Perspective

Need For Standards In Health Information

Achieving standardization requires more than simply overcoming physicians' resistance—which may not even exist.

by Clement J. McDonald

Donald Moran's report is energetic and enthusiastic about technology, and I mostly agree with his level of enthusiasm. However, I quibble with a few of his points.

First, the kind of telemedicine that depends on live video links between patients and providers has not yet fulfilled its promise. Not only did the technology not reduce physical referrals to a physician's office, but it required significantly more patient and nurse clinician time, compared with the controls which did not have remote consultation with a physician.[1] Telephone consultations and twenty-minute car rides to clinical care sites provide tough competition for live video links and the effort needed to coordinate schedules on two sides of the link. The advantage could well tip to video links when video phones become ubiquitous. One could imagine many advantages to home care under that scenario.

The asynchronous delivery of radiologic and other kinds of images to experts is another story. Such telemedicine has been successful, mostly because such delivery is like voice mail. It does not require the sender and receiver to be available at the same time. Indeed, radiologic telemedicine is now an operational fact of life in many large medical centers.

Second, Moran calls for the paperless office. Yes, physicians do want all of the clinical data in a computer so they can easily organize, search, and get access to it. But having all of the data in a computer does not necessarily eliminate paper from the office, nor is it important that it do so. History suggests that computers increase paper use, rather than decreasing it. Each year printers are cheaper and much faster, and they stay busy printing paper reports. Sales of laser printer paper are expected to increase from 787.6 billion sheets in 1996 to 1.2 trillion sheets in 2001, so don't expect paper to disappear from the fully electronic medical office.[2]

Finally, the explosion of new knowledge and technology is a fact but may not have the dire effects predicted. Yes, the number of "research" papers has exploded, but the number relevant to a particular practicing physician is not necessarily large. Brian Haynes lamented in one of his American College of Physicians (ACP) *Journal Club* editorials that he could not always find fifteen good articles to abstract in a two-month period, using the criteria that the article had to be scientifically valid and clinically relevant to the field of internal medicine and not a me-too study.[3] Further, we already have the technology to get access to the entire medical literature through the World Wide Web, courtesy of the National Library of Medicine's PubMed.[4] Moreover, new technology may simplify rather than complicate. Before penicillin, physicians had to know, and worry about, many different sero types of pneumococcal pneumonia and a score of treatment antisera. Afterward, they only had to know to "blast it with penicillin." One can imagine biotechnology bringing a simple cure or vaccine for diabetes that would eliminate the need to read whole textbooks about the management of diabetes.

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Health Affairs *invited his comments on the paper by Donald Moran, which precedes this Perspective.*

■ **Promise of electronic medical records.** However, I agree that the potential for electronic medical records to improve care quality and efficiency is indeed great. The time that physicians and nurses spend finding and organizing clinical information is excessive and increasing as the volume of patient information expands. One hospitalization can produce tens of thousands of separate observations, counting laboratory tests, physiologic monitor output, diagnostic imaging, patient surveys, nursing assessments, and visit notes. The sheer volume makes it increasingly difficult to organize and respond to these data with purely manual methods. Indeed, when physicians were asked, they could not find 10 percent of the data elements that were stored in their usual place within the paper chart.[5] The availability of the patient's history can be vital to clinical decisions, yet this patient information is distributed across many sites of care and is difficult to obtain with current approaches. Outcomes management, quality assurance, and epidemiologic research have even more to gain from electronic medical records. These records can assure quality prospectively and enable research studies that would be impossible to undertake by manual methods.[6]

Computers carry an enormous amount of patient information. Laboratory computers carry laboratory results; pharmacies, drug usage records; electrocardiogram (EKG) carts, EKG diagnoses and measures; cardiac echo systems, the echo results; and on and on. The question is, How does an organization reach these data for electronic medical records, quality assurance, and research systems? The vendors of each clinical system tend to use different internal data structures, and each organization tends to define its own unique and idiosyncratic codes for test and clinical observations.

The answer is "standards." Without standardization, none of the promises of electronic data processing can be met, because we cannot afford the costs of manual translation of data from systems that produce patient data (for example, laboratories) to systems that need them (for example, office practices' information systems). Standardization has been slow to evolve in the health industry, but no slower than in some other sectors of our economy. Take, for example, the interstate highway system, which took nearly fifty years to complete. Or television—it took thirty-eight years from the invention of color television until half of American homes had the technology. Change like this does not occur overnight.

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■ **Need for standards.** Two kinds of standards are particularly important. Message standards define the data structures of the records sent between individual systems. For example, an admission message from a hospital admission/discharge/transfer (ADT) system to a laboratory system will include fields that identify the patient's name, birth date, gender, bed location, and, perhaps, insurance information. Message standards are well developed and used widely but not universally. Health Level 7 (HL7) is used by most clinical systems to communicate clinical and associated administrative data (orders, referrals, diagnostic results, visit notes).[7] X12N is used to transmit insurance, claims, and administrative information.[8]

Clinical code standards have been developed but (except for the federally mandated ones) are being used only by the largest referral laboratories (such as Quest and LabCorp) and a few large health care systems (such as Intermountain Health Care, Partners of Boston, Kaiser Permanente, Columbia Presbyterian, and Clarian of Indianapolis). LOINC and SNOMED are two important examples. Logical Observation Identifiers, Names, and Codes (LOINC) is a freely available database of names, synonyms, and codes for clinical ob-

servations including laboratory tests, and other measurements such as an EKG.[9] It can be thought of as providing identifiers for questions. *Systematized Nomenclature of Medicine* (SNOMED), containing more than 250,000 concepts, is a comprehensive, multiaxial nomenclature classification system created for indexing the entire medical record, including signs and symptoms, diagnoses, and procedures.[10] SNOMED International is being adopted worldwide as a standard for indexing medical records information. It can be thought of as providing codes for the answers.

Privacy standards also are of paramount importance. In contrast to the security of spy movies, security rules in health care cannot be absolute. Physicians have to be able to learn patients' relevant health facts without having to burn the patient's record after each visit. So public policy must find the right balance between privacy and pragmatism.

Data standards are like telephones. They require a critical mass of users before they become useful. Public policy can push adopters to reach that critical mass. The National Drug Code would not have been widely adopted if the U.S. Food and Drug Administration did not require that it be printed on every package containing drugs. And the *International Classification of Diseases*, Ninth Revision (ICD-9), would not be the universal system for diagnostic coding if it were not mandated by the federal government. Public policy will play a key role in the successful adoption of electronic medical information systems.

Achieving standardization is not simply a matter of overcoming physicians' resistance—which, in my opinion, is a demon that does not even exist. Physicians long for standardization. But the task is complex and often is conceptualized as one huge effort, with many smaller initiatives blurred together. Many people want standards, but they don't want to be the first to take the risk. Thus, tremendous opportunities exist to put the seed crystal in and make it happen. Governmental initiative on developing standards could actually move the whole field forward. Right now there is a huge gap between the policymakers, the planners, and the users of data and those who produce the data. At this level of detail, if we could just get all of them to see the world in more of the same way, we could accelerate the process considerably.

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NOTES

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2. R. Narisetti, "Pounded by Printers, Xerox Copiers Go Digital," *Wall Street Journal*, 12 May 1998, B1, B7.
3. R.B. Haynes, "Editorial: Where's the Meat in Clinical Journals?" American College of Physicians *Journal Club* (November/December 1993): A22–A23.
4. Web site: www.ncbi.nlm.nih.gov/PubMed.
5. J. Fries, "Alternatives in Medical Record Formats," *Medical Care* 12, no. 10 (1974): 871–881.
6. M.E. Johnston et al., "Effects of Computer-Based Clinical Decision Support Systems on Clinician Performance and Patient Outcome: A Critical Appraisal of Research," *Annals of Internal Medicine* 120, no. 2 (1994): 135–142.
7. Health Level Seven, an application protocol for electronic data exchange in health care environments, Version 2.3 (Health Level Seven, Inc., Suite 122, 900 Victors Way, Ann Arbor, Michigan 48108).
8. ASC X12 standards for electronic document interchange, 3072, DISA (Suite 200, 1800 Diagonal Road, Alexandria, Virginia 22314).
9. A.W. Forrey et al., "The Logical Observation Identifier Names and Codes (LOINC) Database: A Public Use Set of Codes and Names for Electronic Reporting of Clinical Laboratory Test Results," *Clinical Chemistry* 42, no. 1 (1996): 81–90. The LOINC database is available from the Duke HL7 Web site: www.mcis.duke.edu/standards/termcode/loinc.htm.
10. *Systematized Nomenclature of Medicine*, 2d ed., vols. 1 and 2 (Northfield, Ill.: College of American Pathologists, 1996).