Health IT, Piece by Piece: Measuring Progress on Electronic Records

by Chris Dimick

A model that segments health IT adoption into stages shows a slow climb for US hospitals.

The Big Bang is more than just a theory on how the universe was created. The term also describes the all-at-once implementation of a complete electronic record system within a healthcare facility.

It's a rare event. Some facilities have done it and are light years ahead of the industry. But most US healthcare providers are implementing their systems piece by piece, and the majority are in the earliest stages.

Different studies have sought to track the progress, and estimates vary, depending in part on the definitions. A recent adoption model by HIMSS Analytics plots seven levels of electronic medical record (EMR) capability, ranging from limited ancillary clinical systems to the implementation of a completely paperless, interoperable system.

Using data on more than 4,000 US hospitals as its base, the HIMSS Analytics EMR Adoption Model shows that just 22 percent of hospitals have reached stage 3 or higher. These facilities have gone live with system components such as clinical documentation, an electronic medication administration record, and a basic level of clinical decision support.

Only .6 percent of hospitals had achieved stages 5 and 6, with no hospitals at the final stage. One in five hospitals are at stage 0, with little or no use of electronic record system components (see "Implementation by Stages", below).

EMR or EHR? What's the Difference?

While the terms are sometimes used interchangeably, HIMSS Analytics uses separate definitions for the EMR and EHR.

For the sake of the adoption model, "the EMR is the environment where you are in a hospital or a clinic and you are capturing data to create the electronic record for that encounter in that single group [of institutions]," Davis says. "The EHR is when you start to take that information and share it between other institutions or payers or other organizations."

Nationwide Implementation Far Off

While the president has called for the widespread availability of electronic health records (EHRs) by the year 2014, the HIMSS Analytics adoption model shows the country is not poised for such an accomplishment.

"I don't think [the government] understands what the infrastructure of the United States is for EHRs, because we are looking at a hospital database of over 4,000 and we can tell ya, 'You're not going to come close to that goal,'" says Mike Davis, co-organizer of the model and executive vice president of products and services at HIMSS Analytics.

The model was constructed as a way to illustrate hospital progress in adopting a fully functional EMR, Davis says. Some hospitals use the model as a guide to help plan their implementations, shying away from the Big Bang method and building their systems incrementally.

"They see it as a logical approach to how you put these systems in," Davis says. "However, other people may not implement in this fashion but can still be successful. This is just a framework to allow people to evaluate where they are and set some expectations."

Some newly constructed hospitals launch their systems all at once, taking advantage of a clean slate. Hospitals in the HIMSS Analytics database that have done so, Davis notes, didn't rank higher than stage 4.

Starting at 0

By the end of 2006, 21 percent of hospitals in HIMSS Analytics' database were at stage 0 of the adoption model.

"Most of the hospitals that are at stage 0 are hospitals under 100 beds and critical access hospitals," according to Davis. "Why are they there? (A) They don't have a lot of money; and (B) they are probably not at a stage where they see a lot of value in automating. If you are a 20-bed hospital, paper-based charts are not that big a deal."

Davis expects that number to decrease, however, because the reimbursement mechanism has changed for critical access hospitals. "They are reimbursed at cost now, and guess what, they've got money. So now they are going out and starting to look at these systems because they do want to automate. So the desire is there by hospitals. You are going to start seeing a lot of the smaller hospitals and critical access hospitals beginning to automate their processes."

A Slow Climb up the Ladder

The model scores each hospital according to the systems it has in place. These scores are not available to the general public, but administrators at participating hospitals can access and compare their scores with other facilities throughout the country.

Typically, the more advanced the system, the higher it ranks in the model's scoring system. In order to move up a stage, a hospital must have accomplished everything in the previous stage and the stages below it.

The model measures whether a given application is implemented in a service area rather than hospital-wide. In many cases hospitals start implementations in targeted service areas, Davis explains.

In assigning a score, HIMSS Analytics "first looks and sees what ancillaries are included in that hospital's data," says Davis. "Are lab, pharmacy, radiology installed? Okay, if so they are stage 1; if not, they are stage 0."

At stage 2, a hospital's ancillary clinical systems feed into a clinical data repository with a controlled medical vocabulary. A majority of the 4,000 US hospitals surveyed for the adoption model are at stage 2—39 percent at the end of 2006.

Hospitals are advancing, although slowly, up the model. The model was generated three times in 2006, in the first, third, and final quarters. From the first to the final survey, stage 3 hospitals had increased 7 percentage points; stage 4 had budged half a point.

South Carolina Hospital a Stage 5

Pharmacy robots that fill prescriptions. Bedside bar-coding systems to check medication administration. Instant access to electronic records from anywhere on the globe.

This may seem like the distant future for many hospitals, but for employees at Spartanburg Regional Healthcare System these features are used every day.

Located in Spartanburg, SC, the enterprise is one of the country's leaders in health IT adoption. The HIMSS Analytics study ranked Spartanburg Regional at stage 5 in 2006. Only .5 percent of the more than 4,000 hospitals included in the study have progressed that far.

That's an accomplishment worth noting. "The toughest part of the model to complete is stage 5," Davis says. "It is very expensive, very time consuming, very laborious, a lot of change management, and a lot of re-engineering. It is a huge step."

The healthcare system's 588-bed hospital, named Spartanburg Regional Medical Center, lies at the center of the organization's EMR implementation. The hospital, which was founded in the 1920s, started aggressively implementing its advanced EMR systems in 1997 and hasn't stopped since, according to Ray Shingler, vice president and chief information officer at the healthcare system.

Since 1997 the hospital has installed an advanced computerized physician order entry (CPOE) system; integrated bedside bar-coding technology enabling an electronic medication administration system to prevent medication errors; installed an electronic picture archive and communication system (PACS) for online viewing; and eliminated "10 million pieces of paper" by implementing a completely electronic records system, Shingler reports.

Nearly all of the hospital's systems are electronic and in turn funnel data into the record. The high-tech system is managed by HIM professionals like Lynne Henderson, MHA, RHIA, the corporate director of health informatics at Spartanburg Regional Healthcare System.

An Increased HIM Role in Data Quality

Prior to the EMR project, Spartanburg Regional had a paper medical record and used software for chart tracking and delinquencies. The facility's EMR system went live in 1999, after two years of development.

Nearly all data from the hospital's documentation systems are cold-fed into the medical record. Any hard copy documents, like physician progress notes, are scanned and indexed by the HIM department to create a true paperless medical record department.

Most of the hospital's HIM employees do not even work in the facility; they work from home or an off-site office by accessing the system through an online network.

About 60 groups per year visit Spartanburg Regional to see its EMR system. For visitors to the medical records department, it is what they don't see that impresses, Henderson says. "After I give my presentation I take them into the medical record department where there is no file room," she said. "For some it is really unbelievable, but it shows people that this can be done."

After several clinicians suggested the newly implemented EMR system should be more accessible and user friendly, Shingler and his team transformed it three years ago to make it viewable through a system called Physician Portal. With the portal, data like patient files, PACS images, even real-time vital signs can be accessed from any computer connected to the Internet, anywhere.

The development, installation, and integration of the hospital's electronic documentation systems was done in stages, Shingler explains. A wireless nursing documentation system was first implemented, followed by the electronic medical record system. With the EMR ready to collect electronic data, other systems like the CPOE and bar-coding systems were installed over the years.

Both clinician and administrative support was key in developing the system. It took a forward-thinking board of directors willing to stake millions of dollars on EMR implantation, Shingler says.

As the hospital upgraded its electronic documentation capabilities, HIM's role changed dramatically and for the better, according to Henderson. There are no more lost or misfiled charts; any loose material gets scanned into the electronic medical record, which also serves as the legal medical record. "We are more of a data quality area now," Henderson says. "It is not the traditional HIM roles anymore."

Learning the EMR is time-consuming, but most HIM professionals can learn it if they try, according to Henderson. They just have to embrace the technology and inevitable future of HIM.

"I was a director at a paper-based facility before I came here, and I did it," she says. "I have no special computer training or anything… I am just a normal HIM person."

Implementation by Stages

The HIMSS Analytics EMR Adoption Model scores more than 4,000 hospitals relative to their IT implementation. In order to move up a stage, a hospital must have accomplished everything in the previous stage and all the stages below it. Results

shown here are for the final quarter of 2006.

Stage	Capability	% of Hospitals
7	Medical record fully electronic; the organization is able to exchange data within a regional network	0.0%
6	Physician documentation (structured templates), full CDSS (variance and compliance), full PACS	0.1%
5	Closed-loop medication administration	0.5%
4	CPOE, CDSS (clinical protocols)	3.0%
3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside radiology	18.0%
2	CDR, controlled medical vocabulary, CDSS inference engine; may have document imaging	38.8%
1	Ancillaries: lab, radiology, pharmacy	18.9%
0	All three ancillaries not installed	20.7%

Source: HIMSS Analytics

Stage 0: Some clinical automation may be present, but all three major ancillary department systems--laboratory, pharmacy, and radiology--are not implemented.

Stage 1: Major ancillary clinical systems are installed--pharmacy, laboratory, and radiology.

Stage 2: Major ancillary clinical systems feed data to a clinical data repository (CDR). The CDR contains a controlled medical vocabulary and a clinical decision support or rules engine for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage.

Stage 3: Clinical documentation is required; nursing notes, care-plan charting, and an electronic medication administration record (eMAR) system are implemented and integrated with the CDR for at least one service in the hospital. The first level of clinical decision support is implemented to conduct error checking with order entry. Some level of medical image access from picture archive and communication systems (PACS) is available to physicians outside the radiology department via the organization's intranet.

Stage 4: Computerized physician order entry (CPOE) for use by any clinician is added to the nursing and CDR environment, along with second-level clinical decision support system (CDSS) capabilities related to evidence-based medicine protocols. If one patient service area has implemented CPOE and completed the previous stages, then this stage has been achieved.

Stage 5: The closed-loop medication administration environment is fully implemented. The eMAR system and bar coding or other autoidentification technology, such as radio frequency identification, are implemented and integrated with CPOE and pharmacy to maximize point-of-care patient safety processes for medication administration.

Stage 6: Full physician documentation or charting (structured templates) is implemented for at least one patient care service area. Level-three clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. A full complement of PACS systems provides medical images to physicians via an intranet and displaces all film-based images.

Stage 7: The hospital has a paperless EMR environment. Clinical information can be readily shared via electronic transactions or exchange of electronic records with all entities within a regional health network (e.g., other hospitals, ambulatory clinics, subacute environments, employers, payers, and patients). This stage allows the organization to support the true electronic health record as envisioned in the ideal model.

Funding and Organization Needed

Getting to stage 7 of the model—a completely paperless system capable of regional data exchange—will not be easy, Davis says. Ample funding is one challenge; ample courage in a risk-adverse industry is another. Both are necessary to make the

final nationwide leap to a paperless healthcare environment.

“If you look at what it costs to get to stage 4 and higher, it is very expensive,” Davis says. “Unless the government comes up with some kind of magical funding incentive for hospitals, it is going to be very difficult.”

Most hospitals have spent money to create the record infrastructure, but the cost increases as they install more advanced, “higher-stage” systems like advanced computerized physician order entry and wireless bar-coding technology.

But cost isn’t everything, according to Davis. “Part of it is really organizational readiness. When you start to put these types of applications in, there is a tremendous amount of change management and re-engineering of workflows that have to take place. It is those things that really are the biggest barriers to implementation of a lot of these applications at the higher stages.”

Reaching full, stage-7 implementations will take time. “It is a journey,” Davis says, “because once you’ve put the plan in place, it is going to take several years to get it implemented.”

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