Annotated Bibliography

Entry 1:

Informatic resources to support health care quality improvement in the Veterans Health Care Administration. *Journal of the American Medical Informatics Association, 11*(5), 344-350.

Abstract: Information systems are increasingly important for measuring and improving health care quality. A number of integrated health care delivery systems use advanced information systems and integrated decision support to carry out quality assurance activities, but none as large as the Veterans Health Administration (VHA). The VHA’s Quality Enhancement Research Initiative (QUERI) is a large-scale, multidisciplinary quality improvement initiative designed to ensure excellence in all areas where VHA provides health care services, including inpatient, outpatient, and long-term care settings. In this paper, we describe the role of information systems in the VHA QUERI process, highlight the major information systems critical to this quality improvement process, and discuss issues associated with the use of these systems. (Excerpt from published abstract.)

Annotations: The authors are health services researchers affiliated with the Veterans Administration Health System, the University of Illinois at Chicago and
Loyola University of Chicago. In this article they document how medical informatics resources can improve health care quality. In the first section of the piece, the authors introduce the Veterans Health Information Systems and Technology Architecture (VistA). VistA, according to the authors, is the best and most sophisticated health information system in the United States. VistA is a huge system of both clinical and administrative functions comprised of 1,940 files and 44,960 data fields. In addition, the system is linked to a national data base and the Veterans Administrations Decision Support System (DSS). This system provides a large national data set that allows researchers to review treatment patterns and resource use at every level of care. This is illustrated very clearly in the article with a graphic flow chart. This article is an excellent descriptive introduction to a very sophisticated health informatics systems.

Search Strategy: My strategy was to browse this journal because it is one of the most widely read journals on medical informatics.

Database: Accessed the journal from the Hagerty electronic journal collection.

Method of Searching: Browsing

Search String: N/A

Entry 2:

Abstract: To broadly examine the potential health and financial benefits of health information technology (HIT), this paper compares health care with the use of IT in other industries. It estimates potential savings and costs of widespread adoption of electronic medical record (EMR) systems, models important health and safety benefits, and concludes that effective EMR implementation and networking could eventually save more than $81 billion annually—by improving health care efficiency and safety—and that HIT-enabled prevention and management of chronic disease could eventually double those savings while increasing health and other social benefits. However, this is unlikely to be realized without related changes to the health care system. (Excerpted from published abstract.)

Annotation: The authors of this study are senior health services researchers for the highly respected Rand Corporation. It is there contention that the wide spread adoption of electronic medical records will lead to major health care savings, reduce medical errors, and improve patient health. The authors show how such a system will realize substantial return on investment by minimizing medication error, preventing adverse drug events, improving disease prevention and assisting chronic disease management. With easily understandable charts and tables, they show how over 15 years, with a 90% adoption of electronic medical records, hospitals will realize a net savings of $371 billion and doctors a net savings of $142 billion.

Search Strategy: Since a large part of medical informatics is concerned with electronic medical records I thought a discussion of the economic benefits of adopting EMRs would be an important aspect to present in the bibliography. I found this source in a citation in the Hynes article in this bibliography.
Method of Searching: Foot note chasing.

Search String: Referenced in:


Entry 3:


Abstract: Recent enthusiasm for the automation of medical records and the creation of a health information infrastructure must be viewed in the context of a four-decade history of anticipation and investment. To understand the current opportunities and challenges, we must understand both the evolution of attitudes and accomplishments in health care information technology (IT) and the cultural, economic, and structural phenomena that constrain our ability to embrace the technology. Because prudent IT investment could make a profound difference in U.S. health and disease management, our strategic response must begin with an understanding of the pertinent history plus the challenges that lie ahead.(Excerpt from published abstract.)

Annotation: Edward Shortliffe MD, Phd., writing in *Health Affairs,* maps out the forty year history of health informatics development in the United States and discusses how the process can move forward in the future. Dr. Shortliffe is the President and Chief Executive Officer of the American Medical Informatics Association (AMIA). His PhD. is in medical information sciences and has been a leader in medical informatics for forty
years. He traces of the history of medical informatics in the United States from the establishment of the first computerized system at El Camino Hospital in Mt. View California in the early 1960's to the call by President Bush in 2005 for the use of electronic medical records for all Americans by 2015. The author discusses the cultural, economic and structural barriers that have hindered the process so far and addresses how to move forward. He concludes that the climate for change is, as of 2005, now right for serious step to be taken towards developing a universal and comprehensive electronic medical records system.

**Search Strategy:** I selected Lexis Nexis Academic Universe and limited the search to full text medical journals and Medline abstracts after 2000 by selecting the “Subject Area” and “Health and Medical Care.” This was my initial search using Lexis Nexis and I used the search term phrase “biomedical informatics.”

**Database:** Lexis Nexis.

**Method of Searching:** Key word and/or natural language.

**Search String:** Biomedical informatics

**Entry 4:**

**Abstract:** Medical librarians play a crucial role in the evolution of institutional information policy. As information professionals, they share many similarities with their medical informatics counterparts. Both groups emphasize information delivery to the point of decision making; both groups serve as curators of institutional knowledge
bases. If the term "publication" encompasses the delivery of clinical information relevant to individuals or populations, both librarians and medical informaticians have an immediate interest in the nature of biomedical publishing, particularly in areas of intellectual ownership, confidentiality, distribution, and access. Both groups also have been early leaders in applying information technology to solve pressing knowledge-management problems, and both groups have a strong commitment to educating colleagues in the effective use of information. Although the challenges faced by librarians and medical informaticians are sometimes different, the evolution of information technology and new forms of biomedical communication suggest that there is now a greater convergence between the two disciplines. (Excerpt from published abstract.)

**Annotation:** Dr. Frisse explores the intersection of health informatics and medical libraries. Written in 1995, and a bit dated, this article compares and contrasts the roles of medical informaticians and medical librarians. Whereas informaticians were once thought to be mostly technology oriented, now, according to Frisse, technological developments in libraries have brought these two disciplines much closer together. Frisse shows how both disciplines maintain archival records, publish information, maintain and adopt new technology and require similar levels and kinds of education. The major difference between the two fields is the kinds of information each discipline is responsible for. Medical informaticians are mostly responsible for medical records and clinical data, while librarians are responsible for medical literature as well. In conclusion, Frisse contended, in 1995, that medicine was entering a period of "unlimited" information which will require the skills of both professions.
Search Strategy: I selected the Education Resource Information Center (ERIC) database. I selected this database because the ERIC includes library and information science subjects as well as education. I first expanded “informatics” to find a controlled vocabulary and then added “medical.” My goal was to find information on the intersection of medical informatics and librarianship.

Database: Education Resource Information Center (ERIC) [Dialog 1]

Method of Searching: Dialog controlled vocabulary.

Search String:

? e informatics

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E3  | 337   | 1   | *INFORMATICS (ADDED 10/24/1983)

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S1  | 337   | 'INFORMATICS' (ADDED 10/24/1983)

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27212 S1  MEDICAL
337    S1  MEDICAL

Entry 5:

Entry


The New England Journal of Medicine, 348(25), 2526-2535.
Abstract: After anesthesia, medication safety has perhaps been the most closely studied domain in patient safety. Efforts to reduce the rate of medication errors have involved all the strategies discussed above. Nearly half of serious medication errors have been found to result from the fact that clinicians have insufficient information about the patient and the drug. (Excerpted from the published abstract.)

Annotation: Drs. Bates and Gawande are both affiliated with the Harvard School of Public Health and Dr. Bates is also the Director of the Center for Patient Safety Research and Practice at Harvard. The premise of this article is that medicine in the U.S. must be transformed to achieve major gains in both patient safety and efficiency and that information technology will play a key role. They see information technology reducing medical errors in three ways: 1. Preventing errors and adverse events. 2. Facilitating a more rapid response to errors. 3. Tracking errors and providing feedback about them. The authors present seven strategies for information technology to be used to achieve these goals. At the same time the authors also explain the barriers to achieving these goals. In conclusion they stress the tremendous potential benefits of a more extensive use of information technology in clinical care. This is an important discussion written by well respected researchers in the field. According to the Web of science as of August of 2010, this article has been quoted 289 times.

Search Strategy: I selected Web of Science to “health informatics.” As I scanned a few articles I was looking for those that benefits of health informatics. I read a few and then found article.

Database: Web of Science, the Science Citation Index Expanded.
Method of Searching: Browsing.

Search String: Found the article with the phrase “health informatics” as a subject.

Entry 6:

Journal of Biomedical Informatics, 43(1),104-110.

Abstract: Biomedical informatics lacks a clear and theoretically grounded definition. Many proposed definitions focus on data, information, and knowledge, but do not provide an adequate definition of these terms. Leveraging insights from the philosophy of information, we define informatics as the science of information, where information is data plus meaning. Biomedical informatics is the science of information as applied to or studied in the context of biomedicine. Defining the object of study of informatics as data plus meaning clearly distinguishes the field from related fields, such as computer science, statistics and biomedicine, which have different objects of study. The emphasis on data plus meaning also suggests that biomedical informatics problems tend to be difficult when they deal with concepts that are hard to capture using formal, computational definitions. In other words, problems where meaning must be considered are more difficult than problems where manipulating data without regard for meaning is sufficient. Furthermore, the definition implies that informatics research, teaching, and service should focus on biomedical information as data plus meaning rather than only computer applications in biomedicine. (Excerpt from published abstract.)
Annotation: This article, authored by faculty from the School of Health Information Sciences, the University of Texas Health Science Center at Houston, is an effort to develop a “clear and theoretically grounded” definition for biomedical informatics. After tracing the history of medical informatics in the U.S. from the founding of the American Association of Medical Record Librarians, the precursor to the American Health Information Management Association (AHIMA), in 1928, the authors survey definitions formulated by several well respected members of the field and then engage in a fascinating philosophical exercise into Ackoff’s Data, Information, Knowledge, Wisdom (DIKW) hierarchy. They then discuss the implications of these aspects of informatics upon a clear definition that separates the informatician from the data collector. This article is essential reading for anyone desiring a clearer understanding of biomedical informatics.

Search Strategy: I was looking for a current article discussing the definition of the medical informatics field. I used the Web of Science because it seems to have a great number of current articles. I limited it to 2009-10 and use “medical informatics” as a search term.

Database: Web of Science.

Method of Searching: Topic phrase “medical informatics”

Search String: “medical informatics” limited to 2009-2010 and only “Science Citation Index Expanded”

Entry 7:

Abstract: This paper discusses medical librarianship in relationship to medical informatics. The author views the rise of medical informatics not as a threat to medical librarianship, but, rather, an opportunity for medical librarians to extend their reach and further define the unique aspects of medical librarianship.

Annotation: Prudence Dalrymple is a respected expert on medical librarianship and professor of information science at Drexel University. The thesis of this article is that although some see medical informatics as a threat to medical librarianship, medical informatics, in fact, presents librarianship with an opportunity to expand. The author presents a conventional definition of librarianship that includes the usual communication, identification, selection, acquisition, etc. of knowledge. Dr. Dalrymple then proceeds to discuss medical informatics as a field largely shaped by the emergence of the computer as a tool in medicine. She concludes, however, that informatics has moved away from a strong emphasis on technology to a more balanced approach that has blurred the distinction between librarians and informaticians. The author sees the future of medical librarianship going in a direction more similar to that outlined by Davidoff in his article calling for the “informationist” as a new health professional. This article is a must read for anyone interested in entering the field of medical librarianship.

Search Strategy: I knew Prof. Dalrymple teaches medical librarianship and informatics at Drexel by seeing her name in the catalog. I decided to do a search for articles by her and found this great discussion of medical informatics and medical librarianship. I just did a search from the Drexel Library home page by putting in her name.

**Abstract:** Purpose; To explore the need for, and use of, high-quality, collaborative, clinical knowledge management (CKM) tools and techniques to manage clinical decision support (CDS) content. Methods; In order to better understand the current state of the art in CKM, we developed a survey of potential CKM tools and techniques. We conducted an exploratory study by querying a convenience sample of respondents about their use of specific practices in CKM. Results; The following tools and techniques should be priorities in organizations interested in developing successful computer-based provider order entry (CPOE) and CDS implementations: (1) a multidisciplinary team responsible for creating and maintaining the clinical content; (2) an external organizational repository of clinical content with web-based viewer that allows anyone in the organization to review it; (3) an online, collaborative, interactive, Internet-based tool to facilitate content development; (4) an enterprise-wide tool to maintain the controlled clinical terminology concepts. Even organizations that have been successfully using computer-based provider order entry with advanced clinical decision support features for well over 15 years are not using all of the CKM tools or
practices that we identified. **Conclusions:** If we are to further stimulate progress in the area of clinical decision support, we must continue to develop and refine our understanding and use of advanced CKM capabilities. (Excerpted from published abstract.)

**Annotation:** Dean Sittig, PhD., is the Director of the Clinical Informatics Research Network (CIRN) for Kaiser Permanente. In this article he and his associates explore clinical knowledge management (CKM) tools and techniques used to manage clinical decision support systems. The authors surveyed six large health systems already using clinical information systems using CKM techniques. Their goal was to see the extent to which each system utilized a number of basic CKM tools and techniques. The results of the survey were then discussed in light of accepted standards for CKM systems. There was a wide disparity in utilization and found a great deal of room for increased efficiencies. This article is a very good introductory account of CKM utilization in typical health care systems.

**Search Strategy:** I thought searching the phrase “clinical knowledge management” would be a good place to start and it did, indeed, yield results in a manageable quantity in the Medline databases.

**Database:** DIALOG Medline

**Method of Searching:** Keyword phrase searching.

**Search String:**

`s clinical()knowledge()management`
Entry 9


**Abstract:** It is unacceptable in this “information age” for medical information to remain in its current neglected and disorderly state. The concept of the informationist—a professional who will retrieve, synthesize, and present medical information—is an idea whose time has come. (Excerpt from published abstract.)

**Annotation:** Dr. Davidoff is a highly respected member of the medical community and is presently Executive Editor, Institute for Healthcare Improvement (IHI), Vice-President, Board of Physicians for Human Rights. In this article he and his co-author call for the establishment of a new health profession called “informationist.” They explain how the advent of the computer age, the resulting easy access to massive amounts of data and the corresponding information sources it creates has made it possible for the efficient practice of evidence based medicine. However, they also point out that the link between the point of care and access to this body of information is incomplete. To facilitate the movement of information from databases to clinic, the authors call for a
new profession: “Informationist.” This is an often cited article that clearly illustrates the need for information support in clinical practice. Although this piece is an editorial, it is a well thought out opinion supported by an adequate amount of evidence.

**Search Strategy:** I found this article through citation searching. It is a often cited article and was cited by both Dalrymple and Knight in this bibliography. The web of science shows this article having been cited 89 times.

**Database:** Web of Science limited to “Science Citation Index Expanded.”

**Method of Searching:** Citation Searching.

**Search String:** Referenced in;


**Entry 10**


**Abstract:** Biomedical informatics involves a core set of methodologies that can provide a foundation for crossing the "translational barriers" associated with translational medicine. To this end, the fundamental aspects of biomedical informatics (e.g., bioinformatics, imaging informatics, clinical informatics, and public health informatics) may be essential in helping improve the ability to bring basic research findings to the bedside, evaluate the efficacy of interventions across communities, and enable the
assessment of the eventual impact of translational medicine innovations on health policies. Here, a brief description is provided for a selection of key biomedical informatics topics (Decision Support, Natural Language Processing, Standards, Information Retrieval, and Electronic Health Records) and their relevance to translational medicine. Based on contributions and advancements in each of these topic areas, the article proposes that biomedical informatics practitioners ("biomedical informaticians") can be essential members of translational medicine teams. (Excerpt from published abstract.)

**Annotation:** Indra Neil Sarkar is the Director of Biomedical Informatics, Assistant Professor of Microbiology and Molecular Genetics, and Assistant Professor of Computer Science at the University of Vermont. He holds a MPhil. and PhD. in biomedical informatics from Columbia University and MLIS degree from Syracuse University. In this article he discusses the important role informatics plays in assisting the development of new treatments and insights that may help improve patient care. A process called translational medicine. The author sees crucial roles for biomedical informaticians in some important areas of translational medicine. He cites the areas of bioinformatics, imaging informatics, clinical informatics, and public health informatics as being ones that could play important roles in bringing biomedical discoveries to treatment and care. This article is an excellent introduction to the role of informatics in translational medicine.

**Search Strategy:** During my preliminary reading, and as I was exploring for search terms, I came upon the term public health informatics and in an article or a description I
also found the term translational medicine. In dialog I combined them and found this article.

**Database:** I used the Medline database in DIALOG.

**Method of Searching:** Keyword searching and Browsing.

**Search String:**

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**Entry 11:**


**Abstract:** This article outlines the increasingly diverse roles undertaken by information professionals in support of the surgical team's knowledge needs for evidence-based
practice. Such information professionals may be called "clinical informationists," "information scientists," "information specialists," or "librarians." The role titles are indicative of the ferment of change brought about by the digital revolution, and of the continuing determination of health information professionals to rise to the challenges involved in supporting surgeons and everyone in the surgical team, as they endeavor to provide the best possible care for their patients. Libraries, as we know them, have changed, and are changing. The scholarly communications process is also undergoing profound transformation. The authors discuss these changes and their implications for surgeons. (Excerpted from published abstract.)

**Annotation:** Thalia Knight, Head of Library and Information Services at the Royal College of Surgeons of England and Anne Brice, Associate Director of the National Health Service (NHS) National Knowledge Service, based in Oxford, England, have written an excellent article on the role of medical informaticians in support of surgeons. As they point out, beginning really in the late 1980s, and reaching somewhat of a critical mass at the beginning of the 21st Century, the amount of relevant information available to medical clinicians became more than can be efficiently accessed by clinicians alone. Their conclusion is that “only a collaborative systemic approach stands any chance of of solving the challenges to medical knowledge management.” In regards to surgeons, the authors see medical informaticians supporting clinicians five ways: Keeping professionally updated, Supporting practice policy and procedures, support at individual, team and organizational levels, support for knowledge management services, and support for work based lifelong learning, training and research. This article is a valuable
discussion of the potential for biomedical informatics to play an active role in supporting clinical care.

**Search Strategy:** As I was compiling search terms, I saw that medical librarianship and medical informatics were used interchangeably in some cases, but not in others. In fact, searching these two terms in the same data base reveals some results that were the same and others that were different. For example, in the Web of Science, limiting the search to science, medical librarianship results in only 19 sources, while medical informatics turns up over two thousand entries. A few are in both sets of results. I suppose this is because the lesser term is not as popular. At any rate, I did a search with medical librarianship and this article was one of the results.

**Database:** Web of Science limited to Science citation index expanded.

**Method of Searching:** Keyword searching.

**String:** Medical librarianship.

**Entry 12:**


**Abstract:** Boundaries are disappearing between the sources and types of and uses for health information managed by informaticians and librarians. Definitions of the professional domains of each have been impacted by these changes in information. Evolving definitions reflect the increasingly overlapping research agendas of both disciplines. Professionals in these disciplines are increasingly functioning collaboratively as “boundary spanners,” incorporating human factors that unite technology with health care delivery. (Excerpt from published abstract.)
Annotation: Perry and his co-authors do a very good job of outlining the broad nature and evolution of medical informatics. To illustrate the breadth of the discipline and how it has evolved, they list four different definitions for the discipline over the time period from 1977 to 2003. These dates range from the early period of digitalized medical information to our present system of easy access from personal computers. What this shows is an evolution from informatics being almost totally technology defined to a broader definition that emphasizes information and knowledge domains. The authors show that there has been what amounts a convergence of the roles of medical librarians and medical informaticians. The former have become more technologically oriented and the latter having moved toward information and knowledge management. This is an excellent article for those considering entering the medical informatics/library fields.

Search Strategy: I quickly realized that medical informatics is in many ways related to medical librarianship. So, I searched DIALOG in the Library Literature and Information Science database with the term “medical librarianship.”

Database: DIALOG in the Library Literature and Information Science database #438

Method of Searching: Keyword searching

Search String:

? b 438
Entry 13:

Abstract: The article is an up to date survey of 177 informatics programs in the United States related to biomedicine and health care. The survey includes state, institution name, links to the program web page, degrees offered, admission requirements and other important information. It can be accessed at:

http://www.ils.unc.edu/informatics_programs/

Annotation: Kampov-Polevoi and Hemminger are affiliated with the University of North Carolina at Chapel Hill, School of Information and Library Sciences, where the former is a graduate student in the PhD program and the latter an associate professor in the that department. This survey of medical informatics programs is a very valuable resource, both for those working in the field, and those looking for a training or degree program. Not only do they include programs in the field as a whole, but also in subfields such as dental informatics and cheminformatics. The information is exhaustive and up to date. The authors contend that their compilation is the only such resources. This is an essential resource for professors, advisors and any one in the health informatics or medical library field.
**Search Strategy:** I thought it important to find out about different training and degree programs in the field so I decided to search DIALOG for medical librarianship programs.

**Database:** DIALOG in the Library Literature and Information Science database #438.

**Method of Searching:** Keyword.

**Search String:**

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