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Finding and Paying for Interoperability

**EXECUTIVE
SUMMARY**

Healthcare is like the estuary that mixes water from multiple sources, some fresh, some salty and some brackishly inbetween. Healthcare information, like different species that only thrive in separate streams, is accessible and useful in certain IT environments but not all. Interoperability is the stream in which all the different kinds of information “fish” thrive together. Sadly, this stream is still a figment of the imagination in healthcare.

But we're trying, and it's a measure of the importance of interoperability in healthcare that there are so many paths to it. An industry has arisen around interface engines alone, which like electronic bandaids address a hospital's or health system's immediate need for system integration within their own walls. Then there are the major HIT vendors who claim they have de facto interoperability solutions in the form of their own single platforms. Other vendors offer virtual interoperability using middleware or web-services layers that, in a kind of digital gymnastics called context management, link disparate software applications into a single display for the user. RHIOs are the latest attempt to do that on a community and regional level.

No surprise, the issue always comes down to money. A costly tangle of technical spaghetti, interface engines have

always been a temporary solution. We all know how expensive and lengthy-to-install single vendor solutions are and, while they provide extended interoperability throughout much of the enterprise, those same vendors acknowledge they rarely cover it all. And of course the virtual connectivity of most RHIOs is still awaiting a model of financial sustainability.

This issue of IE looks at interoperability in healthcare from necessarily several perspectives: two provider organizations, the federally recognized HIT certification organization, a major HIT vendor and a vendor of virtual interoperability.

Sharp view

Veteran healthcare CIOs have just about seen—and tried—it all when it comes to interoperability. For Bill Spooner it's a quest he won't give up on until the issue is solved. “I'm on a journey to achieve common standards,” says the CIO at San Diego-based Sharp Health-Care. The 1,800-bed integrated delivery system is consolidating IT systems onto a single Cerner platform, driven partly he says by the fact that HL7 and CCOW standards have not overcome the disadvantages of multiple systems with dissimilar presentations and design.

“Despite all these industry interfaces,” says Spooner, “we use GE Care for pharmacy and order entry and CliniComp for nursing documentation. You enter

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MEMBER



The Scottsdale Institute is proud to welcome new member Children's Memorial Hospital in Chicago.

Children's Memorial Hospital has a 125 year history of providing compassionate care in a family-centered environment. In addition to the main hospital in Chicago, it has 6 city and suburban outpatient centers and provides outreach services at 8 partner hospitals in the metropolitan Chicago area. In 2007, Children's Memorial served 113,352 children and had 9,549 inpatient admissions, 386,350 outpatient visits, 15,726 surgical procedures and 41,853 radiology procedures. Children's Memorial Hospital is licensed for 270 beds and is Illinois' only freestanding hospital exclusively for kids.

continued on next page

orders on System One and chart them on an eMAR on System Two. Some of the orders will not translate cleanly from one to the other." That can be dangerous, for example, when it involves a sliding-scale insulin order set where the amount of insulin administered is dependent on patient weight.



Bill Spooner, CIO, Sharp HealthCare, San Diego

SHARP

User convenience and training are also driving the move to a single platform and away from best of breed at Sharp, whose 2,500 affiliated physicians and three related medical groups would benefit from the hospitals moving to a common system. The medical groups already use Allscripts for the ambulatory medical record. "Physicians wanting to work in both worlds want to see all tests irrespective of performing site and avoid any duplicate ones, and if I'm a hospital patient my primary care doctor doesn't treat me there," and therefore needs to have seamless access to the inpatient record for later follow-up, says Spooner. He's aware of other CIOs using systems based on direct programming and service oriented architecture (SOA is a set of tools and standards for filing and accessing data, allowing systems to work together) to provide interoperability, "but that's good only to a point."

Even so, it's difficult to totally move to a single platform. "We have millions invested in PACS. We can't swap that out for Cerner PACS. Every organization will

always have a suite of systems that's not part of a single platform," says Spooner, who breaks interoperability into three parts:

- 1) Data exchange within a care setting (hospital, medical group, etc.)—even simple transactions like admitting and orders. "We see this as gravitating as much as possible to a single or limited suite of applications for the most optimal workflow."
- 2) Clinical Information Exchange among care settings—Different core applications are optimal for the workflow of the particular care setting. "We need standards-based data exchange like the HL-7 CCD for convenient, reliable information exchange between the settings."
- 3) Device connections—The simplest example is a laboratory instrument that transmits data to a lab information system. "Everybody can do that; we've developed point-to-point interfaces," he says. Most complex connections include the numerous monitoring devices in an ICU.

Monitoring devices, including online glucometers and computerized infusion pumps take the issue to another level of complexity, especially in critical care for collecting real-time information and passing it on to the EHR.

From Spooner's vantage point, HIT vendors are going to one of two scenarios: individual point-to-point connections, or building their own interface engine called a gateway. "I'll have my gateway talk to your gateway. Because there's still not a standard—even with HL7, an organiza-

tion still has two, three or four gateways. Cardinal is developing a gateway to connect its three main product lines of Pyxis automatic drug dispensing units, Alaris smart infusion pumps and CareFusion bar-coding product. I'll have a Cerner gateway talking to a Cardinal gateway," he says, adding, "I wish I had a common solution usable by all."

Even groups like the Certification Commission for Healthcare Information Technology (CCHIT), which has taken on the charge of certifying EHR products in terms of functionality and certain interface standards, do not offer a panacea. "If I'm in the market for a medical group office system, I can find one that's certified but not necessarily interoperable," says Spooner.

Legacy problem

Kent Gale, president of Orem, Utah-based KLAS, which measures IT vendor performance in healthcare, says the firm conducted a study on interoperability a year and a half ago, but not much has changed since then. "Parroting providers, the vendor's responsibility is to communicate clearly with their clients regarding their interest, ability and willingness to share information within their own and other software systems. Some providers have waited for seven or eight years while their software supplier attempts to have systems they built and/or control interoperate. But it's not an easy problem to solve. To the vendor those legacy problems come from older systems and versions that don't seem worth the effort to make interoperable (they are just going to be replaced or retired) and that has led to workarounds to achieve minimal inter-

operability within their own products. It's a painful challenge because the provider assumes it's going to get better based upon communication with their vendor. The problem gets even worse now with clinical decision support where data has to be shared meticulously. A version level change in one system might affect one simple data element that doesn't get translated or passed correctly through the interface and patient harm results. Providers speak of having allergies missing in a record," he says.



Kent Gale, president, KLAS, Orem, Utah

What are vendors doing? Vendors with integrated solutions—Epic, Cerner, Meditech, etc.—have built their systems around a single architecture and/or data base. To efficiently provide system availability and great response times some file and code duplication still exists in these solutions, Gale says. Most other vendors have accepted the fact that providers don't want to have to deal with disparate systems, so they are building "virtual integration" in which certain files such as room and bed, credentialed physicians and formulary medications are standardized for shared use by their non-integrated systems. "That allows them to build all the applications at once," he says, noting that Eclipsys, McKesson, GE and several others have moved toward a more virtual integration.

Welcome continued

In 2012, the hospital plans to move to the campus of Northwestern University's Feinberg School of Medicine, opening a new state-of-the-art facility named Ann & Robert H. Lurie Children's Hospital of Chicago.

For more than 60 years, Children's Memorial Hospital has served as the pediatric training ground for Feinberg School of Medicine. In addition, Children's Memorial Research Center, the research arm of the hospital, is one of 13 multidisciplinary centers at the Feinberg School.

Consistently ranked as one of the nation's best children hospitals, it was also the first freestanding children's hospital in the country to receive the prestigious Magnet Award for Nursing Excellence.

Welcome Patrick Magoon, CEO, Stan Krok, CIO, and the entire Children's Memorial Hospital team.

Still, the reality is that most customers haven't really enjoyed the benefit of interoperability, Gale says. "Vendors that aren't addressing interoperability are lagging behind. It's a market differentiator, especially if you want ambulatory working with inpatient systems."

Certifiably so

The key industry group in this area is the Certification Commission for Healthcare Information Technology (CCHIT), an independent, nonprofit organization that was awarded a contract in 2005 by HHS to develop, create prototypes for, and evaluate the certification criteria and inspection process for EHRs and the networks over which they exchange patient information. The HHS funding is transitional, designed to support certification development, testing and assessment, after which the Certification Commission will transition to a self-sustaining model.



Mark Leavitt, MD,
chairman, CCHIT,
Chicago

Mark Leavitt, MD, chairman of the Commission, says interoperability of EHRs is becoming more important every day. "Perhaps even more importantly than actual applications, medical center CIOs must concern themselves with interoperability of the EHR so that EHRs can become more portable. Why don't have that portability already? I don't blame the providers or the vendors.

We don't reward it. Our compensation system rewards volume, as in cardiac catheterizations and appendectomies," he says.

It's a cultural issue with deep roots in medicine. "One of the first things medical students learn is to take a history from a patient. We've been relying on the patient for interoperability. The first thing you should learn in medical school is how to open a computer," says Leavitt.

He asserts that the lack of interoperability required for sharing patient information community wide or regionally should not be blamed on vendors. "That kind of interoperability will get better when we start rewarding the integration of health-care." Still, "within the enterprise we must include the vendor community both as part of the solution and as part of the problem." For example, when hospitals purchase a CT scanner, the vendor typically wants to also generate sales of storage media for the digital studies. While it's the natural motivation of vendors to seek sales from ancillary products or services after the initial equipment sale, most such vendor solutions are proprietary. "You can't connect. It's a dangerous way to drive a business advantage," says Leavitt.

The Certification Commission's goal, he says, is to accelerate standards in such a way that products come as close to being plug-and-play as possible. That means there will be increasingly rigorous standards and more rigorous testing of products. "EHRs are either a trip wire or a brand new competitive opportunity. Successfully demonstrating interoperability creates an incredible advantage with community physicians. I'd hate to

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March 10

Standards Update: Moving Toward Integrated Nomenclature and Structured Data

- Jack Corley, senior VP, Chief Technology and Quality Officer, Advanced Technology Institute, Charleston S.C., and deputy program manager, Health Information Technology Standards Program (HITSP)

March 11

Mercy Health Partners Gives Doctors Secure Mobile Access to Clinical Patient Data

- Mike Hibbard, VP, Informatics, Mercy Health Partners, Cincinnati
- Tom Gocke, solution executive, Thomson Healthcare, Denver

March 27

Labor and Delivery Systems: Functional Strengths/Weaknesses and Depth of Integration

- Steve Van Wagenen, KLAS Research Director, Orem, Utah

April 1

Improving Transparency and Reporting Through the EMR at Cedars Sinai

- Jerome K. Wang, MD, FAAP, FACP, associate medical director, Enterprise Information Services, and medical director, Information Systems — Cedars-Sinai Medical Care Foundation, Cedars-Sinai Health System, Los Angeles

more events on next page

be an IT-backward hospital,” says Leavitt.

Under CCHIT certification this year, office products have to be capable of e-prescribing, including receiving labs in a certain format, and sending and receiving prescription-drug orders. That should help improve patient compliance. In the coming year, systems will have to be able to transmit a Continuity of Care Document (CCD).

The Certification Commission’s leverage comes from credibility. “We’ve convinced buyers of the validity of certification and vendors are saying they want to get certified. It has to deliver value to both because it’s voluntary and it will work as long as we see market acceptance,” he says, adding that the Commission certified about half of all ambulatory products, representing 40 percent of ambulatory product vendors and more than three fourths of the installed marketplace, within the first year. In the first six months of inpatient EHR certification availability, 36 percent of inpatient product companies certified products.

Leavitt says the history of computer technology bodes well for interoperability taking hold in healthcare. “You look at computers and the wireless networking. It says ‘WiFi certified.’ There was a day when it was all proprietary. We’re a catalyst in the absence of economic drivers.”

A giant turn to interoperability

McKesson is an 800-pound gorilla in the HIT space and is no stranger to the need for interoperability, itself largely the result of acquisitions of HIT firms like HBOC. Stung early on by criticism for the apparent lack of product integration,

the company has since made interoperability a corporate quest.

McKESSON

Empowering Healthcare



**Pam Pure, VP,
McKesson Corp,
San Francisco**

“Our view is that we will be open and interoperable and we want to accelerate that trend,” says Pam Pure, executive VP of San Francisco-based McKesson Corp. and president of

Atlanta-based McKesson Technology Solutions, which includes the firm’s healthcare IT units. “But interoperability is a broad term and efforts must focus on user experience and the flow of data. We have a whole strategy around connectivity and are moving our core solutions to a single platform. However, we also recognize that no one will ever have a single vendor or a single platform for everything,” she says.



**Michael Simpson, VP,
McKesson Horizon
Clinicals, San Francisco**

McKesson’s interoperability platform aims to make it easier to connect clients with disparate applications as well with different systems that may have been added through acquisition

of other facilities. Michael Simpson, senior VP and general manager for McKesson Horizon Clinicals, the umbrella name for its clinical systems, says Horizon is built with industry-standard interfaces as well as with regard to regulatory require-

Upcoming Events continued

April 3

Stark Law Relaxations: The Business Case for a Community Physician Technology Donation Strategy

- Michael Busch, VP and Chief Strategic Officer, Butler Health System, Butler, Pennsylvania
- Kenneth Kleinberg, VP and hospital strategist, Allscripts, Chicago

April 7

EMR and EDW Enables Reporting and Improves System Design at Northwestern

- David Liebovitz, MD, CMIO, Northwestern Memorial Hospital and medical director, Clinical Decision Support, Northwestern Medical Faculty Foundation, Chicago

April 10

Safe Harbor and Stark Law Update and Case Studies

- Ira M. Kalina, partner, Drinker Biddle Gardner Carton, Chicago

April 24

CPOE Outlook: 2006 vs. 2007

- Adam Gale, COO, KLAS Enterprises, Orem, Utah

April 29

Predictive Knowledge Management

- Tonya Hongsermeier, MD, MBA, corporate manager, Clinical Knowledge Management and Decision Support, Partners HealthCare, Boston
- Vi Shaffer, Research VP, Gartner, Stamford, Conn.

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ments. “There’s no homogeneous environment anymore. Our mission is to make healthcare safer. The last several years the specs have been loose, based on HL7. McKesson has interpreted it one way, Cerner another and so on. CCHIT’s work will combat that.”

He says that McKesson’s erstwhile reputation of having a less-than-integrated suite of products ironically forced it to focus on becoming interoperable in a way that some monolithic system vendors didn’t. Now it’s possible for a hospital, for example, to take on a McKesson application “without taking the rest of the systems down. We now have world-class experts in interoperability. It’s become a strength for us.”

Two years ago, McKesson developed a service-oriented architecture (SOA) layer for all of its products called the Horizon Messaging Service that creates interoperability among all of the company’s products as well as with other vendor products. “It communicates to the rest of the world. It also gives us a platform for connectivity if we acquire another product,” says Simpson.

Called an enterprise service bus, the platform guarantees delivery of data messages without requiring management of hundreds or thousands of interfaces. “Our job in life is to reduce the complexity of interfaces. For CIOs, they don’t need any more headaches,” he says.

RHIO-sized provider

The University of Pittsburgh Medical Center can rightfully claim interoperability as a regional and executive-level issue.

“UPMC is a large integrated delivery network the size of many RHIOs,” says Michael Dunn, MD, perhaps the only healthcare executive with the title of medical director of interoperability.

Integration has to be a strategic priority for UPMC, which has 20 hospitals, 400 outpatient-care locations, employs 4,000 physicians and serves 4 million people in western Pennsylvania. It also has its own health plan. “We’ve grown by mergers and acquisitions and so have a real need for interoperability because of the disparity of medical records. Interoperability is a top priority for UPMC and the nation but has to be done in a manner that’s financially sustainable.” While CMS has funded a number of good pilot projects showing great promise for interoperability—RHIOs—the concern is who pays for the continuation of the interoperability effort after federal funding runs dry?”



Michael Dunn, MD,
medical director,
Interoperability,
University of Pittsburgh
Medical Center

UPMC

For example, Dunn argues, the industry expects individual providers to fund 90 percent of the cost of an EMR while those providers receive only 5 percent to 10 percent of the benefit. Sustaining interoperability is not free. There are data standards, messaging standards, and document standards. Similarly, to expect vendors to fully bear the sustainment costs of interoperability doesn’t make

The industry expects individual providers to fund 90 percent of the cost of an EMR while those providers receive only 5 percent to 10 percent of the benefit. Sustaining interoperability is not free.

sense either. “The reason you can go to an ATM machine anywhere around the world is because the structure exists to support profitable operations. My fundamental concern is that the cost of interoperability is out of sync with the reward. If the reward is increased quality of care and decreased cost of business, why is it that those who see the benefit of these would not pay for interoperability? I see focusing solely on the vendor commitment to interoperability as just another example of American healthcare’s whole series of inconsistencies.”

He says the commercial driver for EMRs came from coding and billing and interoperability should be paid by quality improvement, better outcomes and management of high-risk populations—especially preventing chronic disease like diabetes. “If systems within an EMR used a chronic care model we could use them for preventive care of high-risk outliers. But one must design that into the system. It’s not a given,” asserts Dunn. It makes strategic sense to UPMC, not just because it has a health plan but also because it serves an older, more geographically stable population. “It makes sense if you’re dealing with a population for 10 years or more rather than changing every 18 months or so,” he says.

However, being able to perform the kind of analytics required for identifying, managing and treating high-risk populations demands what Dunn calls “semantic interoperability,” which he says CCHIT falls short of in its certification. “Interoperability is not a single, straightforward case. One can have a viewer which provides basic interoperability and no

one would criticize that. Semantic interoperability involves full transfer of meaning. That kind of work is naturally much more expensive. But also supports enterprise clinical decision support (CDS),” he says.

UPMC has made an \$84-million, multi-year, strategic investment in partnership with an Israeli technology firm, dbMotion, to build a semantic interoperability platform in order to derive value from its clinical systems. “We think we’ll be able to document a return in terms of clinical quality and financial efficiency. In the case of skilled nursing facilities (SNFs), CMS has been very concerned about the premature return of patients from a SNF. At UPMC we do 15,000 transfers from acute care to SNFs each year, and 4,000 result in returns to acute care within 30 days. Using the CCD (Continuity of Care Document), if we can deliver that document right away to the SNF and diminish the number of returns by even as little as 10 percent, we could have a measurable impact on the cost of those returns, which are very expensive,” he says.

This month, UPMC successfully launched a pilot that should lead in the next two to three years to building a semantic interoperability platform. Then it will implement advanced CDS. “It’s not a Big Bang, it’s a journey to develop interoperability processes,” says Dunn. “By bringing information from multiple data streams to the point of care, we’ll be able to improve quality of care and quality of life. We’re keen on identifying decreased cost from high-quality targets. Diabetes represents a great possibility for critical parameters. We’re very keen on defining

“Semantic interoperability involves full transfer of meaning. That kind of work is naturally much more expensive. But also supports enterprise clinical decision support (CDS).”

ways to use interoperability as a support system for providers.”

Virtually there

If there’s anyone who has witnessed the evolution of interoperability in healthcare, it’s Oscar Diaz. The founder and Chief Software Architect of Scottsdale-based Carefx, Diaz’s resume reads like a road-map of healthcare IT from the 1970s to today. He started out working on ICU data management with HP, then founded the IEEE P1073 MIB standards effort, and went on to co-found with Stan Huff of IHC the IEEE MEDEX standard, a pre-HL7 Standards effort. In the early 1980s, he participated in the formation of the initial versions of HL7. He then launched EMTEK which was then sold to Motorola in 1985, who in turn sold it to Eclipsys in 1998.



Oscar Diaz, founder & Chief Software Architect, CareFx, Scottsdale, Ariz.

CAREfx

During the EMTEK days, Allina had an installation of Medicalogic in the ambulatory setting and EMTEK in a number of acute care hospitals. The integration of the two desktops became the genesis for the interoperable desktop requirement which served to launch the Clinical Context Object Working group (CCOW) later renamed HL7 Context Management Architecture (CMA). CMA is an HL7 protocol that allows users to synchronize disparate applications on a desktop. That initial effort got him involved in integrat-

ing CCOW into what became the Carefx framework. “We created the mess and now we are trying to fix it,” Diaz jokes.

Diaz continues his interoperability journey at Carefx, a Service Oriented Architecture (SOA) and web-services-based information aggregator for healthcare. Originally using the web to integrate imaging applications with applications like surgical planning, the company married web services with context management. The context management capability virtually links disparate applications around a patient or a clinical encounter in a way that makes them seem like they’re all part of a seamless application. The technique has caught the attention of IBM, who has partnered with Carefx to develop a context-enabled portal and “portlet-based data access.” This open systems architecture front-ends and integrates applications into a common intuitive browser-based display.

Diaz asserts this kind of interoperability addresses another major barrier to physician adoption of CPOE, clinical systems and the EHR. “Everybody talks about CPOE, but CPOE has a very poor adoption rate, which by most studies is less than 10% worldwide. Physicians essentially need to review data quickly, add to that data and then take an action that corresponds to the changes in a patient’s condition. In today’s systems, reviewing the data typically requires logging in and out of five to seven different software applications. Multiply that by the number of hospitals that a physician may be affiliated with and this results in as many as 15 different log-ins....all with different passwords and password expirations.”

This being a presidential election year, healthcare has at least become part of the national discussion again—and brought interoperability along with it.

Carefx provides a single login that is federated across multiple enterprises and eliminates one of the largest barriers to system access.

The Carefx framework relies on SOA-based web services. For instance, a census can be extracted in real-time from a Meditech system. In addition, multiple queries are simultaneously executed to other vendor systems for data on that same patient. These views are then contextually integrated into a single composite display. “It’s a great model for RHIOs, where the barrier to establishing governance is ‘who owns the data,’ says Diaz. “The web-services model goes directly against the source system and thereby avoids the knotty problems of centralized data repositories. This federated real-time model solves synchronization and update issues of a central repository model. The real-time federated model is also part of the integral workflow of the clinician because the data is accurate and the source system is the source of truth and is responsible for maintain-

ing the integrity of the data as part of the clinical workflow,” he says.

Conclusion

While it may sound like an IT issue that could be resolved but only for the self interest of HIT vendors, many astute observers, including providers, view interoperability as a much larger issue that stands or falls on the reimbursement system in healthcare. Sounds like a familiar theme. This being a presidential election year, healthcare has at least become part of the national discussion again—and brought interoperability along with it.

Says UPMC’s Dunn: “It’s an enormous political question this year. It depends on whether interoperability is a significant part of that question. Not the end all or be all. But it depends on how we answer the enormous question of who pays for this stuff. Interoperability is one small piece of the whole healthcare economy scene and what we do about healthcare as a nation is the main driver of interoperability.”



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