Informationist programme in support of biomedical research: a programme description and preliminary findings of an evaluation

Susan C. Whitmore*, Suzanne F. Grefsheim† & Jocelyn A. Rankin‡, *Information and Education Services Branch, †NIH Library, US National Institutes of Health, Bethesda, MD and ‡Public Health Library and Information Center, US Centers for Disease Control and Prevention, Atlanta, GA, USA

Abstract

Background: The informationist programme at the Library of the National Institutes of Health (NIH) in Bethesda, MD, USA has grown to 14 informationists working with 40 clinical and basic science research teams.

Purpose: This case report, intended to contribute to the literature on informationist programmes, describes the NIH informationist programme, including implementation experiences, the informationists' training programme, their job responsibilities and programme outcomes.

Brief description: The NIH informationist programme was designed to enhance the library's service capacity. Over time, the steps for introducing the service to new groups were formalized to ensure support by leadership, the team being served and the library. Job responsibilities also evolved from traditional library roles to a wide range of knowledge management activities. The commitment by the informationist, the team and the library to continuous learning is critical to the programme's success.

Results / outcomes: NIH scientists reported that informationists saved them time and contributed to teamwork with expert searching and point-of-need instruction. Process evaluation helped refine the programme.

Evaluation method: High-level, preliminary outcomes were identified from a survey of scientists receiving informationist services, along with key informant interviews. Process evaluation examined service implementation, informationists' training and service components. Anecdotal evidence has also indicated a favourable response to the programme.

Introduction

The Library at the National Institutes of Health (NIH) in Bethesda, MD, USA established an informationist programme in 2001. The programme, which began with one informationist at one scientific institute, has expanded over time to include 14 informationists working with over 40 groups in 16 institutes and centres.

Correspondence: Susan C. Whitmore, Information and Education Services Branch, NIH Library, US National Institutes of Health, Bethesda, MD 20892, USA. E-mail: whitmors@mail.nih.gov

The informationist as first proposed by Davidoff and Florance[1] in 2000 was envisioned as an information specialist who would directly benefit the clinical care team and therefore patient care. This specialist would be trained in the essentials of clinical work, be fully able to function in a clinical care team, and possess a clear and solid understanding of information science. The informationist concept builds upon 30 years of clinical librarianship, a service that was first established to improve patient care and to augment the information-seeking skills of health care providers.[2]

While clinical librarians tend to be generalists within the health libraries sector, informationists, like the health professionals they serve, tend to be specialists. Informationist programmes emphasize both domain knowledge—biomedical, behavioural or social science—and expert knowledge of information science. A successful informationist's initial training can be in the biosciences or the information sciences, but, to be effective, an informationist must be well prepared in both domains. Informationists, whose services have been implemented in different ways in different organizations, are now practicing in a variety of health care settings, including clinical, biomedical research and public health.[3–9] Unlike their clinical librarian forebearers, informationists also are characterized as embedded in the clinical or research environment, working as team members in new and collaborative ways.

Background

The NIH Library, with a staff of 53 full-time employees and 20 contractors, supports a major US government agency that conducts translational bench-to-bedside health care research. The NIH has over 18 000 employees, about half of whom are in the scientific and clinical positions that make up the Library's primary user group. Library users include researchers and fellows in the laboratories and clinics, as well as science administrators working in the various grant administration programmes. The Library's services and collections, which emphasize electronic formats, are comparable in size and scope to a large academic biomedical library.

The NIH Library informationist programme was initiated to improve outreach and service to clinical research groups at NIH. It was apparent that growing reliance on the Library's electronic resources and online research services would mean that librarians would be engaging less and less with their customers within the physical library space. Indeed, a recent information-needs assessment showed that NIH researchers are self-sufficient information seekers who overwhelmingly prefer online journals. They consider journals as their most important information resource and, across all age groups, want to access these journals at the desktop, not in the physical library.[10] The informationist programme was designed to integrate information services, not just resources, into the workplace of NIH clinical and bench scientists and science administrators.

Programme description

Informationists at the NIH Library are primarily librarians with a degree in library and information science and either formal education, training or extensive experience in the biomedical, behavioural or social sciences. In addition, two have doctoral degrees in the sciences. Customer groups include clinicians, researchers and administrators at NIH and at sister agencies. Each informationist works with several groups, spending a considerable amount of time out of the library providing information, training and consultation services. While all have offices located in the library, several also have been given office space in their users' settings.

Setting the stage

When first planning the informationist service, the Library Director made presentations to the Director of the Clinical Center, who ultimately became a strong advocate for the programme, the clinical directors and the library advisory committee in order to identify potential groups which might be interested. By programme definition, NIH informationists work with teams and other scientific groups, not simply with individuals, as might be the case for research assistants. Specific research groups have been approached over time, based on having an informationist on the library staff who either has the right science or clinical background or interest to effectively work with the group.

To initiate an informationist assignment, a member of the library management team met one-to-one with senior researchers or clinicians in the targeted group to discuss the programme and its benefits. Obtaining a commitment from a senior scientist in the group has helped ensure that the following three processes are firmly in place.

- *Endorsement by management*. Formal acceptance by the group's senior researcher or clinician usually resulted in their staff also accepting the presence and services of the informationist.

- *Team mentor*. Senior staff who readily saw the benefits of the programme were more than willing to appoint a mentor for the informationist. The mentor's role included introducing the informationist to staff, explaining research team project assignments, giving advice on meetings or lectures to attend, and facilitating the informationist's integration into the team.
- *Acculturation*. Although deep understanding comes with time, the informationists needed support from the library and the team to quickly learn as much as possible about the work of the group. This learning, which ranges from the terminology to the theories underlying the team's research, is necessary in order for the informationist to understand the team's information needs and also to be articulate in offering information services.

A brief experiment in having the informationist find his or her own assignment and mentor was not uniformly successful and reaffirmed that the service is best offered as a service to a group rather than as a personal service to an individual. While the implementation processes for an informationist programme must be designed to reflect the organization's work culture, the NIH Library experience found the three processes listed above to be fundamental to establishing a solid programmatic underpinning for informationists in the NIH environment.

Training

Given that many informationists start with expertise in information science and need additional training in a scientific or clinical subject domain to function at a high level, appropriate training for this new role has been a major theme in the literature.[11–15] To prepare informationists to function as well-qualified team members at NIH, the Library developed its own training plan. The goal was to nurture informationists who would be up to date in library and information science, the general areas of biological, behavioural or social science that are relevant to NIH research and programmes, and who would also be knowledgeable in the specific subject area(s) in which they provide informationist services.

Informationists were to consult with their mentors and supervisor to set a formal and continuing individualized course of study. The Library provided tuition funds and release time from work so that staff could attend lectures, conferences and academic courses. Support also was provided for informationists to present at and/or attend continuing education at both library and information science conferences and scientific conferences.

Three courses offered to all NIH researchers formed the core of the required training programme. These courses were 'Introduction to the Principles and Practice of Clinical Research', 'Ethical and Regulatory Aspects of Clinical Research' and 'Understanding the Grants Process'. In addition to these three classes, informationists were expected to keep up to date by pursuing graduate-level courses to develop or update their knowledge in areas of science that would aid them in providing information services to their assigned or potential groups, or, if no academic courses were available for their subject area, then, in conjunction with their supervisor, they were to select appropriate courses in other areas.

No more than one academic course per year was expected; however, informationists without a science or health sciences background who needed to take basic courses such as biology or chemistry were expected to take more than one basic science course a year to advance to higher level and graduate level subject courses. The number of academic courses to be completed was based on performance, mentor assessment and an informationist's level of education and experience.

In addition, informationists were expected to engage in regular continuing education in science pertinent to their service areas and to maintain their skills as library and information specialists. The expectation to continue their education in science could be fulfilled by taking continuing education courses offered by professional associations or NIH, attendance at scientific conferences, publishing a paper in a referred or indexed science journal, delivering a paper or presenting a poster at a scientific conference, attending NIH lectures, independent reading of the scientific literature or auditing academic courses. The expectation to maintain their skills as library and information science specialists could be fulfilled by similar events relating to library and information science.

Most recently, an in-house statistics course was provided for the informationists to help them develop a better understanding of statistical analyses reported in the biomedical and behavioural research literature. This course was designed to aid the informationists in reading, evaluating and analysing the biomedical and social science literature.

Job responsibilities

As noted by Shipman and Homan[16], the role of the informationist is ultimately defined by the context in which he or she works. The precise services provided to groups will vary and depend on the needs of the group. Team roles and responsibilities at NIH have expanded over time, in part as a result of the degree to which the informationist has become embedded.

When the Library's informationist programme first began, services were offered to clinical research groups. The programme consisted primarily of attendance at clinical rounds and protocol searching. As relationships matured with these clinical teams, additional services were developed such as reading, selecting and summarizing information from the literature. The customer group then expanded to bench researchers, grant administrators and technology transfer staff. To meet the expectations of the new groups, services grew to include database development, gathering competitive intelligence information and use of software to analyse data from experiments.

The NIH Library's informationist programme has evolved over time. As with other innovations, it began by performing many of the same tasks carried out in the physical library—literature searching and instruction for example—but in a new way. However, the change in venue led to increased user expectations about the types of services an informationist could provide. While initially NIH researchers saw benefit in informationists going on rounds, doing comprehensive searches and providing expertise in unfamiliar databases, today critical appraisal and summarizing and synthesizing the literature are also routinely expected, as are help with manuscript preparation, co-authoring articles and help with data analysis software. This evolution reflects Giuse's

informationist maturity model. In this model, an informationist service will progress through five stages, including baseline, preliminary outreach, formalized service, established service and iterative optimizing.[17] Nonetheless, all NIH informationists have in common the following:
- formal training in both information science and a subject domain;
- work outside the library in the practice environment as a team member and/or expert consultant to a scientific group;
- responsibilities for critical appraisal and literature synthesis and/or complex bioscience data analysis;
- understanding of the culture in which they work.

In addition, depending upon the settings in which the NIH Library informationists work, they may have additional responsibilities such as:
- contributing technology, knowledge management and content integration expertise;
- training, co-teaching and providing evidence-based medicine (EBM) education for the team;
- other team roles such as participation in research projects, manuscript preparation and co-authoring (see Fig. 1).

Evaluation

Programme evaluation has been ongoing since the inception of the NIH Library informationist service and has included process and outcomes evaluation. Both quantitative and qualitative methods have been used.

Process evaluation has been accomplished through meetings of the informationists with their library supervisor, meetings with their mentors and regular general meetings of the entire informationist team. In the area of training, informationists identified areas where they felt that their expertise needed to be developed, pursued training as needed and identified training that they felt all informationists should participate in. Milestones related to the informationists' training plans were established and monitored. The services performed have also been subject to ongoing assessment, with informationists routinely sharing information about new projects and services. The types of informationist tasks being performed, the uptake
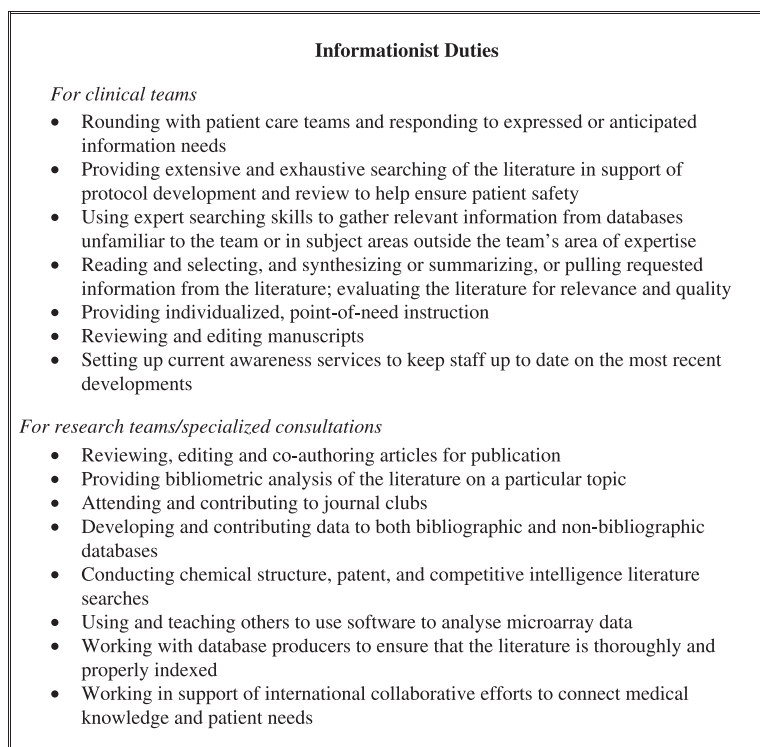
Informationist Duties

For clinical teams
- Rounding with patient care teams and responding to expressed or anticipated information needs
- Providing extensive and exhaustive searching of the literature in support of protocol development and review to help ensure patient safety
- Using expert searching skills to gather relevant information from databases unfamiliar to the team or in subject areas outside the team's area of expertise
- Reading and selecting, and synthesizing or summarizing, or pulling requested information from the literature; evaluating the literature for relevance and quality
- Providing individualized, point-of-need instruction
- Reviewing and editing manuscripts
- Setting up current awareness services to keep staff up to date on the most recent developments

For research teams/specialized consultations
- Reviewing, editing and co-authoring articles for publication
- Providing bibliometric analysis of the literature on a particular topic
- Attending and contributing to journal clubs
- Developing and contributing data to both bibliographic and non-bibliographic databases
- Conducting chemical structure, patent, and competitive intelligence literature searches
- Using and teaching others to use software to analyse microarray data
- Working with database producers to ensure that the literature is thoroughly and properly indexed
- Working in support of international collaborative efforts to connect medical knowledge and patient needs

Figure 1 NIH Library informationists' responsibilities

of services by various groups and the time invested in supporting groups have been tracked. The collective feedback has informed the delivery of the programme, including guiding the refinement of the training programme, allowing for introduction of new services and planning for backup expertise, and led to the decision to formalize the steps taken prior to introducing the programme to a new group.

Programme outcomes have been reviewed through several evaluation procedures. In 2004, the Library received an award from the NIH Director's set-aside funds for programme evaluation and additional funds from the National Library of Medicine to assess the impact of the informationist services on the groups they served. The study was undertaken by a consultant specializing in information industry research. It consisted of a baseline survey conducted in 2004 of 74 scientists in established groups and groups that had not yet been assigned an informationist. The 2004 response rate is unavailable as the definitive number receiving the survey was unknown. The same survey was repeated with the same groups in 2006. Respondents numbered 91 of 181 surveyed (50% response rate).

The survey, based on a consultant's proprietary instrument, consisted of 23 questions that gathered data on clinical researchers' information-seeking behaviours, resources used, expectations of qualifications and services provided by informationists and role on the clinical research team. A full statistical analysis and comparison of the two surveys is underway. However, preliminary findings showed that over time groups with an informationist tended to use a wider range of information services and resources more frequently; were more satisfied with their ability to find answers to questions that arose during the course of their work; and were more likely to pursue answers to questions that arise in their work than they were previously. The consultant also noted that users of the service demonstrated 'strong acceptance and uptake of the informationist service, growing demand for a wider variety of services, robust return on investment and unassailable satisfaction and loyalty ratings.' They further remarked that the researchers targeted for the service reported 'need [for] much more help outside the traditional bounds of information professional expertise' than was true in the past. Training for informationists
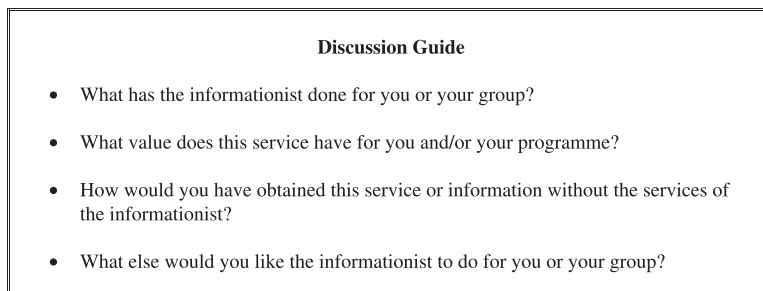
<div style="border:1px solid black">

Discussion Guide

- What has the informationist done for you or your group?

- What value does this service have for you and/or your programme?

- How would you have obtained this service or information without the services of the informationist?

- What else would you like the informationist to do for you or your group?

</div>

Figure 2 Discussion guide for key informant interviews

to maintain and expand subject and information science competence also was seen as critical to the continued success of the programme.

As part of an ongoing evaluation process, interviews are conducted at regular intervals with customers to gather deeper insight into outcomes. These interviews are semi-structured and based on a guide with general questions designed to elicit open-ended responses (Fig. 2). The objective is to discover researchers' perceptions of informationists' roles and assess the value they place on informationists' work. To date, 13 interviews have been completed. Interviewees have been unanimous in finding that the informationists' work has saved them time and that their literature searches have been more thorough and comprehensive than those that they could have performed themselves. They particularly rely on the informationist when they have limited time to do searching or when they need an exhaustive literature search. In addition, researchers report that they do not have time to explore or learn to use all the information resources that are made available to them and they rely on the informationist to provide point-of-need training and advice based on the informationist's knowledge of the group's immediate needs. Finally, they express great appreciation when the informationist is knowledgeable about their area of research as, again, it saves them time in not having to provide detailed explanations of what they need or the terms to search with.

To identify potential areas of interest for further study of our informationist programme, a volunteer sample of NIH informationists is participating in an exploratory research initiative using the diary method to record critical incidents related to their work. The critical incidents are being compiled using web-based survey software.

Finally, in addition to the formal measures, informal observations and anecdotal feedback have provided strong indications of the programme's acceptance. These have included the active mentoring on multiple teams, an example of which was the expectation by one mentor that he would assign the informationist a chapter in a textbook each week, and would then meet the informationist for coffee each week to quiz the informationist on the chapter contents. That a very busy research scientist would take the time to tutor the informationist in his area of subject expertise demonstrates a strong commitment to the informationist and the informationist programme. Other examples were the offer of office space in the teamwork area—where space is highly coveted—invitations for co-authorship on papers, and inclusion in general staff meetings, journal clubs and other events.

Conclusion

The NIH Library informationist programme provides an example of embedded librarians who practice outside the library proper. The expansion of the programme during the past 6 years has provided opportunities to systematically study, refine and retool the service.

The unique bench-to-bedside translational research focus of the NIH limits the generalizability of our experience. Also, the defining characteristic of the informationist, which is a specialist in context, reminds us that all informationist programmes are developed, implemented and ultimately measured by their ability to contribute significantly to work of the specialized group(s) being served. We also know that, given the size and programmatic scope of the NIH, it may never be

possible to assign an informationist to every group that needs one.

Nonetheless, our experience suggests that informationists can and do provide a valued service dimension when libraries are becoming increasingly viewed as a desktop utility. Our preliminary findings also suggest that informationists contribute significantly to the scientific process, introducing a wider range of resources to the research activity, increasing scientists' satisfaction with their ability to answer questions and enabling pursuit of answers to meet information needs. Further research is recommended to explore the generalizability of these findings.

Key Messages

Implications for Policy

- In a time of increasing reliance by scientists on electronic resources and services delivered to the desktop, informationist programmes provide customized library services.
- To assure the success of the informationist programme, commitment from senior clinical, research and administrative leaders within the organization as well as the groups served is essential.
- Acculturation of the informationist within the group is aided by assignment of a key group member as mentor for the informationist.
- Informationists' contributions across all groups include saving researchers' time and providing expert searching and point-of-need instruction.
- Informationists' roles evolve over time and, depending on the context, may contribute to more sophisticated information and knowledge management functions.

Implications for Practice

- Informationists must be enthusiastic lifelong learners; continuous learning is essential to expand both subject domain and information science competence.
- Job responsibilities are defined by the work context, will vary by work group and may increase over time.

References

1 Davidoff, F. & Florance, V. The informationist: a new health profession? *Annals of International Medicine* 2000, **132**, 996–8.

2 Lamb, G. A decade of clinical librarianship. *Clinical Librarian Quarterly* 1982, **1**, 2–4.

3 Greenhalgh, T., Hughes, J., Humphrey, C., Rogers, S., Swinglehurst, D. & Martin, P. A comparative case study of two models of a clinical informaticist service. *British Medical Journal* 2002, **324**, 524–9.

4 Giuse, N. B., Koonce, T. Y., Jerome, R. N., Cahall, M., Sathe, N. A. & Williams, A. Evolution of a mature clinical informationist model. *Journal of the American Medical Informatics Association* 2005, **12**, 249–55.

5 Sladek, R. M., Pinnock, C. & Phillips, P.A. The informationist: a prospective uncontrolled study. *International Journal for Quality in Health Care* 2004, **16**, 509–15.

6 Minie, M., Bowers, S., Tarczy-Hornoch, P., Roberts, E., James, R. A., Rambo, N. & Fuller, S. The University of Washington Health Sciences Library BioCommons: an evolving Northwest biomedical research information support infrastructure. *Journal of the Medical Library Association* 2006, **94**, 321–9.

7 Chattopadhyay, A., Tannery, N. H., Silverman, D. A., Bergen, P. & Epstein, B. A. Design and implementation of a library-based information service in molecular biology and genetics at the University of Pittsburgh. *Journal of the Medical Library Association* 2006, **94**, 307–13, E192.

8 Rook, R. & Adsheadt, F. Postgraduate training in public health medicine. St George's Hospital Medical School public health information service. *Health Information and Libraries Journal* 2001, **18**, 38–44.

9 McKibbon, K. A. & Bayley, L. Health professional education, evidence-based health care, and health sciences librarians. *Reference Services Review* 2004, **32**, 50–3.

10 Grefsheim, S. F. & Rankin, J. A. Information needs and information seeking in a biomedical research setting: a study of scientists and science administrators. *Journal of the Medical Library Association* 2007, **95**, 426–34.

11 Watson, E. M. Subject knowledge in the health sciences library: an online survey of Canadian academic health sciences librarians. *Journal of the Medical Library Association* 2005, **93**, 459–66.

12 Wales, A. Managing knowledge to support the patient journey in NHS Scotland: strategic vision and practical reality. *Health Information and Libraries Journal* 2005, **22**, 83–95.

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

14 Urquhart, C., Spink, S., Thomas, R. & Durbin, J. Systematic assessment of the training needs of health library staff. *Library and Information Research* 2005, **29**, 35–42.

15 Lyon, J., Giuse, N. B., Williams, A., Koonce, T. & Walden, R. A model for training the new bioinformationist. *Journal of the Medical Library Association* 2004, **92**, 188–95.

16 Shipman, J. & Homan, M. Medicine's library lifeline. *Library Journal* 2003, **128**, 49–50.

17 Giuse, N. B., Sathe, N. & Jerome, R. Envisioning the information specialist in context (ISIC): a multi-center study to articulate roles and training models. *Task Force on the Information Specialist In Context (ISIC) Final Report*. Chicago, IL: Medical Library Association, 2006. Available (to MLA members only) at: http://www.mlanet.org/members/pdf/isic_final_report_feb06.pdf (accessed 9 August 2007).