HYPOTHESIS

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Contents

The Structured Abstract:
An Essential Tool for Researchers

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By now, most health sciences librarians are well aware of structured abstracts. Since the introduction of this convention for summarizing clinical research in 1987 [1,2] structured abstracts have become the predominant mode of abstract found in the major clinical journals. Many behavioral, social, biological, and basic medical sciences journals are now also following the convention of structured abstracts. In their most basic form, structured abstracts organize their summaries of publications with the following headings:

- OBJECTIVE
- METHODS
- RESULTS
- CONCLUSIONS

Some clinical journals include structured abstracts with variations on these headings. For example, some will use headings such as: Context, Background, Aim, Findings, and Interpretation. Some additional headings include: Design, Population, Setting, Participants, Intervention (method), Main Outcome Measures and other aspects relevant to the research.

A summary of the advantages of structured abstracts appears in the Summer 2001 issue of *Hypothesis*. [3] The evidence points in particular to advantages for searching [4-6] and quickly extracting needed information [7] from these types of summaries, regardless of the exact headings use by a journal. No wonder then that structured abstracts are gaining popularity. The MLA Annual Meeting for 2003 strongly recommends use of structured abstracts; participants wishing to present papers or posters at the 2004 MLA Annual Meeting will be *required* to submit their entries in structured abstract format.

Fortunately, preparing structured abstracts also can help you from the very outset of contemplating your research, progressing through the research process itself, and culminating in its final reporting to your colleagues. This article shows you how.

OBJECTIVE: Envisioning Your Research Question

Do you have a research idea? Not sure where to start? The structured abstract can guide your thinking at the very beginning. Consider the overall purpose of your research. What are you trying to learn or to demonstrate? Such questions are the beginnings of a hypothesis. Here are some generic examples of research questions:

- *What made our program a success?*
- *Which form of teaching results in students searching effectively?*
- *Which information resources are used the most?*

There are many types of other questions you can entertain. For an inventory of research questions already developed by a worldwide collaboration of health sciences librarians see the Spring 2001 issue of *Hypothesis* [8]. Advice on formulating questions can be found elsewhere [9]. In addition, please see Bayley et al's examples of alternatives to the more conventional formats for structured abstracts [10].

An increasing number of journals are allowing authors to begin their structured abstracts under the heading QUESTION. Should you choose a more traditional approach, however, you can convert your question into a statement under the heading of OBJECTIVE. Consider how the questions above become converted to OBJECTIVE statements:

- *To demonstrate how this program (name) was a success in achieving its five goals.*
- *To determine if teaching MEDLINE by the _____ method results in second year medical students retaining 90% of the search skills learned after three months duration.*
- *To measure electronic resources usage at the _____ Library and Informatics Center over the 2001-2002 period as a means of predicting future use.*

Note how these research questions became more refined in the process of stating them clearly for the structured abstract. Research questions typically become more focused as one writes up the proposal in structured abstract form. Normally research questions also become more specific and detailed during this process.

The content to be drafted in the METHODS and RESULTS sections will anticipate the actual research project in the initial stages. This might be the moment when you decide to submit your structured abstract for consideration as a presentation or poster at a professional meeting such as the MLA Annual Meeting. Your eventual research project need not be tied absolutely to what you propose, but the more you can clarify what methods you

think will be needed and what results you anticipate while still in the proposal stage, the easier your work will be later. Clarification also will attract colleagues with similar interests.

METHODS: Documenting Your Research Steps

Now that you have determined what you want to research or demonstrate, *how* will you proceed?

The METHODS section in a structured abstract should accurately, although concisely, summarize how you will proceed in learning the answer to your question. METHODS headings are sometimes brief:

- *Prospective cohort study*
- *Randomized controlled trial*
- *Series of three focus groups*

These brief descriptions often communicate a great deal because of the specific meanings attached to these short-hand descriptions of study designs. A handbook of research methods or two probably will suggest the type of methods that might be appropriate for answering your question and suggest some instruments you might use to gather information. Some authors substitute the term DESIGN for methods in their structured abstracts. Because questions vary and the designs have relative validity you also might want to consult a table of Evidence-Based Librarianship (EBL) Levels of Evidence for ideas [10]. As your research inquiry proceeds, you will find that your methods become more specific. Even the most experienced researchers must fine-tune their methods as practical issues arise.

As you contemplate what method to use, you might find it easier to identify two other elements found in some structured abstracts: SETTING and POPULATION. Most health sciences librarianship/informatics research includes these components. And, by thinking about the parameters of your setting or the exact criteria of who will be included (and who will be excluded) in your population, you begin to clarify your research project that much further. SETTING headings might be followed by the following sample statements:

- *A small library with one librarian and two technicians serving a 400-bed hospital.*
- *A small research library that serves an MRI research facility owned by a healthcare corporation.*
- *An academic health sciences library serving a school of medicine, a college of nursing, and two allied health sciences programs*

POPULATION headings might precede the following types of concise, but descriptive text:

- *First-year medical students with no previous formal MEDLINE training*

(Structured Abstracts — Continued from page 11)

- *Third-year internal medicine residents*
- *All users of an academic health sciences library*
- *Physicians and research scientists*

Will your methods include an INTERVENTION or an EXPOSURE? These might be helpful headings to include in your structured abstract. These headings might, coincidentally, help clarify the direction of your research. Experimental designs such as randomized controlled trials or observational designs such as the cohort studies usually utilize interventions or exposures respectively. An INTERVENTION usually has a specific research meaning. Some examples are:

- *Weeding according by _____, _____, and _____ criteria.*
- *A 30-60 minute interview in the faculty members' offices*
- *A 120-minute in-depth MEDLINE training session for the study group whereas the control group received only a 15-minute overview session*

The heading EXPOSURE also has a specific research design meaning. Some examples are:

- *Access to information resources during the 2002-2003 period*
- *One 60-minute required training session on MEDLINE search strategies*
- *Teamwork training lasting two days for all managers*

RESULTS: Reporting Your Research

The RESULTS section of the structured abstract reports what you have discovered. It will probably report that you only made a modest discovery or perhaps some unexpected results. Contrary to popular belief, when conducted correctly most solid research often does not report any dramatic or surprising results. Even if you wonder, "Who cares?" while reviewing less than dramatic or unexpected results, you have a professional responsibility to report whatever it was that your research produced. Do try to be as accurate as possible for the sake of those trying to understand your research method and results. Quantify as much as possible to lend precision. You might want to review the kinds of methods employed by colleagues who have attempted to answer research questions resembling your own. If their methods do nor seem appropriate do not let the range of their methods limit your choice of research design. Your own design might produce unique data or observations worth sharing with your colleagues. On the other hand, by employing similar research designs capable of collecting compatible data, your research might be more easily included in a systematic review or meta-analysis.

At the time of submitting a proposal for a poster or a presented paper you most likely will not have your results ready yet or the results might still be unanalyzed. This should be perfectly acceptable, but you should consider what results your hypothesis, null hypothesis, and alternative hypotheses suggest. Colleagues reviewing your proposal should be able to evaluate your proposal on the basis of your Objective, Methods, and anticipated Results alone, so do not worry about having actual results to report at the proposal submission stage.

The CONCLUSION should not introduce any information or ideas not already described elsewhere in your structured abstracts. Ideally, it should be only one or two sentences in length, and can include an evaluation of your research and areas for further research -- questions for your colleagues to use as they start research with their own structured abstracts!

Examples of Structured Abstracts

The following articles include structured abstracts to give you some examples for different types of research:

SYSTEMATIC REVIEWS
Brettle A. Information skills training: a systematic review of the literature. *Health Information and Libraries Journal*. 2003 Jun; 20 (2): in press.

Winning A., Beverley C. Clinical librarianship: a systematic review. *Hypothesis.* 2001 Fall; 15(3): 3, 8-9. Available from: http://gain.mercer.edu/mla/research/hypothesis.html

META-ANALYSIS
Sharpe D, Rossiter L. Siblings of children with a chronic illness: a meta-analysis. *Journal of Pediatric Psychology*. 2002 Dec; 27 (8): 699-710.

RANDOMIZED CONTROLLED TRIAL (INTERVENTION)
Bradley DR et al. Real-time, evidence-based medicine instruction: a randomized controlled trial in a neonatal intensive care unit. *Journal of the Medical Library Association*. 2002 Apr;90(2):194-201. Available from: http://www.pubmedcentral.nih.gov/tocrender.fcgi?journal=93

COHORT STUDY (PREDICTION)
brown ha, Alpi K, Cleary D, Dorsey MJ. Accessing the most recent information Part II. *Hypothesis.* 2002 Summer; 16 (2): 6. Available from: http://gain.mercer.edu/mla/research/hypothesis.html

QUALITATIVE RESEARCH STUDIES (EXPLORATION)
Maliski SL, Heilemann MV, McCorkle R. From "death sentence" to "good cancer": couples' transformation of a prostate cancer diagnosis. *Nursing Research.* 2002 Nov-Dec;51(6):391-7.

Fuat A, Hungin AP, Murphy JJ. Barriers to accurate diagnosis and effective management of heart failure in primary care: qualitative study. *BMJ*. 2003 Jan 25;326 (7382):196.

Gallagher TH, Waterman AD, Ebers AG, Fraser VJ, Levinson W. Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA*. 2003 Feb 26;289 (8):1001-7.

PROGRAM EVALUATION
Tannery NH et. al. Use of Web-based library resources by medical students in community and ambulatory settings. *Journal of the Medical Library Association*. 2002 Jul;90(3):305-9. Available from: http://www.pubmedcentral.nih.gov/tocrender.fcgi?journal=93

PROJECT DESCRIPTION
Gregg AL et al. Designing a curriculum on Internet health resources for deaf high school students. *Journal of the Medical Library Association*. 2002 Oct;90(4):431-6. Available from: http://www.pubmedcentral.nih.gov/tocrender.fcgi?journal=93

NARRATIVE REVIEW
Eldredge J. Cohort studies in health sciences librarianship. *Journal of the Medical Library Association*. 2002 Oct;90(4):380-92. Available from: http://www.pubmedcentral.nih.gov/tocrender.fcgi?journal=93

SUMMARY
Here is a checklist based on this description of the steps in the research process and how the structured abstract can assist you in clarifying your thoughts and actions:

1. Formulate a research QUESTION, refining it as you proceed with your research.

2. Consider the METHODS you will use to answer the question, including the population and setting, the research design, any instruments you might develop or employ and if you will include an intervention or exposure.

3. Once you have carried out your research, analyze the data you have collected and summarize it in your RESULTS section.

4. Finally, prepare your CONCLUSION and inspire your colleagues. ?

REFERENCES

[1] Ad Hoc Working Group for Critical Appraisal of the Medical Literature. A proposal for more informative abstracts of clinical articles. *Annals of Internal Medicine* 1987 Apr.; 106(4):598-604.

[2] Huth EJ. Structured abstracts for papers reporting clinical trials. *Annals of Internal Medicine* 1987 Apr. ; 106 (4):626-7.

[3] Bayley, L. Evidence-Based Librarianship Implementation Committee Report: Report of the Research Results Dissemination Task Force. *Hypothesis* 2001;15(2):6-7.

[4] McIntosh N. Structured abstracts and information transfer. *British Library R&D Report* 6142. London: British Library, 1994.

[5] Hartley J. Sydes M. Blurton A. Obtaining information accurately and quickly: are structured abstracts more efficient? *Journal of Information Science* 1996; 22(5):349-356.

[6] Booth A. O'Rourke AJ. The value of structured abstracts in information retrieval from MEDLINE. *Health Libraries Review* 1997 Sep; 14(3):157-166.
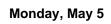
[7] Hartley J. Sydes M. Are structured abstracts easier to read than traditional ones? *Journal of Research in Reading* 1997 Jun; 20(2):122-136.

[8] Evidence-Based Librarianship Implementation Committee. The most relevant and answerable research questions facing the practice of health sciences librarianship. *Hypothesis* 2001 Spring; 15(1): 9-15, 17.

[9] Eldredge JD. Evidence-based librarianship: formulating EBL questions. *Bibliotheca Medica Canadiana*; BMC 2000 Winter; 22(2): 74-7.

[10] Bayley L. Wallace A. Brice A. Evidence-Based Librarianship Implementation Committee Research Results Dissemination Task Force recommendations. *Hypothesis* 2002 Spring; 16(1):6-8.

[11] Eldredge JD. Evidence-based librarianship levels of evidence. *Hypothesis* 2002 Fall; 10-13.

Monday, May 5	**Shoot the Pipeline with Evidence-Based Librarians: Original Research and Practical Methods**	**3:30 - 5:00 PM**

This session will bring Evidence-Based Librarianship (EBL) to life for all who want to integrate EBL into their practice. This session will feature the first-ever systematic review (the highest level in the EBL hierarchy of evidence) of Clinical Medical Librarian programs conducted in the US. Two other presentations will summarize methods for measuring user attitudes and behaviors.

Come join the MLA Research Section for an afternoon of practical learning that will bring us closer to the exciting international EBL movement.