

Research for Beginners

Resource Notebook



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Why should we do research?

To contribute to the advancement of knowledge (evidence-based librarianship)

To advance our personal reputations/careers

To satisfy our own curiosity

To run our libraries (collections, programs, services) better

Your reason? _____

- Working alone
examples
- Partnering with other librarians
examples
- Partnering with researchers from other disciplines
examples

The Process: Seven Steps to Success

Step One: Pick the Research Project

- Find the topic/hypothesis to be tested/question to be answered
- Find resources/advice
- Refine the topic/hypothesis/question



Step Two: Research Design

- Learn about designs/methods
- Choose the doable design/method
- Get help
- Statistics

Step Three: Resources and Approvals to Begin

- Time (how much needed and how to get it)
- Money (how much needed and how to get it)
- Other resources needed (including research partners?)
- Approvals from supervisor/can your supervisor help you?
- Approvals from your institution



Step Four: Do the Research/Collect the Data

Step Five: Analyze the Results

Step Six: Publish the Results

- Choose your audience
- Choose your format
- Publication of research results to multiple audiences in multiple formats

Step Seven: Evaluate



Why should I do research?

Research Policy Statement of the Medical Library Association
<http://www.mlanet.org/research/science1.html>

Working alone

Pfannenstiel, Brenda R. "Famous Persons" in MEDLINE: Examination of a Medical Subject Heading. Medical Reference Services Quarterly, Spring 1998, 17(1):11-23.

Abstract: The "famous persons" Medical Subject Heading (MeSH) provides a unique perspective on the medical literature indexed in the MEDLINE database. A total of 3,745 MEDLINE citations indexed with the term "famous persons" from 1966 through 1994 were examined. Discussions of possible diagnoses of creative artists, royalty, political leaders, and even fictional characters were a frequent preoccupation, as were assassinations. Publication dates of articles concerning a particular famous person are often clustered around an anniversary of the person's birth or death. A few famous persons account for a disproportionate number of citations.

Timeliness is not an issue

Funding is not an issue

No other participants, as researchers or as research subjects, are necessary

Cullen RJ. In search of evidence: family practitioners' use of the Internet for clinical information. J Med Libr Assoc Oct 2002 ;90(4):370-9.

PURPOSE: The aim of the study was to determine the extent of use of the Internet for clinical information among family practitioners in New Zealand, their skills in accessing and evaluating this information, and the ways they dealt with patient use of information from the Internet.

METHOD: A random sample of members of the Royal New Zealand College of General Practitioners was surveyed to determine their use of the Internet as an information source and their access to MEDLINE. They were asked how they evaluated and applied the retrieved information and what they knew about their patients' use of the Internet. Structured interviews with twelve participants focused in more depth on issues such as the physicians' skills in using MEDLINE and in evaluating retrieved material, their searches for evidence-based information, their understanding of critical appraisal, their patients' use of the Internet, and the ways they handle this use. RESULTS: More than 80% (294/363) of members in the sample completed and returned the questionnaire. Of these, 48.6% reported that they used the Internet to look for clinical information. Gender and age were more significant in determining use than practice type or location. Information was primarily sought on rare diseases, updates on common diseases, diagnosis, and information for patients. MEDLINE was the most frequently accessed source. Search skills were basic, and abstracts were commonly used if the full text of an item was not readily available. Most reported that up to 10% of patients bring information from the Internet to consultations. Both Internet users and non-Internet users encouraged patients to search the Web. Internet users were more likely to recommend specific sites. CONCLUSIONS: Practitioners urgently need training in searching and evaluating information on the Internet and in identifying and applying evidence-based information. Portals to provide access to high-quality, evidence-based clinical and patient information are needed along with access to the full text of relevant items.

Survey questionnaire

Structured interviews

Whitmire, Ethelene. Disciplinary Differences and Undergraduates' Information-Seeking Behavior. Journal of the American Society for Information Science and Technology. June 2002, 53(8):631-8.

"Using data from the 1996 College Student Experiences Questionnaire (CSEQ) and the Biglan model, frequently used in education research, Whitmire analyzed differences in undergraduates' information-seeking behavior. Data were collected from a sample of 5175 undergraduate

students selected from 10,000 at thirty-eight four-year institutions." Hypothesis Fall 2002 16(3):15
Ambitious data collection (from outside source)
Use of research instrument (CSEQ)

Partnering with other librarians

Dudden RF, Coldren S, Condon JE, Katsh S, Reiter CM, Roth PL. Interlibrary loan in primary access libraries: challenging the traditional view. Bull Med Libr Assoc Oct 2000;88(4):303-13.

INTRODUCTION: Primary access libraries serve as the foundation of the National Network of Libraries of Medicine (NN/LM) interlibrary loan (ILL) hierarchy, yet few published reports directly address the important role these libraries play in the ILL system. This may reflect the traditional view that small, primary access libraries are largely users of ILL, rather than important contributors to the effectiveness and efficiency of the national ILL system. **OBJECTIVE:** This study was undertaken to test several commonly held beliefs regarding ILL system use by primary access libraries. **HYPOTHESES:** Three hypotheses were developed. H1: Colorado and Wyoming primary access libraries comply with the recommended ILL guideline of adhering to a hierarchical structure, emphasizing local borrowing. H2: The closures of two Colorado Council of Medical Librarians (CCML) primary access libraries in 1996 resulted in twenty-three Colorado primary access libraries' borrowing more from their state resource library in 1997. H3: The number of subscriptions held by Colorado and Wyoming primary access libraries is positively correlated with the number of items they loan and negatively correlated with the number of items they borrow. **METHODS:** The hypotheses were tested using the 1992 and 1997 DOCLINE and OCLC data of fifty-four health sciences libraries, including fifty primary access libraries, two state resource libraries, and two general academic libraries in Colorado and Wyoming. The ILL data were obtained electronically and analyzed using Microsoft Word 98, Microsoft Excel 98, and JMP 3.2.2. **RESULTS:** CCML primary access libraries comply with the recommended guideline to emphasize local borrowing by supplying each other with the majority of their ILLs, instead of overburdening libraries located at higher levels in the ILL hierarchy (H1). The closures of two CCML primary access libraries appear to have affected the entire ILL system, resulting in a greater volume of ILL activity for the state resource library and other DOCLINE libraries higher up in the ILL hierarchy and highlighting the contribution made by CCML primary access libraries (H2). CCML primary access libraries borrow and lend in amounts that are proportional to their collection size, rather than overtaxing libraries at higher levels in the ILL hierarchy with large numbers of requests (H3). **LIMITATIONS:** The main limitations of this study were the small sample size and the use of data collected for another purpose, the CCML ILL survey. **CONCLUSIONS:** The findings suggest that there is little evidence to support several commonly held beliefs regarding ILL system use by primary access libraries. In addition to validating the important contributions made by primary access libraries to the national ILL system, baseline data that can be used to benchmark current practice performance are provided.

Collected data from other libraries and analyzed it together

Wood FB, Lyon B, Schell MB, Kitendaugh P, Cid VH, Siegel ER. Public library consumer health information pilot project: results of a National Library of Medicine evaluation. Bull Med Libr Assoc Oct 2000;88(4):314-22

In October 1998, the National Library of Medicine (NLM) launched a pilot project to learn about the role of public libraries in providing health information to the public and to generate information that would assist NLM and the National Network of Libraries of Medicine (NN/LM) in learning how

best to work with public libraries in the future. Three regional medical libraries (RMLs), eight resource libraries, and forty-one public libraries or library systems from nine states and the District of Columbia were selected for participation. The pilot project included an evaluation component that was carried out in parallel with project implementation. The evaluation ran through September 1999. The results of the evaluation indicated that participating public librarians were enthusiastic about the training and information materials provided as part of the project and that many public libraries used the materials and conducted their own outreach to local communities and groups. Most libraries applied the modest funds to purchase additional Internet-accessible computers and/or upgrade their health-reference materials. However, few of the participating public libraries had health information centers (although health information was perceived as a top-ten or top-five topic of interest to patrons). Also, the project generated only minimal usage of NLM's consumer health database, known as MEDLINEplus, from the premises of the monitored libraries (patron usage from home or office locations was not tracked). The evaluation results suggested a balanced follow-up by NLM and the NN/LM, with a few carefully selected national activities, complemented by a package of targeted activities that, as of January 2000, are being planned, developed, or implemented. The results also highlighted the importance of building an evaluation component into projects like this one from the outset, to assure that objectives were met and that evaluative information was available on a timely basis, as was the case here.

Librarians were participants as researchers and as “subjects” or data sources

Klein MS, Ross FV, Adams DL, Gilbert CM. Effect of online literature searching on length of stay and patient care costs. Acad Med Jun 1994;69(6):489-95
PURPOSE. To examine the associations between (1) the economic indicators of hospital costs, charges, and length of stay (LOS) for inpatient cases and (2) the use of MEDLINE searches for such cases. METHOD. An outcome-based, objective, prospective study with an economic evaluation was conducted from September 1989 to September 1990 at three metropolitan Detroit teaching hospitals representing both allopathic and osteopathic care. The study consisted of (1) 192 test cases, derived from a consecutive sample of inpatients of all ages for whom MEDLINE searches were requested at the participating medical libraries, and (2) 10,409 control cases, which were of the same diagnosis-related groups (DRGs) as the test cases but did not involve identified MEDLINE searches. Statistical analysis included the use of multivariate analyses of variance and correlation coefficients. Comparisons of cases were made on case-by-case and DRG bases regarding total patient costs, charges, and lengths of stay for cases with or without MEDLINE searches. RESULTS. The test cases were found to have a higher severity of illness. Among test cases, statistically significant relationships existed between (1) hospital expenses and LOS and (2) hospital expenses and the timing of the search during hospitalization when controlling for LOS. When cases were matched for DRG and LOS, the cases with early searches (i.e., conducted during the first half of hospitalization) had significantly lower expenses. CONCLUSION. Of the test-case patients (for whom MEDLINE searches were conducted during hospitalization), those whose searches were conducted earlier had statistically significantly lower costs, charges, and lengths of stay than those whose searches were conducted later.

A classic often cited by librarians to justify their jobs!

Partnering with researchers from other disciplines

Marshall JG. The impact of the hospital library on clinical decision making: the Rochester study. Bull Med Libr Assoc Apr 1992;80(2):169-78

In these times of economic constraint, libraries of all types are under increasing pressure to evaluate their services. Hospital libraries face a particular challenge because the goals of the

health care system demand that the relevance of library services to patient care be determined. The **hospital librarians in Rochester, New York, responded to this challenge by developing a research project** that explored the impact of library services on clinical decision making. A systematically sampled group of 448 physicians in the Rochester area agreed to participate in the study between September 1990 and March 1991. The physicians were asked to request some information related to a current clinical case and then to evaluate its impact on the care of their patients. **Senior medical staff or administrators acted as study facilitators** in each of the fifteen participating hospitals. As a result of the information provided by the library, 80% of the 208 physicians who returned their questionnaires said that they probably or definitely handled some aspect of patient care differently than they would have handled it otherwise. Changes in the following specific aspects of care were reported by the physicians: diagnosis (29%), choice of tests (51%), choice of drugs (45%), reduced length of hospital stay (19%), and advice given to the patient (72%). Physicians also said that the information provided by the library contributed to their ability to avoid the following: hospital admission (12%), patient mortality (19%), hospital-acquired infection (8%), surgery (21%), and additional tests or procedures (49%). The physicians rated the information provided by the library more highly than that provided by other information sources such as diagnostic imaging, lab tests, and discussions with colleagues. In addition to confirming earlier research findings that information provided by hospital libraries is perceived by physicians as having a significant impact on clinical decision making, the results increase our store of scientific knowledge about the specific nature and extent of the impact of information provided by the hospital library.

A single author study, but note bolded text above

Baker LM, Case P, Policicchio DL. General health problems of inner-city sex workers: a pilot study. J Med Libr Assoc Jan 2003;91(1):67-71

OBJECTIVE: A pilot study was designed to determine the general health problems of inner city sex workers. SAMPLE: The researchers worked with an agency that provides outreach services to these sex workers. Through this agency, they had access to a purposive sample of sex workers in a large Midwest city. METHODS: Nonparticipant observation was used to gather information about their health problems, the nature of information they may need, and the barriers to obtaining health care and health information. RESULTS: Sex workers (N = 75) ranged in age from nineteen to sixty-one years old. They identified a number of physical or psychological problems, such as rape, depression, and tuberculosis. HIV/AIDS was never mentioned. A major barrier to health care is a lack of information about where to go for treatment or how to obtain health insurance. CONCLUSIONS: More research needs to be done by library and information science professionals to determine the information needs of sex workers and the agencies that provide them with health and social services.

Baker is LIS faculty, Case is Sociology faculty, Policicchio is Safe Choices Project Manager at Alternative for Girls

The Process: Seven Steps to Success

Step One: Pick the Research Project

Find the topic/hypothesis to be tested/question to be answered

Pick a topic that truly interests you, or a question for which you truly need an answer, because research will take some time and effort. You don't want to lose interest halfway through!

List your research ideas here:

Short of ideas? See Research Ideas from Medical Librarians, MCMLA Chapter Research Project 1998-1999 at <http://www.mcmla.org/archives/ideas2.htm> (face-to-face and electronic focus groups or "brainstorming sessions")

See also the prediction, intervention, and exploration questions identified in: Evidence-Based Librarianship Levels of Evidence. Jon Eldredge. *Hypothesis* Fall 2002, 16(3):10-13. Or see <http://research.mlanet.org/ResearchQuestions.pdf>

Refine the topic/hypothesis/question

- like refining a student's paper topic, make it doable given your resources (see step three)
- think hard! If the question is clearly stated in your own mind, the next steps will be easier; if it isn't, the next steps may be impossible.

Step Two: Research Design

Learn about designs/methods

- Examine methods of similar research studies (if you want to do a citation impact study, read other studies; if you want to set up an observational study, find out how others have done it. Don't be afraid to contact the researcher to ask questions about his or her methodology.; the researcher will probably be flattered!)
- MLA Research Section bibliography at <http://research.mlanet.org/resbib.html>
- Sage Publications lists nearly 700 products in its Research Methods and Evaluations section (see <http://www.sagepub.com/>), including detailed manuals on specific research methods.

- Enroll in or audit a course on research design, not necessarily in library school.
- Social Research Methods <http://www.socialresearchmethods.net>
- Search ERIC <http://SearchERIC.org/>
- Does your institution have a Research & Grants Administration dept. or a research-savvy person you can consult?
- research instruments—see below

Choose the doable design/method

- Which method will help you answer your question/test your hypothesis?

- Consider the resources needed to use the method (see step three)

Get help

- Partner with someone experienced/knowledgeable in the method (combine your weaknesses with your partners' strengths, and vice versa)
- MLA Research Section Mentor database
<http://research.mlanet.org/mentor.html>

Statistics and Measures

- If your design will require sophisticated statistical analysis, partner with a statistician
- Learn to use a statistical software program
- Enroll in/audit a statistics course
- Statistical Resources on the Web
<http://www.lib.umich.edu/govdocs/stats.html>
- Free Statistical Tools on the Web
<http://gsociology.icaap.org/methods/statontheweb.html>
- Data & Story Library <http://lib.stat.cmu.edu/DASL/>
- StATS: Steve's Attempt to Teach Statistics
<http://www.childrens-mercy.org/stats/>
- Test Reviews Online (Buros Institute)
<http://buros.unl.edu/buros/jsp/search.jsp>
- ETS Test Link <http://www.ets.org/testcoll/index.html>
- EdRes.org <http://edres.org/>

About Research Instruments

Research instruments (measures, scales, tests, tools) are used to develop, test, and measure concepts important to a discipline. Instruments may be used to measure attitudes or behaviors, how well classroom material was learned, or physiological parameters such as blood cell counts or EEGs.

"The goal of instrumentation is to create measures that reduce error in research through consistency, accuracy, and sensitivity of measurement. For self-report instruments, consistency is analogous to reliability, and accuracy is analogous to validity. With laboratory instruments, validity is also used to describe the accuracy of the measures, but precision refers to the instrument's consistency in measurement. Sensitivity is directly applicable to both types of measurement and refers to the instrument's ability to finely discriminate in individual differences and changes in the concept under study. Control of measurement error is achieved by assuring that as much response variability as possible is due to the subject's relationship to the concept under study rather than to inconsistent or systematic extraneous factors."

Encyclopedia of Nursing Research. Joyce J. Fitzpatrick, editor. (NY: Springer, 1998), p. 272.

Librarians can benefit from the work done in other disciplines to produce and validate research instruments.

How does a library user's coping style or personality type affect his or her information-seeking behavior? Psychologists may have a tool to help you explore this question.

Did those nursing or medical students hear a word you said when you tried to teach them about searching databases, or respecting copyright laws, or using bibliographic file management software? Education literature may help you to develop appropriate pre- and post-tests.

The following reference books describe research instruments and will often tell how well they have been validated, whether they are publicly available or must be purchased, or if they may only be administered by someone trained and certified to do so.

Instruments for Clinical Health Care Research. Frank-Stromberg, Marilyn and Olsen, Sharon J. (Boston: Jones and Bartlett, 1997)

Handbook of Family Measurement Techniques. Touliatos, John; Perlmutter, Barry F.; Straus, Murray A. (Thousand Oaks, CA: Sage Publications, 2001)

Tests in print; a comprehensive bibliography of tests for use in education, psychology, and industry. Buros, Oscar Krisen. (Highland Park, NJ: Gryphon Press, 1961)

Tests : a comprehensive reference for assessments in psychology, education, and business. Maddox, Taddy. (Austin, TX: Pro-Ed, 2003)

Test critiques compendium : reviews of major tests from the Test critiques series. Keyser, Daniel J. and Sweetland, Richard C., editors. (Kansas City, MO: Test Corp. of America, 1987)

Mental Measurements Yearbook. (Highland Park, NJ: Mental Measurements Yearbook, 1941-)

Some books about research instruments are very specific, such as:

Research instruments in social gerontology. Mangen, David J. and Peterson, Warren A., editors. (Minneapolis, MN: Univ. of Minnesota Press, 1982-)

Alcoholism treatment assessment research instruments. Lettieri, Dan J.; Nelson, Jack E.; Sayers, Mollie A., editors. (Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1985)

SPM handbook of health assessment tools. Hyner, Gerald C., et.al., editors. (Pittsburgh, PA: Institute for Health and Productivity Management, 1999)

Drug abuse instrument handbook: selected items for psychosocial drug research. Nehemkis, Alexis; Macari, Mary A.; Lettieri, Dan J. (Rockville, MD: National Institute on Drug Abuse, 1976)

Handbook of community and home health nursing: tools for assessment, intervention, and education. Stanhope, Marcia and Knollmueller, Ruth N. (St. Louis: Mosby, 1996).

If you are interested in developing or adapting instruments for measuring your services to or the information-seeking behaviors of immigrant populations, this book may help you:

Translating questionnaires and other research instruments: problems and solutions. Behling, Orlando and Lae, Kenneth S. (Thousand Oaks, CA: Sage Publications, 2000)

It is also possible to identify research instruments by searching databases such as CINAHL or PsychInfo.

The Cumulative Index of Nursing and Allied Health Literature uses research instruments as a publication type, so a search for the terms or keywords "adolescence" and "coping" with the publication type "research instrument" will get citations to studies in which such instruments as the Youth Coping Index (YCI) or the Young Adult-Family Inventory of Life Events and Strains (YA-FILES) were used. The article citation may even have complete source information for the instrument, or the fulltext of the instrument itself.

In PsychInfo one may search subject terms such as "measurement," "scoring (testing)," "test scores." One may search a subject such as "health behavior" or "information seeking" or "health knowledge" and then apply limits to the resulting sets, limits such as "tests and measures" (articles about a research instrument, not a study which uses an instrument in its methodology); such as "classification codes" (e.g., "health psychology testing" or "promotion and maintenance of health and wellness"); such as "special features" (e.g., 400 assessment instrument).

Step Three: Resources and Approvals to Begin

Time (how much needed and how to get it)

- Release time/sabbatical?
- Schedule it in your calendar, set intermediate and final deadlines
- Expect and plan for the project to take three times as long as you estimate is needed

Money (how much needed and how to get it)

- Budget/anticipate all expenses (travel, phone, photocopies, postage, clerical

- assistance, equipment, software, etc.)
- Internal grants/institutional support?
- External funding
 - MLA Resources for Researchers <http://research.mlanet.org/resources.html>
 - NLM grants <http://www.nlm.nih.gov/ep/extramural.html>
 - NNLM Funding Opportunities <http://nnlm.gov/projects/funding/>
 - Funding obtained through non-librarian research partners?
- Working with no funding

Other resources needed

- Use of workplace/other computers, photocopiers, etc.
- Use of institutional staff/volunteers for clerical/other assistance

Approvals from supervisor/can your supervisor help you?

- Research experience will enhance your knowledge and skills as an employee
- Research results may benefit your institution
- Research publication will enhance your institution's reputation

Approvals from your institution

- Do you need IRB approval? (unlikely, but if you intend to use human subjects, especially vulnerable populations, it is best to check)
- Do you need HIPAA or other release/consent forms? (if you record the subjects behavior, or use your access to protected patient information to select your survey sample, etc.?)

HIPAA Privacy Rule and Research <http://privacyruleandresearch.nih.gov/>

Step Four: Do the Research/Collect the Data

First steps:

- Recruiting subjects for your observational study?
- Developing a mailing list for your survey?
- Having a system/thinking ahead: how you plan to analyze the data will influence how you collect it
- Use relational database software?
- Use computer use tracking software?
- Set up a hard copy filing/indexing system?

Collect the Data

Step Five: Analyze the Results



- Don't allow your interest to flag (overcome project or motivation fatigue)
- Divide and conquer
- Share out portions of the work with your partners
- Schedule mini-deadlines for each stage of the analysis

- See step two regarding mentors and statisticians--ask for help!
- Celebrate how far you've come, and how near your goal!

Step Six: Publish the Results

Choose your audience

- Librarians/colleagues
- Information consumers/library clientele
- Hospital administrators/Institutional employers
- City/county/state/federal government officials
- University faculty or administrators
- Vendors

Choose your format

- Peer-reviewed journal article or book/book chapter
- Conference/meeting presentations (papers)
- Poster sessions
- Website publication
- Internal publication (reports, newsletters)

About Structured Abstracts

MLA Research Section Examples <http://research.mlanet.org/abstract.html>
http://research.mlanet.org/various_abstracts.html

"The Structured Abstract: An Essential Tool for Researchers" by Liz Bayley and Jon Eldredge. Hypothesis Spring 2003 (17(1):1, 11-13.

Publication of research results to multiple audiences in multiple formats

- Advantages (publicize results to diverse groups; presentations at meetings are often solicited for journal articles later)
- Ethical constraints (copyright/publication agreement precludes placing same article in two different journals; presenting same material in two different formats to same audience at same meeting is "double dipping" for credit)

Step Seven: Evaluate

First, congratulate yourself on having completed a research project!

- Appreciate your growth
- New skills acquired
- New knowledge gained
- New experience acquired
- New partnerships forged

Examine the problems or failures and learn from them

- Skill or knowledge deficit?
- Unsuccessful partnership?

- Insufficient resources?
- Poor study design?
- Weaknesses in your own working style that require compensation by partnering with someone who has corresponding strengths

Good research projects may win awards! <http://research.mlanet.org/awards.html>

Consider how your experience will inform your next research effort.

Further notes:

American Library Association lists many research committees within ALA, ACRL, or ALA Divisions <http://www.ala.org>

Special Libraries Association also offers research information and support to its members through its web site at <http://www.sla.org/>

Research humor

Writing a research paper <http://www.netfunny.com/rhf/jokes/89q1/research.297.html>

Ig Nobel Prize <http://www.improb.com/ig/ig-top.html>

Hot AIR (Annals of Improbable Research) <http://www.improb.com/>

"The Etiology and Treatment of Childhood" by Jordan W. Smoller

<http://users.erols.com/geary/psychology/publication.htm>

Peep Research: A Study of Small Fluffy Creatures and Library Usage

http://www.millikin.edu/staley/fluff/peep_research.html

Are you trying to interest children in research, or would you like to look at research that is NOT library/information science or medical in nature?

Many science museums describe their research projects online in attractive websites, e.g., Science Museum of Minnesota at <http://www.smm.org/>

You may find many interesting descriptions of science projects undertaken by government agencies, e.g., Moose Mystery at

<http://midwest.fws.gov/agassiz/moose.html>

WWW Virtual Library: Science Fairs <http://physics.usc.edu/~gould/ScienceFairs/>

Ultimate Science Fair Resource <http://www.scifair.org/>