

'Rage against the machine?': nurses' and midwives' experiences of using Computerized Patient Information Systems for clinical information

Philip Darbyshire PhD, MN, RSCN, RNMH, RNT, Dip N

Professor of Nursing, Women's & Children's Hospital, University of South Australia and Flinders University, Adelaide, Australia

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Correspondence:

Philip Darbyshire

Department of Nursing & Midwifery

Research & Practice Development

2nd Floor, Samuel Way Building

Women's & Children's Hospital

72 King William Road

North Adelaide 5006

South Australia

Telephone: +61-8-8161-6468/6497

E-mail: philip.darbyshire@adelaide.edu.au

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Background. Computerized Patient Information Systems (CPIS) are used increasingly in health care, yet few studies have asked clinicians to describe their experiences of using these systems and what they mean to their practice and patient care.

Aims and objectives. The aim of this study was to explore clinical nurses' and midwives' perceptions and understandings of computerized information systems in everyday practice. The objective was to provide a detailed and faithful account of clinicians' experiences of using such systems.

Design. A qualitative design was used, based upon interpretive phenomenology.

Methods. A total of 13 focus groups involving 53 practitioners was conducted in hospitals across five Australian states with nurses and midwives from a wide range of practice settings. The participants ranged from Level 1 RNs to Clinical Nurse Consultants and nurses with an IT project management role.

Results. This study focuses specifically on clinicians' experiences of using CPIS to manage clinical information. Clinicians' experiences were characterized by digital disappointment rather than electronic efficiencies. Clinicians reported generally that computerization had neither enhanced their clinical practice nor patient care, nor had it improved patient outcomes.

Conclusions. Participants' experiences were predominantly negative and mostly critical of CPIS and their: perceived inability to capture 'real nursing', difficulty in use, incompatibilities, non-responsiveness and irrelevance to patient care and meaningful clinical outcomes.

Relevance to clinical practice. Technological 'solutions' to health care problems are endlessly seductive and easily entrance policy and decision makers. Computerization will continue to impact upon clinical practice and cannot be wished away. Today's computerized systems may have been developed with scant regard for clinician end-users. A crucial issue facing everyone in health informatics is how point-of-care systems can be developed in ways that involve clinicians meaningfully and which recognize and respond to the complexity and subtlety of the world of nursing and midwifery practice.

Key words: clinicians' experiences, Computerised Patient Information Systems (CPIS), focus groups, qualitative research

Introduction

Increasing computerization within health care continues to have an impact on nursing practice. Nurses are urged to use Computerized Patient Information Systems (CPIS), with promises that these will reduce paperwork, free nurses' time, improve accurate recording, provide medico-legal safeguards, ease access to clinical information and improve patient outcomes. (See Appendix 1 for details of the various systems referred to by the participants). However, introducing and developing computerization is about considerably more than installing new technology and training people in its use (Hawthorne & Yurkovich, 1995; Purkis, 1999; Goorman & Berg, 2000). Consequently, a deeper understanding is required of clinicians' perceptions of CPIS and of how they work with these in everyday practice.

I was commissioned by Leading Management Solutions Pty (LMS), a CPIS development company that had received Commonwealth Government research funding, to study Australian nurses' and midwives' experiences of using current CPIS. The research question was 'What are nurses' and midwives' experiences of using CPIS in everyday clinical practice?' Two central study findings have previously been reported describing clinicians' experiences of CPIS 'user friendliness' (Darbyshire, 2000) and discussing the practice politics of CPIS (Darbyshire, 2001). This paper presents another major theme particularly germane to clinical nursing – clinicians' experiences of using CPIS in their everyday handling and management of clinical information.

Background to the study

Considering that 'Automated information systems have been part of the health care environment for nearly 30 years (Manning & McConnell, 1997, p. 141), it is surprising that few studies have explored clinicians' perspectives of using CPIS (Timpka & Johansson, 1994; Karlsson *et al.*, 1997; Valenta & Wigger, 1997; Wilson & Fulmer, 1997). There are numerous studies of 'nurses attitudes to' various aspects of CPIS (see e.g. McBride, 1996; Marasovic *et al.*, 1997; Simpson & Kenrick, 1997) but as Wilson & Fulmer have observed:

Although more nurses are using computer technology, little is understood of how nurses perceive the impact of these technologies on their practice. (1997, p. 23)

Reluctance to use appropriate qualitative research approaches to explore health informatics has been noted (Murphy *et al.*, 1998), but the value of qualitative research in this area has become increasingly recognized (see e.g. Ridsdale & Hudd, 1997; Goorman & Berg, 2000; Lee *et al.*, 2002). This

study redressed this gap by investigating the perspectives of nurses and midwives working directly with such systems. The aims of this study were:

- 1 to gain a deeper understanding of nurses' and midwives' experiences of using CPIS;
- 2 to explore nurses' and midwives' meanings, perceptions and understandings concerning CPIS; and
- 3 to investigate clinicians' perspectives of the impact of CPIS on patient care, clinical practice and outcomes.

Research approach and methods

This study sought to answer the question, 'What are nurses' and midwives' experiences of using CPIS in everyday clinical practice?' A qualitative research approach, drawing on the established tradition of interpretive phenomenology (Benner, 1994) was chosen because it would best answer the research question. This approach allowed clinicians' experiences and perspectives of using CPIS to be ascertained, presented and interpreted.

Selecting the research participants

In qualitative research, sampling aims to obtain information-rich cases. Participants were thus selected to include nurses and midwives with experience of the central study phenomenon, i.e. they had current experience of using any CPIS in their clinical practice and were willing to discuss this. This was not an evaluative study of a particular product or system, but of clinicians' experiences of CPIS in general. Various hospitals across southern and eastern Australia were approached by LMS and myself, and invited to participate in the study. Qualitative research does not claim statistical representativeness but even within the opportunistic sampling approach that was used, it is important to include a broad range of experiences of the study phenomenon. Therefore, we circulated information about the study's focus group interviews widely across all areas and departments of the participating hospitals.

Data collection and analysis

Recruitment was highly successful and 13 focus group interviews were held in hospitals in five Australian state capital cities and one regional centre between October and December 1998. Fifty-three participants from approximately 25 different public and private hospital, and community areas such as general medical/surgical, midwifery, child health, mental health, anaesthetics, clinical support, emergency, theatres, intensive care and community health participated

in the study. Interviews lasted between 45 and 90 minutes, and each group was conducted. Interviews began with 'focused but roomy' questions about CPIS that the participants had used. This progressed to more specific aspects of their usage. An advantage of my being very unfamiliar with CPIS was that the participants had to explain their workings to me in some detail. Interviews were tape-recorded, transcribed and checked to ensure accuracy and completeness of the interview data. Data collection and initial analysis were concurrent as this enabled emerging themes from early data to inform subsequent interviews. Each interview was analysed manually line-by-line to identify and explore salient themes, patterns, events, perceptions, understandings and practices that highlighted the practitioners' experiences of using CPIS.

In the data presented, PD is the author and interviewer, FG# is the number of each focus group and P# is the respective focus group participant. This information helps establish analytic 'trustworthiness' by showing the 'spread' of cited data and lets readers see that, for example, all quotations are not from only one or two participants.

The influence of CPIS on clinical practice and patients

Participants were clear that CPIS had a significant impact and influence on their practice. While some participants described positive aspects of their use, the practitioners' experiences with CPIS were predominantly negative.

CPIS as beneficial and valuable

Few participants found CPIS beneficial in their practice. The main benefits suggested were reducing administrative or repetitive tasks, or improving legibility of notes and records. The advantage of CPIS for patients was less clearly expressed but seemed to be that nurses would have more time to spend 'at the bedside'. Documentation takes up a considerable amount of nurses' time (Lower & Nauert, 1992; Dennis *et al.*, 1993; Minda & Brundage, 1994) and thus anything that reduces or replaces paperwork was appreciated:

PD: Why did they like it, why were they happy with it [the CPIS]?

P1: Replaced all the writing.

P4: It replaced a lot of paperwork. (FG2)

Some participants described time-saving afforded by CPIS by not having to create care plans from scratch, not having to enter repeatedly the same information into a variety of forms and having to record less clinical observations manually. As one commented:

P1: If people sat down and wrote nursing care plans the way they should you know that's half an hour to three quarters of an hour per shift to do that, this (CPIS) takes five minutes and that was a huge benefit. (FG5)

Where nurses were enthusiastic about their system, they saw some evidentiary benefits. This nurse explained:

P1: We didn't have a data system before all this to say 'yes this is how much time per patient is taking.' Before it was all done on assumption. Now they've got hard evidence to show that this is what we're doing...and in this day and age that's what you need, you have to have that evidence. (FG5)

Participants reporting positive experiences of CPIS tended to work in the 'information-rich' and technologically sophisticated areas. The continuum here extended between a fully integrated, responsive, paperless environment used routinely by all staff in the unit, to limited access to a single ward computer. One ICU nurse who used this 'state-of-the-art' system was adamant that despite her initial misgivings, she would now be reluctant to give it up:

P2: When the system first arrived...we fought it like crazy. No, I won't have anything to do with it. ...It probably took me six months to learn all of the bits and pieces with it, and now I wouldn't be without it. (FG9)

However, such enthusiasm for a CPIS was the exception rather than the rule.

CPIS as irrelevant, useless or sinister

Clinicians were largely critical and suspicious of CPIS in relation to their handling of clinical information. They found them difficult and time-consuming to use. They believed they were primarily management rather than clinical tools and they believed that they 'short changed' nursing by being incapable of capturing much of what they believed was crucial in nursing care.

Clinical information: 'The biggest argument against clinical information systems from nurses is that it doesn't reflect their practice' (FG4, P3)

Practitioners were asked specifically about the input and output of clinical information. Their perceptions of data entry were almost uniformly negative with most describing serious difficulties with ease of use, additional to the previously reported difficulties of using the basic hardware and software involved (Darbyshire, 2000). Clinicians also described entering 'management's information' which they viewed as having little to do with clinical practice.

Considerable discussion occurred regarding the ability of CPIS to capture essential elements of nursing and patient care. Most participants believed that only selected and partial information was entered into the systems. However, some participants put this criticism into an important perspective when they observed that nurses have never been particularly successful in 'capturing nursing' in previous nursing documentation. As one nurse noted:

P6: I've been reviewing case notes for the last twelve years, and we do not currently record what happens to a patient, we do not record very well what happens to anybody from a nursing care perspective. (FG7)

Practitioners believed that they were trying to 'fit' a complex caring practice into systems unable to accommodate this and felt that their data entry efforts created only a partial view of their practice, both in quality and quantity. Areas of care most frequently mentioned as being absent from CPIS were the roughly termed 'emotional and psycho-social' aspects of care. Participants articulated this concern in different ways:

P1: It's really a flawed system isn't it? ...They might be constipated but at the same time they're also dying. So you spending a lot of time with them, not necessarily doing anything specific but just being in the room and I mean how can you measure that? You can't, you really can't.

P3: And bureaucrats don't understand that 'being there' stuff. As far as they're concerned that's not productive hours. Your productive hours are the ones that are earning us our money and yet the being there stuff is just so important, and so much of what we do. (FG9)

P2: You do one thing in isolation, each unit of care is a separate entity but in practice you're doing five things at once and that's counselling, chatting 'Hi how are you going', and it's not just nothing stuff, what you're doing it's very important caring.

P3: A lot of what we do is sort of person stuff or and those things are difficult you know you don't think when you start talking to a parent oh okay,...well that took twenty minutes to talk to them, I mean you do it as a human being those things aren't tangible, you know you can't sort of put a time on it. (FG13)

Getting information out of CPIS: 'the black hole'

The clinicians saw very little useful information returning to them from a CPIS in any usable form. The phrase used several times here was the 'information black hole'. As these participants explained:

P4: If the person using it can't see, what comes out of it, that they're just entering all this stuff and never know what happens to it, where it goes in this big black hole. (FG8)

P3: A lot of the large systems that are ensconced in the public system here in 'State X' have traditionally been black holes of data for the clinician. ...They never ever saw the results of it and the results that did come out were privy to a select few right at the executive level. (FG4)

Participants explained this 'information black hole' phenomenon in various terms; of information not being used because hardware or software made it too difficult to access, of information retrieval being the role of someone or somewhere else, of unacceptable delays and of power relations which signaled that such information was not the rightful domain of clinicians. These participants explained the difficulties involved in retrieving what may have been useful clinical information from their CPIS:

P3: We never see anything coming back from it, which is always. It's not very encouraging. (FG13)

P1: You will have forgotten what you were asking for by the time you get a report. (FG2)

P3: The age of people having hysterectomies for example is a clinical indicator, and I could imagine [the CPIS] being able to tell us that very easily. At the moment if I went to do that I'd have to ask the coder to give me a list of all patients who've had a hysterectomy and then I would physically have to go and look at all their case notes and find a date of birth. I mean that's horrendous, I've done it and it happens lots. (FG6)

Clinicians also felt that useful information could be retrieved from CPIS but that this was, for various reasons, really the role of someone else:

P1: It [the CPIS] is for data collection but you never heard the feedback or you never closed the loop. And you're doing a lot of work for other people really.

P4: But it's also part of the nurses' role, they collect data for the doctor, they get data for the patient on this, they get data for management on that, but they don't get anything but data back really that they can use themselves for their own purposes. (FG13)

P2: I think that's [the CPIS] supposedly for those who are going to look at it at the other end to pull out those stats that you were talking about, that's my understanding. ...But we don't get any of that feedback do we? (FG11)

Clinical information was also viewed as 'belonging' to the more powerful groups within the organization and thus not part of nurses' legitimate business. As one clinician commented:

P2: I wonder why doctor so and so has so many more bleeding angiograms? I wonder if we could do a comparison between two doctors? No way love, don't even think it. (FG4)

Participants generally believed that clinical information was not readily retrievable or accessible from CPIS. Clinicians entered data but saw little return for their efforts. As one nurse remarked ruefully, 'there's nothing coming back as a benefit from that. So it's all cost at the moment but no benefit' (FG7, P5).

Even when clinicians were able to access or recover information from the CPIS, the originally entered information seemed to have mutated into an unrecognizable or unusable form. This nurse had a special interest in CPIS and was clearly 'computer literate', but nonetheless found it dispiriting trying to obtain clinically useful information:

PD: What could clinicians actually get out of these systems that really could be beneficial?

P6: Lots and lots of things. Yeah I have my nightmares sometimes just trying to get information out of the computer system...the stuff that goes in is good data, but something happens to it in the interim, and it's no longer good any more, because it gets, aggregated or collated or something, or it gets dropped off. ...We wanted to get charge nurses to be able to do their own queries, in the system, in minutes. I can't even do that now with our system, in the mainframe I have to go through two or three other programs,...and then eventually hopefully we come up with something that's useful. So lets say you're a clinician and you, you work on a medical ward, and you had a particular interest let's say in looking after patients with asthma. So you want to know about outcomes for cases that you've cared for,...they should be able to pull that data out but they can't. (FG7)

Other participants explained the complexities that rendered the extraction of meaningful, useful data so daunting. It seemed that fundamentally the different CPIS in use across different funders and providers simply cannot 'talk to each other':

P6: One of the biggest things stopping that (accessing data), being able to have that at the moment, is our coding systems...from a clinical perspective sometimes they don't, the coding they use don't make a lot of sense...And so if I wanted the main frame to tell me how many cardiac bypasses we've done, it will tell me according to Commonwealth Medical Benefits Scheme, which is different coding that what the coders sent to ISIS and actually put in the case-notes.

P1: So we're stuffed basically because there isn't one consistent one to retrieve data. It means we have to have all different systems to collect it and then we can't get it all back together for patients going through.

P5: Coding is not just coding. (FG7)

Given the constant exhortations that nursing must become 'evidence based', 'customer focused', 'outcomes driven' and more, it was salutary to discover how the participants experienced almost no relationship between CPIS and patient outcomes.

CPIS and outcomes: 'no-one really knows what happens to people' (FG1, P2)

Participants saw CPIS as having almost no helpful influence in identifying or improving clinical outcomes. As this nurse explained:

P3: The care that I give to a critically ill ventilated baby is exactly the same whether I have to write it down or whether I click into the computer. ...I don't actually think that having this computer system influences the baby's outcome. (FG9)

Participants described the degree of difficulty they faced in using CPIS to help with clinical outcomes. This dialogue highlights some of these:

PD: Where is the relationship between these systems and any kind of clinical outcomes?

P3: It's in there but you can't get it.

P2: Yeah that's the problem.

PD: Help me see more about that.

P3: OK. Collect data on maybe a factual basis or in looking at different tasks that nurses do or based on clinical pathways...looking at how those jobs and tasks have gone together to make up a patient episode of care. Now, the nurse on the ward is not going to be able to get back to see that because they did all of these things with patient X, that he's any better off than patient Y. ...We can see that even though we've reduced cardiac bypass graft down from a ten day stay two years ago, down to an eight point six day average stay now, the actual nursing care that goes into that has actually gone up. So it costs more nursing wise to keep that patient in hospital for eight point six days than it does to keep them in for ten days, so it's not benefiting nursing at all. All it's benefiting is the figures and the turnover of patients and doctors' fees because they get more patients through. (FG4)

Others described similar difficulties with outcomes, noting the current focus on what they believed to be rather simplistic outcomes, such as number of days in hospital. Once again, the discrepancies between management, clinician and patient perspectives regarding outcomes was highlighted:

PD: Do any of the systems at the moment focus at all on outcomes?

P2: Well I don't think the system lets us see our outcomes, I think that's another thing, we're being told we should be able to.

P3: Our outcome is the discharge.

P2: But what condition are they in?

P3: ...Because we did discharge early to the care of community health. So we don't really know, we don't have the feedback, the only time we know if something's wrong is if they say, 'Oh that patient's back on, (ward X)', because they needed to have this done after they left you. And you think, oh we didn't even know that they were there. (FG1)

P4: The patients are out in three days, they don't look at the fact that they're sicker, they're out, we've got another bed, so they see it as influencing outcomes, but we certainly don't.

P2: Yeah, that's a management perspective but not from a clinical perspective. (FG9)

Clinicians in this study may well have shared the concern raised in a UK study of workload measurement systems where the authors concluded that:

There has been a rapid development of measurement systems in the health services in the United Kingdom (UK) over recent years, not always matched by a thorough understanding of the phenomenon being measured...without this kind of investigation of how they actually work *in practice*, [italics in original] it would be prudent to be wary about any of the measurement systems which have been proposed. (Carr-Hill & Jenkins-Clarke, 1995, p. 221)

It is reasonable to expect a relationship between CPIS and improved outcomes to exist. When clinicians are expected to use CPIS and to ensure that timely and accurate data are entered in, CPIS should 'live up to their side of the bargain' by providing information or data that will be useful to clinicians as they work to identify and improve clinical outcomes for patients. From the participants' descriptions of their experiences it seems that such a link between CPIS and improved patient outcomes may be more prominent in the sales brochures than at the bedside.

Limitations of the study

Data collection occurred in late 1998 and thus a criticism could be made that the data are no longer 'valid'. This could be the case if this were a study merely of computer hardware and software where change is rapid. However, change in professional cultures is not nearly so dramatic. The data could also be seen as outdated if numerous other studies (more recent) had already addressed this issue, but as a recent study has acknowledged, 'there remains an almost complete

lack of published information on the quality outcomes, *staff perceptions* [my italics] and cost benefits of CIS implementation' (Fraenkel *et al.*, 2003, p. 120). Therefore, this remains one of the rare studies that has obtained and presented the detailed perceptions and experiences of practitioners who actually use CPIS. It is also not uncommon in the research literature to read valuable studies in both health care informatics (Fraenkel *et al.*, 2003) and in qualitative health research generally (Whittaker, 2002) where the study data is over 5 years old.

This was an exploratory qualitative study undertaken in one country and it would thus be foolish to claim that its findings are generalizable to *all* nurses and midwives. Gathering data at a site via a single focus group has limitations such as the inability to seek clarification of participants' comments later and to track their experiences over time. Despite such limitations, much can be learned from a detailed account of the CPIS experiences of even small numbers of practitioners. This study has highlighted a broad commonality of CPIS experiences and perceptions among nurses and midwives from varying levels of practice and from a wide range of clinical areas that merits attention and adds to our research understandings of how computerization impacts on practitioners and their practices. 'What can we learn from studies with such small numbers?' is a frequent criticism of qualitative research. Walcott (2002), in his Keynote Address at a recent qualitative research conference provided the answer, when he explained succinctly, 'As much as we can'.

Discussion

Health care computerization is promoted on the basis of its numerous benefits; it will save time, improve record keeping, increase accuracy, enhance the flow of information, improve the quality of clinical data available, reduce paperwork and more. Much of this is identical to how computerization is promoted generally. In the iconography of IT there are no more powerful marketing images than those promising instant connectivity and free flow of information. The smiling, thrusting young professionals in the adverts communicate effortlessly with clients/the office/the internet/their broker. They send and receive e-mails and documents, faxes and pictures and pull out the latest sales projections instantly at the push of a button – and all via their wire-less laptop – as they sit atop a mountain, sip a latte in their favourite cafe or languish in bed. It is an irresistible message, but the problem is, as most gadget owners will attest, that regular communication is more usually with 'error messages' as few gadgets actually fulfil their promises without a struggle. Clinicians in

this study were no strangers to such digital disappointment. Chu (1993) has argued this forcefully claiming that:

The current form of clinical systems is self-destructive because of poor quality and performance. Unfortunately, nurses are wearing the blame for something that is not their fault. (p. 59)

While some clinicians had positive experiences of CPIS, most described their experiences of using CPIS with a mixture of cynicism, passive acceptance or weary resignation at yet another burden that had been foisted on them. Current systems seemingly lacked the sensitivity or facility to allow nurses to record the less-tangible caring practices of nursing which often go unrecognized and therefore unrecorded and ultimately unvalued – the ‘being there stuff’ (FG2) as one participant described it, or ‘The real stuff’ as Annells & Koch (2001, p. 806) called it in a different context. This perceived failure of CPIS to account for such important nursing and midwifery work is now well recognized and further supported by this study. Goorman & Berg (2000, p. 8) discuss this ‘mostly invisible work’ of nurses and argue that ‘this key role is not recognizable in the standard view of medical and nursing work that is conceptualized in the electronic patient record’. The question arising here is, ‘Can any CPIS system which is based essentially on standardization, account for such “invisible” practices which even experienced nurses can find difficult to articulate clearly?’

Nor did the CPIS seem to capture the true extent of patient acuity. While there is an impossible difficulty for any system to capture ‘reality’ in its totality, clinicians wanted systems that were sensitive and adaptable to the differing acuities of patients with ostensibly the same diagnosis. However, many participants realized that such a request has financial and political implications in an era of Casemix and Diagnostic Related Group (DRG) based funding.

Incompatibility between systems was a serious shortcoming of CPIS. Systems seemed unable to fulfil what for clinical end-users was a basic function – that they ‘speak to each other’. A clinician will see little benefit in a system which cannot communicate with an existing one in her hospital or integrate with other important information or patient care programmes, perhaps in the local community services.

Participants’ experiences of accessing and extracting information from the CPIS were almost entirely unsatisfactory. It seemed that clinicians were simply the ‘soldier ants’ of computerized information (Darbyshire, 2001), entering data but receiving little useful clinical information back. There was scant awareness of potentially valuable information that could be extracted from a CPIS. The view was very much that the data entered by clinicians simply went ‘somewhere else’

to ‘someone else’ to be dealt with. Few participants seemed to know how to extract useful or meaningful information or data from the system. Even if they were aware of exactly what they wanted, it was simply ‘too hard’. This was frustrating for many participants as they were sure that in principle the CPIS should be able to provide them with useful information which could help answer some pressing clinical questions.

Harder still, perhaps, was linking CPIS information to patient outcomes. It seemed that timely discharge was the major outcome as the focus was predominantly on ‘throughput’ and trying to ensure that patients did not linger longer than their DRG or Casemix funding stipulated. Clinicians’ experiences suggested that the use of CPIS had not led to any real changes in their thinking or practice. The CPIS was simply an electronic way of doing what was previously done, a keyboard version of the previous pen and paper system.

Advocates of health care computerization may suggest that the problems identified by these end-users may evaporate when the technology improves. This is a fond hope that assumes that such problems are essentially technical rather than social and cultural in nature, but it seems that even the most sophisticated technology will fail in the absence of clear appreciation of the needs, perceptions and experiences of end-users. Clinicians may ask themselves whether these recently reported scenarios sound familiar. Cedars-Sinai Medical Centre in Los Angeles is one of several hospitals that has ‘turned off its computerized physician order entry system’ in the face of mounting complaints from users (Chin, 2003, p. 1). The Mayo Clinic in Jacksonville, Florida has abandoned its use of fingerprint access to patient records following increasing complaints about its use and a ‘major software meltdown’ (Morrissey, 2002, p. 22). Simpson (2002) has also reported on the spectacular failure of the City of Atlanta’s US\$15 million ‘personnel management system’ which was so flawed that the advice of consultants was to ‘just shoot it and walk away’ (p. 12). The difference between the theory of CPIS and their use in everyday clinical practice seems still to be, as Stenhouse (1975) noted in another context, like the difference between Field Marshall Haig’s headquarters and the mud of Flanders.

How prescient T. S. Eliot was, when in 1934 he wrote at the beginning of his play, ‘The Rock’, of:

The endless cycle of ideas and action,
Endless invention, endless experiment,
Brings knowledge of motion but not of stillness;
Knowledge of speech, but not of Silence.

He then asked the now familiar questions that many practitioners may also be asking of CPIS:

Where is the wisdom we have lost in Knowledge?
Where is the Knowledge we have lost in Information?

Conclusions

This study suggests that most clinician end-users of CPIS may indeed be 'discontents' (Goorman & Berg, 2000) but with good reason. From their perspective, the promised improvements of CPIS have not materialized and they feel comparatively powerless to influence these systems. McManus (2000) argues within a UK context that:

Industry and the NHS must ensure that the whole lifecycle of a project is considered *together with its impact on users* [my italics] and its integration with the rest of the information systems. (p. 23)

Could a generation of CPIS really have been developed and introduced with so little regard for the everyday world of clinical nursing and midwifery, and the complexity of this social, political and professional milieu that such a recommendation still needed to be made in the year 2000?

Familiar, comforting and almost reflex response to clinicians' disaffection with CPIS are that they are, as one Chief Information Officer opined, 'resistant to change - period' (Gillespie, 2002, p. 57) or that 'more education and training' is the answer. Such responses conveniently locate the 'problem' with CPIS within the end-users. However, I contend that the issues raised by this study go much deeper, perhaps to the identity and 'soul' of what it means to be a nurse or midwife in an age of increasing technology and of omnipresent technological understandings of health care (Benner, 1985; Barnard & Sandelowski, 2001). To engage clinicians meaningfully with CPIS will require a more participatory, discursive and reflective approach than their experiences suggest has been the norm.

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Contributions

Study design: PD; data collection: PD, AH; data analysis: PD; manuscript preparation: PD; literature review: PD, CO.

References

- Annells M. & Koch T. (2001) 'The real stuff': implications for nursing of assessing and measuring a terminally ill person's quality of life. *Journal of Clinical Nursing* 10, 806–812.
- Barnard A. & Sandelowski M. (2001) Technology and humane nursing care: (ir)reconcilable or invented difference? *Journal of Advanced Nursing* 34, 367–375.
- Benner P. (1985) Preserving caring in an era of cost-containment, marketing and high technology. *Yale Nurse*, August 1985, 12–20.
- Benner P. (1994) *Interpretive Phenomenology: Embodiment, Caring and Ethics in Health and Illness*. Sage, Thousand Oaks, p. 372.
- Carr-Hill R. & Jenkins-Clarke S. (1995) Measurement systems in principle and in practice: the example of nursing workload. *Journal of Advanced Nursing* 22, 221–225.
- Chin T. (2003) Doctors pull plug on paperless system. *American Medical News* 46, 1, 4.
- Chu S. (1993) Part 1, Clinical Information Systems: a fourth generation. *Nursing Management* 25, 59–60.
- Darbyshire P. (2000) User friendliness of computerised information systems. *Computers in Nursing* 18, 93–99.
- Darbyshire P. (2001) The Practice Politics of Computerised Information Systems: a focus group study. *Nurse Researcher* 8, 4–17.
- Dennis K., Sweeney P., Macdonald L. & Morse N. (1993) Point of care technology: impact on people and paperwork. *Nursing Economics* 11, 229–237, 248.
- Fraenkel D., Cowie M. & Daley P. (2003) Quality benefits of an intensive care clinical information system. *Critical Care Medicine* 31, 120–125.
- Gillespie G. (2002) I.T. often a tough sell to nursing staff. *Health Data Management* 10, 56–59.
- Goorman E. & Berg M. (2000) Modelling nursing activities: electronic patient records and their discontents. *Nursing Inquiry* 7, 3–9.
- Hawthorne D. & Yurkovich N. (1995) Science, technology, caring and the professions: are they compatible? *Journal of Advanced Nursing* 21, 1087–1091.
- Karlsson D., Ekdahl C., Wigertz O. & Forsum U. (1997) *A Qualitative Study of Clinicians' ways of using a Decision-support System*. Proceedings AMIA Annual Fall Symposium, pp. 268–272.
- Lee T.T., Yeh C.H. & Ho L.H. (2002) Application of a computerized nursing care plan system in one hospital: experiences of ICU nurses in Taiwan. *Journal of Advanced Nursing* 39, 61–67.
- Lower M. & Nauert L. (1992) Charting: the impact of bedside terminals. *Nursing Management* 23, 40–44.
- McBride S. (1996) Attitudes towards computers: a test of construct validity. *Computers in Nursing* 14, 164–170.
- McManus B. (2000) A move to electronic patient records in the community: a qualitative case study of a clinical data collection system, problems caused by inattention to users and human error. *Topics in Health Information Management* 20, 23–37.
- Manning J. & McConnell E. (1997) Technology Assessment: a framework for generating questions useful in evaluating nursing information systems. *Computers in Nursing* 15, 141–146.
- Marasovic C., Kenney C., Elliot D. & Sindhusake D. (1997) Attitudes of Australian nurses toward the implementation of a Clinical Information System. *Computers in Nursing* 15, 91–98.

- Minda S. & Brundage D. (1994) Time differences in handwritten and computer documentation of nursing assessment. *Computers in Nursing* 12, 277–279.
- Morrissey J. (2002) Access denied. *Modern Healthcare* 32, 22–26.
- Murphy E., Dingwall R., Greatbatch D., Parker S. & Watson P. (1998) Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment* 2, 1–292.
- Purkis M. (1999) Embracing technology: an exploration of the effects of writing nursing. *Nursing Inquiry* 6, 147–156.
- Ridsdale L. & Hudd S. (1997) What do patients want and not want to see about themselves on the computer screen – a qualitative study. *Scandinavian Journal of Primary Health Care* 15, 180–183.
- Simpson R. (2002) When bad implementations happen to good systems. *Nursing Management* 33, 12–14.
- Simpson G. & Kenrick M. (1997) Nurses' attitudes toward computerisation in clinical practice in a British general hospital. *Computers in Nursing* 15, 37–42.
- Stenhouse L. (1975) *An Introduction to Curriculum Research and Development*. Heinemann, London.
- Timpka T. & Johansson M. (1994) The need for requirements engineering in the development of clinical decision-support systems: a qualitative study. *Methods of Information in Medicine* 33, 227–233.
- Valenta A.L. & Wigger U. (1997) Q-methodology: definition and application in health care informatics. *Journal of the American Medical Informatics Association* 4, 501–510.
- Walcott H. (2002) *Keynote Address at the Qualitative Health Research Conference*, September 2002, Bournemouth, UK.
- Whittaker A. (2002) Eliciting qualitative information about induced abortion: lessons from northeast Thailand. *Health Care for Women International* 23, 631–641.
- Wilson R. & Fulmer T. (1997) Introduction of wireless, pen-based computing among visiting nurses in the inner city: a qualitative study. *Journal of Community Health Nursing* 14, 23–37.

Appendix 1

Computerized Patient Information Systems are described by various other terms and acronyms, e.g. Clinical Information Systems (CIS), Electronic Patient Records, etc. For simplicity I used the one term CPIS, which refers to any computerized system which the study participants were involved in using in their clinical practice. Participants mentioned the following

specific systems in their comments: CONPAS, EXCELCARE, TREND CARE, CARESYS, TRENDSTAR, PROACT, PACE, CAREVIEW, AS400, ANSOS, IBIS, HOSRIP, ATS/PMI, CPLAN, SHARON, HIBISCUS, FAMUS, NDIS, OBSTET, HOSPAS, APACHE, KRONOS, ANZICS, ISS, PAIS, PRISM and CCIS.