Librarians in Biomedical Research: New Roles and Opportunities

A STUDY FUNDED BY AN SLA GRANT SHOWS THAT LIBRARIANS ARE BECOMING MORE INVOLVED IN ALL PHASES OF BIOMEDICAL RESEARCH AND INCREASINGLY ARE BEING INCORPORATED INTO SPONSORED RESEARCH.

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As biomedical research becomes increasingly complex and collaborative in nature, the information needs of its researchers continue to grow. Librarians and information professionals (IPs) are positioned to contribute their training and skills to the work of research teams and help them make more efficient use of information. Several non-traditional duties for IPs have already been established in an effort to support biomedical research, thereby moving IPs beyond the role of librarian and into that of information researcher.

The technological and infrastructural challenges of collaboration have been described in several forums in the library science community (and beyond) as "e-science." Providing information services for geographically dispersed workgroups such as "collaboratories" is at the heart of e-science (DeRoure, Jennings and Shadbolt 2001).

For librarians, the changing nature of science represents not only expanded professional opportunities but also the chance to increase their impact on biomedical research. Information professionals and librarians possess certain skill sets, including analysis, research, needs assessment, and objective data gathering, that can mitigate some of the information challenges faced by scientists. These skill sets make librarians logical choices for teams involved in multidisciplinary and geographically dispersed research.

This article presents an overview of the results of a research project conducted by the authors from January 2009 to March 2010 and funded by SLA through a research grant. For more information about the grant, visit the SLA Web site and look under "Research."

Study Methodology

This study explored emerging roles for IPs in today's biomedical research teams in hopes of providing support for the continued inclusion and expansion of opportunities for librarians. The following questions guided the study:

1. In what aspects of collaborative biomedical research can traditional IP

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skills be applied in non-traditional ways?
2. How are IPs applying their skills outside the traditional roles of librarian or information professional?
3. How can the biomedical research process be improved through more targeted interventions by IPs?
4. How can SLA foster the development of non-traditional roles for IPs in collaborative biomedical research?

We conducted a preliminary literature review to help us develop a theory of how the traditional competencies of an IP can be applied to biomedical research. Next, we received approval from an institutional review board for protocol and study instruments and set out to recruit librarians and IPs. We contacted potential participants by sending a series of e-mails to colleagues in professional organizations and library and information science schools.

Our recruitment messages called for IPs working in "non-traditional" roles. Several people who answered were surprised to find that they qualified for participation in our study, as they did not necessarily think of their own work as non-traditional. Had we defined our target population differently or simply used terms that did not include "non-traditional," we might have attracted a different mix of people and, thus, different services and roles.

Fifty-four people completed a survey indicating interest in participating in the study. Of those 54, we interviewed 14 at their workplaces. Our questions focused on what they do in their positions, their role in their institution's research, and their thoughts and feelings about working as an IP in biomedical research. We followed each interview with a short "show and tell" session that allowed participants to demonstrate any interesting projects on which they were working or tools they used in their work.

All interviews were transcribed by a transcriptionist and analyzed for patterns and themes. Once these themes had been identified, the transcripts were reviewed again and coded.

While reference work and searching are traditional elements of a librarian's job, today's biomedical research librarians are becoming more involved in the research itself.

Most of the study participants were employed by their institution's library and identified themselves as librarians, though these factors were not necessarily reflected in their job titles. Job titles varied but included bioinformaticist, analyst, science librarian, and information coordinator (see Figure 1). Ten participants had earned undergraduate degrees in a scientific field, and two held doctoral degrees in life sciences. Most worked in medical school libraries at large research universities. Some were assigned to a specific academic department, while others served many departments. One participant was a solo librarian; the others worked in teams ranging in size from 2 to more than 15.

Because this is an ethnographic study of a self-selected population rather than a representative sample, our results are not generalizable. However, given the breadth of our recruitment efforts, we believe we reached a large segment of the librarian population in the United States.

Study Results

We discovered a rich and diverse spectrum of services being offered by librarians in a variety of biomedical institutions. In the course of collecting and analyzing the data, seven key themes emerged:

1. Diverse and novel services being provided;
2. A deep understanding of the research environment;
3. Innovative ways of delivering services;
4. A focus on client outreach;
5. Increased direct funding of librarians through sponsored research (e.g., grants and contracts);
6. Metrics and defining success; and
7. Professional identity and career growth.

These themes, taken together, begin to create a picture of what it means to be a librarian in the rapidly evolving world of biomedical research. The following paragraphs touch briefly on some of these themes.

Diverse and novel services. Study participants' jobs ranged from traditional library positions with non-traditional elements to bioinformatics specialists who didn't perform any traditional library functions. The services they provided reflected this diversity. We categorized the services participants offered into the following broad groups:

- *Original research and analysis, including in-depth literature searching:* Participants spent huge chunks of time finding, compiling and analyzing information for their clients. While reference work and searching are traditional elements of a librarian's job, today's biomedical research librarians are becoming more involved in the research itself. No longer called upon simply to find articles for their users, study participants are also performing analyses. Many have also completed training in conducting systematic reviews.
- *Bioinformatics support:* A few participants were deeply involved in bioinformatics, with titles like "Bioinformaticist" and "Bioinformatics Librarian." These participants spent a significant portion of their time training researchers to use new tools and techniques to find information about genetics and other biology-related issues.
- *Grant and manuscript writing support:* Participants' time and effort

FIGURE 1: **PROFESSIONAL IDENTITY: TITLES AND ROLES**

Librar*
- Medical Librarian
- Research Librarian
- Librarian (2)
- Reference Librarian
- Health Sciences Librarian
- Emerging Technologies Librarian
- Clinical and Translational Sciences Librarian
- Library and Communications Manager

Bioinform* or Inform*
- Research Informatics Coordinator
- Biosciences & Bioinformatics Librarian
- Bioinformaticist

Other
- Protocol Analyst
- Research Information Technologist

were increasingly being incorporated into sponsored research (i.e., grants and contracts). As they became more involved in the grants themselves, they also were becoming more involved in writing the grant proposals and developing the resulting manuscripts. Several had been co-authors of papers produced by their research teams.

- *Teaching and technical support:* All participants taught classes, which ranged from information literacy courses to seminars on using biomedical research databases and NCBI software.
- *Offering traditional library services in non-traditional ways:* Study participants had made the shift to digital, online delivery of their services while still valuing face-to-face communication. They were blogging about new services and upcoming courses, providing chat reference services and mobile versions of their online catalog and other tools, and compiling lists of appropriate new resources (articles, Web sites and tools) and distributing them electronically.

Understanding of the research environment. Study participants revealed they had a deep understanding of the research environment, either because they had studied a scientific discipline at some point in their academic career or because they had worked with researchers as embedded IPs or librarians in a biomedical setting for several years. Even if participants did not necessarily grasp all the details of the science behind the research, they understood the scientific research process and how they could apply their IP skills to further that process.

Innovative service delivery. From our first interview, study participants struck us as being innovative and entrepreneurial. Each was assessing the landscape of her institution and looking for niches that needed filling, and each had identified new services that could help improve scientific research. We were able to identify a set of shared characteristics (both environmental and personal) that were common to our most entrepreneurial participants.

First, all had supportive leaders who gave them considerable leeway to try new things. Second, they were not afraid of failing. Third, all had mastered the art of the reference interview. Each participant identified the reference interview as her most treasured skill from library school and expressed gratitude for having learned how to dig deeply into a person's information request and identify the true need buried within. This skill is especially crucial in a developing field, where both participants in the reference interview are treading new ground.

Many of our participants made it very clear that they consider what they do to be traditional, core librarianship. They also stressed that while their services and delivery methods may be new and innovative, what they are doing—supporting their clients—is not. They understood that as their clients became better able to find their own basic information (such as relevant articles and simple facts), it opened the door for them to offer new services.

Funding through sponsored research. One unanticipated theme that emerged in our interviews was that of funding. It quickly became clear that librarians increasingly were being written into funded research as project staff members in addition to being funded by institutional overhead dollars. We think this represents a major shift in how scientists, particularly principal investigators who initiate sponsored research proposals, think about librarians.

Defining success. Participants consistently defined success as positive recognition of their work by clients. When they knew that a client was satisfied, they felt sure they had done a good job. One participant mentioned she felt she was doing a good job if she was busy and people continued to seek her help. Co-authorship was also mentioned as a sign of successful service to research groups.

Crafting the Future

These results indicate that librarians are blazing new trails in the field of information science by providing innovative services to biomedical researchers. Using their traditional library-based skills, including standard reference interview techniques, study participants were working diligently to craft new solutions to the problems of contemporary science. They emphasized that the

FIGURE 2: **INTEGRATING LIBRARIANS INTO BIOMEDICAL RESEARCH**

Librarian involvement is possible and desirable in all phases of biomedical research. Following is a model for integrating librarians into the biomedical research process, depicting stages of sponsored biomedical research and possible tasks for information professionals.

Pre-Proposal	Application Development	Award Acceptance and Project Set-Up	Project Management and Monitoring	Award Close-Out
• Search strategy • Familiarity with databases and directories • Data mining for funding opportunities • Competitive intelligence • Management of streams of information in multiple formats	• Bibliography and literature search for application • IACUC literature search requirements • Description of information and library resources available to the project staff • Information management systems planning • Coordination of contributions	• Implementation of information management plan • Portal development	• Collaboration development • Portal support • Continued competitive intelligence • Knowledge management • Mediation • Reporting support	• Final reporting • Support for and compliance with funding agency publication policies • Record retention • Disposition of working documents or spaces

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"core" skills of librarianship were relevant to them but that these skills must be infused with innovative approaches specific to the biomedical research environment.

With scientists increasingly recognizing librarians as partners in their research by including them in grants and contracts and listing them as authors of publications, it is hard to overstate the tremendous potential for librarians in this area. We recommend that biomedical research teams make every effort to include librarians as key team members (see Figure 2). We would also like to see professional organizations offer greater support for librarians who are reaching out to assist biomedical researchers outside of the library and who often feel isolated and without a professional home. We believe strongly that library schools need to develop programs to prepare librarians for careers in science.

Finally, we have proposed a research agenda that recommends further study in three main areas: (1) how biomedical research librarians are providing services, (2) the impact of these services, and (3) how both professional organizations and library schools can better support this group of professionals.

In summary, librarians involved with biomedical research are utilizing their traditional library-based skill sets, including analysis, research, needs assessment, and objective data gathering, in non-traditional ways to make a major impact on their institutions' research programs. The leadership and innovation of the participants in this study are helping to craft a future for IPs as critical members of research teams, thus creating new opportunities for all librarians. Further support from professional organizations and library and information science schools, as well as more attention to the work practices of librarians in biomedical research, can help accelerate this trend. **SLA**

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