CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Hospital clinicians information behaviour and attitudes towards the 'Clinical Informationist': an Irish survey
Authors	Flynn, Maura G.;McGuinness, Claire
Publication date	2011-03
Original Citation	Flynn, Maura G.; McGuinness, Claire (2011) 'Hospital clinicians information behaviour and attitudes towards the 'Clinical Informationist': an Irish survey'. Health Information and Libraries Journal, 28 (1):23-32. http://dx.doi.org/10.1111/j.1471-1842.2010.00917.x
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1111/j.1471-1842.2010.00917.x
Rights	© 2010 The authors. Health Information and Libraries Journal © 2010 Health Libraries Group. The definitive version is available at wileyonlinelibrary.com
Download date	2026-11-01 01:54:08
Item downloaded from	https://hdl.handle.net/10468/882



UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Health Information and Libraries Journal

Health Libraries Group | cilip

Hospital clinicians' information behaviour and attitudes towards the "clinical informationist": An Irish survey

Journal:	*Health Information and Libraries Journal*
Manuscript ID:	HILJ-09-0055.R1
Manuscript Type:	Original Article
Keywords:	Evidence-based Medicine, Information Services, Libraries, Hospital, Questionnaires

scholarONE™ Manuscript Central

For Peer Review

Abstract

Background

Hospital clinicians are increasingly expected to practice evidence-based medicine (EBM) in order to minimize medical errors and ensure quality patient care, but experience obstacles to information-seeking. The introduction of a Clinical Informationist (CI) is explored as a possible solution.

Objectives. This paper investigates the self-perceived information needs and behaviour of clinicians in two Irish public hospitals. It also explores clinicians' perceptions and attitudes to the introduction of a CI into their clinical teams.

Methods. A questionnaire survey approach was utilised for this portion of the study, with 22 clinicians in two hospitals. Data analysis was conducted using descriptive statistics.

Results. Analysis showed that clinicians experience diverse information needs for patient care, and that barriers such as time constraints and insufficient access to resources hinder their information-seeking. Findings also showed that clinicians struggle to fit information-seeking into their working day, regularly seeking to answer patient-related queries outside of working hours. Attitudes towards the concept of a CI were predominantly positive.

Conclusion. This paper highlights the factors that characterise and limit hospital clinicians' information-seeking, and suggests the CI as a potentially useful addition to the clinical team, to help them to resolve their information needs for patient care.

For Peer Review

Key Messages

Implications for Practice

- The integration of CIs into clinical teams could reduce the need for clinicians to look for information outside of working hours
- There is a clear need for a professional CI programme within pre-service librarianship education; arguably, a specialist Masters programme is required for this complex role.
- Clinicians' *actual* use of specific EB resources, such as Cochrane, should be explored further, to establish if - and why - they are used less than more general resources such as Medline.

Implications for Policy

- Clear guidelines, establishing the degree of medical knowledge required by CIs, should be established, and used to inform the development of CI education programmes.
- There is a need for full cost-benefit analysis to be performed within existing CI programmes, to demonstrate the cost-effectiveness, or otherwise of such programmes.
- Policy guidelines, addressing the medico-legal and "duty of care" issues arising from the integration of CIs into clinical teams must be established.

For Peer Review

Introduction

Despite the increasing global emphasis on Evidence-Based Medicine (EBM) within healthcare, little research has been conducted in Ireland regarding the information needs and information-seeking behaviour of hospital clinicians in fulfilling their patient care responsibilities. This research seeks to address this gap in the literature.

Objectives

The aims of this study were to investigate the information needs and information behaviour of hospital clinicians in two Irish public hospitals, and to explore clinicians' attitudes towards the concept of a Clinical Informationist (CI).

Literature review

Information needs of clinicians

There is an extensive body of research regarding the information needs of clinicians, revealing considerable and complex information needs for patient care (Davies, 2007). Grandage (2002) suggests that each single patient visit may generate one to three highly specific questions. Recently, Davies (2009) highlighted a broad range (i.e. 0.44 – 73) in the reported number of clinical questions raised by doctors in a number of international studies. Furthermore, the majority of clinical questions raised by doctors are not pursued and many remain unidentified (Covell *et al,* 1985; Gorman, & Helfand, 1995). Davies (2007) suggested that: "the top categories of information need are treatment or therapy (average 38%), diagnosis (average 24%), and drug therapy/information (average 11%)" (p.82).

Information sources used by clinicians

Clinicians use a variety of information sources to resolve their clinical information needs, including personal clinical knowledge, colleagues, test results, printed and digital medical records, conversations with patients, biomedical image scans, visual inspection of biological specimens, statistical summaries of disease data, and evidence found in articles and books (Florance *et al*, 2002).

Although there is disparity regarding the ranking of resource usage by clinicians, medical textbooks, medical journals and colleagues are used frequently (Case, 2007). Colleagues are extensively used, as they are "familiar, reliable, immediately available, and inexpensive; they give concise, organised answers that synthesise available information" (Leckie *et al*, 1996, p. 170).

Barriers to clinicians' information-seeking behaviour

Ely *et al* (2002) suggest that clinicians face several obstacles when attempting to answer clinical questions with evidence. They include the time required to find information; difficulty in modifying the original question; difficulty in selecting an optimal search strategy; failure of a seemingly appropriate resource to cover the topic; uncertainty in knowing when all the relevant evidence has been found; and inadequate synthesis of all evidence into a clinically useful statement. Time constraints are a key barrier (Davies, 2007) while the volume of medical information is another obstacle, with Coiera (2003) suggesting that a new article is added to the medical literature every 26 seconds or less.

Information skills as a Barrier

Sanders & Del Mer (2005) suggest that clinicians' skills limitations constitute barriers to effective searching, and that clinicians must acquire the skills of asking a useful question,

For Peer Review

appraising and applying evidence. Specific problems encountered by clinicians include the use of inappropriate search terms; misspelling; the use of brand drug names rather than generic; and a belief that searches fail due to a lack of relevant evidence, rather than erroneous search strategies (Davies, 2007).

Some clinicians believe that inadequate information skills training hinders information-seeking; however, many choose not to partake in information skills training, although this could be due to the time constraints imposed by their role. Similarly, regular practice is required in order to maintain literature searching skills, as these decline if not used and updated regularly (Davies, 2007).

The Clinical Informationist

Although rooted in the clinical medical librarian initiatives of the 1970's (Lamb, 1982), the role of "Clinical Informationist" was proposed in 2000 by Davidoff and Florance, and refers to "knowledge worker[s] formally trained in both the information and clinical sciences, so they can retrieve, synthesize and present medical information routinely for clinical health care teams (Rankin *et al*, 2008, p.194). According to, Davidoff and Florance (2000) the CI, requires two core competences, namely a clear understanding of information science, and of the essentials of clinical work. In their systematic review, Rankin *et al* (2008) list several justifications for CIs, including pressure on clinicians to practice EBM, the lack of usefully packaged syntheses of evidence, an informed patient body, and new practices in scholarly communication (p.195). Wider national policy, budgetary and strategic objectives, coupled with increasing application of high technology in the biomedical sciences, also serve as a rationale for more effective management and use of healthcare information (Ibid).

CI roles and tasks encompass, amongst others, literature searching; journal club facilitation; information skills and informatics training; collaboration on team research; current awareness; creating resource lists; providing evidence for new guidelines or pathways; and information management (Harrison, 2008; Ward, 2005). Desirable competences include critical appraisal, locating and synthesising information, communication, research expertise, and information management and organisation (Rankin *et al*, 2008, p.199)

Rankin *et al* (2008) observe that the "uptake of the informationist concept has been relatively broad" (p.202). CI programmes have been described in a variety of settings, for example, Emergency Department, Nursing, Perioperative setting, and Biomedical research (Coats *et al*, 2009; Tod *et al*, 2007; Kurup & Hersey, 2007; Whitmore *et al*, 2008). Furthermore, the number of CIs in post has increased; the UK now has approximately 50 CIs and this figure could be increased further in the future on foot of the 2008 Hill Report (Coates *et al*, 2009). In addition, the first CI in Ireland was appointed on a pilot basis in 2008.

A few studies have explored the effectiveness of CI programmes. For example, Banks *et al* (2007) demonstrated that librarian support and computerised literature searching into morning report decreased length of hospital stay, while McGowan *et al* (2008) demonstrated that librarians providing timely information to primary care practitioners' clinical questions yielded a highly positive impact on decision-making. In general, however, the true impact of CI programmes remains undetermined: Rankin *et al* note that "to date, little solid evidence has been published relating to the effectiveness of existing informationist programmes or justifying new ones" (2008, p.203).

Clinicians' attitudes to CIs

Clinicians' attitudes to the integration of CIs into the clinical team have been mixed. Schacher (2001) suggests that clinicians can be reluctant to rely on others to provide information because of their personal responsibility for patient care. It is also argued that clinicians should conduct their *own* literature searching and evaluation, as their skills will deteriorate if that task is assigned to another professional (Houghton and Rich, 2001). Root Jorgensen (2001) challenges the concept of CIs by proposing that, for example, pharmacists already "specialize in the provision of just such information [and that] pharmacists are uniquely qualified as drug and medical information specialists" (ibid, p. 251).

By contrast, CI advocates assert that, although CIs do mediate literature searching, the programmes can also foster clinical independence in information searching (Florance *et al*, 2002) and equip healthcare workers with new critical appraisal skills through journal club involvement (Urquhart, 2005). Furthermore, Schacher (2001) suggests that: "resistance will dissolve when it is demonstrated that [the integration of CIs] saves money and improves patient care" (p. 718). Indeed many studies suggest that the implementation of CI initiatives has been well received by clinicians and other health workers, for example Vaughn (2009), Urquhart (2005), and McGowan *et al* (2008).

Method

Research questions

Two research questions inform this study. Firstly, what are Irish clinicians' perceptions of their own information needs and the effectiveness with which they currently retrieve information for patient care? Secondly, what are the attitudes of Irish clinicians towards the potential integration of CIs into healthcare teams?

Research design

This study employed a survey approach, as it was felt that busy clinicians would be more likely to respond to it, than participate in a time-consuming interview. Two medium-sized (200-250 bed capacity) teaching hospitals in the Republic of Ireland constituted the study site, and were purposefully selected due to the perceived opportunity for access afforded by the researcher's contacts in each hospital. Clinicians were recruited using snowball sampling, assisted by the researcher's library contacts. While all clinicians in all specialist areas were eligible to participate (100 in Hospital A, 130 in Hospital B), the eventual sample number was small (n=22), meaning that findings may not be generalised to the wider population, and are indicative of possible trends only.

Data collection and analysis

A 33-item questionnaire was constructed and pilot-tested with a group of nurses, and subsequently modified to improve reliability[1]. Questions were developed by the researcher, based on themes identified in the literature review. The questionnaire was administered primarily in electronic format using the online tool SurveyMonkey, during June, July and August 2008; potential participants were emailed the survey link. Several hard copies of the survey were also distributed by the hospital librarian at one site, and later entered manually into SurveyMonkey. Analysis was performed using descriptive statistics, and findings displayed in graphical and tabular format. While the survey questions covered a range of

[1] Questionnaire to be made available as appendix in online version of paper

For Peer Review

issues, only those questions relating to information behaviour and competence, and attitudes towards CIs, are reported here.

Demographic data

The seven Hospital A participants were all registrars and male. The age range of the participants was 31-57, with a mean of 44. The participants work in the Ear, Nose and Throat department (71%) and Orthopaedics (29%) and all spend 21 hours or more per week in patient care. The 15 Hospital B participants comprised 12 males and 3 females and spanned all roles – three Interns, one Senior House Officer, one Registrar, two Special Registrars and eight Consultants. An accurate age profile for the respondents could not be obtained, as three participants failed to answer this question, but there was a large range amongst the 12 participants who did respond (i.e. 24 – 51 years). The participants work in General Surgery (40%); Medicine (27%); Endocrinology (13%); Plastic Surgery (7%); Rheumatology (7%); and Cardiology (7%). 14 participants responded when asked how many hours per week they spend in patient care; 12 participants spend 21 hours or more and two participants spend 10-20 hours.

As the sample size is small (n=22), findings from both survey sites are reported together in the section below.

Results

Context of clinicians' information needs

The majority of hospital clinicians who responded (90%, n=19) are predictably busy, spending over 21 hours per week engaged in direct patient care, and generating an average of 1-5 clinical questions requiring further investigation each week (Fig.1). This amounts to a potential 260 clinical questions per clinician per year. Participants were also asked to indicate approximately how many hours on average they spend each week investigating clinical questions. Of the 18 who responded, two-thirds (66%, n=12) claimed to spend between 1-3 hours per week, with the remaining one-third (33%, n=6) spending up to 10 hours researching clinical queries. The findings also show that a significant proportion of the information-seeking takes place outside of the working day. When questioned, 40% (n=8) of the participants claimed to search for information "*at home, after work*," while a further 40% (n=8) endeavour to fit it in "*during breaks in the day*" (Fig.2). Only one participant seeks clinical information during a patient encounter, while the remaining 3 (15%) do so "periodically."

Fig.1

Fig.2

When questioned about the situations in which additional information is frequently required (Fig.3), participants indicated that "*latest research on a specific topic*" (75%, n=15) and "*treatment*" (65%, n=13), followed by "*specific patient problem*" (60%, n=12) were the role aspects requiring information most frequently; however, all aspects were selected by at least one-third of all clinicians. Information on diagnosis, new diseases, and new therapies and products also feature strongly, selected by at least 40% (n=8) of participants.

Participants were also asked about the frequency with which they believe they satisfy their information needs (Fig.4). 70% (n=14) of those who responded (n=20) claimed to find the

For Peer Review

information they require more than fifty percent of the time, although just 25% (n=5) are successful more than seventy-five percent of the time. Four participants (20%) find what they need less than twenty-five percent of the time.

Fig.3

Fig.4

Information-seeking strategies

When asked if they refer to the medical literature for patient care, the majority (90%, n=18) answered yes, while just two participants claimed *not* to consult the literature. Participants were also questioned about the information sources they tend to choose most often for patient care (Fig.5). The findings demonstrate the popularity of the traditional information channels of textbooks (30%, n=14) and journals (30%, n=14), although the use of electronic versions of both is increasing. For instance, the resource "UpToDate", defined by one participant as an "*online version of a textbook*" was mentioned by several participants. The "Internet" and "Colleagues" also constitute important sources of information for clinicians, mentioned in 19% (n=9) and 17% (n=8) of responses respectively. Included in the category "Internet" are the major online resources of PubMed and Medline, as well as general search engines, such as Google. While "Databases" were mentioned just twice, it is likely that participants were referring to these two resources, which are freely available via the Internet. Certain resources were mentioned by name, including: the British Medical Journal, New England Journal of Medicine, the Oxford Clinical handbook, the BNF, and several specialist journals.

Fig.5

To further explore the clinicians' resource use patterns, participants were asked to answer true or false to a number of statements regarding their use of specific resources (Table 1). The results show that the participants claim to use *specific* evidence-based resources such as the Cochrane Collaboration much less frequently (n=5, 25%) than databases such as Medline (n=13, 65%) and general search engines such as Google (n=15, 75%). Furthermore, 13 (65%) of the clinicians reported experiencing difficulties in trying to keep up-to-date with evidence-based medicine. The findings also show a preference for electronic sources (n=12, 60%) over more traditional paper-based (n=7, 35%).

Table 1

Participants were also asked to rank, from 1-6, the factors which could potentially influence their choice of information sources, with 1 being most important, and 6 the least important (Table 2). The findings demonstrate the influence of electronic access to information, with "*accessible electronically*" (avg. 2.11) and "*Internet access*" (avg. 2.20) ranked as most important, followed by "*evidence-based information source*" (avg. 2.76); "*concise/summary format of information source*" (avg. 3.27); "*proximity to colleagues*," (avg. 3.64) and "*available in hardcopy*" (avg. 4.47).

Table 2

This study also sought to establish the barriers to information-seeking that exist for hospital clinicians. In order to establish what the barriers to information-seeking might be, the participants were presented with a list of suggested reasons to explain why they do not pursue

For Peer Review

their clinical questions and were asked to tick all reasons that apply to them (Table 3). The results are unequivocal in highlighting "*lack of time*" (89%, n=17) as the most significant barrier. The barriers to information-seeking which relate specifically to the clinician's own skills sets were selected by comparatively few participants, e.g. "My searching skills are not adequate" (21%, n=4) or "I am uncertain about how thoroughly to read chosen articles" (15%, n=3).

Table 3

The clinicians' relative confidence in their own information skills were confirmed by their responses to a question, which asked them to self-rate their ability to find information. The results are shown in Fig.6, with 55% (n=11) of those who responded (n=20) rating their skills as good, 15% (n=4) as very good, and 25% (n=5) as average. Just one rated him/herself as "poor."

Fig.6

Clinicians' perceptions of CIs

When asked if they were familiar with the role of Clinical Informationist, 68% (n=13) of the clinicians indicated that they were not, while 32% (n=6) claimed to have heard the term. The clinicians were also asked to outline their feelings towards the idea of CIs in Irish public hospitals, and 18 of the 19 responses received reflected a positive attitude, e.g. "*it will be very helpful*"; "*will be great for public hospitals*"; "*very good*"; "*excellent idea*"; "*sounds like a very useful role*"; and "*they would definitely be a worthwhile addition...especially in the encouragement and streamlining of more evidence-based medicine and continuing referral to the latest literature rather than just going along with what has traditionally been done*". One participant compared CIs to librarians, stating that "*this would be excellent - many "librarians" already do this work.*" The one remaining participant replied: "*ambivalent*", to this question.

When asked about particular areas where a CI might meaningfully contribute, diverse suggestions were received, including:

- Continually evolving fields, such as oncology, infectious disease and pharmacology.
- Education/CPD/Research: keeping up to date with changes in other specialities, disseminating new research findings and organising interdisciplinary teaching/ journal clubs.
- Treatment: evidence-based management; polypharmacy, evidence base with regard to particular procedures.
- Unusual/rare problems: presentations and management of difficult issues and cancers which is common in plastic surgery.

The clinicians were also asked what, if any, advantages and disadvantages they thought would potentially result from the introduction of CIs. Among the advantages cited were:

- Improve clinicians' access to information
- Improve patient care
- Improve teaching and utilisation of evidence-based medicine
- Education/keeping up to date/updating knowledge

For Peer Review

- Contributions to research / publications
- Saving time

By comparison, just three disadvantages were perceived – one, that it could be costly to employ an CI; two, that it could potentially result in the deskilling of health professionals' own information-seeking skills; and three, that there could potentially be some medico-legal issues arising from the input of a CI into clinical decision-making.

Clinicians' perceptions of the skills required by a CI

The clinicians' perceptions regarding the skills and qualifications which a CI should possess were also sought, and 14 responded. The suggested skills were:

- Medical knowledge / clinical training
- Communication skills
- Interpersonal skills
- Knowledge of medical information resources
- Knowledge of research and EBM
- Appraisal skills
- Computer skills

Finally, the participants were asked what impact they perceived the inclusion of a CI into their own team would have upon patient care. Of the 18 responses received, 72% (n=13) answered "positive" and 27.7% (n=5) were "neutral," while no participants stated that it would have a negative impact.

Discussion

This paper revealed that the hospital clinicians surveyed generate on average 1-5 clinical questions per week, a figure that is somewhat lower than figures gathered in other studies (Grandage, 2002; Davies, 2009), which tallied questions on a per patient basis. However, previous studies focused primarily on office practice settings, rather than hospitals. Hospital clinicians, who are specialists rather than generalists, may have fewer questions arising in the course of their work. The role aspects, for which information is required, correspond loosely to other studies (e.g. Davies, 2007), namely treatment and diagnosis, although the present study also found "latest research" and "product information" to be important.

One of the more interesting findings of this study was the extent to which information-seeking is carried on outside of working hours, with clinicians pursuing queries either during breaks, or at home after work, for up to 10 hours per week. This suggests that clinicians have a constant, rolling backlog of queries to pursue which must be accommodated during leisure or family time, and that they are generally "catching up" on the issues and queries that arise in the course of patient care on a day-to-day basis, using personal time to perform work-related activities that cannot be accommodated during their set schedules. It also indicates a need for remote, out-of-hours access to medical information resources which clinicians can access from home, or that alternative means of satisfying clinical questions rapidly during the working day must be found.

The importance of electronic resource access was highlighted in this study, with Internet access considered especially important, a finding supported by previous research (Bardyn, Young & Lombardi, 2008). Textbooks and journals remain heavily utilised, but now in digital format, where available. Colleagues are also a key source for clinicians, which

For Peer Review

supports evidence reported by Case (2007) and Leckie *et al* (1996). Clinicians are also confident in their own information skills, with 70% (n=14) rating their ability to find information as "good" or "very good" – this contradicts findings reported by Davies (2007) and Sanders & Del Mer (2005), both of which suggested that skills limitations form barriers to effective searching by clinicians. However, further research is required to establish whether clinicians' self-rating of skill offers a misleading picture of their *actual* level of competence.

The use of *specific* evidence-based resources, such as the Cochrane Collaboration, is reported as low in this study (Table 1); however, clinicians consider the degree to which a resource is "evidence-based" as an important factor in selection. Participants' higher reported use of online databases such as Medline, which index Cochrane and other systematic reviews (Table 1) suggests that they may feel that these resources are sufficient for their clinical information needs. More in-depth research into clinicians' perceptions, and use or non-use of specific EB resources would be informative, and potentially useful to the architects of those systems.

The barriers to information-seeking experienced by the study participants largely corroborate with previous research which highlights time constraints as the key obstacle to effective information seeking (Ely *et al*., 2002; Davies, 2007; Jerome et al, 2001). The barriers mentioned by clinicians in this study point to further areas in which a CI might play a role, i.e. lack of time, access to computers and lack of expert knowledge of available evidence.

Clinicians' attitudes towards the introduction of CIs were mainly positive, suggesting several advantages and areas which could benefit from CI involvement. Potential disadvantages were also mentioned, including cost, deskilling of health professionals' own information-seeking skills, and medico-legal issues. Cost and funding arrangements are undoubtedly central considerations, but such issues were outside the scope of this research and merit further attention elsewhere. The issue of deterioration of information skills has been disputed by Urquhart *et al*. (2007) who suggest that clinicians who work with CIs believe that their IL abilities *improve*, although their study was small (n=33) and the improvement was based on self-perception by the clinicians. The study does suggest, however, that CI services "should be balanced between supporting healthcare staff via mediated searching and empowering them to do their own searching effectively" (p. 14). It is also noteworthy that seven of the 13 participants who answered this question perceived no potential disadvantage to CI introduction.

Clinicians' suggestions, regarding the skills and qualifications which CIs require, conveyed the perceived desirability of prior clinical training and medical knowledge. Davidoff and Florance (2000) propose the need for a multidisciplinary learning experience for prospective CI's, including: "a core of basic medical concepts, principles of clinical epidemiology, biostatistics, critical appraisal, and information management" (p.997) and accredited training programs. This requirement presents a challenge in Ireland due to the absence of institutions which combine Library and Information work education with medical/clinical training.

Conclusion

This study, though small, makes an important contribution to the existing literature on the information behaviour of hospital clinicians in Ireland for patient care, as this is a comparatively under-researched area in the Irish context. It is hoped that this study will form the basis for further research into the information behaviour of clinicians and other health professionals, such as nurses, paramedics and GP's. The clinicians' opinions regarding the

For Peer Review

potential introduction of CIs into public hospitals in Ireland were largely positive, and several potential areas for CI involvement were suggested, which merit consideration at practice and policy level.

Several limitations must be noted, however. Firstly, the small sample size (n=22) means that the findings must be treated as exploratory, rather than general. Snowball sampling, assisted by the hospital librarians, could also mean that a degree of bias may have been present in participant recruitment, focusing on "library-friendly" clinicians rather than the population at large. Moreover, the role of other healthcare professionals, for example, nurses, radiologists and pharmacists, has not been considered in this study, and constitutes a gap requiring further exploration.

In general, this study points to immense scope for further research regarding the introduction of CIs, focusing on issues such as cost and funding; the training and accreditation of CIs; and models for the integration of CIs into clinical/hospital library teams.

References

1 Bardyn, T., Young, C. & Lombardi, L.C. How we surveyed doctors to learn what they want from computers and technology. *Computers in Libraries* 2008, **28**, 7-11.

2 Case, D.O. *Looking for Information: A Survey of Research on Information-seeking, Need, and Behavior*. 2nd Ed. London: Academic Press, 2007

3 Coates, T.J., Sutton, S. & Cooke, M.W. In an emergency-call the clinical librarian! *Emergency Medicine Journal* 2009, **26**, 321-323.

4 Coiera, E. *Guide to Health Informatics*. 2nd Ed. London: Arnold, 2003

5 Covell, D., Uman, G. & Manning, P. Information needs in office practice: Are they being met? *Annals of Internal Medicine* 1985,**103**, 596-599.

6 Davidoff, F., & Florance, V. The informationist: a new health profession? *Annals of Internal Medicine* 2000, **132**, 996-998.

7 Davies, K. Quantifying the information needs of doctors in the UK using clinical librarians. *Health Information and Libraries Journal* 2009, **26**, 289-297.

8 Davies, K. The information-seeking behaviour of doctors: a review of the evidence. *Health Information and Libraries Journal* 2007, **24**, 78-94.

9 Ely, J.E., Osheroff, J. A., Ebell, M.H., Chambliss, M.L., Vinson, D.C., Stevermer, J.J. & Pifer, E.A. Obstacles to answering doctors' questions about patient care with evidence: qualitative study. *BMJ* 2002, **324**, 710-713.

10 Florance, V., Giuse, N.B., Ketchell, D.S. Information in context: integrating information specialists into practice settings. *Journal of the Medical Library Association* 2002, **90**, 49-58.

11 Gorman, P., & Helfand, M. Information-seeking in primary care: How physicians choose which clinical questions to pursue and which to leave unanswered. *Medical Decision Making* 1995, **15**, 113-119.

For Peer Review

12 Grandage, K.K., Slawson, D.C., Shaughnessy, A.F. When less is more: a practical approach to searching for evidence-based answers. *Journal of the Medical Library Association* 2002, **90**, 298-304.

13 Harrison, T.M. (2008) Delivering the evidence to the client. [WWW Document]. URL http://www.valaconf.org.au/vala2008/papers2008/96_Harrison_Final.pdf

14 Houghton, B. & Rich, E.C. The informationist. [Letter] *Annals of Internal Medicine* 2001, **134**, 251-252.

15 Kurup, V. & Hersey, D. The perioperative librarian: luxury or necessity? *Current Opinion in Anaesthesiology* 2007, **20**, 585-589.

16 Lamb, G.E. A decade of clinical librarianship. *Clinical Library Quarterly* 1982, **1**, 2-4

17 Leckie, G.L., Pettigrew, K.E., and Sylvain, C. Modeling the information-seeking of professionals: a general model derived from research on engineers, health care professionals, and lawyers. *Library Quarterly* 1996, **66**, 161-93.

18 McGowan, J., Hogg, W., Campbell, C., Rowan, M. (2008) Just-in-Time information improved decision-making in primary care: a randomized controlled trial. PLoS One, **3**, e3785. [Online serial]. URL http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0003785.

19 Rankin, J.A., Grefsheim, S.F., & Canto, C.C. The emerging informationist speciality: a systematic review of the literature. *Journal of the Medical Library Association* 2008, **96,** 194-206.

20 Root Jorgensen, D.B. The informationist [Letter] *Annals of Internal Medicine* 2001, **134**, 251.

21 Sanders, S. & Del Mer, C. Clever searching for evidence. *BMJ* 2005, **330**, 1162-1163.

22 Schacher, L.F. Clinical Librarianship: its value in medical care. *Annals of Internal Medicine* 2001, **134**, 717-720.

23 Tod, A.M., Bond, B., Leonard, N., Gilsenan, I.J., Palfreyman, S. Exploring the contribution of the Clinical Librarian to facilitating evidence-based nursing. *Journal of Clinical Nursing* 2007, **16**, 621-9.

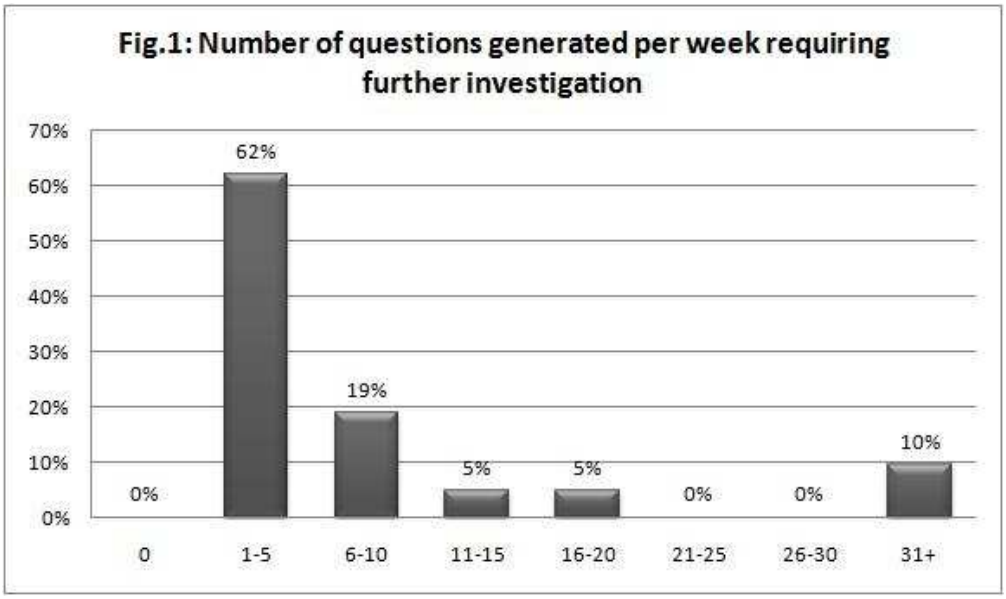
24 Urquhart, C., Durbin, J., & Turner, J. (2005) North Wales Clinical Librarian Project. Final project report [WWW document]. URL http://hdl.handle.net/2160/195

25 Vaughn, C. J. Evaluation of a New Clinical Librarian Service'. *Medical Reference Services Quarterly* 2009, **28**, 143–153.

26 Ward, L. A survey of UK clinical librarianship: February 2004. *Health Information and Libraries Journal* 2005, **22**, 26-34

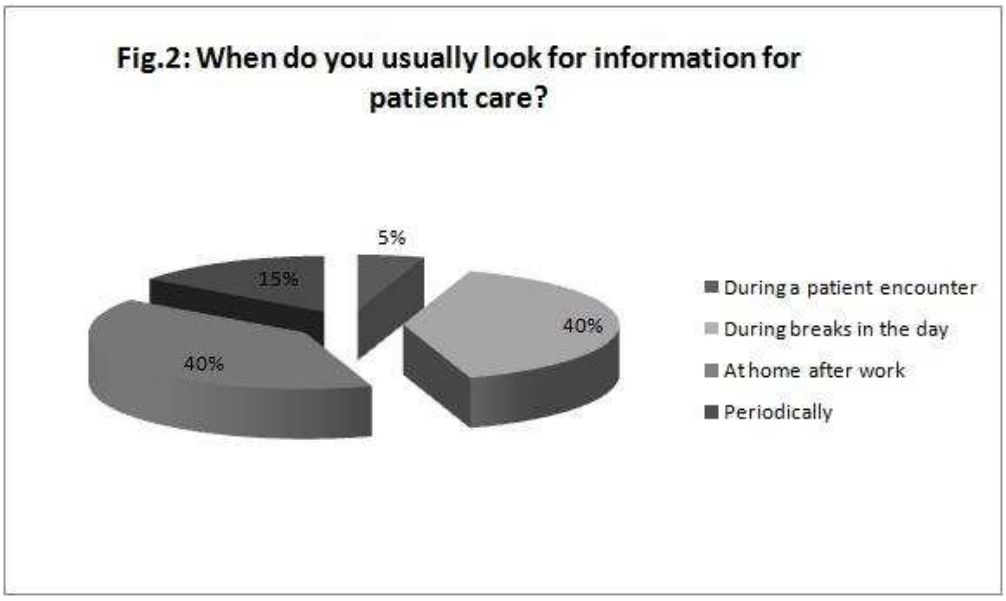
27 Whitmore, S.C., Grefsheim, S.F., Rankin, J.A. Informationist programme in support of biomedical research: a programme description and preliminary findings of an evaluation. *Health Information and Libraries Journal* 2008, **25**, 135-41.

For Peer Review



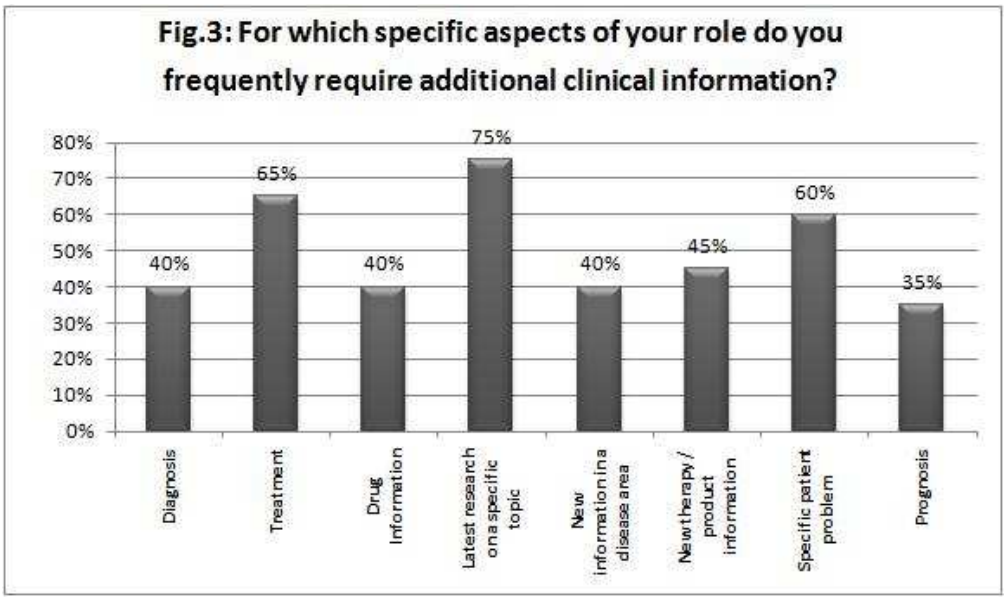
Number of questions generated per week requiring further investigation
153x90mm (96 x 96 DPI)

er Review



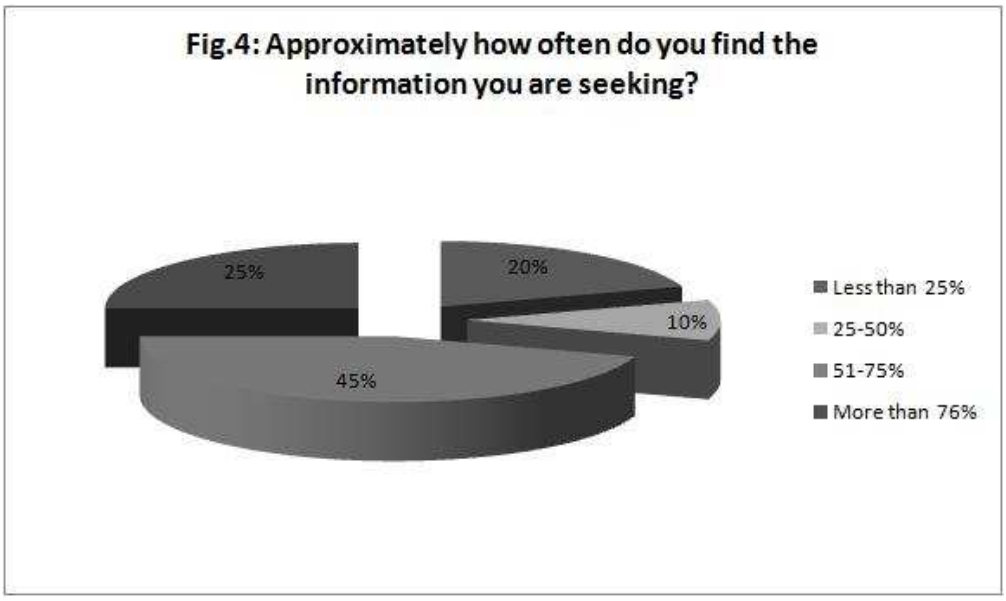
When do you usually look for information for patient care?
153x90mm (96 x 96 DPI)

For Review



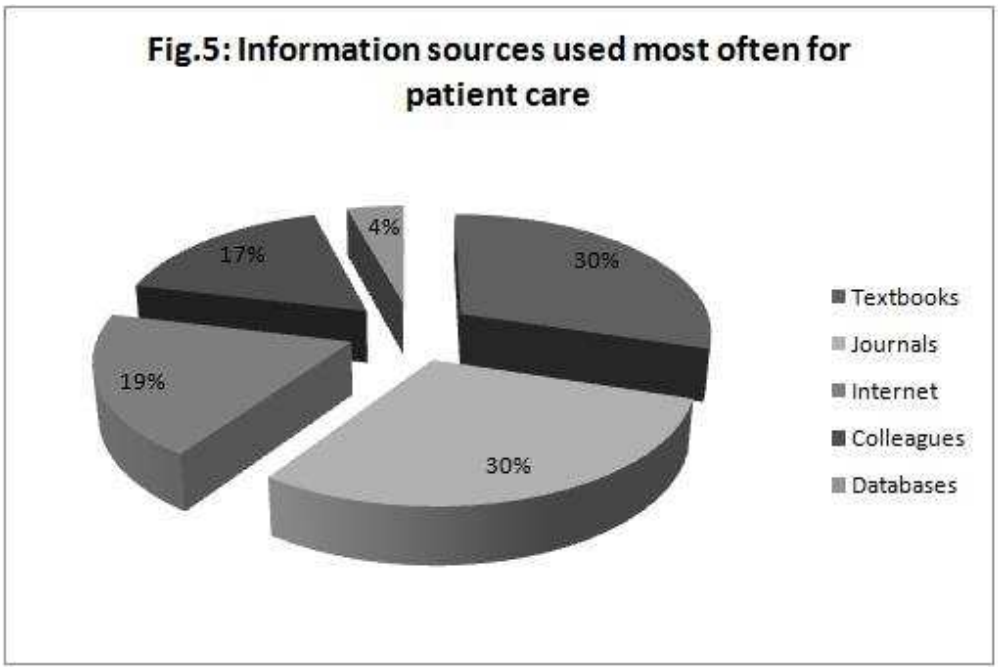
For which specific aspects of your role do you frequently require additional clinicial information?
153x90mm (96 x 96 DPI)

For Peer Review



Approximately how often do you find the information you are seeking?
153x90mm (96 x 96 DPI)

For Review



Information sources used most often for patient care
135x89mm (96 x 96 DPI)

Review

Table 1 Clinicians' information-seeking

Statement	True	False	No response
I find most of my clinical information for patient care on databases such as Medline	**13**	7	0
I frequently consult evidence-based resources, such as The Cochrane Collaboration or the Trip Database	5	**14**	1
I frequently use a search engine like Google or Yahoo to find clinical information for patient care	**15**	5	0
I use printed sources more than the Internet for clinical information for patient care	7	**12**	1
I encounter difficulty keeping up to date with evidence-based medicine	**13**	5	2

Clinicians' information-seeking
177x111mm (96 x 96 DPI)

Review

Table 2 Factors influencing clinicians' selection of information sources

Factors influencing selection (Rank 1-6, 1 = most important)	Response average
Accessible electronically	**2.11**
Internet access	2.20
Evidence based information source	2.76
Concise / summary format of information source	3.27
Proximity to colleagues	3.64
Available in hardcopy (books and journals)	4.47

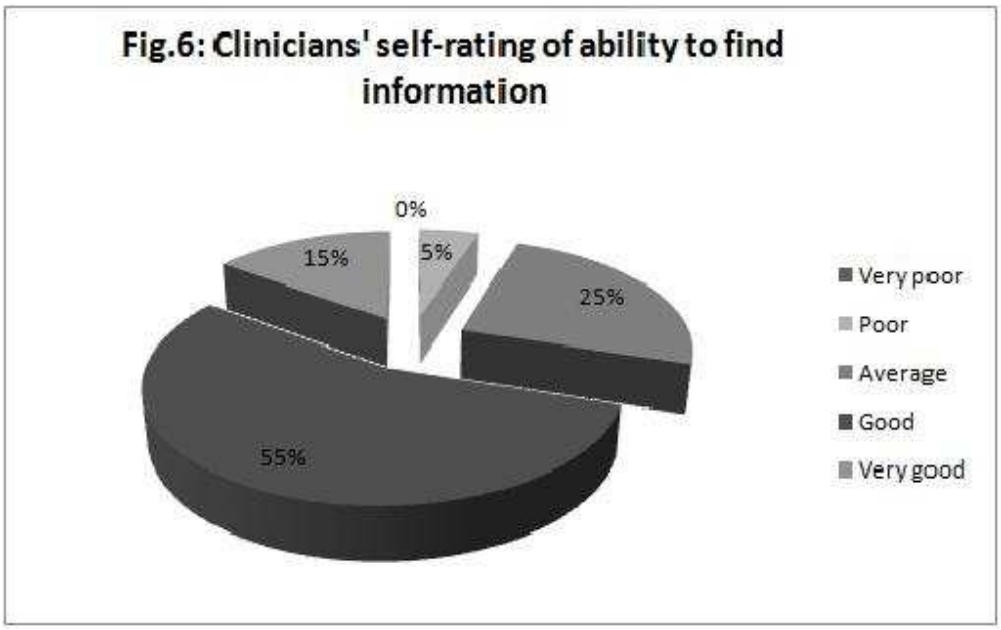
Factors influencing clinicians' selection of information sources
171x76mm (96 x 96 DPI)

For Peer Review

Table 3 Reasons why clinicians don't pursue their clinical questions

Reasons	No. of responses (n=19)
Lack of time to initiate search	**17**
Lack of time to search adequately	12
Inadequate access to computers in patient care areas	11
Sometimes I suppress a recognised information need due to time or work pressures	10
Sometimes my question isn't important enough to justify a search	9
Sometimes I don't think that evidence exists	7
Sometimes I am uncertain about where to look for information	5
Sometimes I don't recognise that I have an information need	4
My searching skills aren't adequate	4
I am uncertain about which articles to read thoroughly	3
It's not really part of this hospital's culture to explicitly search for evidence when caring for individual patients	3
I am uncertain about how thoroughly to read chosen articles	3
Sometimes I don't know where to look first	3
Excessive time/effort would be required to learn enough to manage a problem so a referral is made instead	2
Sometimes I suppress a recognised information need because I am reluctant to be open about areas in which I lack knowledge	2
I am unaware of how to access information sources	2

Reasons why clinicians don't pursue their clinical questions
170x142mm (96 x 96 DPI)



Clinicians' self-rating of ability to find information
135x84mm (96 x 96 DPI)

For Review