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On the Road to Interoperability, Public and Private Organizations Work to Connect Health Care Data

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When David Ross, MD, a family medicine physician who works in an Affiliated Community Medical Centers clinic in Litchfield, Minnesota, as well as a part-time emergency department physician in a local hospital, treats a patient who is from out of town, he wishes that he were able to quickly and easily look at that patient's electronic health record (EHR). Often, he said, a patient who arrives at the emergency department may be unconscious or incoherent, and without access to the patient's record, he doesn't know anything about that patient's medical history.

When he cares for local patients at the clinic, he can view their hospital EHR if he has admitting privileges there, but because hospitals use different EHR systems than the clinics, he can only read the hospital's EHR; he cannot integrate that information into the clinic's EHR.

"This results in a delay of information [in] transit and most often the faxing and the scanning of paper documents into our respective EMRs [electronic medical records]," said Ross in an email.

Although people often take for granted their ability to withdraw money from an ATM hundreds of miles from home or call someone in another cellphone network, many organizational, financial, and technical barriers still need to be surmounted before that same sort of universal operability is achieved for the electronic exchange of patient information.

Yet if the vision of the Office of the National Coordinator for Health Information Technology (ONC)—the federal entity charged with coordinating health care technology initiatives—is achieved, electronic exchange of health information among clinicians, health facilities, and patients should be widely available within 10 years. The ONC was legislatively mandated as part of the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, a program that is part of the American Recovery and Reinvestment Act of 2009. Earlier this year, the ONC unveiled a draft of a 10-year interoperability road map

(<http://bit.ly/1ElxEAx>) in which the ONC outlines steps needed to be taken in governance, technical standards, certification and testing, business and regulatory climate, and privacy and security to ensure the secure and seamless flow of health care data among providers and consumers. The ability of clinicians to share data electronically has become especially important because the Centers for Medicare & Medicaid Services' newest draft regulations for stage 3 "meaningful use" of EHRs stipulate that clinicians must be able to exchange health care information through EHRs (<http://1.usa.gov/1csPsna>).



What Is Interoperability?

The ONC bases its description of interoperability on the IEEE's definition as "the ability of a system or a product to work with other systems or products without special effort on the part of the customer" (<http://bit.ly/1dSxdbY>). In the health care world, this means that "people who need health information have it when they need it and have it in a way they can use it," explained Erica Galvez, MA, the ONC's interoperability portfolio manager.

With interoperability, information about a patient's medications, diagnostic tests, allergies, or recent appointments can be pulled from an EHR or database at a physician's office, hospital, or laboratory and folded into the patient's EHR at another location.

"The information comes into the provider's workflow, is context specific, and can inform the conversation," Galvez said.

Interoperability encompasses more than EHRs, she added; it also includes the flow of information to and from mobile monitoring devices, public health databases, and other electronic sources.

The Interoperability Jigsaw Puzzle

Although the ONC road map presents the movement toward interoperability as a smooth, straight road, in reality it's more like fitting together the pieces of a giant jigsaw puzzle. Several public and private organizations are working on different pieces, including organizations creating technical standards, establishing health information exchange (HIE) networks, connecting those HIEs, and developing principles of governance and usage. The hope, according to health care information technology experts, is that all the pieces eventually will interlock.

"Very few are doing it soup to nuts," said Galvez. "That's why we put forward a road map."

Health Level Seven International (HL7), an organization that establishes American National Standards Institute-accredited standards for electronic health information technology, is developing Fast Healthcare Interoperability Resources (FHIR), a technical standards framework that will simplify the process of exchanging data between EHR systems (<http://bit.ly/1Hg4qrD>).

A simpler way for exchanging information would be welcome news to oncologist James Salwitz, MD, who practices with Regional Cancer Care Associates, which has 26 offices across New Jersey. Salwitz said

that the health care field lags behind other industries in the ability to easily share data. He can retrieve radiology images and other patient information from Robert Wood Johnson Health System facilities, the region's major medical center, but not without a search, as this information is not automatically entered into the patient's EHR at his practice.

"You shouldn't have to go looking," he said. "You go in and it's there, and the only limitations should be what the patient puts on [the record]."

He shared an example of the consequences of the lack of interoperability: when a patient came for an appointment, he noticed the patient had an enormous bruise on his face. It turned out that the patient had undergone eye surgery but had not told the surgeon that he was taking an anticoagulant, and the surgeon did not have access to this information because he could not access the patient's EHR at another medical facility.

Meanwhile, other organizations are working on creating HIE networks and establishing protocols for exchanging information.

One is Healtheway, a nonprofit organization that comprises the American Medical Association, Cerner, Epic, Greenway Health, Kaiser Permanente, Optum, Walgreens, and several other groups. One of Healtheway's projects, eHealth Exchange, connects 4 federal agencies, 10 000 medical groups, 8200 pharmacies, and 30% of hospitals in a supersized HIE. Carequality, another Healtheway initiative, is establishing rules of engagement, common technical standards, a participating providers' directory, and "principles of trust" in order to stitch together the current patchwork of public and private HIEs, explained Dave Cassel, Carequality's director. The goal, he said, is to link HIE networks much like the way cell-phone networks are connected.

"Many physicians are connected to one data sharing network or another. If you connect just a few of these networks together, we are on the cusp of a quantum leap in interoperability," Cassel said.

Another organization, CommonWell Health Alliance, a consortium of health information technology vendors and other organizations, serves as a centralized retrieval service. The organization was launched in 2013 with Allscripts, Athenahealth, Cerner, Evident (formerly CPSI), Greenway Health,

McKesson, and Sunquest Information Systems as founding members, and other EHR vendors have since joined. The members represent 70% of hospitals, 25% of ambulatory care centers, and 70% of post-acute care centers nationally, according to CommonWell executive director Jitin Asnaani.

Member organizations pay membership dues ranging from \$2500 to \$100 000, based on the member company's annual revenue and the type of membership, and in addition, those member companies that want to offer CommonWell's services to its physicians, hospitals, and clinics pay annual member service fees from \$50 000 to \$2.75 million, depending on the member company's annual revenue.

CommonWell functions somewhat like a library reference desk, Asnaani explained. If physicians or health care systems use EHR systems from vendors who are part of the alliance and who have signed member service agreements, they can register patients with CommonWell. When CommonWell receives a request for patient records, it works through a third-party service provider, RelayHealth, to match the patient with records at locations in the CommonWell network and then retrieve those records.

CommonWell has made it easier to share patient data, said William "Tripp" Jennings, MD, system vice president and medical informatics officer at Palmetto Health, a health system in Richland County, South Carolina, that participates in CommonWell.

For example, many patients from a local orthopedic practice are referred to Palmetto facilities, and the ability to digitally exchange information means that data don't have to be entered into 2 different systems, he explained.

Interoperability Trailblazers

Although interoperability has only come into the spotlight in the past few years, some organizations have been quietly exchanging data electronically for years.

The Indiana Health Information Exchange, which the ONC cited as a "beacon community" for interoperability, began in 2004. The exchange grew out of ideas generated at the Regenstrief Institute, a health care informatics and research organization based in Indianapolis. The IHIE connects 25 000 physicians, hospitals, and other health care providers in 17 states. Members pay yearly subscription fees, said IHIE chief executive officer John Kansky.

The beauty of the IHIE is its normalized clinical data repository, explained Kansky. "Participants send us real-time data, which we are saving in a repository that we host for them."

The IHIE takes the data sent from participating providers and converts them into a summary that uses a standardized way to present information, he explained. He compared it to gathering notes in French, Italian, and Portuguese and translating them all into English.

Electronic health record vendor Epic also was an early proponent of interoperability. In 2005, Epic launched Care Everywhere, a network that allows health care organizations and clinicians who use Epic software to exchange health information. The network incorporates ONC-recommended standards, a "trusted phone book" directory of members, and common rules, explained Eric Helsher, Epic's vice president of client success. Organizations that use other EHR systems also can exchange information through individual agreements with health systems that do use Epic. Originally, non-Epic users were charged a fee to use the service, he said, but that fee has been dropped until 2020.

Epic is participating in Healtheway's Carequality, but has not joined CommonWell. "We've been doing this since 2005, CommonWell is not nearly to that size, and we felt like we would be stepping back, but we look forward to their growth and joining Carequality so we can all connect our networks," said Helsher.

More Work Needed

Although in 2013 48% of office-based physicians and 59% of hospitals used EHRs that met federal criteria for a basic EHR system, information is still not being widely shared across "organization, vendor, and geographic boundaries" and "EHRs are not yet

sufficiently standardized to allow seamless interoperability," according to an October 2014 ONC report to Congress (<http://bit.ly/1Ha8WaT>).

A qualitative study of the use of health information technology to improve health care noted that many physicians are frustrated: they cannot use their EHRs to share information across health systems because of technical incompatibility and a lack of incentives for health systems to do so (Sheikh A et al. *J Am Inform Assoc.* doi:10.1093/jamia/ocv022 [published online April 16, 2015].

Yet it is possible to overcome technical incompatibility, as demonstrated by an interoperable clinical oncology treatment plan and summary draft standard developed by the American Society of Clinical Oncology and approved by HL7 (Warner JL et al. *J Am Inform Assoc.* doi:10.1093/jamia/ocu015 [published online January 20, 2015].

The highest barriers are financial and policy ones, not technical ones, noted those with expertise in health care technology.

"Technology is almost never the obstacle," noted IHIE's Kansky. "It is really the governance of the data and getting organizations with different agendas to agree on what you are going to do."

It's also imperative that health care organizations exchanging health information electronically are vigilant about security, said Robert Tennant, director of health information technology policy at the Medical Group Management Association.

"The trust that patients have could be severely eroded if we start to see breaches in HIEs," said Tennant. "This is a very precarious house of cards, and the security issue cannot be overemphasized."

There's also the challenge, he noted, of ensuring that only relevant data are shared, so clinicians are not flooded with irrelevant information.

Financial incentives also need to be modified to encourage data sharing, said Mark Segal, chair of the EHR Association.

"Under fee-for-service, there's not direct financial support for the exchange of information," said Segal. "As we move into a population health model, like [accountable care organizations], there is, in effect, a financial benefit to exchanging data."

In fact, the ONC in April released a report to Congress on "health information blocking," in which the agency noted that "current economic incentives and characteristics of both health care and health IT markets" discourage the sharing of health information (<http://bit.ly/1QFEZUI>).

For instance, vendors may charge up to \$1 per outgoing EHR record and \$5 per incoming record in addition to connection or interface fees, noted Peter Ashkenaz, an ONC spokesperson, in an email. Another challenge, Segal said, is finding a more efficient way to match patients with their records. Health Insurance Portability and Accountability Act (HIPAA) regulations prohibit the use of Social Security numbers or other national identification numbers, thus forcing health care organizations to match patients with records by cross-referencing a series of identifiers such as birth date, address, and driver's license number.

"There's frustration in the industry broadly that the current methods are not sufficient," he said.

Interoperability holds great promise, and physicians are both hopeful and realistic, noted Tennant. The question is whether the reality will match the lofty expectations for interoperability.

"The goals articulated from ONC are laudable and will produce higher-quality patient care, but there are so many real-world barriers that physician practices would like to see overcome before we reach nirvana," he said. ■