HEALTH IT CULTURE

Scott R. Coplan, PMP, FHIMSS, CPHIMS, and David Masuda, MD, MS

Big Data

Seeing the Big Picture in 'Big Data'

THOSE OF US IN HEALTHCARE imagine large quantities of useful, easily accessible, accurate, and meaningful data at our fingertips, helping us improve the way we provide individual patient care while reducing costs and advancing healthcare systemically. Unfortunately, while this is where we want to be "when healthcare grows up," we're not there yet. Are we even close? Yes—we have access to more data than ever before, but the expertise we need to sift through this data and understand its impact on both individual patient care and systemic change is still on the drawing board.

In 2008, Hersh and colleagues reported on one of the first modern health information technology workforce studies.1 They proposed that to support the rapid adoption of clinical information systems, the U.S. healthcare delivery system needed at least 40,000 new health IT professionals, an estimate recently adjusted even higher. This study also led the Office of the National Coordinator (ONC) to fund training programs for developing 12 new health IT work roles. Six of these roles require university-based training and include: clinician/public health leader, health information management and exchange specialist, and research and development scientist. The remaining roles require up to six months of intense training and include: practice workflow and information management redesign specialist, implementation support specialist, and technical/software support staff.

The skills and competencies of these 12 roles focused on workforce support required for U.S. health IT adoption over the last decade—skills such as requirements definition and clinical system acquisition and implementation. With these phases mostly completed, many major organizations now envision a next phase.

With apologies for leaning on an overused buzzword, we enter an era of "big data," or very large and complicated data difficult to analyze using traditionally available database management tools. Data analysis, examining data to understand it, and data analytics, discovering and communicating meaningful data patterns, are central to health system transformation and improving individual patient care at lower costs. With reliance on clinical systems, most healthcare delivery organizations now have an almost infinite amount of data from individual electronic patient records—all of which could prove valuable to new or improved data examination.

We find ourselves in this situation somewhat by surprise. Healthcare, like most industries, is highly data and information intensive. By definition and necessity, healthcare is an IT industry—and IT solutions serve two primary purposes: collecting and examining data. Over the past 10 years, healthcare leapt from analog to digital at an extremely high rate of speed, with our attention focused almost single-mindedly on IT's data collection aspect. When preparing requirements, acquiring and implementing electronic health records, we focused primarily on features and functions for data input and considerably less on data examination needs once we entered that data.

This leads us to where we are today: "Gosh, now that we have all this data, how can we use it?"

Not only is our health IT workforce missing the full range of competencies for examining data, we now realize just how challenging this work is. The sheer data volume is daunting, but the biggest part of the challenge is the quality (or more accurately, the lack thereof) of the data we now have available. Because we never fully defined requirements for it, we are not sure how to effectively analyze the data we are now collecting—and we failed to adequately define, acquire, or implement our new systems with this in mind.

It isn't surprising then that recent efforts to assess health IT workforce needs draw attention to this dilemma. In early 2012, Fenton[2] and her colleagues published the results of a large workforce assessment where they completed surveys and focus groups with more than 50 Texas healthcare delivery organization leaders, asking about their views on current and future workforce skills and competencies. Their findings are much like prior results. For example, employers indicated that most current employees have sufficient basic

TO ACHIEVE NEW clinical documentation models we must also consider new medical education models.

health IT skills (medical terminology, basic computer skills, and understanding patient information flow). However, their current staff have less proficiency and require more training at both intermediate (e.g., data management, data mining/report creation, data sharing, problem solving and critical thinking) and advanced (e.g., ability to implement and manage health IT to support strategic plans, use data for planning and management purposes, and design databases/systems to support organizational goals) levels.

One interesting and possibly new finding from this assessment is that employers believe there is a growing need for deep skills and understanding related to working effectively with data. The authors commented: "...a difference was noted related to data management, data mining, data analytic, and similar skills and competencies. Twenty-six percent (26%) of employers indicated they would seek training for their staff related to data management and another 31% indicated they were seeking to hire these skills. So, more than half (57%) feel they need these skills in their organization. This unexpected finding illustrates the shifting nature of HIT workforce needs. This is expected to continue into the foreseeable future."[2]

Perhaps this goes without saying—there is no question we need a workforce with these competencies. But thinking a step or two further, we might recognize that we also need to *reconsider* the skills and competencies of our frontline healthcare staff—primarily physicians and nurses—the key people generating and entering data into our systems, the initial creators of big data.

Hersh addresses this idea in a 2012 blog post[3]: "Of course, those of us who work in clinical informatics know that gleaning value from clinical data is challenging. Indeed, those who have learned from implementation in the trenches may be best qualified to understand the limitations of their data. As I often say, documentation is not usually the highest priority for busy clinicians. Indeed, it is often what stands between a tired clinician at the end of the day and being able to go home for dinner. Clinical data also suffers from the lack of standards in structure and terminology of data, and it is often fragmented across different systems, both within and across different healthcare organizations."

More consistent use of data structure and content standards is certainly important, but mandating standard approaches for clinical documentation alone is not likely to get us where we need to go. We need to examine and change two other aspects of the data entry process.

WITH RELIANCE ON CLINICAL SYSTEMS, most healthcare delivery organizations now have an almost infinite amount of data from individual electronic patient records—all of which could prove valuable to new or improved data examination.

One approach is reconsidering the models clinicians use to complete clinical documentation. For example, the Subjective, Objective, Assessment and Plan (SOAP) note described by Lawrence Weed nearly half a century ago is still in widespread use today. While this model was appropriate in a totally analog world using paper and pencil, in a digital world we may well need to develop, consider and adopt new models. Halamka4 proposes an interesting and novel approach—a major overhaul of the ways providers complete clinical documentation.

He notes: "Imagine the following - the entire care team jointly authors a daily note for each patient using a novel application inspired by Wikipedia editing and Facebook communication. Data is captured using disease specific templates to ensure appropriate quality indicators are recorded. At the end of each day, the primary physician responsible for the patient's care signs the note on behalf of the care team and the note is locked. Gone are the 'chart wars,' redundant statements, and miscommunication among team members. As the note is signed, key concepts described in the note are codified in SNOMED-CT. The SNOMED-CT concepts are reduced to a selection of suggested ICD-10 billing codes. A rules engine reports back to the clinician where additional detail is needed to justify each ICD-10 code i.e. a fracture must have the specifics of right/left, distal/proximal, open/closed, simple/comminuted."

Perhaps it is time we look at the ways IT enables redesign of documentation tasks, e.g., using social media and multi-authoring tools to refine clinical documentation for a digital world.

As the adage goes, "old habits die hard." To achieve new clinical documentation models we must also consider new medical education models. Medical education must also more deeply reflect the data and information nature of healthcare delivery. We historically acculturate physicians as the "ship's captain", with their own memories serving as the primary knowledge repository. Today - and even more certainly in the future—this model is no longer sufficient. There is simply too much knowledge and too much data to keep in or rely on each physician's working memory. Charles Freidman captured this idea in his vision of "Medical Education in an Era of Ubiquitous Information."[5] He posits that by 2020, we will likely have "ubiquitous EHRs, health data that is fluid and computable, and a learning health system."

We will have medical practices "...supported by a knowledge cloud integrated with consumer - and care provider-facing systems." In such a medical environment, a physician's requisite competencies will follow three themes: "Knowing what you do and don't know," "Performing with support from the knowledge cloud," and "Evaluating and weighing evidence."

Friedman also suggests these new competencies will require that physicians have new and deep data understanding. For example, to retrieve useful answers, physicians using the knowledge cloud must phrase good questions as well as mine data effectively. Physicians skilled in evaluating and weighing evidence will become discriminating data users—learning to make decisions with vague and conflicting information. Friedman concludes by suggesting five ways to revise medical education curriculum. These include training in both the theory and practice of "decision analysis, data mining, meta-analysis, critical evaluation of the literature and evidence-based decision making under uncertainty." In essence, Friedman argues that physicians must develop a much deeper and richer data understanding – appreciating what it is,

WE SEE FROM… research studies that our future health IT workforce needs increasingly more data examination competency. At the same time, it is clear that effective examination depends on high quality data.

its strengths and weaknesses, and how a variety of people use that data for both individual patient care and transforming systemic health care delivery.

We see from the research studies that our future health IT workforce needs increasingly more data examination competency. At the same time, it is clear that effective examination depends on high quality data. A clinical workforce trained as Friedman proposes—where caregivers understand the importance of both data entry and examination—is a big part of responding to both these needs.

But it is only one part. If that workforce is going to make "meaningful use" of the mountain of data we now collect, we need to remember a critical aspect of goal achievement—*to start with the end in mind*. That means training people *today* for the way we want to practice medicine tomorrow. It also means making sure when this new wave of healthcare professionals arrives that the new health IT we specify, acquire and implement ensures that our "big data" supports our desired understanding of the big picture—improving individual patient care at a lower cost, affecting systemic change and enabling ongoing improvements into the foreseeable future. **JHIM**

Scott R. Coplan, PMP, CPHIMS, FHIMSS, President of COPLAN AND COMPANY, an integrated project management software and services firm, has more than 30 years of project management consulting experience and is a University of Washington School of Public Health, Department of Health Services Clinical Assistant Professor.

David Masuda, MD, MS, a physician and educator at the University of Washington, has for the past 15 years developed and delivered courses in clinical care and applied clinical informatics for certificate, masters and doctoral programs in health administration, medicine and nursing.

REFERENCES

1. Hersh W, Wright A. What workforce is needed to implement the health information technology agenda? Analysis from the HIMSS Analytics Database. AMIA Annu Symp Proc. 2008 Nov 6:303-7. Available at: www.ncbi.nlm.nih.gov/pubmed/18998990.

2. Fenton SH. Texas health information technology: employer needs assessment report. Texas State University –San Marcos. Accessed: December 30, 2012. Available at: www.health.txstate.edu/him/TxHIT-workforce/news/contentParagraph/03/document/TexasHITEmployerNeedsAssessment_RELEASED_03302012.pdf.

3. Hersh W. From implementation to analytics: the future of work informatics. [blog] Informatics Professor. Accessed: December 30, 2012. Available at: http://informaticsprofessor.blogspot.com/2012/04/from-implementation-to-analytics-future.html.

4. Halamka JD. Brainstorming about the future of clinical documentation. [blog] Life as a Healthcare CIO. Accessed: December 30, 2012. Available at: http://geekdoctor.blogspot.com/2012/12/brainstorming-about-future-of-clinical.html.

5. University of Washington. Accessed: December 30, 2012. Available at: http://mediasite.hs.washington.edu/Mediasite/Play/3873f876c9f24f2fb26311e76b75ddf21d.