The Informationist: Building Evidence for a New Health Profession - A Case Study

Suzanne F. Grefsheim, MEd, MSLS †

Director, Division of Library Services,

National Institutes of Health

10 Center Drive, MSC 1150

Bethesda, Maryland 20892-1150

301.496.2448 (voice)

301.402.0254 (fax)

grefshes@nih.gov

Susan C. Whitmore, MS, MSLS

Chief, Information and Education Services Branch

Division of Library Services/NIH Library

National Institutes of Health

Bethesda, Maryland, 20892-1150

email: whitmors@mail.nih.gov

Barbara A. Rapp, PhD, MLS

Office of Health Information Programs Development

National Library of Medicine

National Institutes of Health

Bethesda, Maryland 20894-3811

rappb@nlm.nih.gov

Jocelyn A. Rankin, PhD, MLn

Chief, CDC Information Center

Centers for Disease Control and Prevention

Atlanta, GA 30333

jrankin@cdc.gov

Rex R. Robison, PhD, MLS

Informationist

Division of Library Services/NIH Library

National Institutes of Health

Bethesda, Maryland, 20892-1150

robisonr@mail.nih.gov

Candace C. Canto, MA, MLS

Special Assistant to the Director

Division of Library Services

National Institutes of Health

Bethesda, Maryland 20892-1150

cantoc@mail.nih.gov

.

† Corresponding author

Abstract

Background: To encourage increased use of evidence in practice, an *Annals of Internal Medicine* editorial and the Institute of Medicine called for a new information professional on clinical teams, an informationist trained in a scientific or medical discipline as well as information science and its technologies.

Objective: This study explored the effects of informationists on information behaviors of clinical research teams, specifically whether the presence of the informationist increased the frequency of seeking information for clinical or research decisions; increased the range of information resources consulted; facilitated and improved access to information; increased clinical research teams' confidence that they adequately researched the literature; and improved decision making and practice. The study also gathered perceptions of training and experience needed for successful informationists.

Methods: Preliminary exploratory focus groups and key interviews followed by baseline (2004) and follow-up (2006) surveys were conducted with researchers/clinicians receiving the informationist service. Survey data were analyzed with Pearson's *Chi*-square or Fisher's Exact Test.

Results: Comparing 2006 to 2004 survey responses, study participants reported: seeking answers to questions more frequently ($p<0.001$); spending more time seeking/using information; believing time was less an obstacle in finding/using information ($p=.01$); using more information resources ($p=.01$); and experiencing greater satisfaction with their ability to find answers ($p=.01$). Study participants' opinions on informationists' qualifications evolved to include both subject knowledge and information searching expertise.

Conclusion: Over time informationists appear to positively affect clinical research teams' information behaviors thereby improving the level of evidence available in the clinical research setting.

Keywords: (MeSH): Program Evaluation; Evidence-Based Medicine; Patient Care Team; Information Services; Attitude of Health Personnel; Librarians; Medical Informatics**. Non-MESH:** Clinical Informationist; Bioinformationist.

I. Introduction

In their 2000 *Annals of Internal Medicine* editorial, Davidoff and Florance called for a new role on the clinical care team, the informationist.[1] This role was needed, they believed, to bring evidence to clinical practices facing continued growth of published literature, patient safety concerns and general lack of time available to health care professionals. The Institute of Medicine also noted that training and encouraging clinicians to identify and apply evidence was not the complete solution to improving practice.[2] They too suggested an informationist be part of the clinical team. Both Davidoff and the Institute of Medicine thought clinical knowledge and experience, as well as strong information science and related technology skills were required to perform this function. Davidoff acknowledged obstacles to adoption, most notably training for the new role and reimbursement.

The National Institutes of Health (NIH) Library hired its first two informationists – librarians with extensive expertise in a clinical specialty – in 2001 and assigned them to research teams in their field of expertise. Over the intervening years the informationist program has grown, and currently the library has 14 informationists who are members of over 40 NIH clinical and/or basic science research teams. From the start, informal feedback from the research teams was positive; however, as the commitment to the program increased, a formal evaluation was suggested. The current study, focused solely on the NIH informationist program, examines evidence of the effects informationists have had on their clinical research teams.

II. Background

Studies of health professionals have underscored the need to better support their information needs. Covell found that many information needs were not recognized by practicing physicians and others went unanswered.[3] In analyzing information requests during clinical teaching, Osheroff reported there were frequent requests but many required the synthesis of patient information and medical knowledge and thus were difficult to answer.[4] A taxonomy of 59 barriers to information use illustrated the complexity of developing successful interventions.[5] However, Gorman showed how the biomedical literature could answer primary care information needs[6]; and Westbrook found that use of online information resources enhanced the accuracy of answers provided to typical clinical problems by experienced clinicians.[7] Nonetheless, online databases and libraries, even when available, are infrequently consulted due to lack of time and search skills.[8]

The *Annals* editorial proved a stimulus to librarians already exploring ways to better integrate information into the users' context. As Masys pointed out, both the growth in the biomedical knowledgebase and the widespread availability of computer-based information have compounded the time required to obtain and synthesize information, both factors driving the emergence of new occupations including the informationist.[9] The informationist idea has grown in the United States and internationally to include evidence roles not only in clinical care but also in health policy, public health, and biomedical research. It is often seen as the role enabling the convergence of the information sciences and informatics. [10-11] Several academic medical centers have established model programs and other health organizations have launched

initiatives that included informationists.[11-18] A recent literature review [19] confirmed that informationist programs, when considered as innovations, remain in the Early Adopter stage.[20]

This literature review also found that there appear to be two informationist maturation models relating to the emphasis on technology in the informationist role. The informationist on the clinical team initially focuses on service aspects, later progressing to support of the team's technical/informatics information needs. Conversely, the bioinformatics informationist begins with a strong technical focus and over time adds a more personal service [19]. Additional early findings suggested that embedding informationists encourages questioning [16, 21], and that trained informationist librarians can perform critical appraisal of the literature comparable to clinicians.[22] Further, program success requires both technical expertise and service excellence [15] as well as commitment by management. [12] Finally, informationists must demonstrate domain knowledge and commitment to continuous learning, and be completely embedded within the team.[12]

More rigorous evaluation of informationists' programs is widely recognized as a need but is challenged by the fact that these programs are inherently customized and targeted to small groups. As Schacher observed, the benefits of having the literature available at the point of care are clear, but more and better data on the impact and cost effectiveness of informationists are needed to secure routine positioning of these professionals on health care teams.[23]

III. Study Questions

Because every patient at NIH is enrolled in a clinical trial, traditional measures of information effects in a hospital, such as differences in patient length of stay or patient outcome, would not provide the data needed to evaluate the NIH Library's informationist program. As a result, the evaluation looked instead at changes over time in the information behaviors among and between groups served by an informationist. The training and experience needed to perform the informationist role effectively also were explored. Specifically, the study attempted to answer the following questions:

1. Does the presence of the informationist:

a. Increase the frequency that teams seek information to support clinical or research decisions?

b. Increase the range of information services consulted in response to information needs?

c. Facilitate and improve access to information relevant to clinical practice?

d. Increase the confidence of clinical research teams that they have adequately researched the available published literature?

e. Improve clinical and research decision making and practice through enhanced access to the published literature?

2. And, what education, experience, and personal characteristics are important contributors to a successful informationist?

IV. Methods

A. Study Site

The NIH not only funds translational clinical and basic research through extramural grants and contracts, but also conducts both laboratory research and hundreds of phase I or II clinical trials in its own intramural research program. Eighteen of the 27 NIH institutes and centers have intramural clinical research programs. Most NIH clinical trials take place at the Bethesda, MD, NIH Clinical Research Center, a 242 bed in-patient hospital with 90 day-stations for out-patient visits. IRB approval was not required for this study, since NIH does not require it for program evaluations conducted among its staff by central service organizations such as the NIH Library.

B. Focus Groups

The study began with exploratory work to identify and describe NIH researchers' expectations, perceptions and experience with the informationist concept. In October 2003, a qualitative research consultant conducted three 90-minute focus groups with ten scientists from one institute representing both clinical and laboratory staff. Topics included: discovering new ways an informationist might contribute to their work; gathering information to enhance the informationist role; and informing the design of the planned quantitative study that would reach the larger group receiving informationist services. Using the same semi-structured interview guide, the consultant conducted three key informant interviews with the same institute's leadership. Focus groups and interview data were transcribed and content analysis was conducted by the consultant to identify themes and patterns

C. Baseline Survey - 2004

Following the focus groups and key informant interviews, the NIH Library contracted with a second consultant, a market research and consulting firm, to develop and then implement a

survey of NIH staff who had, or were about to have, an informationist on their team. The focus group findings informed the content and format of the survey. For example, the web survey format was chosen because it offered flexibility for clinical researchers being studied, something noted as particularly critical by focus group participants. The survey method allowed for two iterations – a baseline and a follow-up survey 18-24 months later. In January 2004 the survey was pre-tested. The final survey was posted to the web in February.

To encourage survey response, lead researchers and other principal contacts from the participating clinical research teams were asked to send their teams a link to the web survey. While the survey was underway, when an informationist joined a new team, its members also were asked to complete the survey; ultimately individuals from nine teams could respond to the survey (~150-200 individuals). The survey was available from February 2004 through February 2005. Though slow in coming and requiring repeated reminders, 74 surveys were completed. A definitive response rate is unknown since the actual number receiving the survey was dependent upon each research team leader. However, given the size of the potential survey population, it appears that the response rate was in the range of 40-50%.

D. Follow-up Survey - 2006

The survey was repeated during four weeks from mid-May to mid- June 2006. Because of the time required to obtain responses to the baseline web survey (13 months), the follow-up survey was conducted by phone. Members of the nine original teams (n=170) were invited to take the survey; 84 team members responded for a 49% response rate.

E. Survey Analysis

Responses to both surveys were stratified into two groups. Group A represented the five clinical research teams which in 2004 had an informationist on the team for a year or more. Group B represented four teams, three clinical research teams and one team of science administrators, that in 2004 had an informationist for less than six months. The nine teams were from nine different institutes and centers. In 2004, there were 74 survey respondents, 42 in Group A and 32 in Group B. In 2006, there were 84 respondents with 46 in Group A and 38 in Group B.

Responses to the survey questions were analyzed both by the market research consultant who developed the survey and the authors, primarily for inter-group comparisons. Some questions lent themselves to inter-year comparisons (Table 1); others to comparisons between Groups A and B (Table 2). Responses were analyzed using Pearson's *Chi*-square test. In cases where cell values were too low to use Pearson's, Fisher's Exact Test was used (noted by †). Statistics were calculated using programs provided by Prof. Richard Lowry of Vassar College with his permission, available online at http://faculty.vassar.edu/lowry/VassarStats.html.

V. Results

A. Focus Group Findings

Despite expressing overall satisfaction with their information-gathering capabilities, focus group participants reported difficulty sorting through the plethora of information and finding specific information they needed. The suggestion that an informationist could be a solution to this dilemma was greeted with skepticism by participants with no experience with the program.

However, the few participants who had used this or a similar service remarked on the competence and trustworthiness of informationists and generally gave them high praise. The consultant compared this to Federal Express' early market research that indicated low interest or perceived need for overnight delivery. It was not until the service existed and people began using it that users understood its value.

After colleagues endorsed the concept, skeptics were more willing to discuss potential benefits of a librarian/informationist on their team. Many saw advantages to informationists attending rounds and staff meetings. Customizing information services to the team's specific needs was a general preference.

Participants had difficulty articulating the personal characteristics or training that an informationist should have, given most had never encountered one. They were more comfortable talking about desired skills, such as competence with technology, critical thinking and knowledge of the scientific method. The one trait they did identify was "initiative." The idea of an informationist approaching them in their workplace was hugely appealing. They especially welcomed someone who could suggest better ways to search, retrieve and organize information.

B. Survey Findings

1. Information Behavior

To address study questions related to whether having an informationist on a clinical research team resulted in information behavior changes, several questions were asked of clinical research team members about their ability to find answers to questions. By 2006, researchers reported

pursuing answers to their questions more than 60% of the time, a significant increase ($p<0.001$) compared to the earlier survey (Study Question 1a) (Table 1-1.1). They also reported spending 37% more time each week searching the literature, retrieving materials, and reading - 9.2 hours on average compared to 6.7 hours in 2004. Although they spent about the same percentage of time personally seeking information rather than asking someone else to find it for them (85% of the time in 2004 and 81% of the time in 2006), they were significantly less likely to identify *time to look* as an obstacle (47% in 2004 to 29% in 2006) ($p=.01$), (Table 1-1.2). They also were increasingly likely to use *electronic journals and databases* to find information (69% in 2004 and 80% in 2006) (Table 1-1.3).

When asked where they looked for information (Study Question 1b), in 2004, 95% of all respondents reported using PubMed/MEDLINE (Table 1-1.4), and the range of reported use of other databases by both groups was 1%-27% (median 11%). By 2006, use of databases other than PubMed was much higher (range 8%-54%; median 24%). For example, both groups used Web of Science ($p=.001$), Cochrane Library Reports ($p=.001$) and GenBank ($p=.01$) significantly more often in 2006 than in 2004. Large increases also were reported in the use of other protein and molecular biology databases.

To explore whether informationists facilitated or improved access to information (Study Question 1c), respondents were asked to rate the frequency with which three factors caused unsuccessful information seeking (Table 1-1.5). In 2006 *lack of time* ($p=.02$), *difficulty finding information* ($p=.01$), and *insufficient training* ($p=.01$) were all significantly lesser issues than in 2004. Consistent with this finding, more respondents felt *more satisfied* ($p=.01$) with their ability

to obtain answers in 2006 than they had in 2004 (Table 1-1.6), suggesting that informationists had increased the confidence of clinical research teams in adequately researching the literature (Study Question 1d).

2. Attitudes towards informationist program

Several survey questions related to researchers' perceptions of the informationist program. To explore the informationists' role in clinical decision making (Study Question 1e), respondents were asked which tasks and activities their informationists participated in. While there was little difference in responses between the two groups, there was a significant increase over time within groups in the informationists' roles, for example *going on rounds*, *helping with searches*, and *critically evaluating the literature* (Table 2-2.1). A notable percentage of both Groups A & B (more than 36% in 2006) reported their informationist was engaged in "other" tasks not on the list of options, suggesting informationists were participating in a broader array of team activities than anticipated when the service began. Involvement in nearly all activities (including the "other" category) increased over time, again suggesting that informationists were used more often and for more types of tasks. Another indicator of increased team responsibilities was that in 2004 only 39% of all respondents reported using the service (as opposed to merely having an informationist assigned to their team), while in 2006 70% did.

Those who worked with informationists were asked if they would do it again (Table 2-2.2) and whether they would recommend an informationist to others (Table 2-2.3). Responses were highly positive, even more so in 2006 than 2004. Whether they reported using the service or not, respondents were presented with a list of potential benefits and asked to select those they thought

informationists offered (Table 2-2.4). Multiple responses were allowed. By 2006 there were increases in each group's perceptions of benefits, including *added thoroughness, providing expertise in finding information,* and *help finding additional information.* The one option where an informationist was not generally seen as providing a benefit, *helping find information for patients*, is a function frequently reserved for nurse educators at NIH.

To answer the last study question about requisite training for informationists, respondents were asked to rank six competencies informationists should have to be effective team members (Table 2-2.5). In both years and in both groups, the first choice was consistent: *expertise searching information sources relevant to my clinical/research area*. Interestingly, by 2006 in each group *specific knowledge of my clinical/research area* rose from fourth to second most important competency.

C. Demographic Data

For both survey iterations, principal investigators/co-principal investigators, fellows and nurse researchers/study coordinators comprised the majority of respondents. In 2004 the proportion of respondents in each of these three categories was comparable. In 2006, however, the number of principal investigator/co-principal investigator respondents was considerably higher than the other two.

VI. Discussion

Findings from the survey responses supplied full or partial answers to the study questions and also provided specific information about how informationists affect their teams and how the informationist program has matured over time. Generally, findings indicated that the presence of an informationist in the clinical research environment does help researchers effectively utilize both the growing number and increasingly complex biomedical resources.

A. Improving access, and increasing information seeking frequency and confidence

Over the two year period between surveys (2004 and 2006), researchers and clinicians appeared to be more able to pursue answers to their questions. Although time has been cited frequently as a leading obstacle for clinicians seeking information [5, 8], our study indicated time became less of an obstacle. In addition, information was viewed as easier to find despite both the constantly increasing numbers of journals, articles, and genetic sequences available in online databases, as well as the periodic changes in search features and interface design. These findings were especially interesting because the survey responses also showed time spent on information-related tasks actually increased by 37%. By 2006 survey respondents reported they were significantly more likely to pursue answers to questions and they were more satisfied with their ability to find needed information – findings suggestive of a positive effect over time from having an informationist as a team member.

B. Increasing range of information sources

Informationists also appear to have had a positive effect on the range of information services consulted in response to an information need. In 2004 most survey respondents relied solely on PubMed as a source of information, but in 2006 the range and frequency with which other

databases were consulted rose significantly. For example, increased use of Web of Science (WoS) and Cochrane Library Reports, in particular, appears to be the direct result of informationist intervention. Though WoS had been available at NIH since 1998, six years prior to the start of our study, with numerous training sessions held yearly, our data show use of this resource rose significantly over a two year period in those groups with an informationist. Increased use of the Cochrane database is even more likely to be attributable to the informationists, since no classes in this resource had been offered at the NIH Library prior to or during the study period.

C. Improving clinical and research decision making

Whether an informationist improved the clinical or research decision making and practice of team members is not as clear. What we did learn is that over time the vast majority of team members thought their informationist added needed expertise; found information that they otherwise would not have; added thoroughness; saved them time; and reduced their workload burden. To the extent that these perceived benefits improve decision making, informationists have had an effect.

D. Education and experience

While expertise in searching information sources relevant to the team was consistently the most valued knowledge or skill of the informationist, by 2006 the importance of the informationists' subject knowledge also was recognized. This finding suggests that teams initially adopt informationists because they want better access to the literature. Over time, however, the informationist's subject knowledge is recognized as necessary if all the perceived benefits are to

be achieved. In our and other programs, training informationists in science and medicine is an essential component. [24] While library science literature has observed that subject knowledge is desirable [25, 26], the current study shows that clinical research teams view it as key to the informationist's preparation.

E. Program Maturation

Over time the evolution and uptake of informationists' services was apparent (Table 2-2.1). While NIH informationists reach the entire team when they make presentations or participate in rounds, they also work extensively with individual team members. By 2006 more individual team members were working with the informationist than had in 2004, showing that informationists had achieved greater penetration into the teams. Researchers also reported valuing several informationist program features significantly more in 2006 than in 2004. In addition, nearly all respondents reported they would use an informationist again and recommend one to others. The increased use and recognition of potential benefits no doubt fed each other, the result of the long term relationships informationists embedded within a team are able to build.

One of the more intriguing findings from the surveys was that for a large number of respondents informationists were engaged in "other" team activities beyond those anticipated. Although the survey itself did not provide insight into what these "other" activities might be, our experience with the program informs us that these activities include such things as creating citation databases; conducting bibliometric analyses of grant funded publications; developing web pages and wikis to facilitate communication within and outside the teams; compiling and indexing a video database demonstrating movement disorders; and facilitating use of protocol authoring

software. As informationists adopt more of these duties with their groups, it seems to support the finding of the recent systematic review [19] that with maturity clinical informationist programs evolve to support more technical/informatics needs of clinicians/researchers.

In addition to the activities reported by the clinical informationists, the NIH Library informationist program itself matured over the course of seven years to include chemistry and bioinformatics consult services. The bioinformatics informationist was initially assigned to a team of NIH computational biologists in the Mathematical and Statistical Computing Laboratory who consult with various NIH labs on data analysis. His role on the team was "to organize and further explore the potential relevance of the genes that emerge in microarray studies… using automated tools." [27] Since joining the team, the bioinformationist has developed a thorough understanding of the tools used in measuring gene expression and function, including the use of DNA microarrays, and other molecular biotechnology techniques; has become familiar with pathway and molecular interaction tools such as Ingenuity Pathway Analysis (IPA), bioGRID, and Cytoscape; and has developed an understanding of systems biology and the various "omics," e.g. genomics and proteomics, that have developed as a result of the sequencing of the human genome.

One of two chemistry informationists focuses on "knowledge management – database development such as linking structures to relevant citations; data and document curation; and even text and data mining" for the National Cancer Institute's Laboratory of Comparative Carcinogenesis. [28] The other focuses on tech transfer working primarily with the NIH Office of Technology Transfer, which assesses the technology products market for potential cooperative

agreements. He also uses his knowledge of substructure patent searching (Markush searches) to aid discovery of potential inventions by a group of intramural researchers in an NIH core chemistry facility set up as part of the NIH Roadmap for Medical Research. [28]

Unlike the clinical informationists, these informationists work more as consultants to laboratory teams on specific projects rather than being long-term members of the teams. However, they are similar in that both types of informationist must have strong subject matter/technical competencies as well as be expert information scientists.

VII. Study Limitations

Study participants, drawn from NIH teams that include an informationist, were volunteers and therefore not necessarily representative of the NIH population as a whole. While most of the study questions related directly to the survey questions, some questions were answered only by inference. For example, whether having an informationist on the team improved decision making could only be inferred from respondent perceptions of the informationist so this issue requires further study. Finally the lack of a control group against which to compare our findings limits the ability to attribute changes in information behavior solely to the informationist's presence.

VIII. Conclusion

Over time informationists on NIH clinical research teams seem to make a difference in scientists' information behaviors. While spending more of their own time on information tasks in 2006 than previously, study participants said that time was less a factor in their decision to pursue information; that information was less hard to find; and they were significantly more likely to pursue answers than previously. Most important, these study participants were more satisfied with their ability to find information.

As for training and qualifications of an effective informationist, subject knowledge along with expert literature searching was clearly valued by scientists. This finding reinforces Davidoff and Florance's description of the unique qualifications required of this role, that is, both in-depth training and experience in information science and a scientific subject specialty.

Future research should focus on gaining a deeper understanding of the informationist on clinical and/or research teams, particularly the larger effects on health care quality and health economics. A controlled comparison of health teams with and without informationist members would contribute to this understanding. Additionally, qualitative studies, using interviews and observation for example, could provide more details on why researchers choose to work with informationists and what they value about them. As the informationist role develops in health care settings nationally and internationally, it should be informed and shaped through both local and multisite studies.

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Table 1

	2004 (n=74)	**2006** (n=84)
1.1. How frequently are you able to pursue answers?		
Less than 20% of the time	19%	2%
20-40%	18%	7%
40-60%	22%	12%
60-80%	26%	29%
80-100%	16%	50%
1.2. Influences on whether you seek information		
Urgency of question	50%	57%
Time to look	47%	29%
Ease of finding answer	64%	70%
Curiosity about answer	34%	33%
Other	5%	10%
1.3. Most likely source of answers		
Electronic journals or databases	69%	80%
Free information on Internet	11%	15%
All other choices (including colleagues and librarians)	20%	5%
1.4. Databases used (multiple responses permitted) (top 10 responses in 2006 shown)		
PubMed/MEDLINE	95%	96%
Web of Science	27%	54%
MD Consult	20%	39%
Cochrane Library Reports	19%	45%
GenBank/DNA sequences	16%	35%

EMBASE		5%		24%
Protein sequence databases		4%		24%
Other molecular biology		1%		19%
Biological Abstracts		8%		18%
Other		15%		40%
1.5. Reasons for failure				
Lack of time to search in all relevant places	Often	47%	Often	27%
	Sometimes	47%	Sometimes	61%
	Never	5%	Never	12%
Relevant information too hard to find	Often	14%	Often	10%
	Sometimes	76%	Sometimes	62%
	Never	11%	Never	29%
Insufficient training on how to search	Often	24%	Often	8%
	Sometimes	54%	Sometimes	62%
	Never	22%	Never	30%
1.6. Satisfaction with your ability to obtain answers, compared to year ago				
More satisfied		35%		55%
Similarly satisfied		41%		43%
Less satisfied		1%		1%
Not sure		23%		1%

Table 1.Changes between 2004 and 2006 in information seeking in all clinical teams with an informationist.

Table 2

	Group A			Group B		
	2004	**2006**	***p***	**2004**	**2006**	***p***
	(n=42)	(n=46)		(n=32)	(n=38)	
2.1. What does your informationist do?* (multiple responses accepted)						
Goes on rounds	25%	64%	0.01	21%	80%	<0.001
Comprehensive searches	63%	82%	n.s.	50%	80%	n.s.
Help with searches	56%	94%	0.003	57%	96%	0.005
Screens and summarizes	19%	42%	n.s.	21%	44%	n.s.
Helps organize my files	6%	27%	n.s.	7%	36%	0.005
Manuscript preparation	6%	39%	0.01	7%	28%	n.s.
Critically evaluates literature	13%	52%	0.01	14%	48%	0.04
Other	19%	39%	n.s.	43%	36%	n.s.
2.2. Would you use the service again?*						
Yes	88%	100%		71%	100%	
Don't know	13%	0%		29%	0%	
No	0%	0%		0%	0%	
2.3. Would you recommend the service to others?*						
Yes	100%	97%		71%	96%	
Don't know	0%	0%		29%	0%	
No	0%	3%		0%	4%	
2.4. Benefits of informationist service (multiple responses accepted)						
Added thoroughness	74%	93%	0.012	78%	89%	n.s.

Providing expertise in available databases	74%	100%	<0.001	88%	100%	0.039†
Providing expertise in finding information	69%	93%	0.003	94%	95%	n.s.
Saving time	55%	93%	<0.001	81%	100%	0.0069†
Help finding additional information	55%	96%	<0.001	72%	97%	0.0040†
Reducing workload burden	55%	85%	0.002	63%	95%	<0.001
Help find information for patients	38%	57%	n.s.	50%	58%	n.s.
Other	2%	13%	n.s.	6%	13%	n.s.
2.5. Most important competencies informationist should have (top 3 rankings shown)						
Expertise searching information sources relevant to my clinical/research area	1st	1st		1st	1st	
Ability to critically evaluate articles	3rd	3rd		2nd	3rd	
Expertise in evidence-based medicine searches	2nd			3rd		
Specific knowledge of my clinical/research area	4th	2nd		4th	2nd	

Table 2. Perceptions of informationist contributions and competencies. *Question was asked only of team members with an informationist [Group A: *n*=16 (2004), *n*=33 (2006); and Group B: *n*=14 (2004), *n*=25 (2006)].