RESEARCH REPORT

Starting the data conversation: informing data services at an academic health sciences library

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Objective: The research obtained information to plan data-related products and services.

Methods: Biomedical researchers in an academic medical center were selected using purposive sampling and interviewed using open-ended questions based on a literature review. Interviews were conducted until saturation was achieved.

Results: Interview responses informed library planners about researchers’ key data issues.

Conclusions: This approach proved valuable for planning data management products and services and raising library visibility among clients in the research data realm.

Keywords: Libraries, Medical; Biomedical Research; Data Collection; Information Storage and Retrieval; Health Information Management; non-MeSH: Data management; medical libraries; health sciences libraries; interview methods

INTRODUCTION

Over the past five to ten years, libraries have begun to provide data-related services to researchers. Examples include assisting researchers in complying with the data management and sharing requirements of federally funded grants (e.g., National Institutes of Health, National Science Foundation) [1–4]; providing guidance for developing workflows and standard data collection procedures [1–4]; training researchers on how to better organize, store, and preserve their data [1, 3, 4]; and building searchable interfaces to provide a level of discovery and access for research datasets [1, 3–5]. Health sciences libraries, however, have been slow to develop these services [6, 7]. New data sharing and data management initiatives from the National Institutes of Health’s Big Data to Knowledge initiative and the publishers Public Library of Science (PLOS) [8, 9] have created new opportunities for librarians, in particular for health sciences librarians, to expand their roles in data services.

A number of libraries have assessed researchers’ data-related issues and needs as a way to guide the development of their services in this area. These assessments have been done through interviews [10–16], focus groups [17–21], and web audits or bibliographic analyses [22–29]. However, few have addressed these data needs in the context of health sciences research [18, 20, 23] or provided a methodology that the authors found satisfactory for gathering information about researchers’ data management practices.

This paper describes the methodology that the authors used to identify researchers to interview, reach out to those researchers, and conduct the interviews. It describes key findings from the interviews about the challenges that researchers face when collecting and managing data.

METHODS

The authors, located in an academic health sciences library, completed a series of interviews as a means to assess their research community and the challenges that the researchers face when collecting, managing, storing, and preserving their research data. These interviews were also designed to build connections with the researcher community. They were intended to provide valuable information to plan the development of library products and services, including an institutional data catalog to describe researchers’ datasets created at the medical center, and led to the development of a tool to help basic science labs better manage their research data.

Developing interview questions

We performed a literature review to identify studies that evaluated the data-related challenges and needs of an institution’s researchers. The library then selected a number of interview questions from previous studies that were deemed most appropriate for understanding researchers’ data management challenges [12, 16, 18, 20, 26]. Questions taken from previous studies were adapted to make the interviews more conversational and open-ended. Additional interview questions were developed by the library to create a conversational interaction (Appendix A online only). The rationale was that if the interviews had a conversational tone, researchers would be more likely to elaborate on their answers, providing more in-depth information and bringing to light issues
about which the librarians would not have thought to
ask, due to the differences between their perspective
and the researchers’.

Selecting study participants

Researchers with active grant funding were selected.
Data from the institution’s grants management tool were
used to identify eligible participants. The grants
management tool retrieved data from institutional
researchers including their administrative department,
grant funding agency, grant title, and contact
information. Using the data gathered from the
grants management tool, the authors identified
and purposively selected researchers based on their
expected data service needs, types of research (e.g.,
basic science, clinical research), levels of research
experience, and involvement in big data research.
Selected participants were sent an email outlining
the librarians’ intention to learn more about their
data-related needs. Two attempts were made to
reach out to researchers, after which a lack of
response resulted in the researcher’s removal from
the list of potential interviewees. The authors
interviewed individual researchers until theoretical
saturation was achieved, such that no new insights
into key requirements for library data services were
identified.

Conducting the interviews

Prior to each interview, the librarians reviewed the
stated research interests and publications of the
researchers being interviewed to gain a better
understanding of their research methods, including
the types of data collected, the data collection methods
used, and whether the researchers used newly created
data or existing data from previous studies. This
information provided librarians with the necessary
background to feel confident discussing researchers’
data during the interviews and provided context for
the interviewer as the researchers responded to
questions about their research data.

Two librarians were present for each interview: one
who led the discussion and another who took notes
on a laptop using word processing software. Using
two librarians allowed the interview to remain
conversational, so that one librarian would not be
tasked with asking questions, listening intently, and
taking notes at the same time.

Analyzing the results

Notes collected during the interviews were saved to
a secure institutional server, and no personal identifying
information was collected; only the distinction between
basic science and clinical researchers was recorded, as
well as the researchers’ departments. Interview
responses were coded in a word processing document
using the grounded theory method and then transferred
to a spreadsheet with an indication of being collected
from either a basic science or clinical researcher
(Appendix B online only). This spreadsheet served as
a large, de-identified dataset, comprising frequencies of
the major themes related to the data management of the
interviewed researchers. The institutional review board
gave this study an exemption, as the de-identified
dataset categorized this study as non-human subject
research.

RESULTS

Researchers were invited to participate in the study
until theoretical saturation was achieved, at which
time the authors had conducted thirty interviews,
comprising eleven interviews with basic scientists
and nineteen with clinical researchers. A number of
responses to the questions were unique to individual
researchers and therefore did not provide the
librarians with information they could use to
implement widespread products and services. These
results can be viewed in the online Appendix C.
Themes that did emerge from the interviews are
described in Table 1. The specific themes that pro-
vided the library with an opportunity to implement
new products and services are discussed in more
detail below.

Data organization challenges and needs

Basic science researchers. The basic science research-
ers interviewed identified several challenges in
managing their data. The biggest obstacle for re-
searchers was the perceived lack of standards and
procedures available for them to uniformly collect
their data. Without specific collection standards,
researchers were left to develop custom data collec-
tion methods, constantly reinventing the wheel,
sometimes with every new research project.

Another issue that researchers identified was a dis-
connect between the different types of data collected.
For example, imaging data and raw numerical data
that were collected as part of the same research project
were often located in different places and, therefore,
difficult to find. Postdoctoral researchers and graduate
students, who work in a lab for a limited amount of
time, exacerbate this problem: these researchers work
on a specific project but then leave with either the
physical data or the methodology they used to collect
that data. This leaves the basic science researcher
without the ability to understand who used their data,
how they used their data, or where their data have gone
once that researcher leaves.

Clinical researchers. The major challenges identified
by clinical researchers related to the quality of their
data. Many researchers mentioned data quality as
a major concern. This issue often stems from the
involvement of multiple personnel in collecting data
for a clinical study, coupled with inconsistent data
collection methods. These inconsistencies can result in
team members entering data elements using different
interpretations of a given variable (e.g., weight
measured in pounds versus kilograms), potentially...
rendering a data element or an entire dataset useless. Clinical researchers also identified difficulties in transferring data from one format to another. Clinical researchers use a number of different types of statistical software (e.g., SAS, SPSS, STATA, R) as part of their research process, and moving data between different types of software often results in poor data quality and even data loss.

**Researcher interest in data sharing**

Identifying researchers most interested in sharing their data was essential to inform the implementation of a data catalog for internally generated research datasets. The interviews identified clinical researchers—particularly those in the Department of Population Health (11 researchers)—as willing to share their data with the public as long as they were aware of who was using their data. Those same researchers expressed interest in finding shared datasets for their own research, either through direct access or collaboration. Responses to the interviews suggested that basic science researchers currently show little interest in sharing their research data, as the majority preferred to share with their direct collaborators or with no one at all. Basic science researchers cited a number of reasons for a reluctance to share data including negative experiences with past sharing, concerns about privacy restrictions, the belief that their data are too specialized to be of value to others, insufficient storage options for sharing data publically, and the hurdle of having to organize their data prior to sharing.

**DISCUSSION**

The biggest challenge that libraries face in building data management services is the researchers’ perception that librarians do not understand research data and have no role to play in data management. While several other studies interviewed researchers about their data management challenges, many took an approach that seemed to call upon the researchers to be conversant in the language of the library, rather

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**Table 1**

Results from data interviews

|                         | Basic scientists (n=11) | %       | Clinical researchers (n=19) | %       | Overall (n=30) | %       |
|-------------------------|------------------------|---------|----------------------------|---------|----------------|---------|
| **Data storage methods**|                        |         |                            |         |                |         |
| Data repository         | 2 (18%)                |         | 1 (5%)                     |         | 3 (10%)        |         |
| Institutional server    | 5 (45%)                |         | 18 (95%)                   |         | 23 (77%)       |         |
| External hard drive     | 5 (45%)                |         | 5 (26%)                    |         | 10 (33%)       |         |
| DVD                     | 2 (18%)                |         | 1 (5%)                     |         | 3 (10%)        |         |
| Drop box                | 3 (27%)                |         | 3 (16%)                    |         | 6 (20%)        |         |
| External institute      | 1 (9%)                 |         | 4 (21%)                    |         | 5 (17%)        |         |
| Others with single responses (Appendix B) | | | | | | |
| **File formats used**   |                        |         |                            |         |                |         |
| Lab notebook/paper      | 7 (64%)                |         | 7 (37%)                    |         | 14 (47%)       |         |
| Excel                   | 5 (45%)                |         | 9 (47%)                    |         | 14 (47%)       |         |
| Comma separated values  | 1 (9%)                 |         | 1 (5%)                     |         | 2 (7%)         |         |
| Others with single responses (Appendix B) | | | | | | |
| **Data organization methods** | | | | | | |
| Documented procedures   | 1 (9%)                 |         | 5 (26%)                    |         | 6 (20%)        |         |
| Data dictionary         | —                      |         | 7 (37%)                    |         | 7 (23%)        |         |
| Folders                 | 4 (36%)                |         | 5 (26%)                    |         | 9 (30%)        |         |
| Paper cheat sheet       | —                      |         | 1 (5%)                     |         | 1 (3%)         |         |
| Lab notebook            | 3 (27%)                |         | —                          |         | 3 (10%)        |         |
| Shared drive            | 2 (18%)                |         | —                          |         | 2 (7%)         |         |
| **Willingness to reuse data (their own and other people’s research data)** | | | | | | |
| Yes                     | 3 (27%)                |         | 15 (79%)                   |         | 18 (60%)       |         |
| No                      | 2 (18%)                |         | 1 (5%)                     |         | 3 (10%)        |         |
| For comparison only     | 4 (36%)                |         | —                          |         | 4 (13%)        |         |
| Only their own data for use in future studies | | | | | | |
| 6 (53%)                 |                       |         | 15 (79%)                   |         | 21 (70%)       |         |
| **Challenges of data organization** | | | | | | |
| Poor data output formats | —                      |         | 5 (26%)                    |         | 5 (17%)        |         |
| Data quality            | —                      |         | 4 (21%)                    |         | 4 (13%)        |         |
| Disparate datasets      | 5 (45%)                |         | 2 (11%)                    |         | 7 (23%)        |         |
| Team miscommunication   | —                      |         | 2 (11%)                    |         | 2 (7%)         |         |
| Lack of standards       | 7 (64%)                |         | —                          |         | 7 (23%)        |         |
| Postdoc/student leaves with data | 5 (45%) |         | —                          |         | 5 (17%)        |         |
| Too time consuming      | 5 (45%)                |         | —                          |         | 5 (17%)        |         |
| Cannot search data      | —                      |         | 1 (5%)                     |         | 1 (3%)         |         |
| Data loss               | —                      |         | 1 (5%)                     |         | 1 (3%)         |         |
| Size of data            | 1 (9%)                 |         | —                          |         | 1 (3%)         |         |
| **Interest in data sharing** | | | | | | |
| Sharing with the public | 3 (27%)                |         | 11 (58%)                   |         | 14 (47%)       |         |
| Sharing via collaboration only | 5 (45%) |         | 6 (32%)                    |         | 11 (37%)       |         |
| Not interested in sharing | 3 (27%)               |         | 2 (11%)                    |         | 5 (17%)        |         |
than speaking to the researchers in their own language. For example, the use of terminology such as "e-science," "metadata," and "Dublin Core" throughout the data interview process—terms that have little to no meaning for most researchers—may serve to widen, rather than narrow, the gap between librarians and researchers. Through the careful construction of "researcher-centric" questions and thorough preparation by the interviewers in educating themselves about the researchers' work, the interviewers were able to avoid this potential pitfall.

Another strategy the librarians found to be very effective was making the interviews conversational and open-ended. Providing a relaxed environment for the researchers allowed the interview questions to flow more coherently, gave the librarians the opportunity to ask the researchers to elaborate on their answers in a more natural way, and allowed room for the researchers to expand their answers into areas that the librarians, with their different perspective, might have overlooked.

Through the data interviews, the authors gained valuable knowledge about the medical center research community’s data issues including, but not limited to, the challenges they face when collecting, organizing, and sharing their research. Insights gained from the interviews provided new information that led to the improvement or development of library data products and services. The understanding that the Department of Population Health is most keen to share their data and find other research datasets that they can use for their research provided useful information that allowed the library to build out its data catalog to first address the needs of its most likely users. The data interview results regarding the extent of the difficulties that basic science researchers face in organizing the data in their labs led to the development of a low-barrier lab organization tool that is currently being piloted in two basic science labs.

Data interviews are an effective means of elucidating the challenges that researchers at an institution face when collecting, organizing, and sharing their data. The interviews also raise the visibility and, when conducted well, can enhance the credibility of the library in the realm of research data. Because of both benefits of raised visibility and credibility and the high variability of responses across researchers and so presumably across institutions, the value of what is reported in this report may lie more in the methodology than the specific results, as these interviews can serve as an important first step for a health sciences library to insert itself into the data conversation and change the perceptions of the research communities that they support.

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