The accessibility of research-based knowledge for nurses in United Kingdom acute care settings

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Background. The successful dissemination of the results of the National Health Service (NHS) research and development strategy and the development of evidence based approaches to health care rely on clinicians having access to the best available evidence; evidence fit for the purpose of reducing the uncertainties associated with clinical decisions.

Aim. To reveal the accessibility of those sources of information actually used by nurses, as well as those which they say they use.

Design. Mixed method case site, using interview, observational, Q sort and documentary audit data in medical, surgical and coronary care units (CCUs) in three acute hospitals.

Results. Three perspectives on accessibility were identified: (a) the humanist – in which human sources of information were the most accessible; (b) local information for local needs – in which locally produced resources were seen as the most accessible and (c) moving towards technology – in which information technology begins to be seen as accessible. Nurses' experience in a clinical specialty is positively associated with a perception that human sources such as clinical nurse specialists, link nurses, doctors and experienced clinical colleagues are more accessible than text based sources. Clinical specialization is associated with different approaches to accessing research knowledge. Coronary care unit nurses were more likely to

perceive local guidelines, protocols and on-line databases as more accessible than their counterparts in general medical and surgical wards. Only a third of text-based resources available to nurses on the wards had any explicit research base. These, and the remainder were out of date (mean age of textbooks 11 years), and authorship hard to ascertain.

Conclusion. A strategy to increase the use of research evidence by nurses should harness the influence of clinical nurse specialists, link nurses and those engaged in practice development. These roles could act as 'conduits' through which research-based messages for practice, and information for clinical decision making, could flow. This role should be explored and enhanced.

Introduction

The production and dissemination of quality research information is of no use to nurses if they do not, or cannot, gain access to it. Accessing research-based information is a central strand of a developing National Health Service (NHS) evidence based culture. The NHS information strategy, the development of NHS Net, and the National Electronic Library for Health all strive to bring better quality research-based information closer to decision makers at the bedside. This paper focuses on the interaction between nurses, their clinical decisions and the information informing those decisions. Providing critical appraisal training, developing nurses' research implementation skills and forging complex strategies of research utilization will ultimately prove fruitless if not based on an understanding of how *real* nurses (as opposed to academics' visions of nurses), access information for *real* clinical problems, in *real*-time. Information solutions cannot be tailored to the needs of nurses unless we have a meaningful picture of what those needs are.

Accessibility and research-based information

High on the list of reasons why nurses fail to use research evidence is the practitioners' perceived lack of accessibility to such material (Bostrum & Suter 1993, Funk *et al*. 1995, Parahoo 2000, Retsas 2000, Rodgers 2000). At the same time, the number of journal articles on research utilization in nursing is testimony to nursing's discursive promotion of the idea of research-based practitioners as the exemplar of the modern, fully equipped, professional. These trends raise the vexed question, 'if nurses have to meet the professional, policy and educational imperatives of research use and yet research-based knowledge is seen as inaccessible, from where are they obtaining such knowledge?'

Studies with physicians (Covell *et al*. 1985) suggest that individuals claim to access research knowledge via media such as journals whilst in reality consulting colleagues from their own and other professions. Like nurses, doctors also have vested interests in claiming to use research information as the basis for practice. Importantly, the reality of their information use was only exposed by research methods which did not rely on self reported behaviour (Covell *et al*. 1985).

New ways of presenting information for clinical practice have proliferated over the past 10 years. The NHS research and development strategy has been accompanied by an investment in an NHS information strategy (Department of Health 1993). Organizations such as the International Cochrane Collaboration and the NHS Centre for Reviews and Dissemination have striven to make synthesized research evidence accessible via targeted printed matter, the internet and CD-ROMs. It is unclear, however, what impact these new ways of presenting information are having on clinical decision makers. Moreover, traditional resources, such as on-site libraries, are being transformed into 'information centres' staffed by 'information brokers' (Wakeham 1996, Flemming *et al*. 1997).

Alongside these contextual changes, evidence based health care has developed into a tried and tested set of techniques for focusing clinical uncertainty by asking structured clinical questions, searching the literature (Flemming 1999, NHS Centre for Reviews and Dissemination 2000) and appraising the validity of evidence. Our knowledge of research implementation has also increased (Oxman 1994, NHS Centre for Reviews and Dissemination 2000). All of these developments rely on clinicians having access to the best available evidence; evidence fit for the purpose of reducing the uncertainties

associated with their decisions. Without access to good quality research knowledge, evidence based decision making will not be possible.

The study

Aim

The study on which this paper is based examines the 'real life', real time, use of information in clinical decision making by nurses and does so alongside the perceived realities of nurses revealed by interview and modelled self reports. It aims to reveal the accessibility of those sources of information actually used by nurses as well as those which they say they use.

Design

A case study design (Yin 1994) with embedded units of analysis – hospitals, wards/units, individual nurses and clinical decisions – was used.

Methods and sampling

A critical review of the literature on research use and decision making in nursing (Thompson 1999) provided the basis for a screening questionnaire which yielded demographic characteristics of the population from which we selected informants for interview and observation. Selection was carried out by randomly selecting individuals from within the demographic characteristics deemed potentially theoretically significant in the aforementioned critical literature review.

Organizational sampling units

The organization sample was selected based on key differences (Table 1). Six surgical, six medical and three coronary care units (CCUs) provided the backdrop for sampling. Ethical approval was granted by the relevant Local Research Ethics Committees. Piloting was in two NHS Trust sites unconnected with the main study.

Instruments

Details of the screening questionnaire used can be found in Thompson *et al*. (2001).

Semistructured interviews

Interview material was collected across the sites from a total of 108 nurses of differing grade, speciality, educational and professional development, and clinical experience. The interviews were designed to let nurses raise (hitherto unanti-

cipated) important issues and to provide a qualitative picture of the accessibility, barriers to use and perceptions of usefulness associated with research-based information. Interviews lasted up to 1 hour, taking place mainly in the ward manager's office. Interviews were tape recorded and transcribed verbatim before importation into the qualitative data analysis package Nudist NVivo (http://www.qsr.com.au).

Non-participant observation

Observational material was collected over 180 hours from 60 nurses (56% of those interviewed were also observed). Observation revealed not just what nurses said they did but how they used information sources in real time. We worked within the participant-as-observer framework (Roper & Shapira 2000). Our non-participant status as observer was explicit and this meant that we were able to validate our perceptions of what was happening during observation with informants, and to question nurses (*a posteriori*) in order to deepen understanding. Observational material was recorded in the form of field notes by a single researcher, after typing up, these notes were then imported into the Nudist NVivo qualitative analysis package. The final analysis was agreed between primary researchers. We used a number of techniques to minimize the effect of our observer status, for example:

- taking time to build a rapport with the nurses observed;
- observing nurses previously interviewed so that we could triangulate peoples' accounts with an observed 'reality';
- spending many hours in the sites so that our faces became familiar and (hopefully) our presence less threatening;
- underplaying our academic status, instead emphasizing our clinical experience and status as nurses.

Documentary/resource audit

Workplace literature and text/electronic-based resources give valuable insights into organizations' support for information dissemination (Forster 1994). Documentary audit described the evidence available for nurses on wards and allowed cross-referencing of sources referred to during interviews. Ward based materials were hand searched and audited. Publication date, reference to research material, the origin of the document, the nature of the resource, and the clinical focus of the document were all recorded.

Q-sorts and Q methodological modelling

The interview and observational data were used to construct three 'Q-sorts' (sets of stimuli used to model respondents' shared subjectivities on a phenomenon or concept – such as the barriers to using research in practice). The methodology

Table 1 Case site characteristics

Case site features	Case site 1	Case site 2	Case site 3
General information	Large hospital (700 beds). Referral centre for some specialities; large postgraduate medical education centre	University teaching hospital (800 beds). Recent merger had led to formation of a new Trust body	Medium-sized District General Hospital (650 beds) offering general medical and surgical services, Accident & Emergency and Out Patient departments
Research and development infrastructure	Member of NHS Research & Development (R & D) Consortium. R & D facilitator in post to co-ordinate nursing and midwifery R & D within the context of a published strategy for developing research in practice. Key groups: the Research Active Group; the Midwifery R & D Group; the Nursing Research Quality Group	Established R & D panel to develop a strategic framework of research, subject to annual review. Nurses represented on both the Board of Directors and the R & D panel. Nurses actively involved in clinical audit. Research into practice group had been established to implement the findings of nursing research	R & D directorate: Health Services Research Unit and the Clinical Audit Department.Nursing and Professions Allied to Medicine (PAM) involvement in R & D included a Research Support Group and clinical audit co-ordinator posts
NHS R & D support funding	£617,000 – 3 years. Funding directed towards medical R & D. Nursing research mainly in primary and community care and women and children's health	£6 million for 1997/98. Additional funds derived from charities (in excess of £1 million) and commercially funded work (£1·5 million)	£30,000 per annum for 3 years (1998–2001). Revenue from commercial research amounted to £250,000 per year
Nurses' role in any R & D committees	Nursing representation on Trust R & D Committee, University R & D Division and Consortium Quality Group	The Local Research Ethics Committee (LREC), Clinical Effectiveness Group and to be included in proposed Consortium Steering Group for R & D funding	LREC and R & D Steering Group
Practice development structures	Over 30 clinical nurse specialists (CNSs) and nurse practitioners in post and a team of 12 practice development nurses (PDNs). Active link nurses	Large body of CNSs active in practice development, alongside a smaller number of PDNs. Link nurse structure in place	Small team of PDNs focusing on increasing nurses' clinical skills. CNSs attached to various specialities. Link nurse system in place but not effective
Library provision	Extensive postgraduate medical library (over 18 000 books, 286 journal titles) and good on-line database provision and CD-ROM System	Well-stocked postgraduate medical library offering good on-line database provision. Also a smaller library catering for nurses, midwives and PAMs, with a good range of textbooks and journals but limited on-line database provision	Access to well stocked but physically cramped library (20 000 textbooks, 400 periodicals). On-line access to MEDLINE, CINAHL, Cochrane Library and the National Research Register
Ward-based information technology	Ward-based computers used for patient administration; not linked to electronic databases	Ward-based computers for patient admin; CCU installing computer linked to electronic databases just as fieldwork ended	Ward-based computers used for patient administration; not linked to electronic databases
Links with local universities	Strong links with local university offering both undergraduate and postgraduate nurse training through a Faculty of Health, comprising Schools of Nursing, Community and Health Studies and Medicine	Strong links between the Trust and the 'old' and 'new' university providers of medical and nursing education. Some nurses working in the Trust also held part-time academic posts as senior lecturers	Strong links had been established and academics were involved in Trust R & D activity. The university offered diploma level training for student nurses, CPD and Masters level courses and was beginning to recruit doctoral students

had four main stages – for a more detailed account see Stainton-Rogers (1991) and Brown (1993):

1 construction of a 'Q-sample' – a set of stimuli (usually statements) about a specific topic;

2 Q-sorting – respondents systematically sorted Q-sample statements according to a condition of instruction (COI), resulting in an accurately ranked picture of their views. This enabled the respondent to model their viewpoint on a given topic;

3 data analysis – transposing the dataset so that an initial correlation matrix could be constructed based on a dataset in which the Q sample statements were now the rows and the individuals completing the sorts were the column variables. This is a key difference from conventional factor analytic methods in which the data matrix is the other way round; factor analysis of the resultant person × person correlation matrix; computation of factor scores in order to enable interpretation by outlining what the underlying shared perspectives look like. Factor scores represent what a representative Q sort would look for the people defining a particular factor. They are computed as Z scores based on the merged sorts of individuals who load significantly on a factor and taking into account the relative weightings of these sorts (i.e. some people load more heavily on a factor than others). Z scores are transformed back into the integer points on the sorting scale for ease of interpretation (the resulting factor array points mirror the original sorting scale positions, for example, a statement scoring +5 on a sorting scale ranging from +5 (most accessible) to −5 (least accessible) would be seen as most accessible to the individuals defining that factor;

4 interpretation – this is qualitative and takes place with reference to broader theoretical postulates or arguments.

The Q sample

The 42 statements making up the Q sample are presented in the Appendix.

From qualitative coding to Q sample

Information sources named by nurses, observed as being used, or simply available, were identified and printed onto 42 small cards for sorting by the respondents. Because documentary audit and the interview data revealed the research basis of the sources used in the Q sample we were able to focus on the ranking of information *sources* as a consequence of the COI.

The condition of instruction and sort distribution

An individual's interpretation of what the phenomenon means *to them* arises as a result of the COI. The COI is also presented in the Appendix.

One hundred and twenty-two individuals sorted the Q sample cards according to a common COI (see Appendix), and into a roughly normal distribution. Q statement positions were then scored. A statement placed in the −5 position would score 1, +5 would score 11 and so on.

Analysing the Q data

PQMethod version 2·09a (http://www.rz.unibw-muen-chen.de/~p41bsmk/qmethod/) was used for the Q analysis; eigenvalues of more than 5·0 were deemed potentially theoretically significant.

Conventional factor analysis relies on having more rows than columns in a data matrix (Kline 1994) which in Q translates to having more Q statements (rows) than individuals sorting (columns). However, this convention has been shown to be of no practical or conceptual importance to Q approaches, with simulations of different row/column ratios and methods of factor extraction revealing no statistically (or theoretically) significant differences in results (Arrindell & van der Ende 1985). However, PQMethod is not designed for large numbers of sorts and so the data spiking method (on the advice of Prof. Schmolk) was used. We used 78 randomly selected Q sorts which yielded the three factor initial solution (from a 42 × 78 data matrix). The factor scores for these three factors were inserted back into the beginning of the (full 42 × 122) data matrix as reference sorts and the analysis run again resulting in a correlation matrix for the 122 Q sorts against the three reference sorts (representing the extracted factors). This process enabled the use of these correlation coefficients as dependent variables in regression modelling. Quotes or observational data from those individuals who loaded significantly on a factor were used to aid qualitative interpretation of the factors and to add depth to reporting. Analysis was, as in all qualitative projects, not always linear and rigid. However, key analytical decisions and choices were agreed within the research team at each stage.

Regression modelling

Regression modelling (using SPSS 9·0) allowed exploration of factor associations with key demographic variables in the nurses: age, level of education, clinical experience. After checking that assumptions underlying least squares regression were met via scatterplotting, independent variables were entered into a multivariate linear regression model (using the SPSS 9·0 default stepwise option) and where there were significant associations with the Q factors we entered the significant variables into the model together (using the SPSS enter option) as a way of controlling for interactions. The independent variables entered were:

- Clinical experience
- Clinical experience in a specific domain
- Clinical specialty/domain
- Non-professional educational attainment
- Mode of professional preparation (for example, RGN or Project 2000)
- Previous involvement in research as a data collector or subject.

Results

What information was available?

Resources ranged from textbooks, primary research conducted locally, conference output and patient information and local resource files (Table 2). There was no evidence of systematic indexing of resources, making efficient searching by nurses difficult.

The perspectives on accessibility

Three significant perspectives were extracted from Q sorts and are presented in the factor array in the Appendix. It is important to point out that the results relate to accessibility in the broadest sense. That is, accessibility in terms of both physical and intellectual accessibility. It is also important to note that despite the relative differences between perspectives it was the human sources of research-based information that were overwhelmingly seen as most accessible (especially the clinical nurse specialist role).

Perspective one: the humanists

Nurses defining this perspective held the overwhelming view that human sources were the most accessible. This stance accounted for 21% of the variance in the Q sorts. The relative accessibility of human sources was pervasive and tied to 'routine' ways of working, often accompanying very 'un-routine' decisions. Information seeking often following common patterns regardless of the nature of the decisions involved. The explanatory utility of the perspective can be verified from the fact that in 180 hours of observation, involving around 1080 decisions, only two forms of text based research information were used: local protocols or guidelines (used four times) and the British National Formulary (BNF) (used more than 50 times).

Referral to clinical nurse specialists (or those embodying the role) was a common and frequent alternative to having to make a decision oneself. Not surprisingly, the most accessible sources were also the most trusted. Indeed, clinical experience was a key currency in decisions:

Int: Right. How do you know how to treat those more complicated wounds?

Nurse: How do I know how to treat them? Well sometimes it's consultant preference they'll ask you to use a certain thing. We've got [the tissue viability nurse], who's a very good source of reference, and if you need any advice she'll come up, and she'll help you. A particular gentleman I'm thinking of, who had a nasty open wound for ages, and we used the new vacuum assisted closure on him, and it worked very well, because we hadn't seen that very well. But she brought that and showed us how to use it, and it did work well on him. So we would use

Table 2 Numbers of sources of text based information available in the clinical areas, proportion of which were research based and their mean age (years)

Source	CCU n (%)	Surgical n (%)	Medical n (%)	Research-based CCU n (%)	Research-based surgical n (%)	Research-based medicine n (%)	Mean age (SD)
Textbook	99 (17)	99 (5)	105 (6)	3 (3)	5 (5)	11 (11)	11·4 (7·79)
Policies	67 (12)	221 (11)	228 (14)	20 (30)	83 (38)	94 (41)	4·2 (2·65)
Journal article	152 (26)	434 (22)	379 (23)	97 (64)	254 (59)	231 (61)	6·6 (3·96)
Local files	65 (11)	182 (9)	185 (11)	14 (22)	38 (21)	33 (18)	5·8 (3·87)
Conference output	11 (2)	11 (1)	14 (1)	6 (55)	6 (55)	10 (71)	5·3 (2·93)
Commercial literature	37 (6)	184 (9)	161 (10)	4 (11)	5 (3)	13 (8)	6·9 (4·38)
Videos	10 (2)	12 (1)	15 (1)	1 (10)	–	1 (7)	6·1 (3·57)
Memos	38 (7)	348 (17)	169 (10)	4 (11)	47 (14)	42 (25)	2·6 (1·89)
Booklets	–	–	14 (1)	–	–	6 (43)	6·6 (4·67)
Newsletters	57 (10)	177 (9)	145 (9)	14 (25)	34 (19)	37 (26)	6·7 (4·49)
Charts or posters	14 (2)	74 (4)	87 (5)	3 (21)	8 (11)	11 (13)	5·3 (4·45)
Resource packs	7 (1)	52 (3)	26 (2)	3 (43)	12 (23)	6 (23)	4·4 (2·69)
Patient information	7 (1)	54 (3)	70 (4)	1 (14)	9 (17)	16 (23)	6·56 (3·55)
Study days	3 (1)	80 (4)	21 (1)	–	15 (19)	10 (48)	1·9 (1·35)
Reports or strategy documents	8 (1)	70 (4)	36 (2)	4 (50)	41 (59)	15 (42)	4·8 (2·85)

that again if we saw a similar sort of thing. I think you from…if you've used something before and its worked…If you've had good results.

Int: So it's your experience?

Nurse: Yes. Or maybe someone else's experience, if they've seen something and they've had good results with something. (Staff Nurse, D Grade, Surgery, Site Three)

Relying on human sources of information, who themselves couldn't always explain the basis of their acquired wisdom, meant that nurses recognized their potential for encouraging variability in practice:

Int: They (doctors) like to be involved with the wound care?

Nurse: Yes. Especially the plastic surgeons. Because its quite specific, their wound care. We've had 10 plastic surgery beds since July. And if we have problems with new graft sites or donor sites, then they are quite strict about what they like you to use and what they don't. And even between one consultant and another, they've got different varying opinions, and we've learnt that just since July.

Int: Do they give you any kind of written guidelines about what they like?

Nurse: It's more word of mouth, actually. (Staff Nurse, E Grade, Surgery, Site One)

It was clear that link nurses were a vital entry point for text based sources of knowledge into ward life. Despite recognizing the limitations of text based resources, some nurses still felt the need to contribute to the increasing numbers of resources such as local files on wards (of which only 11–22% were research based):

Int: Do you have a file?

Nurse: Yes, there's too many really though, aren't there. I'm in the process of making a new file at the moment. Because of the plastic surgery we need a new one for plastics. (Staff Nurse, E Grade, Surgery, Site Two)

Library use was almost exclusively associated with formal continuing professional development (CPD) and there was a widespread perception that the nature of nursing work discourages library use. Close physical proximity was not a sufficient condition for library use.

Int: Right. If you wanted to get some information yourself, where would you go, do you think?

Nurse: The library. There's a CD-ROM…I like the one at the other site, because I live near there, and I find that more accessible than the one actually on my doorstep here, but you don't always get off when you're here, you don't often get time to go…So I prefer to go on my days off or something and go to the library if I need something.

Int: Right, so did you get in to the way of using the library when you were doing your diploma?

Nurse: That's it. That brought me up to date with looking for information. (Staff Nurse, D Grade, Surgery, Site Two)

Associated characteristics

Regression modelling revealed that the longer a nurse spends in a clinical specialty the more probable it is that she/he will perceive human sources of information as the most accessible (adjusted regression coefficient 0·61, $P = 0·03$ adjusted for O level as highest level of educational attainment).

Perspective two: local information for local need

This perspective was marked by the relative accessibility of locally produced resources (for example, ward information files and ward noticeboards) and accounted for 18% of Q sort variance.

Like all the perspectives, experienced colleagues, clinical nurse specialists and link nurses were the most accessible. The need for a sense of 'closeness' to ward teams or clinical areas was emphasized. The most inaccessible human resources were those associated with a perceived distance from the ward: hospital research and development, practice development, or nurse managerial structures. Again specialists were seen as a possible source of variability:

Nurse: …there's such a lot of trained staff on the wards now and if we're not careful we all do our own thing a little bit. It's trying to get a definite decision rather than different people doing different things. So trying to co-ordinate, getting other specialist advice from other nurses because there's a lot more now than there used to be. (Staff Nurse, E Grade, Medicine, Site Three)

Despite the age of most text-based materials on the wards, nurses viewed the 'literature' as a means of staying up to date, recognizing the limitations of human sources:

Nurse: My only concern about using each other is that maybe not everybody is up to date literature-wise. (Staff Nurse, E Grade, Medicine, Site Three)

It was clear that some hospital environments made use of protocols and guidelines more readily than others, for example, CCUs. Almost all common medical procedures (most requiring some nursing input) were covered by procedure manuals. Core care protocols were well accepted as the basis for treatment decisions (for example, thrombolysis or the management of diabetes).

Many nurses felt that as their experience increased there was little need to consult the protocol or guideline. Moreover, protocols were often seen as tools for education, training or 'revision' rather than as decision support technologies:

Nurse: …it's there as a reminder of what the next step would be if you're faced with a situation…it depends on your experience, because a lot of it is you've been there and you've done that so many times that you know the next step, but it's a very good learning tool for all of us and a revision tool as well because it's explaining why you're doing certain things as well, so it's not just pointing us in the right direction from medical care but it's also good learning tool. (Staff Nurse, E Grade, CCU, Site Three)

The apprenticeship model of clinical skills acquisition encouraged nurses to assume that other, more experienced, practitioners were 'working to protocol'. As nurses tended not to consult these documents regularly then there was little to correct this potentially erroneous assumption.

Accessing protocols (apart from CCU) was often an informal affair into which people either opted, or not:

One thing I did do, is I did a wound care file, because what we're finding with the changeover of shifts and one time being on the red team and one time being on the blue team, you know, if the continuation couldn't be carried through we're changing sides all the time, and with wounds coming in and thinking, well why has that particular dressing been used…So I've started off just a little file in the treatment room just a basic photocopy thing, saying the person's name, what sort of wound they had, what was being used. So we could keep track. But some people use it and some people don't. It's all the time factor, people can't be bothered because you're documenting everything down in your nursing assessment Cardex. But the thing is, there can be pages and pages and pages, and its reading back, and you sometimes haven't got the time. So I thought, if they used the wound care file it would be a lot easier. But some of us do and some of us don't. (Staff Nurse, E grade, Surgery Site Two)

The key to the widespread accessing of protocols seemed to lie in medical sponsorship: where doctors supported the introduction of protocols then nurses appeared to use them – often regardless of the document's lack of grounding in a research base. In fact, of the protocols identified, 43% of those developed by doctors contained references to research as opposed to the figure of 32% for nurses.

The regression modelling of this perspective reveals no independent predictors of this perspective. This means that it is equally probable across the whole sample of nurses.

Perspective three: moving towards technologies

As well as the accessibility of human sources, nurses adopting this perspective saw local guidelines, protocols and online databases (MEDLINE/CINAHL) as relatively accessible. Interestingly, whilst library based technologies (such as online databases) were seen as relatively accessible, medical or nursing trust librarians were not. This was linked to a general perception that librarians were not a resource for *clinical* problem solving, more for consultation regarding CPD-generated 'abstract' problems. The perspective explained 15% of the variance in the Q sorts.

CCUs in particular were associated with the use of guidelines and protocols. The real-time use of protocols was observed only once in general medical or surgical environments (in response to a query over the prescription of nitrates to control blood pressure), whereas in the three CCUs protocol use was more routine. This extract from Site Three fieldnotes illustrates the interaction between clinical problems and protocols:

A lady (67-year old, myocardial infarction four days ago) is readmitted to the unit with chest pain. The Staff Nurse handing the patient over reveals that she had Streptokinase for the original infarct four days ago. The doctor and Staff Nurse are discussing the patient and the doctor (who originally admitted the patient a few days previously) thinks that she had the Streptokinase three days ago whilst the nurse thinks that it was five days ago. The medical and nursing notes give different dates and there is some discrepancy over times (it was in the middle of the night in the nursing notes and the morning in the medical notes!). They consult the protocol for thrombolysis. The protocol states that repeat administration is OK after four days (to the hour). Despite this clear recommendation the registrar decides to ask the advice of the consultant. He (the consultant) says 'just use TPA'. In the meantime the nurse decides to explain the increased risk of stroke to the patient (it states in the protocol that there 'is a heightened risk of stroke'). The patient doesn't want to make the decision to undergo thrombolysis alone and wishes to speak to her daughter about it. The daughter is brought in from the relatives' room and staff nurse discusses risks using words such as 'more', 'bigger' and 'slightly higher'. She can't quantify the exact risk for the daughter when asked, 'how much is slightly higher?', and states that it, 'differs from patient to patient'. In the end they consent to treatment. At the station the ward sister and the staff nurse discuss the issue of risk and the Sister offers a figure of 2% (she doesn't say what sort of risk increase this is – for example, relative or absolute). She tells the Staff Nurse that, 'there's only been one trial of TPA after strep'. (Field Notes, Afternoon, Site Three, CCU)

This extract highlights a number of issues:
• the ease with which protocols act as a first port of call in the CCU environment;

• that protocols are a useful basis for joint communication between different clinical professionals;

• that quantitative summaries of useful information able to 'feed' decisions are something that could prove useful for clinicians. For example, the nature of the consultation between staff nurse and daughter might have been very different if she had been able to quantify the relative or absolute risks involved.

This apparent readiness to use technologies such as protocols could be misleading. Where such technologies related to *nursing* care (as opposed to the nursing role in *medical* procedures) the comments of some staff reveal a lack of consensus:

…yeah we're updating the core care plans and I know they 'should' be used (her emphasis)…we try and ignore them as much as we can…it's patronizing when you do the stuff day in and day out…its just harking back to 1997 (the year the original core care plans were developed), it's a retrograde step and pretty pointless…we use some more than others – like the angio we use a lot – but you know we're selective (extracts from field notes, early evening, Site Three, CCU)

Electronic resources were viewed as (relatively) accessible from this perspective. Given that even the most accessible of the libraries (Site Three) was at least a 6 minute walk from the units, it was perhaps intellectual rather than physical accessibility that nurses were referring to:

Int: Say you wanted to find out about Hickman lines and giving antibiotics would you feel you could go and get all the information on that topic that you needed?

Nurse: Yes, I am not into the Internet linking but I can use the computer in the library and like being at [the University]. I am a bit more confident about actually accessing information. (Staff Nurse, D Grade, Medicine, Site Three)

The lack of accessibility associated with librarians was problematic as they were a key source of advice on using information resources in the sites. Librarians were associated with teaching nurses to search for themselves (as opposed to doing it for them) and there was a heavy demand for their services. Strangely, these characteristics appeared to be viewed negatively by some nurses:

Int: So have you got anyone else to look up stuff for you on the computer? Have you ever tried asking the librarian or anyone?

Nurse: No, because sometimes if you go to [the nursing library] they'll tell you what you need to…they would go through it with you, but they tend not to do it for you! (Staff Nurse, F Grade, Medicine, Site Two.)

Associated characteristics

Regression modelling reveals that working in coronary care is linked to a more positive attitude to the technologies of local guidelines and the information possibilities of online databases (regression coefficient 10·6, $P = 0\cdot003$).

Discussion – accessing research knowledge

Clinical experience in a specialty is an important influence on nurses' perceptions of the accessibility of research information sources. Having extensive clinical experience in a specialty also helps to define a nurses' own potential as an information resource for other nurses. Importantly, the level of educational attainment in the nurses in this study appears to make little difference to the relative accessibility (physical or intellectual) associated with research-based information sources.

It is also clear that clinical domain exerts at least some impact on notions of accessibility. We used a wound care decision scenario as the basis for the modelling of accessible sources of information. This was designed to isolate the impact of clinical specialism; for example, surgical protocols and guidelines are more likely to relate to the scenario proffered and so surgical nurses were (*a priori*) the most likely to see them as accessible. However, CCU nurses (regardless of the wound care scenario) were the most likely to see local guidelines as accessible. One explanation for this lack of 'matching' of decision support technology to clinical problem is that nurses tend to use sources that they know and trust regardless of the nature of the problem or clinical decision involved. Training in recognizing clinical uncertainty, and expressing such uncertainties as focused clinical questions (which provide the bedrock for evidence retrieval and uncertainty reduction), may yield changes in information seeking perceptions and behaviour.

To what extent are the sources of information that nurses perceive as accessible likely to lead nurses towards a greater degree of contact with research knowledge? If we examine the documentary material available on the units themselves it is clear that only around a third of the 4000 documents examined make reference to some kind of research evidence. Of course, large amounts of material on wards may have an evidence base; however, establishing its heritage and consequent validity, reliability and applicability is often impossible. Indeed, it was not possible to identify the authorship of nearly 1000 documents. So the picture is disappointing: few sources of information are explicitly research based and many are the result of the efforts of clinical nurse specialists, practice development nurses and doctors. The quality of these products was

variable and the lack of an audit trail problematic. Moreover, it was clear that the messages for practice provided, or sponsored, by powerful individuals often carried extra weight in decision processes because of the supporters' clinical (rather than research) credibility.

Examining qualitative interview data and Q sorts alone indicates that whilst other professionals dominate as the prime source of information in uncertain clinical situations, text or electronic technologies might be seen as having something to offer to nurses. This conclusion has to be balanced against the fact that in more than 180 hours of observation across 15 wards in three sites at different times of the day we only saw written forms of (explicitly research-based) knowledge accessed four times. All were protocols and three of the occasions were on CCUs. This study highlights the power of using multiple approaches when examining research information use by health care professionals. As in other studies (Covell *et al.* 1985) we found relying on self report an inadequate mechanism for assessing factors related to accessibility. In using a combination of interviews, observation and statistical modelling, a richer, deeper, and more reliable picture emerges than if we had relied on a simple self report device such as questionnaires.

Conclusion

Three perspectives on what counts as accessibility in information sources were identified from this study. Together, these accounted for a sizeable (54%) part of the variance associated with the Q sorts. Whilst there were areas of delineation between perspectives (the accessibility of local informal resources and technologies such as local guidelines and protocols and on-line databases) the main cross-factor characteristic was *the accessibility of human sources*; specifically, those sources combining a research utilization remit with clinical workload (clinical nurse specialists and link nurses). Immediate colleagues (with or without research awareness) were more accessible as a source of information for reducing clinical uncertainty than any form of 'evidence based' technology.

As well as agreement regarding those resources deemed accessible there was also remarkable commonality in the perceived *inaccessibility* of sources. Specifically, all the perspectives saw the nurse-managerial structure (in the form of the Director of Nursing and their team) as not easily accessible in relation to the reduction of uncertainty in clinical decision making. Two of the perspectives stressed the perceived inaccessibility of the Trust medical or nursing librarian in relation to their role in helping resolve clinical uncertainty.

Those resources perceived as the most accessible were those linked directly to ward-life: the specialist nursing function; the link nurse who helped operationalize the clinical nurse specialists' knowledge; local and clinically focused (such as guidelines and protocols). Unfortunately, documentary analysis suggests that despite the important role of clinical nurse specialists and other members of the health care team as producers of research-based resources, the basis for many nurses' sources of information remains difficult to ascertain. These results suggest that the highest organizational returns for those seeking to make research-based information accessible could be derived from strategies which harness the power of human change agents – and the clinical nurse specialist function in particular.

Clearly, these strategies are part of many of the emerging nurse consultant roles currently being developed in the UK. However, concurrent with the development of these potentially powerful change agents should be a rigorous evaluation of their impact on clinical decision making (in terms of both process and quality of outcome) and an assurance that educationalists will prepare consultants adequately for their role as a bridge between the worlds of research and practice.

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Appendix – the access Q sample and condition of instruction

Condition of instruction

A 62-year old woman has been readmitted with a drainage wound which has opened at home following outpatient investigation. It is a little red, sore, and has some exudate (clear and not smelling offensive). The consultant has seen her on admission and as he departs he asks you to use your judgement and dress it and will examine her more fully in a couple of days. It is a situation in which you feel unsure (after all, you want to promote healing in the most effective way possible) where would you go for information, advice or guidance?

Sort the following sources of information and advice from those which you feel are most accessible (+5) through those which are least accessible (–5).

No.	Statement	Factors		
		1	2	3
1.	Practice development nurse	2	1	2
2.	The research and development (R & D) co-ordinator for the Trust or one of their staff	0	−2	0
3.	A research nurse working on a research project in the Trust	2	−1	2
4.	Clinical audit co-ordinator	0	−4	0
5.	Clinical governance lead	−1	−3	−2
6.	Medical/nursing librarian at the Trust	−4	−1	−4
7.	One of the experienced nursing colleagues in my team	4	5	3
8.	The link nurse with an interest in that area	4	4	4
9.	The consultant on the firm looking after the patient	3	−2	−2
10.	The registrar on the firm looking after the patient	3	0	−2
11.	One of the therapy team	3	1	0
12.	The clinical nurse specialist	5	4	5
13.	The journals held on the ward	0	1	1
14.	The journals in the local medical/nursing library	−1	0	2
15.	One of the information files on the ward and put together by the staff	2	3	3
16.	Local clinical guidelines or protocols	2	3	4
17.	The Director of Nursing or one of his/her team	−3	−5	−5
18.	Information or a poster on the staff/ward notice board by nursing staff	0	3	1
19.	Information or a poster on staff/ward notice board from a company with an interest in this area	0	2	−1
20.	Clinical guidelines produced by a company with an interest in this area	1	0	1
21.	Information in the medical notes of a similar patient	−1	1	−2
22.	Information in the nursing cardex or notes of a similar patient	1	2	−3
23.	A documentary on television or an article in a magazine or newspaper	−3	−1	−3
24.	MEDLINE/CINAHL on a CD-ROM in the local medical/nursing library	−3	0	3
25.	The internet accessed via the local medical/nursing library	−2	−2	1
26.	The internet accessed at home	−5	−4	−1
27.	The subject index cards at the local medical/nursing library	−2	−1	0
28.	Notes from a professional development course you have done (ENB course or post registration diploma) at the local college/university	1	−2	0
29.	Notes from your student training	−1	0	−4
30.	Notes from an informal teaching session done by one of the staff on your unit	1	2	−1
31.	Notes or information from a product company representative or presentation on the ward	0	0	0
32.	Text books on the ward	0	2	0
33.	Text books in the local medical/nursing library	−1	0	0
34.	Text books you have at home	−2	1	−1
35.	Notes from an 'in-house' training course completed in the hospital	1	0	2
36.	A product company telephone helpline	−2	−2	−2
37.	A product company representative	−1	−3	−1
38.	My documented experience of previous patients (reflective diaries)	1	1	2
39.	Pharmacist	2	2	1
40.	Medical notes from a patient with a similar problem	0	−1	1
41.	Nursing Cardex from a patient with a similar problem	−2	−1	−3
42.	Royal College of Nursing (RCN Direct)	−4	−3	−1

ENB = English National Board for Nursing Midwifery and Health Visiting.