Next IT Challenge: From Data Acquisition to Harmonized Information Management

By William A. Fera, MD

Healthcare has made significant progress on capturing data electronically, but it still struggles to leverage it fully. The University of Pittsburgh Medical Center is making inroads by harmonizing data from different settings and systems into a single view.

Since well before the turn of this century, healthcare has concerned itself with information technology in a significant way. Yet, as we enter a new decade, many thought leaders have recognized that this "IT" approach is inadequate. The healthcare reform that industry experts seek can be achieved only through the more complex process of information management.

The distinction is noteworthy. The foundational IT model has guided healthcare from a paper-based enterprise to one driven by digitized information. As a result, providers and caregivers now find themselves struggling with the challenge of managing and making meaningful use of the data available to them.

Within a few short years, healthcare leaders have arrived at two significant conclusions: (1) that data acquisition is only the first stage of the technology revolution; and (2) that data aggregation alone will not deliver the value they seek.

In order to optimize the promise of healthcare IT, the industry must develop strategies and solutions that make massive amounts of data easily accessible and useable to a variety of caregivers and stakeholders-regardless of their chosen software, information system, application, or care setting. In other words, the industry must turn its attention and its energies to a more demanding model of healthcare information management.

Moving Beyond Simple Sharing

Those who have embraced this forward-thinking approach have concluded that the maturation of a data strategy must progress through four distinct stages:

- Acquisition of data
- Aggregation of acquired data
- Adjudication of aggregated data
- Analysis of these data in a meaningful way

For the most part, healthcare has made significant progress through the first stage and is striving to conquer the second. More and more healthcare providers are digitizing data-through electronic health records, clinical decision support tools, practice management systems, and PACS-aggregating it within each application.

However, they have hit a roadblock as they attempt to break down the data silos represented by each distinct system. For many, the cross-application aggregation and adjudication of data represents the Mt. Everest of information management. The industry has yet to figure out a way to deliver the information in a concise and "smart" fashion so that it is accessible on demand and at the point of care. Stymied at this point, healthcare consequently is unable to progress to stage four: achieving meaningful analysis of the information it has acquired.

Under these circumstances, few healthcare organizations are equipped to attain the pinnacle of genuine information management at this time. One might compare the current state of healthcare IT to a vast public library without the Dewey

Decimal system that enables users to readily locate and access the resources they need-much less to put it into context with the other volumes of data that may be available.

Harmonizing Data, Regardless of System or Setting

In order to make meaningful use of the bits and bytes of information that are being collected every day by providers across the care continuum, healthcare leaders must begin to investigate solutions that allow data points to be organized semantically so information being acquired can likewise be managed.

In other words, healthcare organizations must begin to explore platforms that allow disparate systems not only to view external information, but also to truly understand and make use of the incoming data while maintaining the original meaning of that information, regardless of source, format, or nomenclature.

In 2007 the University of Pittsburgh Medical Center adopted such a platform, which was developed by a company in which UPMC invested as part of a strategic partnership. The approach allows the organization to rely upon a variety of best-of-breed clinical and administrative systems while delivering harmonized essential data sets and other vital information such as discharge summaries to providers throughout the enterprise of 20 hospitals, more than 400 physician offices and outpatient sites, a health plan, long-term care facilities, and international operations.

The results of this approach have been indisputable. Consider, for example, a patient seen at one community physician's office whose blood test may reveal borderline creatinine levels. In and of itself, this one isolated test result may not represent cause for alarm.

But with data aggregated and normalized from throughout the system via a semantic interoperability platform, the community physician is able to access studies performed in other settings and under the care of other providers. He may discover the creatinine levels have been trending upwards for some time and realize that a diagnosis of renal insufficiency should be considered and that the patient's medications should be adjusted accordingly.

Similarly, harmonized information can prevent potentially dangerous medical errors. When an emergency department physician pulls up a patient's record, for example, she may be overwhelmed with repetitive information-perhaps an allergy to penicillin appears 18 times. If the data are not "de-duplicated" through semantic adjudication, the ED provider may fail to scroll to the bottom of the list and therefore overlook the fact that the patient is also allergic to sulfa drugs.

Just as we have seen that "alert fatigue" can be an unintended consequence of clinical decision support tools, we should be vigilant to the possibility of "data fatigue" and the chance that a valuable piece of information could be the needle lost in a voluminous data haystack.

Aggregated Clinical and Claims Data

The value of this semantically organized information management model is compounded when clinical data is further aggregated with claims data, adding another layer of visibility into the overall picture of a patient's condition and behavior.

Perhaps a primary care physician has referred a long-time patient for a screening mammogram or colonoscopy. In the past, the physician may have had no way of closing the care loop or ascertaining whether or not the patient followed through.

Health information exchange with the health plan, however, will reveal if a claim for the test was filed. This information is invaluable to the physician, not only because it helps the provider ensure patients receive the best care possible but also because it supports participation in pay-for-performance initiatives. Physicians may also be made aware of compliance issues with patients based on fill history with medications.

This level of interoperability likewise delivers great benefits to health plans. Access to clinical information allows case managers to monitor quality measures in a more complete manner. Perhaps patients are having their medication needs met through samples or generic programs-neither of which would show up in claims data. Perhaps physicians are counseling and prescribing appropriate preventive and treatment measures, but patients are not following through. Providers and payers could work together to target difficult-to-treat patients and identify appropriate programs for them.

Blended Analytics Built on a Comprehensive Knowledge Framework

Ultimately, for healthcare to progress from information technology to information management, all stakeholders will need access to aggregated, adjudicated data for the purposes of advanced analytics. Semantically harmonized data, organized into a knowledge framework and appropriate data model, will enable payers and providers throughout the healthcare continuum to have access to, and meaningful use of, information.

Data will become information and information will then become knowledge. A patient record with documentation of a prescription for Lipitor, for example, could be cross-indexed so that the reference could appropriately be interpreted as treatment for high cholesterol or as satisfying a quality measure for diabetic care. This could then lead to an understanding of the long-term outcomes of this treatment for specific populations, as well as the years of life saved associated with the treatment.

Access to, and usability of, essential information is needed to support the notion of value-based healthcare-to understand the quality of care being delivered as well as the cost. Information management is also necessary to advance the concepts of accountable care organizations, medical homes, and other collaborative healthcare efforts dedicated to a patient-centered model. The opportunities made possible through semantic harmonization of data, blended analytics, and true information management are the bedrock of genuine healthcare reform.

William A. Fera is vice president of Medical Technologies and former medical director of interoperability at the University of Pittsburgh Medical Center.

Article citation:
Fera, William A. "Next IT Challenge: From Data Acquisition to Harmonized Information Management" *Journal of AHIMA* 81, no.9 (September 2010): 42-44.