

White Paper ■

Bridging the Gap in Medical Informatics and Health Services Research:

Workshop Results and Next Steps

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Abstract In January 2000, the Agency for Healthcare Research and Quality (AHRQ) and the National Library of Medicine (NLM) cosponsored an invitational workshop entitled "Medical Informatics and Health Services Research: Bridging the Gap." Planned by a small committee of representatives from NLM and AHRQ institutional training centers, the workshop was designed to address the need for education of researchers interested in working at the intersection of the fields of medical informatics and health services research. More than 100 educators and researchers from AHRQ- and NLM-sponsored training programs in medical informatics and health services research participated in the workshop. Through a series of plenary presentations and breakout sessions, the workshop addressed ways of increasing the pool of persons interested, trained, and experienced in addressing specific areas of synergy between the two fields. This paper reports on the results of the workshop.

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As ever-more-massive data sets become available, health services researchers, like molecular biologists, will find that the use of computational tools, some basic understanding of informatics, and interaction with informaticians are essential components of investigation. For example, informatics techniques are helpful in converting data from past practice into information to guide decisions about future practices. Informatics is also a key to achieving change in practice by linking information from health services research directly into practice. Informaticians, who are generally skilled in applying computational tools to data and knowledge, will need more specific understanding of the approaches and problems of health services research. To continue the example,

health services research provides techniques for determining which interventions should be tried. It also provides approaches to evaluating the effectiveness of interventions. These approaches need to be considered up front in the design of clinical databases. At the present time, however, many informatics training programs provide little or no exposure to the computational issues of health services research, and many training programs for health services research say relatively little about informatics.

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*For definitions of the fields and delineation of their differences, see Mandl and Lee¹ in this issue.

from AHRQ- and NLM-sponsored training programs[†] in medical informatics and health services research participated in the workshop. Through a series of plenary presentations and breakout sessions, the workshop[‡] addressed ways of increasing the pool of individuals interested, trained, and experienced in addressing specific areas of synergy between the two fields as described in the companion papers of this issue of the Journal.

Workshop Results

Participants agreed that, while most informaticians are already well versed in applying evaluative techniques to their work, many still could benefit from cross-training in other aspects of health services research. Similar needs and opportunities also exist for health services researchers to benefit from expanded informatics training.

Both medical informatics and health services research emphasize the application of decision sciences to health care delivery, but each has developed sets of different and complementary tools (Table 1). Medical informatics tools inform the design of computer systems and health services research tools provide for the evaluation of such systems. Medical informatics expertise in computer science as it relates to database and health information system design, including vocabulary and terminology, data confidentiality, security, and modeling can be used to translate clinical practice information into data systems. Biostatistical, evaluative, quality management, economic, epidemiologic, and survey skills of health services research can all contribute to the utilization of data systems to assess and improve the delivery of health care.

A series of training and research options were posed for consideration. They range from relatively inexpensive to more costly investments and emphasize cooperation and partnership between agencies of the federal government as well as across training programs (Table 2). Options for NLM and AHRQ to consider include support for:

[†]Information on AHRQ-funded programs may be found at <http://www.ahrq.gov/fund/training/t32.htm>, and information on NLM-funded programs may be found at http://www.nlm.nih.gov/ep/curr_inst_grantees.html (both accessed Oct 3, 2001).

[‡]For more information on the workshop goals and objectives, plenary session presentations, and breakout session reports, see <http://www.nlm.nih.gov/nichsr/mihsr/agenda.html> (accessed Oct 3, 2001) and the papers by Humphreys et al.,² Mandl and Lee,¹ and Shortliffe and Garber³ in this issue.

Table 1 ■

Major Tools Taught in Medical Informatics (MI) and Health Services Research (HSR) Curricula

MI Curricula Contribution to HSR	HSR Curricula Contribution to MI
Vocabulary/terminology	Biostatistics
Data modeling	Clinical epidemiology
Database design	Survey design
Health information systems	Evaluation
Data confidentiality/security	Quality management
Computer science	Economics
Cognitive issues	Decision sciences
Decision sciences	

- The development of innovative curricula in areas that support both disciplines
- Internships in applied settings
- Masters, doctoral, and postdoctoral positions in some training programs supported by each agency. These would be directed toward training researchers at the intersection of both disciplines.

Moving beyond the realm of research training, participants also thought it important for the federal government to continue its commitment to the intersection of both fields by fostering faculty and mid-career development as well as potentially supporting the creation of centers of excellence. In addition, educational institutions with a commitment and interest in the intersection of medical informatics and health services research were encouraged to consider sharing curricula, seminar, and other educational experiences on the Internet and participate in faculty and student exchanges between the two fields.

Participants also recognized the importance of supporting research conducted at the intersection of medical informatics and health services research. For example, NLM might support informatics tool development necessary for the conduct of health services research and the mining of databases created primarily for quotidian clinical use. The Agency for Healthcare Research and Quality might further explorations of the application and evaluation of informatics tools as they relate to medical outcomes, the reduction of medical errors, and the translation of research into practice. Significant tool development and the use of informatics are required for such studies. Each agency could pursue the support of its interests through both joint and independent research solicitations.

Table 2 ■

Dual Competency Training and Research Areas

Level of Expense	Training	Research
Less expensive (least to more)	T1. Share curricula and experiences on Web, distance learning T2. Faculty exchanges T3. Coordinate student projects T4. Support and share seminars T5. Support internships in applied settings T6. Support slots in some existing programs for the intersection between the two disciplines	R1. Flexible, well-constructed review panels
More expensive (more to most)	T1. Support curriculum development, case studies T2. Support programs to train MA-level researchers (as well as fellows) T3. Support mid-career development T4. Support faculty development T5. Create and support new centers of excellence	R1. Joint NLM/AHRQ RFP for proposals and applications focusing on fostering collaboration between medical informatics and health services research, including those dealing with research needs, tool development, implementation, and evaluation

If research funds are used as a stimulus, appropriate attention will also have to be paid by federal agencies to the membership of grant review panels. Care needs to be taken to ensure that adequate informatics and health services research expertise are represented on review panels. For applications focusing on tool development and explorations of feasibility, evaluation solely by the criteria applied to hypothesis-based research may not be appropriate. Conversely, for research applications related to the adaptation and evaluation of informatics systems to health care delivery issues, attention should be directed to incorporating informatics expertise in the review panels. However, primary attention may be given to the evaluation and applicability of the informatics system to health care delivery.

With the emergence of partnering between the fields of medical informatics and health services research, collaborative funding opportunities between NLM and AHRQ may arise. With the interest of the former organization in tool development and feasibility studies and the interest of the latter in applications of the tool to health care delivery, particular care will be needed to ensure that review panels represent the essential expertise of both fields.

Current Initiatives

In fiscal year 2000, NLM awarded \$50,000 each to its 12 university training programs in informatics research, for strengthening or initiating training at the intersection of medical informatics and health

services research. The National Library of Medicine is continuing such support in fiscal year 2002.

Recently, NLM invited training grant applications for support of ongoing or new predoctoral and postdoctoral training programs in informatics research.[§] Such training will help meet a growing need for investigators and leaders who are trained in biomedical computing and prepared to address information management issues in one or more health-relevant domains, including health care delivery, basic biomedical research, clinical and health services research, public health, and professional education. The National Library of Medicine plans to make available approximately \$11 million for this program in fiscal year 2002 and expects to award 15 to 18 training grants, with a starting date of July 1, 2002.

The Agency for Healthcare Research and Quality plans to focus research attention on the developing and testing of appropriate technologies to reduce medical errors. Specifically, AHRQ seeks to support the development and testing of innovative technologies, such as handheld electronic medication and specimen management systems, training simulators for medical education, computerized bar-coding, patient bracelets, smart cards, and automated medication dispensing systems in clinical settings.

[§]Information on this initiative may be found at <http://grants.nih.gov/grants/guide/rfa-files/RFA-LM-01-001.html>. Accessed Oct 3, 2001.

The recent Clinical Informatics to Promote Patient Safety (CLIPS)¹¹ initiative focuses on supporting research projects to assess the extent to which innovations such as these contribute to measurable and sustainable improvements in patient safety and quality of care in health care delivery systems. Research resulting from CLIPS will contribute to an understanding of opportunities for and barriers to using informatics technology to improve the process and outcomes of health care. It is expected that a successful project will evaluate information technology tools that alert providers to information that may be critical to the provision of high-quality care, develop strategies to address barriers to successful adoption of innovative information technology applications, document the costs and resources associated with the information technology applications, or evaluate transferability to other settings. The objective of this request for applications is to assess the extent to which innovative information technology applications, when applied in various health care settings, contribute to measurable and sustainable improvements in patient safety.

Discussion

The workshop was rich in discussion and suggestions for future action, some of which are already being implemented. The continuing post-workshop challenge for AHRQ and NLM is to choose realistic courses of action in response to the recommendations shown in Table 2, while recognizing that this task is complicated because of:

- Competing budgetary demands
- Difficulties in fostering partnerships between individuals in both fields, due to the multiple, conflicting demands and interests they face

In considering options, federal organizations can profit from prioritizing their major interests in the intersection of medical informatics and health services research. They can also look at problems arising from the need to interface molecular biology and informatics, because of analogies to issues in biomedical computing, as discussed in the BISTI (Biomedical Information Science and Technology Initiative) report of June 1999 to the Director of NIH.⁴

For biomedical computing, the research community is insufficiently familiar with the uses of information technology, and there is a shortage of informaticians expert in the domain. Similarly, the respective research communities of medical informatics and health services research are often unfamiliar with the substantive and methodologic interests and insights of each other. For BISTI, responses under discussion include training grants for molecular biologists to learn more about computing, research grants for the development of more tools, curriculum grants, and centers in which specialists from both areas can interact. Although these vary significantly in cost and issues addressed, a similar spectrum of solutions can be considered for the intersection of health services research and medical informatics training, in addition to fostering research on the application and evaluation of tools to address emerging issues in health care delivery.

Discussion of next steps can start with building on existing federal assets—specifically, training programs in health services research, supported by AHRQ, and in informatics, supported by NLM. At present, a few of these are housed in the same institution, and opportunities for cross-fertilization at these sites are a priority. Communication at these institutions can be improved by borrowing from the model described by Shortliffe and Garber.³ In the future, it is expected that more co-location of training programs may occur, and even if this is not the case, efforts can be directed to increasing informatics presence at AHRQ training programs, and vice versa. Allocating some training positions for a few researchers with the interest and energy to pursue comprehensive training in both fields could also be considered. Finally, encouraging research in areas that intersect both fields could be readily pursued.

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