

# Reducing the Need for Computer-Based Information Systems in Healthcare Through the Use of Self-Contained Organizational Units

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## Abstract

The relentless move to computerization in the UK National Health Service (NHS) is challenged in this paper. The distinction between two types of information is defined: proceduralized and interpretative. An alternative to the use of computerized information systems for the latter is presented that relies on a change in organizational structure in the form of a self contained unit. This effectively reduces the need to process information. The unit, based on the principles of Patient Focused Care, provides multiskilled teams using a combination of multi-disciplinary documentation and protocols of care to ensure effective communication takes place without the use of interpretative information systems.

## 1. INTRODUCTION

The National Health Service in the United Kingdom (NHS) is in the throes of much change. The workforce in the NHS is becoming increasingly familiar with on-going change as initiatives are introduced at regular intervals. The NHS is central to the agenda of all the major political parties in the UK and is consequently prone to influence by political fluctuations and the whims of social and media pressure. The costs of introducing change are enormous in terms of money, resources and human endeavor, yet the effects are often variable. The introduction of computerized information systems have accounted for a significant proportion of these costs and much scepticism exists as to the benefits that are said to accrue from these investments.

A recent initiative introduced in most of the hospitals in the NHS is the Resource Management Initiative. The Initiative, which introduced organizational as well as cultural change, was deemed incapable of working successfully without an extensive commitment to computerized information systems. Indeed, the initial funding from the Department of Health was given with the proviso that a considerable proportion was spent on purchasing substantial and expensive Clinical and Nursing Information Systems.

The enthusiasm on the part of the Department of Health for systems that were largely untried and unevaluated has been criticized (Health Economics Research Group 1989). Yet the underlying belief that computerization was the answer to the information needs of the organizations was essentially accepted, and indeed, considered unremarkable. This shift in thinking that has developed over the last two decades or so is relatively unchallenged. In the NHS, although computerized information systems are still somewhat undeveloped and untried, the essential belief is that "the future is in the technology." There are few instances where the perceived need is ever questioned, only the availability of resources to acquire them.

In this paper information systems are categorized into two types: *proceduralized* and *interpretative*. The need for the latter is questioned.

## 2. PROCEDURALIZED VERSUS INTERPRETIVE INFORMATION SYSTEMS

Proceduralized and interpretative information systems are two ends of a continuum that stretches from purely technical, formalized systems that are bound with structure, measurements and data, to those systems that are derived from, and based on, the skills of people in interrelationships. The former are systems that rely on technical measures and indices and are, of necessity, formalized ways of measuring procedures. The latter are based on the interpretations that people apply to interactions, needs or influences. They are bound up with communication and the communicative process and are interpretations or evaluations based on the skills and tacit knowledge that people apply to their work.

Proceduralized systems are defined as those which benefit from the computer's ability to process vast quantities of data in order to arrive at data that can be used by people or other machines. The computer's greatest attribute is its ability as a superb number crunching tool. Thus its value as a database, able to process data for other purposes and outputs, is without question. Within the NHS context, the Patient Administration System (PAS), where demographic data is input and accessed periodically as well as being used for reports and management information, provides an example of an effective and useful proceduralized information system.

Interpretative information systems, on the other hand, are defined here as developing systems that use information that is acquired by human intuition and tacit knowledge. An example of this is computerized care plans. In brief, care plans are produced by nurses showing a plan of action and goals for the delivery of nursing care based on a problem solving approach. They are produced based on depth of nursing experience as well as intuitive and experiential knowledge of the unique features of the individual patient.

A greater likelihood of information systems being appropriate and useful will result if design is developed using an approach that takes into account the social relations between the participants, the infrastructure which supports the computerized system, and the previous history of commitments to computer-based technologies within the organization. In short, the social context has to be defined. An effective model covering many of these aspects is provided by Kling's (1987) "web model."

In addition, to ensure that the knowledge necessary for effective systems development is utilized, users must be significantly involved in the design of the systems (Mumford 1983). The need for user involvement is considerably greater than that incorporated into traditional systems analysis and design methodologies. Users need to be involved from the outset of the project, indeed from the point where the need for a change is recognized, right through the design and implementation stages. Conventional analysis and design systems involve users but confine them to a supporting role rather than focusing the "professional" activity in support of them. The need for greater involvement is recognized, however, and recent extensions of SSADM are beginning to address this.

To function at its optimum, it is necessary to contain the users to a relatively small group that is able to interact effectively. This group would have a level of tacit knowledge such that a deep, situated knowledge of actual work processes would be available to them. They are then capable of designing systems that incorporate accurate, necessary and useful features that would be difficult to emulate without the use of computers.

### **3. AN ALTERNATIVE TO INTERPRETIVE INFORMATION SYSTEMS**

The value of computerized information systems for those systems which have been defined as *proceduralized* is undeniable. For those which have been defined as *interpretive*, however, the value of computerized information systems is far less obvious. This paper offers an alternative to such systems by reducing the need for having information systems at all. Following Galbraith (1977), it is argued that an effective means of meeting information needs is to reduce the need to process information. One way of achieving this, through the creation of self-contained organizational units, is elaborated in this paper.

The paper therefore focuses on the design of a self-contained unit in the NHS, showing how a multi-disciplinary group of people collaboratively designed an integrated, self-regulating unit. This unit seeks to ensure effective communication and documentation procedures without the use of computerized *interpretive* information systems, but does not preclude the use of networked data processing systems, the *proceduralized* systems distinguished earlier, to access demographic data, clinical and laboratory reports, or management information that is available from databases within the hospital.

The group's methods did not consist of devising efficient manual information systems to simply replace computerized information systems, but rather a redesign of work processes. As a result, the organizational design of their work unit is radically different from anything else that

exists in the NHS (other than similar projects which are being developed in several pilot sites across the country).

It is argued that there are no significant inadequacies that *interpretive* systems could have bettered, yet many of the problems and wastage in resources that have tended to occur when computers have been introduced in the NHS have been avoided. Additionally, the benefits gained by collaboratively designing the various features of the unit's work are potentially enormous.

#### **4. BACKGROUND TO THE CASE STUDY**

This case study describes the principles underlying the planning of Patient Focused Care (PFC) in a hospital on the south coast of England. The hospital was one of seven pilot sites in Britain to introduce PFC, or Integrated Patient Care (IPC) as it was described.

PFC's introduction coincided with a significant capital redevelopment at the hospital of around £75 million. The implications of this simultaneous development were enormous as PFC challenged not only work processes, and organizational culture and structure, but also the physical design and layout of the buildings. A successful implementation of PFC would help ensure that the redevelopment program at the hospital would be based on PFC principles.

PFC was first proposed by the management consultants, Booz Allen Hamilton (Lathrop, Krauss and Shows 1988). They argued that the general focus on specialization found in hospitals was inefficient and costly and proposed a more appropriate organizational system whereby self-contained, or partially self-contained, units would be established.

Originating in the USA, which has a sophisticated and well-established market approach to health services, the concept was imported into the UK as part of the internal market reforms of the NHS. This paper does not seek to address the financial changes, the impact of separating the purchasers and providers, contracts, competition and so on associated with these developments, but focuses on the information processing aspects of PFC.

The PFC design process involved workshops with members of staff from Gastroenterology, the proposed specialty for the new PFC unit. The initial workshop defined the hospital's vision of how best to deliver care to patients, the groups of staff that would enable the delivery of such care, and the key indicators which could be used to measure the success of the new method of care delivery. This was deemed crucial as the basis for much of the later work.

A significant innovation that PFC intended to introduce was the concept of multiskilling and cross training. The human resource implications of these were significant and much of the intended changes in personnel policy were to be introduced on the back of PFC. The need for a reduction in the number of specializations and categorizations in jobs within hospitals has been recognized and is discussed in the Patient Focused Care literature (e.g., Lathrop 1993). The proposed PFC care center unit would therefore be staffed by multiskilled, trained carers able to perform some of the functions and duties they now normally require from others. Examples include phlebotomy (the taking of blood) and simple chest physiotherapy.

A crucial development in PFC was the introduction of protocols of care for documentation and audit purposes. These are also known as Clinical Care Pathways or Anticipated Recovery Pathways. These guidelines were devised and owned by multidisciplinary teams. Once a pathway, or protocol, was identified and care agreed, it could be used as a care plan. Only the individual patient's deviations from the protocol would be recorded, thus potentially reducing the extensive amount of time spent by nurses and other professionals acting as scribes. It could also be used as a powerful audit tool as the deviations, or variances, could be analyzed. This form of *variance reporting* was expected to reduce drastically the excessive time spent on documentation, without the use of computers. As Lathrop argues:

The time devoted to documentation is reduced by as much as 75 percent. One particular hospital has reduced documentation time for nurses from more than two hours per nurse per day to less than fifteen minutes (for surgical patients). This saving was accomplished without the use of computer systems: a manual process was simply dramatically improved.

In addition to the protocols, a PFC working group developed an Integrated Care Plan for patient notes. The relevant factor in this development was the move away from individual notes for different professional groups to one multidisciplinary care plan. The various professions should thus be able to relate their care to other professionals' care. Patients should thus avoid the current necessity of repeatedly providing details about their demographics and medical history.

By having documentation that provides a mutual focus for all carers, and by reducing the extent of the documentation by using protocols and exception reporting, a powerful alternative to using computerized information systems will be achieved. Proceduralized information systems that could compute the variances were seen to be useful, however, as an aid to the processing of data from the audit. These various changes may therefore be seen to illustrate the fundamental principle that there are alternative means of dealing with an organization's interpretative information problems or requirements and that effective information processing can be designed into an organization and structure by means other than computerization.

## **5. PARALLELS WITH DEVELOPMENTS IN MANUFACTURING INDUSTRY**

A shift from rigid, bureaucratic organizational forms toward more flexible modes of production and reduced division of labor is seen increasingly in manufacturing industry, as Bessant (1991) describes. This move toward "networking and decentralization" is emulated in the developments discussed in this paper. PFC bears a striking resemblance to "*cellular manufacturing*" which, it is claimed (Ingersoll Engineers 1993), now extends to 73% of UK companies. This involves the creation of "product-focused cells" which are self-sufficient in "all four key dimensions of engineering, logistics, people and accountability." The deployment of such cells is said to nurture productivity gains and cost reduction as well as "commitment, teamworking and empowerment." Other benefits reported include quicker throughput, reduced work-in-progress, improved control, improved quality, better service and better skills.

Kaplinsky (1994) discusses the introduction of a cellular layout in an organization and suggests there was a shift in production philosophy from “the old objective of ‘efficiency’ to the new objective of ‘effectiveness’.” As with PFC, the new organizational structure also led to “multitasking and multiskilling work practices.” “All cell-workers...were given a variety of tasks to perform, and were trained in a range of skills.” Kaplinsky describes the consequence of this being a “significant flattening of the decision hierarchy” from seven layers down to three.

This case also highlights the problems of communication prevalent in the management of change. Kaplinsky describes the previous unidirectional information flows as “focused on the settlement of conflict rather than the communication of information relevant to effective production.” The new strategy included cell managers communicating with their work team for the first ten minutes of each shift, videos, slides, newsletters and courses on continuous improvement as well as other meetings and forums.

Bessant (1994) uses a different term to evoke a similar development. He talks of “focused factories” that “identify a clear business segment which manufacturing can then support in a coherent fashion.” These may develop, it is argued, “either by dedicating factories to particular businesses or by grouping resources within a factory into areas or cells dedicated to particular businesses.” The development of “process innovation,” which Bessant (1994) defines as “the set of radical changes and incremental improvements which a firm makes to the ways in which it produces its outputs,” is reflected in the development of “process redesign” or “process reengineering.” These latter terms are also well entrenched in the philosophy of PFC.

The traditional organizational structure of a hospital in which the functions of individual specialties and departments are extensive and based on bureaucratic, organizational arrangements may thus be seen to have many similarities with the organization of the Fordist factory. The intense specialization and compartmentalization that this can give rise to is illustrated by Lathrop, who quotes an example of a typical 500 bed hospital where, with a total of 2,756 employees, there were 388 job classifications, of which 314 had fewer than six employees, and the average number of employees per classification was 7.1.

Another feature of Fordist manufacturing is the focus on “economies of scale.” This principle, that greater capacity leads to greater efficiency, is seen as fundamental to increasing productivity. While this may be appropriate for high-volume, low-variety production, Marsh (1989) argues that “increased competition and more fragmented markets have in the past few years forced the industry to steer toward more specialized product sectors in which the focus is on tailoring goods to customers needs.” The principle in PFC of focusing services, resources and skills around the needs of the patient thus bears striking similarities to these developments in industry.

Kaplinsky's case also introduces the principle of “families-of-parts” where the factory was broken down into three “sub-factories” with a physical redesign, each cell having “an almost complete range of machinery.” This provides an interesting comparison with PFC and the dilemma associated with the extent of decentralization of equipment or services. While the philosophy of PFC would suggest locating satellite pathology laboratories, X-rays, physiotherapy and

occupational therapy areas within each self-contained unit, economies of scale are likely to lead to a sharing of resources and expensive items of equipment among smaller units. There is, therefore, a need to balance issues of economies of scale with alternative means of providing decentralized services. One solution adopted in the case study was the intelligent vacuum tube system installed throughout the hospital to transport tests and specimens to the various laboratories located around the hospital. This avoided the need for satellite laboratories in the self-contained units.

Finally, the movement toward self-containment and Schumacher's principle of "small is beautiful" is reflected in PFC.

## **6. GALBRAITH'S STRATEGY AND PFC**

The development of self-contained units as a means of reducing the need to process information was proposed by Galbraith as a strategy for effective information processing. Less information processing is required, it was argued, once there is a reduction in resource sharing. This could be achieved in two main ways: reducing output diversity and reducing the division of labor. Thus, "reduced diversity reduced the information processing needed to schedule and reschedule the demands for shared resources [and] there is usually a reduction in the division of labor and therefore fewer distinctly different resources whose work needs to be coordinated and scheduled" (Galbraith 1977).

Both these methods were seen as important aspects of PFC. In practice, this included grouping patients with similar needs thus reducing output diversity, and developing a multiskilled workforce, thereby lessening the division of labor and reducing specialization. Zuboff (1988) also discusses the necessity of introducing new divisions of labor in a flexible organizational structure. She considers this essential so that all workers at all levels are able to develop their intellectual skills in a continuous learning process. Multiskilling, and its concomitant cross training, are seen as means of maintaining a continuous learning process.

Further effects of self-containment on information processing are identified by Galbraith as being that "exceptions have to travel through fewer levels before reaching a shared superior" and that "decisions can be taken at lower levels while supported with local information...self-contained groups permit local discretion based on local information only" (Galbraith 1977).

Three particular issues are highlighted Galbraith's analysis:

- Local decision making and the team structure
- Decision making and information based on the concept of exception reporting
- Decision making based on empowerment and a sense of team ownership.

## **7. LOCAL DECISION MAKING AND THE TEAM STRUCTURE**

The PFC structure will be focused on multiskilled bedside teams comprising nurses and carers and a team leader. There are other teams, including the core team with specialist skills and a team providing administrative support. The core team includes the relevant consultants, physiotherapist, dietitian, radiotherapist, occupational therapist and social worker. The administrative support includes ward clerks, secretaries and administrative clerks. A bedside team of two is responsible for six patients, or four responsible for four high dependency patients. High dependency patients require more intensive caring. Six such teams comprise a larger team with a team leader. The bedside teams are placed in close geographical proximity to each other as they are on a ward, or ward-like area. The unit comprises around thirty inpatient beds as well as endoscopy suites and outpatient facilities. The management structure consists of the team leaders and a care center manager who is on site and has overall responsibility for the unit.

This small team-based structure facilitates the communication process. Information is based locally and there is little in the way of waiting for information to arrive, be retrieved or processed. Much of the processing will be done on the unit by decentralized services, or by improved facilities, such as the intelligent vacuum tube movement of pathology tests.

The information pertinent to the individual patient will be contained within the unit and among the people dealing with them on a daily basis. Clinical decisions are made by individual carers within the context of the team, as well as with team leaders, on the basis of information available and immediately accessible. The self-contained nature of the unit provides an in-built control mechanism in that team members are able to communicate and obtain information when necessary. This seeks to ensure an integration of information that was not possible in the pre-PFC gastroenterology wards. This was mainly because gastroenterology was not seen as an entity with defined boundaries. It was fragmented over various wards as well as different specialities.

This lack of clear boundaries affected the position of the consultants as well. Gastroenterologists are normally general surgeons as well as specialists in gastroenterology, and the delineation between gastroenterology and general surgery is fine. Both groups of consultants do "on take" sessions in emergency wards dealing with all general surgery and gastroenterology. By removing all the gastroenterology to a separate unit, therefore, the general surgeons would have the variety of their workload diminished. There was consequently much displeasure among the general surgeons at the prospect of a PFC center. They felt their professional positions were threatened by a removal of such an important section of their workload — important in terms of interest rather than quantity. The situation unearthed a deep-seated problem that had not been resolved through the years: "What is a general surgeon and is there a role for them?" The movement to specialists that is gathering pace is a movement away from generalists. These boundary issues were important ones that were not resolved for the consultants in the debate about a PFC center, but were rather exacerbated.

## **8. DECISION MAKING AND EXCEPTION REPORTING**

Galbraith argues that decreasing information processing in a self-contained unit has the effect of reducing the levels through which exceptions have to travel, thus ensuring more efficient, effective and appropriate decision making. This concept is enhanced in the PFC context for not only are exceptions passed on rather than produced as a mass of data, but exception reporting is introduced at the initial stages of documentation. This is done by using protocols of care rather than documenting care given for each patient in minute detail. Decisions about patient care are then made either by those producing the information or by others further up the hierarchy, such as team leaders or clinical advisors. Control is maintained by stringent audit procedures.

It must be understood that documentation is a feature that affects all professional carers. Everything that is done is documented by all professions, for caring and informing as well as litigation purposes. In the vast majority of hospitals and departments, medical record documentation is unidisciplinary. All professions produce and carry their own notes. These are not, as a matter of course, made available to other professions. The potential problems of duplication or missing information are enormous.

The primary need for multidisciplinary sets of medical notes, with ease of access and uniformity, was made apparent and was seen as an essential prerequisite to any change introduced by PFC. However, multidisciplinary notes are the starting point rather than the whole story and, to complete the change, protocols need to be introduced.

Protocols define "the usual care requirements for a particular episode of care [and are] designed to record actual individualized care against agreed best practice" (Sparks 1994). They are in pro-forma and diary form. The pro-forma is designed to record actual individualized care against agreed best practice. The protocols are being developed by the clinical team who use them and team involvement helps ensure a strong sense of ownership of the protocol. They are, necessarily, supported by policies and guidelines. The normally slow development progress for each protocol is problematic as initial protocols may take several months to develop. However the speed is invariably quickened after a number have been produced.

The protocol is seen as a dynamic working document and, as such, is updated to "incorporate improvements resulting from concurrent clinical audit and changing practice based on ongoing research into best practice" (Sparks 1994). Care is delivered to a patient according to the protocol with very little text added other than in cases of variance where the exception is noted. This provides a powerful tool for audit where individual action or the protocol procedure can be questioned.

## **9. DECISION MAKING, EMPOWERMENT AND TEAM OWNERSHIP**

The need for ownership and empowerment has been identified as crucial to the successful introduction of Patient Focused Care in hospitals both in the UK and the USA. Lathrop suggests that “empowerment is inherent in any notion of ownership.”

There was an attempt to ensure empowerment in this project by making decisions in workshops with multidisciplinary attendances. This intention was set as a benchmark for the entire project in the initial visioning process. However, decision making in workshops is only viable if the workshops are attended by those who will be responsible for making the relevant decisions. In many of the workshops that took place, many of the decision makers were not included. Thus, at the personnel workshops where jobs were redesigned, the porter, house-keeper, secretaries and nurses were included, but the consultant did not take part (although he was invited), neither did a doctor (other than one initial meeting), nor the secretarial manager.

The team structure of the proposed self-contained unit was organized to facilitate decisions being made about patient care and need by the carers themselves. Thus, at an elemental level, stock for the unit could be ordered by the team who were aware of unit requirements rather than centrally on a fixed time basis by others removed from daily activities.

Other Patient Focused Care hospitals in the UK focused on different aspects of empowerment. At one PFC hospital, for example, team leaders were chosen by team members, thus instituting democracy-in-action which may contribute to sustained empowerment of team members. Although the changes that were being designed at the case study hospital were certainly significant and, indeed, radical, they never intended to reach the limits that were being discussed in at least one other hospital. There, the aim for PFC is for developing self-directed work teams. This far-reaching aim is beyond the scope of, or indeed recognized goal for, PFC at the case study hospital. Although the need for “cultural change” is recognized, it is within the confines of “team work, trust and ownership” (Integrated Patient Care Team 1993). This may be seen as the initial point on a continuum that develops into self-directed work teams and the implied diminishment of a hierarchical structure. The failure to recognize the need to extend the ambit and encompass self-direction marks an unfortunate deficiency in the project.

## **10. REDESIGN: PROCESS REDESIGN**

A major principle of PFC is that, by redesigning work processes within a self contained unit, many of the benefits of improved efficiency are attainable with or without the need to incorporate extensive computerized information systems. This is possible by:

- integrating and co-ordinating process changes with care protocols
- reducing complexity of processes
- improving effective utilisation of all resources strengthening team work and improving job satisfaction
- reducing handovers [Integrated Patient Care Team 1993]

The diversity of the above ideas, all part of process reengineering, indicate the inter-connectivity between the four main facets of PFC. Thus, although “process redesign” was not developed in the workshops, the other areas of role redesign, physical redesign and documentation redesign were all based on changes devised by reviewing work and practice processes.

A small amount of operational analysis was undertaken in the early stage of the project by the management consultants to attain base line data for evaluation. Much of it was based on work undertaken by them at a different hospital.

One area the management consultants analyzed was the processes involved in a simple “Urea and Electrolytes” blood test. This is a routine test given to around 80 percent of patients. The analysis provided data showing inefficient and wasteful usage of resources. The analysis found that it took eleven people to process the test, eighteen hours turnaround time and sixty-four actual process steps. Other data acquired illustrated the excessive time wasted by junior doctors walking from place to place within the hospital as opposed to being in a self-contained unit. They attached pedometers to a number of doctors and found that, on average, they walked up to sixteen miles during the course of their work day, substantially more than would be necessary in a self-contained unit.

## **11. REDESIGN: PHYSICAL REDESIGN**

The multidisciplinary workshops brainstormed their vision of the *ideal care center*. The requirements, in many instances, were aligned to a necessary physical restructuring of the unit in accordance with the principles of PFC. Gastroenterology, in its original state, was far removed from the ideal of an integrated self-contained unit in that it was dispersed over thirteen wards and departments based in three of the four hospital sites.

The ideal Gastroenterology unit that was defined in the multidisciplinary workshops included in-patients, out-patients and the endoscopy suite. By including both medical and surgical patients, it aimed to span all the demarcated boundaries established in the hospital, i.e. the separation of in/out patients and medical/surgical patients.

Many of the design features identified as desirable or necessary by the multidisciplinary work group were included in the initial design stage. These would have ensured a high level of comfort as well as good patient care. They included a diet kitchen for education purposes, single rooms for infection control and privacy, adequate waiting areas for out-patients and visitors, diagnostic services and a business center with a library and seminar rooms.

An important means of enabling a unit to be self-contained is by devolving services onto the unit from the center. The extent of the devolvement was discussed in detail. It was considered important to balance the arguments of economies of scale with those of efficiency and accessibility. The hospital-wide intelligent vacuum tube processor for pathology was proposed as one means of continuing to use a central service.

Some existing centralized services were clearly inappropriate to support the envisioned center. Porters and domestic cleaners or housekeepers, for example, were to be part of the care team and, as such, were to be dedicated to the unit. However, a back-up, though reduced, centralized service of porters and cleaners was still required to provide cover when necessary.

## 12. REDESIGN: MULTISKILLING AND ROLE REDESIGN

Role redesign leading to multiskilling is a principle of PFC that has profound implications on major developments leading to an implemented PFC center and the process of accepting change. In addition, it will be argued that it was a crucial factor in ensuring that the self-contained unit communicates effectively because of its reduced information processing needs.

Multiskilling is a means of ensuring that, once people are able, or trained, to do particular jobs, they can do them without relying on other specialists. It is diametrically opposed to the traditional division of labor or *compartmentalization* that is so predominant in many hospitals around the world. The syndrome of "I'll get someone to do that for you" typifies the reaction of many carers when asked to do something for a patient which is not strictly within the boundaries of their remit, or perceived remit.

The excesses of compartmentalization are exemplified in the numbers of people involved in performing simple activities. Lathrop produces evidence from research in American hospitals to suggest that it takes six people between thirty and forty minutes to produce a chest X-ray. This activity entails "a few minutes of a technologist's time and less than a minute of a radiologist's reading time." The resource implications of scheduling and monitoring the various discrete tasks are huge and not reflected in corresponding service levels. Reducing the number of job categories is a preliminary stage in the introduction of multiskilling.

The term *multiskilling* is resonant with threat to many health care professionals. The need to identify the fears and establish their legitimacy or otherwise was deemed essential in the early phases of the project. At an early workshop, for example, the participants brainstormed their views on the hopes and fears associated with multiskilling. The group's hopes related to an improved service for patients, including an improved information service, improved professional morale and greater job satisfaction. Their fears were summed up in one word: deskilling. They also feared a decrease in quality and more mistakes being made, more work being generated, and a demise of the professions.

A set of principles was agreed by the workshop members to relate to developing and implementing multiskilling throughout the hospital.

## 13. COMMUNICATION AND INFORMATION IMPLICATIONS

Multiskilling also has considerable implications for communication strategies. The issue of multiskilling adds a further dimension to the self-contained argument that information processing can be reduced. It adds a dimension that Galbraith considers only partially, yet it contains

within it the potential for dramatically improving communication by the expedient of reducing numbers of people to whom information needs to be communicated.

Galbraith suggests that self-contained units usually result in “a reduction in the division of labor and therefore fewer distinctly different resources whose work needs to be coordinated and scheduled.” However, reducing the division further by having a multiskilled workforce minimizes to an even greater extent the amount of coordination and rescheduling necessary. Together with the team structure it creates a highly efficient communication structure. The ability to communicate verbally about issues that directly affect immediate work processes to a small team, with whom constant contact exists, ensures that little is ignored. The chances of missing data or care processes is negated, or certainly minimized, by the use of protocols. The legal considerations of documenting all care undertaken are recognized as the protocols are individualized documents. Protocols also ensure that the team is aware of activities performed to their patients by other professionals — something that tends not to happen with multiple, uniprofessional clinical notes

The importance of producing documentation that is valid, relevant and useful was a crucial requirement for PFC. The inadequacies of the current method of producing medical records have much in common with other hospitals. “Writing things down has become the biggest single activity in our hospitals” (Lathrop 1993). All professions keep individual records which lead to fragmentation and ineffective communication. Medical notes by doctors are kept separately from those used by other professions. Physiotherapists and dietitians keep discrete notes which are not filed in the medical record. Nursing notes are stored apart from the medical record during the time of patient admission and filed in the record at the time of discharge. However, they are relegated to a multipurpose storage section at the back of the notes and remain there with various charts and papers. The perception that very little of significance is in the nursing notes is in sharp contrast to the length of time and effort that is expended on producing them.

There is much duplication of professional effort with each group asking repetitive questions leading to frustration and lack of trust among patients. Documentation can be split into two categories: medical and institutional. Lathrop suggests that 19% of personnel time is devoted to medical documentation and 11% to institutional documentation. However, Lathrop’s evidence is based on research undertaken in the USA and as such is not entirely valid in the UK context. Much of his “institutional” documentation relates to billing individual patients, a practice which is not yet politically acceptable in the UK.

Research taking place at the hospital in the form of a clinical audit suggests that the time taken in documenting medical and clinical details is excessively high. It was found that nursing time spent on documentation equates to the equivalent of three full-time staff (or the term commonly used in the NHS “whole time equivalents”) per week for a sixteen bed ward. This is time that could be used for direct care of patients. Additionally, there is the problem of duplicated questioning. From discussions with patients it emerges that it is common for patients to be asked their medical history by six different professional groups before they receive an initial treatment.

One objective for PFC was to produce a single, integrated record that was applicable and appropriate for all the various professions dealing with the particular patient group. A survey was conducted among junior doctors (all doctors apart from consultants are grouped together as “junior doctors,” whether they are House Officers, Senior House Officers or Registrars) to assess their commitment to the concept of one integrated care plan. There was significant acceptance of it with 55% agreeing or strongly agreeing with it, 14% disagreeing and 31% neutral.

The inevitable cultural obstacles, prevalent in the complex organization that is a hospital, had to be overcome so that the inherent lack of trust among the different professions could be overcome. Unless each professional group were confident that the plan was able to accommodate their requirements, they would be reluctant to use it and the fragmented status quo of duplication and repetition would continue. There was never any suggestion that the record would be anything other than a paper document. The working group considered that an integrated, multidisciplinary care plan could be developed collaboratively that would meet the divergent needs of the user groups. They felt that it could be done without computer support.

#### 14. EVALUATION

Patient Focused Care is in its very early stages and it is difficult to assess accurately its effect on real change and development. Thus Kelly, Rawlinson and Whittlestone (1993) argue that “because of its comparative novelty, the balance of costs and benefits accruing to patient-focused care is not fully known.” They also claim, however, that “there is a general consistency regarding benefits that have been reported, including: reduced length of stay, improved patient and staff satisfaction, better clinical outcomes and improved process efficiency.”

The NHS has long been considered sluggish and traditional in its organizational development. Indeed, hospital management does not generally show many signs of great innovation and radical restructuring. PFC is one area that seems to have taken many of the radical developments from industry and used them specifically to provide real improvement in patient care.

Self-contained patient-focused care units exist both in the UK and the USA. The effectiveness of the strategy to reduce information processing by having self-contained units remains unproven, however. No conclusive research studies have been undertaken, and certainly there is no statistically valid evidence to support the theory. There would therefore appear to be a need for a greater research effort to address this important question.

#### 15. CONCLUSIONS

The reformist ideas discussed above are being introduced into the NHS, albeit slowly. The development has become possible through the change in culture that has progressed systematically over the previous few years.

This paper has introduced two terms to distinguish categories of information systems: *proceduralized* and *interpretative* information systems. The lack of such a distinction in traditional information systems design can lead to generic design methods being used with little recogni-

tion of varying requirements. An alternative to interpretative information systems has been presented based on Galbraith's strategy for reducing information systems by having self-contained units.

The proliferation of patient-focused care principles, including process reengineering and protocols, within the NHS ensures the need for the development of this debate. Managers, with the remit of designing or procuring information systems, need to be offered different frames to view their requirements. Instead of thinking solely in terms of computerized information systems, they must be shown alternative perspectives to enable them to make effective choices.

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### **About the Author**

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