNY TURNS	VCFZ1
7	HEADACHE/PAIN	VCAQ1
8	PARESTHESIS	VCPL1
9	WEAKNESS MUSCLES	VCDV3
10	VERTIGO	JCBM3
11	WALKING DIFFICULT	VCDQ9
	ALIMENTARY SYSTEM	
38	D.U.	QJCX1-2
39	G.U.	QJCX1-1
40	HIATUS H.	QLEE3
41	CROHNS	QJLQ1-1
42	COLITIS	QJHZ1-A
43	CIRRHOSIS	QLJL1
44	CHOLECYSTITIS	QJFN1-D
45	PANCREATITIS	QJGT1
	NEOPLASM	
46	BRONCHUS	LKBL1
47	COLON	QKDF1
48	OESOPHAGUS	QKAP1
49	PROST	SKDK1
50	STOMACH	QKBV1
	C.N.S.	
51	C.V.A.	NLPR
52	EPILEPSY	VBEC21
53	S.L.E.	CKWR1
54	POLYNEURALGIA	NZPB7
	C.V.S.	
55	T.I.A.	MHEN3
56	ANGINA	MLAJ4
57	B.P.	MBAB1
58	C.C.F.	MLSN3
59	M.I.	MLQR1
60	P.V.D.	MLAN1

	C.V.S. / R.S.	
12	ANGINA	MLAJ4
13	CHEST PAIN	MGAY1
14	HAEMOPTYSIS	LGCV6
15	P.N.D.	LGBB1-A
16	S.O.B.	LGBB1-C
17	WHEEZING	LGVE5
18	SPUTUM	LGCX3
19	SWELLING ANKLES	MJAC1-A
20	COUGH	LGCC1
	G.U.	
21	DISURIA	TGBR1
22	INCONTINENCE	TGEH1
23	FREQUENCY	TGCE2
24	HAEMATURIA	TGNB1
	DIAGNOSIS	
	MISC	
61	ANTICOGULATION	FLTQ1
62	OBESITY	QLCD1
63	LEG ULCER	GLBL5
	ENDO/METABOLIC	
64	DIABETES	EHAT2
65	HYPERTHYROID	EHCK6
66	HYPERLIPIDAEMIA	EHNR3
67	HYPOTHYROIDISM	EHCH9
	G.U	
68	V.T.I.	TJCD1
69	C.R.F.	TLPC2
70	GLOMERULONEPHRITIS	TENL1
	HAEM	
71	ANAEMIA NON SP	FLAY1
72	B12	CLLI3-3
73	FOLIC	FLBT3
74	IRON	FLCJ1
75	LEUKAEMIA CLL	FLDB3-K
	JOINTS	
76	R.A.	VJEH1
77	O/A	VJGC1
78	CERVICAL	
79	SPONDYLOSIS	

	JOINTS	
25	PAIN	VCFN4-1
26	SWELLING	VCSH2
27	STIFFNESS	VCSJ3
28	PAIN IN BACK	VCAB6
	GENERAL	
29	MALAISE	BLAC5-A
30	WEIGHT LOSS	CCDC2
31	WEIGHT GAIN	CCDA5
	OTHER	
32		
33		
34		
35		
36		
37		
	R.S.	
80	ASTHMA	LENW1
81	COAD	LHAZ1
82	BRONCHIECTASIS	LJFB
83	PNEUMONIA	LJAC1
84	PUL EMB/INF	LLUD3-A
	PSY	
85	ANXIETY	YJAK1
86	DEPRESSION	YJSH1
87	DEMENTIA	YHAL6
	OTHER	
88		
89		
90		
91		
92		
93		

ENCOUNTER FORM (GENERAL MEDICINE)

ITEM NUMBER	COMMENTS
TO BE CHECKED	

ENCOUNTER FORM (GENERAL MEDICINE)

C. OTHER SYMPTOMS | SYSTEMS REVIEW | BLSB1

SYMPTOMS CODE

1.
2.
3.
4.
5.
6.
7.
8.

P.M.H./ALLERGIES	BLPK1		F.H.	BLFR1
1			1	
2			2	
3			3	

SOCIAL HISTORY	BLSJ2		DRUGS	BLDF1
SMOKING			1	
ALCOHOL			2	
JOB			3	
			4	

SOCIAL HISTORY BAS 3

1

2

D. PHYSICAL EXAMINATION (ENTER MODIFIER IN BOX)

√ CONDITION EXISTS M MAJOR D DO NOT DISPLAY

APPEARANCE/FACIES/SKIN/HAIR/THYROID | CBAM1

LYMPHNODES/SWELLING | CBIR1

BREAST | PBBR1

HANDS/NAILS (NOT CNS OR JOINTS) | CBMA1

ENCOUNTER FORM (GENERAL MEDICINE)

LUNGS	LBLJ1
PULSE CADA1	B.P. CAEM
HEART/PERIPHERAL PULSES	HBAC1
ABDOMEN GENERAL/HERNIAS	QBAW2
LIVER/SPLEEN/KIDNEYS	QBLS1
RECTAL EXAMINATION	QBRV1
GENITALIA/VAGINA	SBGA1
CRANIAL NERVES/EYES	WBCK1
JERKS/PLANTERS	WBJS1
MOTOR SYSTEM/CO-ORD/GAIT	WBMJ1
SENSATION	WBSL1
JOINTS/SPINE	VBJQ1

ENCOUNTER FORM (GENERAL MEDICINE)

INVESTIGATIONS

✓ TESTS REQUIRED

BACTERIOLOGY

1	R.S.V.		PNTE3
2	SPUTUM		PNLA3
3	STOOL CULTURES		PNQ16

BIOCHEMISTRY

4	CARDIAC ENZYMES		CNDV5
5	CREATININE		CNCF5
6	B.U.		CNCV1
7	CHOLESTEROL		CNCH1
8	S.G.O.T.		CNEF9
9	S.G.P.T.		ENCH1
10	IMMUNOGLOBINS		CNIG44
11	PROFILE		CNCN3
12	UREA ELECS		CNCR2
13	URIC ACID		CNPT1
	BILIRUBIN		CNLC2

ENDOCRINE

14	T. 4		CNCG4
15	T. 3		FNDL3
16	T.S.H.		FNEN1

HAEMATOLOGY

17	FBC		HHAF6
18	B. 12		CRDV1-1
19	FOLATE		CRJV1
20	E.S.R.		HHUF1
21	H.b.		HHHT1
22	PLATELETS		HHCH2
23	P.T.		HPHA2

SEROLOGY

24	ACUTE PHASE PROTEINS		CNDN3
25	A.N.F.		RPGS5
26	D.N.A. ANTIBODIES		RPCH1-1
27	R.F.		RPHC4

X RAY

28	BA ENEMA		SNSQ1
29	BA MEAL		SNAD1
30	" FOLLOW THROUGH		SNKT1-3
31	BA SWALLOW		SNKN5
32	CHEST X RAY		SNBJ1
33	CHOLECYSTOGRAM		SNCE1
34	SKULL		SPCS1
35	SINUSES		SPCD5
36	I.V.P.		TCDG1

OTHER

37	E.C.G.		WPAN1
38	EXERCISE E.C.G.		WPST1
39	E.E.G.		WRAY1
40	F.O.B.'s		XGDA1
41	P.F.T.S.		WQTT1

OTHER TESTS	CODE
42 PEAK FLOW RATE (PEF)	WQA22

DRUGS (Prescribed by Consultant)

		✓	CODE	DOSE	FREQ			✓	CODE	DOSE
1	AMINOPHYLLINE		LVAX1-1			21	DIGITAL			
2	AMOXICILLIN		DDIX3			22	HODURETIC			
3	ATENOLOL		HTAF5			23	PENICILLIN V			
4	B 12		DSCV1-1			24	PENICILLAMINE			
5	CARBIMAZOLE		ETJV2			25	PHENOBARBITONE			
6	CHLORAMBUCIL		CSDF4			26	PHENYTOIN			
7	CIMETIDINE		RAJX5			27	PIROXICAM			
8	DE - NOL		RAGF1-1			28	PRAZOSIN			
9	DIAZEPAM		TSFE1			29	PREDNISOLONE			
10	DIGOXIN		HSCR1			30	PROPRANOLOL			
11	DIFLUNISAL		VSHC9			31	PYROXICAMONE			
12	FERACORAD C		HSAN3			32	SALBUTAMOL			
13	FOLIC ACID		HSCH6			33	SALAZOPYRIN			
14	FRUSEMIDE		TTGS1			34	SODIUM VALPROATE			
15	GLIBENCLAMIDE		ESFA2			35	TENORETIC			
16	INDOMETHACIN		VSLH5			36	TETRACYCLINE			
17	INSULIN MIXTARD		ESDV1			37	THIORIDIZINE			
18	INSULIN SOL. INJ.		ESDV1-N			38	TRIMOXAZOLE			
19	LEVITIOL		TSJD2-1			39	WARFARIN			
20	MAG. TRISIL		RAHZ6							

OTHER TREATMENTS (Prescribed by Consultant)

40	DIET (SPECIFY)		QWUG6			43	PSYCHOTHERAPY L.T.			
41	OCCUPATIONAL TH.		BRAE2			44	SPEECH THERAPY			
42	PHYSIOTHERAPY		YRAJ1							

STEROID DRUGS

ENCOUNTER FORM (GENERAL MEDICINE)

LUNGS	LBLJ1
PULSE CADA1	B.P. CAEP1
HEART/PERIPHERAL PULSES	HBAC1
ABDOMEN GENERAL/HERNIAE	QBAW2
LIVER/SPLEEN/KIDNEYS	QBLS1
RECTAL EXAMINATION	QBRV1
GENITALIA/VAGINA	SBGA1
CRANIAL NERVES/EYES	WBCK1
JERKS/PLANTERS	WBJS1
MOTOR SYSTEM/CO-ORD/GAIT	WBMJ1
SENSATION	WBSL1
JOINTS/SPINE	VBJQ1

ENCOUNTER FORM (GENERAL MEDICINE)

C. OTHER SYMPTOMS | SYSTEMS REVIEW | BISB1

SYMPTOMS CODE

1.
2.
3.
4.
5.
6.
7.
8.

P.M.H./ALLERGIES	BIPK1		F.H.	BIFR1
1			1	
2			2	
3			3	

SOCIAL HISTORY	BISJ2		DRUGS	BIDF1
SMOKING			1	
ALCOHOL			2	
JOB			3	
			4	

SOCIAL HISTORY BAS 3

1

2

D. PHYSICAL EXAMINATION (ENTER MODIFIER IN BOX)

√ CONDITION EXISTS M MAJOR D DO NOT DISPLAY

APPEARANCE/FACIES/SKIN/HAIR/THYROID | CBAM1

LYMPHNODES/SWELLING | CBIR1

BREAST | PBRR1

HANDS/NAILS (NOT CAS OR JOINTS) | CRHA1

ENCOUNTER FORM (GENERAL MEDICINE)

ITEM NUMBER	COMMENTS

TO BE CHECKED

ENCOUNTER FORM (GENERAL MEDICINE)

N.B. Enter ✓ against Intractive. Do not tick Previous post [illegible] Recently not Progressive. H against History of Second. [illegible] of [illegible] [illegible]

PRESENTING COMPLAINTS AND OTHER MAJOR SYMPTOMS

	ALIMENTARY SYSTEM	
1	ABDO. PAIN	QGAE1
2	APPETITE POOR	QGAL2
3	DIARRHOEA	QGJT1
4	DISPEPSIA	QGAA7
5	DIZZYNESS	[illegible]
6	FUNNY TURNS	TGPZ1
7	HEADACHE/PAIN	VGAQ1
8	PARESTHESIS	VGPL1
9	WEAKNESS MUSCLES	VGDV3
10	VERTIGO	JGDM3
11	WALKING DIFFICULT	VGDQ9

	C.V.S. / R.S.	
12	ANGINA	KLJJ4
13	CHEST PAIN	KGAT1
14	HAEMOPTYSIS	LGGV6
15	P.N.D.	LGBB1-A
16	S.O.B.	LGBB1-C
17	WHEEZING	LGWZ5
18	SPUTUM	LGGZ3
19	SWELLING ANKLES	NJAG1-A
20	COUGH	LGGG1
	G.U.	
21	DISURIA	TGNR1
22	INCONTINENCE	TGEH3
23	FREQUENCY	TGGE2
24	HAEMATURIA	TGHB1

	JOINTS	
25	PAIN	VGYN4-1
26	SWELLING	VGSW2
27	STIFFNESS	VGSS3
28	PAIN IN BACK	VGAB6
	GENERAL	
29	MALAISE	[illegible]
30	WEIGHT LOSS	GGDC2
31	WEIGHT GAIN	GGDA5
	Other	
32		
33		
34		
35		
36		
37		

DIAGNOSIS

	ALIMENTARY SYSTEM	
38	D.U.	QJGX1-2
39	C.U.	QJGX1-1
40	HIATUS H.	QJEZ3
41	CROHNS	QJLQ1-1
42	COLITIS	QJHZ1-A
43	CIRRHOSIS	QLJL1
44	CHOLECYSTITIS	QJFN1-D
45	PANCREATITIS	QJGT1
	NEOPLASM	
46	BRONCHUS	LRBL1
47	COLON	QKDP1
48	OESOPHAGUS	QKAP1
49	PROST	SKDK1
50	STOMACH	QKBV1
	C.N.S.	
51	C.V.A.	NLPR
52	EPILEPSY	RECD1
53	S.L.E.	CKWR1
54	POLYNEURALGIA	NEPB7
	R.C.V.S.	
55	M.I.	MHEN3
56	ANGINA	KLJJ4
57	H.P.	KHAB1
58	C.C.F.	KLSN3
59	A.I.	KLQR1
60	P.V.D.	KLAN1

	KISC	
61	ANTICOAGULATION	FLTQ1
62	OBESITY	QLGD1
63	LEG ULCER	GLBL5
	ENDO/METABOLIC	
64	DIABETES	EHAT2
65	HYPERTHYROID	EHCK6
66	HYPERLIPIDAEMIA	EHKR3
67	HYPOTHYROIDISM	EHCH9
	G.U	
68	V.T.I.	TJCD1
69	C.R.F.	TLPC2
70	GLOMERULONEPHRITIS	TGNL1
	HAEM	
71	ANAEMIA NOS SP	FLAZ1
72	B12	GLLI3-3
73	FOLIC	FLHT3
74	IRON	FLZJ1
75	LEUKAEMIA CLL	FKD33-A
	JOINTS	
76	R.A.	VJRH1
77	O/A	VJCC1
78	CERVICAL	
79	SPONDYLOSIS	

	R.S.	
80	ASTHMA	LEN71
81	COPD	LBAZ1
82	BRONCHIECTASIS	LJYR3
83	PNEUMONIA	LJAC1
84	PUL EMB/INF	LLUD3-A
	PSY	
85	ANXIETY	YJAE1
86	DEPRESSION	YJSR1
87	DEMENTIA	YHAL6
	OTHER	
88		
89		
90		
91		
92		
93		

ENCOUNTER FORM (UROLOGY)

[redacted] IONSTOLL HEALTH DISTRICT

ST. GILES HOSPITAL

UROLOGY

FIRST VISIT ENCOUNTER FORM

1. DATE
2. CLINIC
3. CONSULTANT 1
4. REGISTRAR/S.H.O.
5. TYPE OF ENCOUNTER | SCHEDULED | 1 | OTHER | 0
6. CLINIC VISIT CLASSIFICATION

FIRST ATTENDANCE - G.P. REFERRAL		1	RE-ATTENDANCE		5
" " - WARD DISCHARGE		2	D.N.A. - NO AMBULANCE		6
" " AFTER DOMICILLIARY VISIT		3	D.N.A. - OTHER		7
" " OTHER CONSULTANT REFERRAL		4			

7. HOME TELEPHONE NOS | ACCX1 | WORK TELEPHONE NOS | ACCE2
8. MARITAL STATUS ARDC2

SINGLE		S	MARRIED		M
DIVORCED		D	SEPARATED		P
WIDOWED		W	OTHER		O

9. OCCUPATION AND NATURE OF WORK | ASAP2*

10. VITAL SIGNS | HEIGHT CAJC1 | cms

NURSING

WEIGHT | CAKG1 | kgs | TEMP | CACV1 | °C

URINE DIPSTICK WNAH4

SPECIMEN NOT PASSED		O	P.H.		E	PROTEIN	F
			GLUCOSE		G	KETONES	H
			BLOOD		I		

STAFF

DISPOSAL | AACQ1 | NEXT APPOINTMENT

ADMIT.	ROUTINE		SOON	URGNT.
DISCHARGED				

10/14.

W.R.1

ENCOUNTER FORM (UROLOGY)

PRESENTING COMPLAINTS & MAJOR SYMPTOMS

		ALIMENTARY SYSTEM	
1		ABDOMINAL PAIN	QGAE1
2		ABDOMINAL SWELLING	QGAV3
3		APPETITE POOR	CGAL2
4		BLEEDING P.R.	QGFV6
5		CHANGE IN BOWEL HABITS	QGJF2
6		CONSTIPATION	QGJL6
7		DIARRHOEA	QGJY1
8		DYSPEPSIA	QGAA7
9		PILES	NBBP1
10		VOMITING	QGCN4
		CARDIAC	
11		ANGINA	MLAJ4
12		CHEST PAIN	MGAY1
13		COUGH	LGCG1
14		HAEMOPTYSIS	LGCV6
15		SPUTUM	LGCX3
16		S.O.B.	LGBB1-C
17		SWELLING ANKLES	NJAG1-A
18		WHEEZING	LGWE5
		HERNIA	
19		HERNIA	BGBG1

		G.U.	
20		DRIBBLING	TGBX5
21		DYSURIA	TGBR1
22		ENURESIS	TGEY3
23		ERECTILE DIFFICULTIES	SGKX2
24		FREQUENCY DAY	TGCE2-1
25		FREQUENCY NIGHT	TGCE2-2
26		HAEMATURIA	TGHB1
27		HESITANCY	TGBM7
28		INCONTINENCE	TGEH1
29		INCONTINENCE - STRESS	TGEH1-A
30		INCONTINENCE - URGE	TGEH1-C
31		PAIN LOIN	VGAB6-3
32		PENILE DISCHARGE	SGFT2
33		PNEUMATURIA	TGBZ2
34		POOR STREAM	TGBG3
35		SCROTAL PAIN	SGHE2
36		SCROTAL SWELLING	SGHV4
37		TESTICULAR PAIN	SGEF1
38		TESTICULAR SWELLING	SGFL1
39		TIGHT FORESKIN	SGBX2
40		URETERIC COLIC	TGDC1-4
41		URGENCY	TGCE2-A
		GENERAL	
42		ANOREXIA	BLAC6-D
43		FEVER	CGPX4-1
44		MALAISE	BLAC6-A
45		PYREXIA	CGPX4
46		WEIGHT GAIN	CGDA5
47		WEIGHT LOSS	CGDC2

ENCOUNTER FORM (UROLOGY)

P.M.H./ALLERGIES	BLPK1
1	
2	
3	

F.H.	BLFR1
1	
2	
3	

SOCIAL HISTORY	BLSJ2
SMOKING	
ALCOHOL	
JOB	

DRUGS	BLDP1
1	
2	
3	
4	

PAST OPERATIONS	CODE	DATE

D. PHYSICAL EXAMINATION

APPEARANCE/FACIES/SKIN/HAIR/THYROID	CBAM1

LYMPHNODES/SWELLING	CBLR1

HANDS/NAILS (NOT CNS OR JOINTS)	CBHA1

ENCOUNTER FORM (UROLOGY)

MOUTH, PHARYNX, EARS | Q QBAM1

LUNGS | LBLJ1

PULSE CADA1 [ ] B.P. CAEF1 [ ]

HEART/PERIPHERAL PULSES | HBAG1

CRANIAL NERVES/EYES | WBCK1

JERKS/PLANTERS | WBJS1

MOTOR SYSTEM/CO-ORD/GAIT | WBNJ1

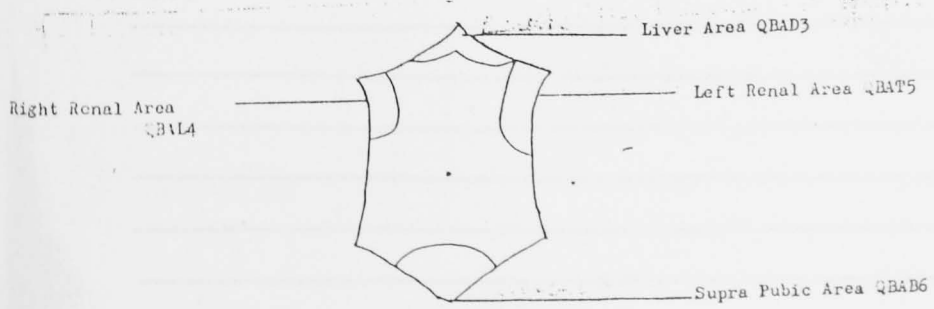
SENSATION | WBSL1

JOINTS/SPINE | VBJQ1

C.N.S.

ABDOMEN

Other Abdomen QBAJ7



ENCOUNTER FORM (UROLOGY)

ITEM NUMBER	COMMENTS

TO BE CHECKED

ENCOUNTER FORM (UROLOGY)

INVESTIGATIONS

		BACTERIOLOGY	
1		M.S.U.	PNTE3
2		M.S.U. EARLY MORNING SPECIMEN	PNTE3-1
3		SPUTUM	PNLR3
4		STOOL CULTURES	PNQL6
		BIOCHEMISTRY	
5		ACID PHOSPHATASE	YPAS1
6		B.S.	CNEV1
7		CALCIUM SERUM	CNFA1
8		CHOLESTEROL	CPCM1
9		CREATININE	CNCP5
10		G.G.T.	ENCN1
11		IMMUNOGLOBINS	CNDM4
12		PHOSPHATE SERUM	CNFQ3
13		PROFILE	CNCM8
14		UREA & EIECS	CNCR2
15		URIC ACID	CNPT1
16		URINE 24 HOURS EXCRETION	
		CALCIUM	JPRL3
		URATE	JPRT4
		OXALATE	JPRD2
		ENDOCRINE	
17		P.T.H.	FNQF1
18		T.3	FNDL3
19		T.4	CNCG4
20		T.S.H.	FNEB1
21		F.S.H.	FPDE5
22		L.H.	FPDP3
23		PROLACTIN	FPDV7
24		TESTOSTERONE	FPQJ1
		HAEMATOLOGY	
25		B.12	CQDW1-1
26		E.S.R.	MNHF1
27		F.B.C.	MNAF6
28		FOLATE	CPJV1
29		Hb.	NMBY1
30		PLATELETS	MNGH2
31		P.T.	MPEA2
32		SICKLE CELL SCREEN	MNAD9
33		Hb. ELECTROPHORESIS	EPHT1

		SEROLOGY	
34		ACUTE PHASE PROTEINS	CNDE3
35		A.N.F.	RPGS5
36		D.N.A. ANTIBODIES	RPGH1-1
37		R.F.	SNSQ1
38		SMOOTH TISSUE ANTIBODIES	RPHH3
		X-RAY	
39		B.A. ENEMA	SNSQ1
40		B.A. MEAL	SBSQ1
41		B.A. FOLLOW THROUGH	SNNT1-1
42		B.A. SWALLOW	SNNZ5
43		B.A. SWALLOW & MEAL	SNNT1
44		CHEST X-RAY	SNBJ1
45		CHOLECYSTOGRAM	SNQB1
46		I.V.U.	TQBS1
47		LYMPHANGIOGRAM ABDOMEN	TQPH1
48		K.U.B.	SNAL2
49		MICTURATING CYSTOGRAM	TQDD1-1
50		RENAL ARTERIOGRAM	TRNF1
51		SINUSES	SPDD1
52		SKELETAL SURVEY	SPAX3
53		SKULL	SPCS1
54		ULTRASOUND ABDOMEN	VQRW1
55		ULTRASOUND RENAL	VQRW1
56		URETHROGRAM	SNAT3
57		VASOGRAPHY	SNAB4
		SCANS	
58		BONE SCAN	VNTA1
59		BRAIN SCAN	VNVF1
60		C.T. SCAN BODY	
61		THYROID SCAN	VNEV3
62		RENAL SCAN	VNSK3
		OTHERS	
63		E.C.G.	WPAN1
64		F.O.B.'s	KQBA1
65		P.F.T.'s	WQFT1
66		URODYNAMICS	YPAN7

ENCOUNTER FORM (UROLOGY)

DRUGS (Prescribed by Consultant)

		/	CODE	DOSE	FREQ			/	CODE	DOSE	FREQ
1	ANDROCUR		RSAX2-1			9	PHENOXYBENZAMINE		WVNV1		
2	CARBACHOL		HTBF1			10	POTABA				
3	CETIPRIN (EMEPROMIUM)		WVAV3-1			11	STILBOESTROL		RTGA1		
4	DICYNENE		NVAX2-1			12	TOFRANIL (IMPIRAMINE)		YSJZ8-2		
5	ESKORMADE (PHENYLPROPANOLAMINE)		LSHR1-1			13	TRYPTIZOL (AMITRIPTYLINE)		YSJDL-2		
6	ESTRACYT (ESTRAMUSTINE		CSBR1-1			14	UBRETID (DISTIGMINE)		WVAC4-1		
7	HIPREX		DSTT6			15	URISPAS FLAVOXATE		NSRP1-1		
8	MIST POT CIT		TSBG2			16	VALIUM		YSFE1-1		

A ANALGESICS (STATE)

B ANTIBIOTICS (STATE)

C CYTOTOXICS (STATE)

D OTHER.

ENCOUNTER FORM (UROLOGY)

UROLOGICAL DIAGNOSES

	BLADDER	
1	CALCULUS	TLBQ9
	CARCINOMA	
2	CYSTITIS - ACUTE	TJCJ5-A
3	" - CHRONIC	TJCJ5-C
4	" - INTERSTITIAL	TJCJ5-L
5	" - RECURRENT	TJCJ5-D
6	CYSTOCELE	RLBQ3
7	DIVERTICULUM	THJQ2
8	ENURESIS	TGEY3
9	FISTULA	THGX1
10	INCONTINENCE	TGEH1
11	INSTABILITY	THAX2
12	LEUKOPLAKIA	TKAR7
13	NEUROGENIC	TLEW1-1
14	TRIGONITIS	TJCJS-1
	FEMALE GENITAL SYSTEM	
15	CARUNCLE	THAE3
16	PROLAPSE UTERUS	RLCF1
17	SENILE VULVITIS	RJAN-E
	KIDNEY	
18	DUPLEX	THNE1
19	HYDRONEPHROSIS	TLFZ4
20	RENAL CALCULUS	TLBH8
21	RENAL CELL CARCINOMA	TKAJ6-A
22	RENAL CYST	TKAL3-A
23	PYELONEPHRITIS	TJAS1
24	TRANSITIONAL CELL CARCINOMA	TKAJ6-E
	MALE GENITAL SYSTEM	
	PENIS:	
25	CARCINOMA	SKAT1-B
26	CONDYLOMATA	SKAB2-A
27	IMPOTENCE	SGKHI
28	PEYRONIES DISEASE	SLON1
29	PHIMOSIS	SHCY1
	TESTIS	
30	EPIDIDYMO - ORCHITIS	SJAY2
31	INFERTILITY AZOOSPERMIA	SHAV2-A
32	" OLIGOSPERMIA	SHAV2-B
33	SEMINOMA	SKAJ3
34	TERATOMA	SKAP7
35	TORSION	SLCY3

	PROSTATE	
36	ACUTE RETENTION OF URINE	THAM1-A
37	CHRONIC RETENTION OF URINE	THAM1-B
38	BENIGN HYPERPLASIA	SKDA3-A
39	CARCINOMA	TKAZ8
40	CALCULUS	THAZ8
41	PROSTATISM	TGAZ8
42	PROSTATITIS	SJDG1
	SCROTUM	
43	CARCINOMA	SKAR4
44	HYDROCELE	SHBA2
45	LYMPHOEDEMA	SHAK4
46	SPERMATOCELE	SHEN7
47	VARICOCELE	NHDF9
	SPERMATIC CORD	
48	ENCYSTED HYDROCELE	SHBA2-A
49	INGUINAL HERNIA	QLECG
	URETER	
50	DUPLEX - COMPLETE	THNM2-A
51	" INCOMPLETE	THNM2-B
52	HYDROURETER	TLFX7
53	STRICTURE	THACG
54	TRANSITIONAL CELL CARCINOMA	TKAG9
55	URETERIC CALCULUS	TLNV5
56	URETERIC COLIC L	TGDC1-B
57	" " R	TGDC1-A
58	URETEROCELE	THAK7
	URETHRA	
59	CARCINOMA	SKAZ5
60	CARUNCLE	SHAS5
61	HYPOSPADIAS	SHNC1-D
62	URETHRITIS	TJOZ3
63	STRICTURE	TLDQ1
	VAS DEFERENS	
64	GRANULOMA	SKAG6
	GENERAL	
65	TUBERCULOSIS	DHQK1

ENCOUNTER FORM (UROLOGY)

DRUGS (Prescribed by Consultant)

		/	CODE	DOSE	FREQ			/	CODE	DOSE	FREQ
1	ANDROCUR		RSAX2-1			9	PHENOXYBENZAMINE		WNV1		
2	CARBACHOL		HTBF1			10	POTABA				
3	CETIMIN (DEMETROMIUM)		WVAV3-1			11	STILBOESTROL		HTGA1		
						12	TOFRANIL (IMIPRAMINE)		YSJZ8-2		
4	DICYNENE		NVAX2-1								
5	ESKORIADE (PHENYLPROPANOLAMINE)		LSHR1-1			13	TRYPTIZOL (AMITRIPTYLINE)		YSJDL-2		
						14	URETID (DILTIGHINE)		WVAC4-1		
6	ESTRACYT (ESTRAMUSTINE		CSBR1-1								
						15	URISPAS FLAVOXATE		HSKP1-1		
7	HIPREX		DSTT6			16	VALIUM		YSPE1-1		
8	MIST POT CIT		TSBC2								

A ANALGESICS (STATE)

B ANTIBIOTICS (STATE)

C CYTOTOXICS (STATE)

D OTHER

ENCOUNTER FORM (UROLOGY)

INVESTIGATIONS

	BACTERIOLOGY	
1	M.S.U.	MNTE3
2	M.S.U. EARLY MORNING SPECIMEN	MNTE3-1
3	SPUTUM	MNLR3
4	STOOL CULTURES	MNQL6
	BIOCHEMISTRY	
5	ACID PHOSPHATASE	YPAS1
6	B.S.	CNEV1
7	CALCIUM SERUM	CNFA1
8	CHOLESTEROL	CPCM1
9	CREATININE	CNCP5
10	G.G.T.	ENCN1
11	IMMUNOGLOBINS	CNDM4
12	PHOSPHATE SERUM	CNFQ3
13	PROFILE	CNCM8
14	UREA & ELECS	CNCR2
15	URIC ACID	CNPT1
16	URINE 24 HOURS EXCRETION	
	CALCIUM	JPRL3
	URATE	JPRT4
	OXALATE	JPRD2
	ENDOCRINE	
17	P.T.H.	FNQF1
18	T.3	FNDL3
19	T.4	CNCG4
20	T.S.H.	FNEB1
21	F.S.H.	FPDE5
22	L.H.	FPDP3
23	PROLACTIN	FPDV7
24	TESTOSTERONE	FPQJ1
	HAEMATOLOGY	
25	B.12	CQDW1-1
26	E.S.R.	MNHF1
27	F.B.C.	MNAF6
28	FOLATE	CPJV1
29	Hb.	NMDY1
30	PLATELETS	MNGH2
31	P.T.	MPEA2
32	SICKLE CELL SCREEN	MNAD9
33	Hb. ELECTROPHORESIS	EPHT1

	SEROLOGY	
34	ACUTE PHASE PROTEINS	CNDE3
35	A.N.F.	RFCS5
36	D.N.A. ANTIBODIES	RTGR1-1
37	R.F.	SMSQ1
38	SMOOTH TISSUE ANTIBODIES	RPHH3
	X-RAY	
39	B.A. ENEMA	SMSQ1
40	B.A. MEAL	SBSQ1
41	B.A. FOLLOW THROUGH	SMNT1-1
42	B.A. SWALLOW	SMN25
43	B.A. SWALLOW & MEAL	SMNT1
44	CHEST X-RAY	SNBJ1
45	CHOLECYSTOGRAM	SNQE1
46	I.V.U.	TQBS1
47	LYMPHANGIOGRAM ABDOMEN	TQPH1
48	K.U.B.	SNAL2
49	MICTURATING CYSTOGRAM	TQDD1-1
50	RENAL ARTERIOGRAM	TRNF1
51	SINUSES	SPDD1
52	SKELETAL SURVEY	SPAX3
53	SKULL	SPCS1
54	ULTRASOUND ABDOMEN	VQRW1
55	ULTRASOUND RENAL	VQRW1
56	URETHROGRAM	SNAT3
57	VASOGRAPHY	SNAB4
	SCANS	
58	BONE SCAN	VNTA1
59	BRAIN SCAN	VNVF1
60	C.T. SCAN BODY	
61	THYROID SCAN	VNEV3
62	RENAL SCAN	VNSK3
	OTHERS	
63	E.C.G.	WPAN1
64	F.O.B.'s	KQBA1
65	P.F.T.'s	WQFT1
66	URODYNAMICS	YPAN7

ENCOUNTER FORM (UROLOGY)

ITEM NUMBER	COMMENTS

TO BE CHECKED

ENCOUNTER FORM (UROLOGY)

MOUTH, PHARYNX, EARS | Q QBAJ1

LUNGS | LBLJ1

PULSE CADA1 | B.P. CAEP1

HEART/PERIPHERAL PULSES | HBAG1

CRANIAL NERVES/EYES | WBCK1

JERKS/PLANTERS | WBJS1

MOTOR SYSTEM/CO-ORD/GAIT | WBMJ1

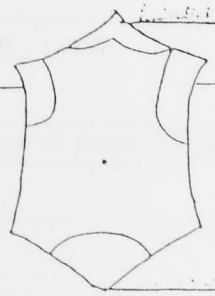
SENSATION | WBSL1

JOINTS/SPINE | VBJQ1

CNS.

ABDOMEN

Other Abdomen QBAJ7



ENCOUNTER FORM (UROLOGY)

P.M.H./ALLERGIES	BLPX1
1	
2	
3	

F.H.	BLFR1
1	
2	
3	

SOCIAL HISTORY	BLSJ2
SMOKING	
ALCOHOL	
JOB	

DRUGS	BLDF1
1	
2	
3	
4	

PAST OPERATIONS	CODE	DATE

D. PHYSICAL EXAMINATION

APPEARANCE/FACIES/SKIN/HAIR/THYROID	CBAM1

LYMPHNODES/SWELLING	CBLR1

HANDS/NAILS (NOT CNS OR JOINTS)	CBHA1

ENCOUNTER FORM (UROLOGY)

PRESENTING COMPLAINTS & MAJOR SYMPTOMS

	ALIMENTARY SYSTEM	
1	ABDOMINAL PAIN	QGAE1
2	ABDOMINAL SWELLING	QGAV3
3	APPETITE POOR	CGAL2
4	BLEEDING P.R.	QGFV6
5	CHANGE IN BOWEL HABITS	QGJF2
6	CONSTIPATION	QGJL6
7	DIARRHOEA	QGJY1
8	DYSPEPSIA	QGAA7
9	PILES	NBBP1
10	VOMITING	QGCN4
	CARDIAC	
11	ANGINA	MLAJ4
12	CHEST PAIN	MGAY1
13	COUGH	LGCG1
14	HAEMOPTYSIS	LGCV6
15	SPUTUM	LGCX3
16	S.O.B.	LGBB1-C
17	SWELLING ANKLES	MJAG1-A
18	WHEEZING	LGWE5
	HERNIA	
19	HERNIA	BGIG1

	G.U.	
20	DRIBBLING	TGBX5
21	DYSURIA	TGBR1
22	ENURESIS	TGEY3
23	ERECTILE DIFFICULTIES	SGK-2
24	FREQUENCY DAY	TGCE2-1
25	FREQUENCY NIGHT	TGCE2-2
26	HAEMATURIA	TGHB1
27	HESITANCY	TGEM7
28	INCONTINENCE	TGEH1
29	INCONTINENCE - STRESS	TGEH1-A
30	INCONTINENCE - URGE	TGEH1-C
31	PAIN LOIN	VGAB6-3
32	PENILE DISCHARGE	SGFT2
33	PNEUMATURIA	TGBZ2
34	POOR STREAM	TGBC3
35	SCROTAL PAIN	SGHE2
36	SCROTAL SWELLING	SGHV4
37	TESTICULAR PAIN	SGEF1
38	TESTICULAR SWELLING	SGFL1
39	TIGHT FORESKIN	SGBX2
40	URETERIC COLIC	TGDC1-4
41	URGENCY	TGCE2-A
	GENERAL	
42	ANOREXIA	BLAC6-D
43	FEVER	CGPX4-1
44	MALAISE	BLAC6-A
45	PYREXIA	CGPX4
46	WEIGHT GAIN	CGDA5
47	WEIGHT LOSS	CGDC2

CORES FLOWCHART (GENERAL MEDICINE)

```
DISPLAY MEDICAL DATA OPTION > INTERACTIVE FLOWCHART

SPECIFY UP TO 8 CODES TO FLOWCHART

CODE #1> YJXK1  ANXIETY
CODE #2> FATIGUE
     CGBP5  FATIGUE
CODE #3> YKCY2  FUNCTIONAL GASTROINTESTINAL COMPLAINTS
CODE #4> VALIUM
     YSFE1  DIAZEPAM
CODE #5>

DATE     ! ANXIETY        ! FATIGUE        ! FUNCTIONAL     ! DIAZEPAM
         !                !                ! GASTROINTESTIN-!
         !                !                ! AL COMPLAINTS  !
=================================================================================
5/31/79  !                !                ! PT COMPLAINS   !
         !                !                ! THAT STOMACH   !
         !                !                ! CRAMPS AWAKEN  !
         !                !                ! HER IN THE     !
         !                !                ! EARLY MORNING  !
         !                !                ! HOURS          !
---------------------------------------------------------------------------------
6/14/79  !                ! [MINOR]        !                ! ONE EVERY 12
         !                !                !                ! HRS AS NEEDED
         !                !                !                ! 10MG ORAL BID
         !                !                !                ! QTY 100 X
         !                !                !                ! NONE REFILLS
---------------------------------------------------------------------------------
6/21/79  !                ! PT HAS BEEN    !                !
         !                ! WORKING 16     !                !
         !                ! HRS A DAY FOR  !                !
         !                ! 2 WEEKS WITH   !                !
         !                ! NO REST PT     !                !
         !                ! COMPLAINS OF   !                !
         !                ! HEADACHES AND  !                !
         !                ! IS WORRIED     !                !
         !                ! ABOUT LOSING   !                !
         !                ! JOB            !                !
---------------------------------------------------------------------------------
7/25/79  ! FOR FEAR OF    !                !                ! 10MG BID
         ! HEIGHTS       !                !                ! QTY 100 X 1
         !                !                !                ! REFILLS
---------------------------------------------------------------------------------
8/20/79  ! PT IS          !                !                !
         ! CONSIDERING    !                !                !
         ! GIVING UP JOB  !                !                !
         ! AS A           !                !                !
         ! PROFESSIONAL   !                !                !
         ! SKY DIVER      !                !                !
---------------------------------------------------------------------------------

DISPLAY MEDICAL DATA OPTION >
```

CORES FLOWCHART (GENERAL MEDICINE)

```
DISPLAY MEDICAL DATA OPTION > FLOWCHART

FLOWCHART FORMAT> ?
ENTER ENOUGH LETTERS TO IDENTIFY A MEDICAL RECORD FLOWCHART.
TYPE "↑L" FOR A LIST OF ALL CURRENT FLOWCHART TEMPLATES,
     "↑" OR "↑Q" OR (ESC) TO EXIT FLOWCHART FUNCTION.

FLOWCHART FORMAT> ↑L
   1 HYPERTENSION
   2 DIABETES
   3 RED BLOOD COUNT
   4 CONGESTIVE HEART FAILURE
   5 KIDNEY FAILURE
   6 URINALYSIS
   7 LIVER FUNCTION TESTS
   8 MENTAL HEALTH
   9 GENERAL HEALTH
  10 CONTRACT HISTORY
  11 ACTIVE PROBLEM LIST
```

43

```
FLOWCHART FORMAT> 1  HYPERTENSION

DATE     ! WGT! BLOOD      ! BUN ! CREA! URIC! K+ ! MEDICATIONS
         !    ! PRESSURE   !     !     ! ACID!    !
=================================================================
8/21/78  !    !            ! 11  !     !     !    !
-----------------------------------------------------------------
6/21/79  !    !*160/100    !     !     !     !    !
         !    ! RIGHT ARM  !     !     !     !    !
-----------------------------------------------------------------
7/25/79  ! 145! 160/80     !     !     !     !    !
-----------------------------------------------------------------
9/1/79   !    !            !*4   !*  6 !     !    !
-----------------------------------------------------------------
```

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