

Overcoming Challenges to Interoperability

**Tackling barriers to the free flow of patient data
across healthcare technology systems**

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EHRs and the Interoperability Obstacle

The widespread adoption of electronic health records (EHRs) for patients has revolutionized the healthcare industry and made it possible for providers to know more about their patients than ever before. EHRs give providers and payers deeper insight into a patient's past medical, social and family histories, and serve as centralized repositories of a patient's healthcare information.

With so much of this information on the virtual record and the national push for providers to adopt EHR technology, patients might assume that their digital health records are accurate, complete and easy for any clinician or facility treating them to access. But this is not the case—yet. The healthcare industry is still grappling with significant challenges to interoperability, or the ability of systems to share clinical and claims data across multiple healthcare platforms.

What happens to your healthcare data when your local hospital does not operate on the same technology platform as your primary or specialty care physician? The information may get lost, blocked or misinterpreted, which can lead to medical errors that impact safety and care. Add patient-generated data from wearables and other health devices to this scenario, and the complexities compound exponentially.

The need for interoperability was poignantly expressed by Vice President Joe Biden at the recent 2016 Health Datapoolooza¹ in Washington, D.C. Biden shared the story of how his family struggled to have health records transferred between providers at Walter Reed National Military Medical Center and the University of Texas MD Anderson Cancer Center during the final months of his son Beau's battle with brain cancer. Incompatibilities between the two health system's EHRs forced the vice president's family and physicians to physically compile and transport his son's medical records from one hospital to another — via a thumb drive.

Though patient records are more advanced and more available than ever, data silos and other technical roadblocks prevent physicians from sharing and patients from accessing healthcare information when they need it the most. One of the biggest barriers to interoperability is the fact that different technology platforms used by healthcare providers do not talk to each other effectively without special configurations. The messages carrying the patient data must be transformed via an integration engine or another software tool so the receiving platform and physicians can use the data safely and effectively.

For providers to use EHRs and other technologies to help improve care and diagnose and treat patients in a timely manner, they must be able to exchange and swap patient data seamlessly. Achieving this plug-and-play interoperability is a goal for the U.S. Department of Health and Human Services (HHS). By 2024, the HHS has called for an interoperable health IT ecosystem that makes the right data available to the right people at the right time across products and organizations. As Biden told the crowd at Datapoolooza, "This (interoperability) matters. It's a matter of life and death."

Challenges to Interoperability

The healthcare industry is often challenged by unnecessary variability in how standards for EHRs are implemented across equipment vendors, as well as variability between implementation teams within hospitals and health systems, in labs and e-prescribing facilities, and at public health reporting agencies throughout the country.

Variability is not limited to differences between system configurations, but is even true for common message types like ADTs (admission, discharge, transfer). Another issue is that providers use different health languages to achieve semantic interoperability. For example, why isn't a diagnosis code for influenza in Logical Observation Identifiers Names and Codes (LOINC) the same as it is in Systematized Nomenclature of Medicine (SNOMED)?

There are defined standards for these different message types and health languages, so why is interoperability between healthcare systems an obstacle? Discordant standards for data and message types lead to incompleteness and inconsistencies in EHRs. Specific challenges to interoperability and integration of EHRs and patient data include:

Malformed or missing data.

The system receiving the EHR may not be able to locate or intercept data in a specific format or field from the system sending it. To complicate matters, these missing data fields may be required to correctly link information about a patient with his or her diagnosis.

Disparate adoption of standards.

Standards for EHR systems are not always

implemented as written by equipment manufacturers or by the teams assigned to implement these standards at hospitals and other healthcare facilities.

Use of outdated standalone legacy systems.

Connecting these legacy systems to the middleware needed to support data exchange often causes structural changes to existing data, resulting in high costs to repair it.

Complex and misunderstood privacy and security policies.

Varying state privacy policies and conservative interpretation of privacy laws and security policies impede the free flow of data among healthcare stakeholders.

Interface discrepancies between systems.

Systems sending EHRs—such as a hospital—must be able to exchange information clearly and correctly with systems receiving them—such as a lab or outpatient facility—without pertinent data getting lost in translation. For providers that are part of a centralized health information exchange (HIE), an integration engine must exist that correctly routes this information and transforms data from one format to another.

Multiple medical records and lack of patient matching and merging.

If an existing medical record is not found, then every time a patient visits a hospital, clinic or specialist, a new medical record is created. Each time the patient is seen by a clinician, this triggers an "encounter." One person may have multiple medical records for a single condition. Each encounter may create separate, individual and independent patient records, with no one healthcare facility pulling the data together in one record. Different staff may ask different questions each time, resulting in different information being collected.

No universal patient ID.

Each time a patient is seen by a clinician for his or her first visit, a patient ID is created for that system. Since each healthcare facility and possibly each clinician or specialist operate on different systems, there is no way to tie this ID together with all of the records a patient may have to reflect the whole—unless these systems are connected to an HIE. A Social Security number may be used to identify patients for insurance or credit reporting, but this is not used for clinical data due to patient privacy concerns.

Statistics on Interoperability Challenges

From statistics collected over the years by leading healthcare organizations² such as the College of Healthcare Information Management Executives (CHIME), the Healthcare Information and Management Systems Society (HIMSS) and the American Health Information Management Association (AHIMA), we know that:

8-12%

of hospital medical records are duplicates.



On average,

64,000-96,000

medical records in an EHR system refer to a patient with another existing medical record.



\$1,009

is the average cost associated with repeated medical care.



10,000⁺

records of people named Maria Gonzales identified in Kaiser Permanente of Southern California's system.



8-14%

of medical records include erroneous information tied to an incorrect patient identity, according to HIMSS.



Patient ID errors.

When a system views information on a patient that looks similar to another patient—for example, patients with similar birthdates, zip codes, or first or last names—patients can be misidentified and, in some cases, their demographic data, personal health information, and even insurance and claims information can be accidentally merged. Some systems have criteria set up to match patients to past records, but these auto merges can cause even more problems if the matching criteria or algorithms aren't specific enough, or the applications or staff managing the master patient index (MPI) are not closely monitoring and managing these merges. A recent report by ECRI Institute³, a nonprofit group focused on patient safety, examined more than 7,600 cases of patient errors recorded between January 2013–June 2015 at more than 181 facilities. The idiosyncrasies of electronic medical records contributed to the problem, according to the report. EHRs may not recognize minor variations in name spellings, which can lead to duplicate patient files or the blending of data for two individuals. ECRI suggested that data sharing among health IT systems may also contribute to this problem.

Human errors.

Errors can also develop from incomplete or improper data collection processes during outpatient referrals or inpatient registration. Different users throughout a healthcare system—doctors, nurses, technicians and registrars, for example—may have different standards for the way they collect information. They may or may not ask patients how to spell their name or street address, for instance. ECRI's report noted that about 13 percent of identification errors occurred during patient registration, and 22 percent were made during procedures and tests. Patients' wristbands were at times missing, unreadable or not even checked at all, according to the report.

Recommendations for Advancing Interoperability

Achieving interoperability between EHRs and other devices and systems that collect patient data is a challenge that won't be solved overnight and demands collective action among multiple stakeholders. It requires getting provider-based IT systems to communicate with each other better and move the right type of data to the correct system at the precise time the information is needed.

On a macro level, actions that could significantly speed progress toward interoperability include:

Agreeing to and supporting a common set of existing interoperability standards.

Health systems and HIT vendors must be proactive about defining standards of interoperability between their systems and quickly adapting to these.

Developing an enterprise master patient index.

An interoperable enterprise master patient index with an engine that matches and aggregates data identifying patients across information systems would allow providers to locate and access the correct patient record in a timely manner. ECRI recommended in its report that hospitals use a more standard means of patient identification, such as photographs with patient files. Clinicians and hospital leaders should also discuss potential identification errors more openly to protect patients from harm.

Sharing clinical and claims data via public and private Healthcare Information Exchanges (HIEs).

Developing middleware software that will transfer data from disparate information systems will help ensure records are complete and integrated, as well as provide a longitudinal view of the patient's behavioral, social and health histories. Other

vertical markets such as retail, banking, and transportation offer good examples for how to achieve this.

Collaborating across alliances.

Mobilizing HIEs across regional, state and local alliances to implement common standards and frameworks for EHRs will

allow providers to achieve interoperability across the larger spectrum of health-care. As consumer-driven healthcare becomes more mainstream, data sharing will need to become as secure and as ubiquitous as financial transactions at your local drugstore.

Developing incentives for interoperability compliance.

Strong, specific incentives with clearly defined measures and a deliberate implementation timeline will help move interoperability higher on the priority list for providers and EHR vendors. Incentivizing adoption to join an HIE or Health Plan to exchange data or incentivizing based on the number of specific types of data transactions, for example, could help advance this initiative.

On the micro level, providers can take immediate steps to improve interoperability of their EHR systems through these strategies:

How emids can help

emids, a premier provider of health-care IT services and industry-leading solutions, can help providers and HIT vendors achieve better interoperability and integration of EHR systems through an array of services that include:

- Strategic consulting and operational assessments
- Systems and application architecture, configuration, integration and testing
- Interface architecture and custom interface development
- Integration of patient and provider clinical and claims data and systems
- Data migration between disparate systems, databases or applications

Learn more about how we can help your organization overcome interoperability and integration challenges in the case studies that follow.

- Ensuring a unified standard implementation of EHRs so disparate information systems can interpret data accurately.
- Developing middleware that enables data to be exchanged securely across various source systems, whatever their location might be.
- Boosting standards for identifying and locating correct patient records through photographs and other methods that could help prevent costly and deadly medical errors.

Case Study 1: Developing an Interface Engine to Improve EHR Communication and Access

Business opportunity:

The client, a technology provider, needed an interface engine for its electronic health records (EHR) server to enable two-way communication between providers and external systems.

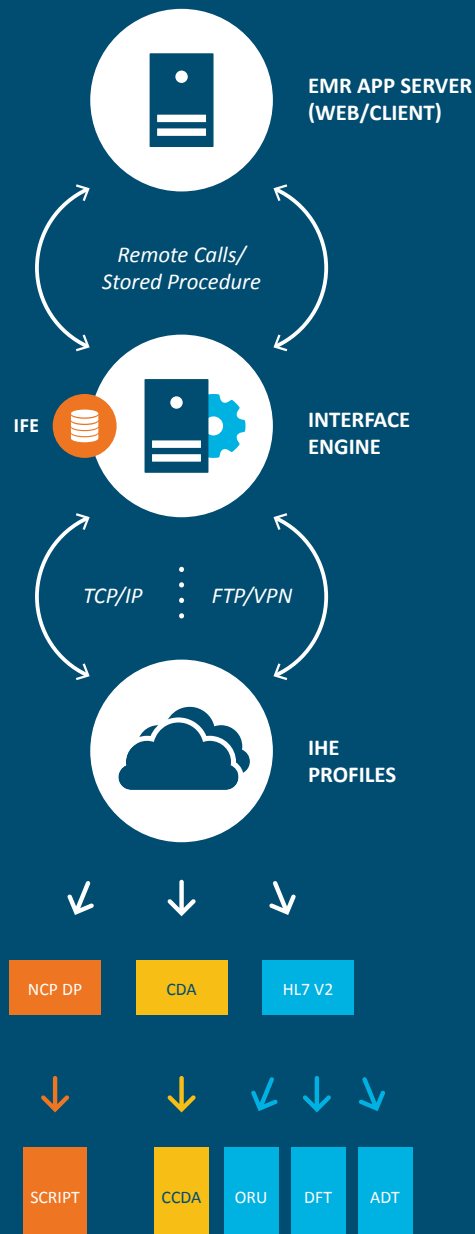
Solution:

- Built a custom interface engine that generates and processes HL7 messages, including admission, discharge and transfer (ADT) messages as well as detailed financial transaction (DFT) messages.
- Developed interface that sends and receives messages with lab information systems (pathology, cytology, microbiology, radiology, blood bank, etc.).
- Enabled patients to download clinical data and view medical history through a patient portal.

Results:

emids developed a joint interface system for client's cloud and client server-based EHR applications to communicate more effectively with external systems and provide patients with information to help them make more informed medical decisions.

Architecture



Case Study 2: Developing a CCDA Exchange Tool for Tracking Medical Histories of Patients

Business opportunity:

The client needed a software tool with a Consolidated Clinical Document Architecture (CCDA) exchange capability to meet EHR Stage 2 Meaningful Use interoperability requirements.

Solution:

- Developed a system that facilitates data exchange with EHR and third-party products, including a patient portal with a secure messaging platform.
- Implemented a service allowing administrators to maintain configuration.
- Built a custom CCDA exchange tool and developed messaging for sharing it securely.
- Developed a system that allows administrators to manage authentication details for Updox systems.

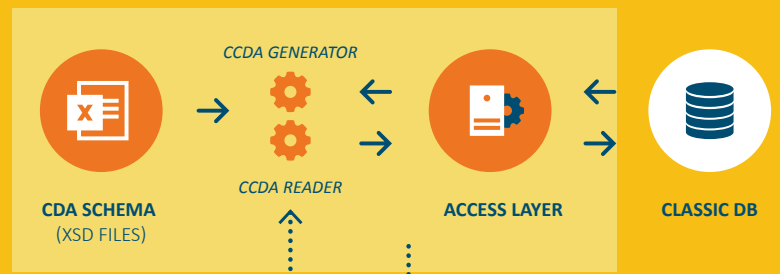
Results:

emids successfully developed a CCDA exchange tool that met the EHR Stage 2 meaningful use criteria and allowed clinical data to be used across the continuum of care to better understand patients' medical histories.

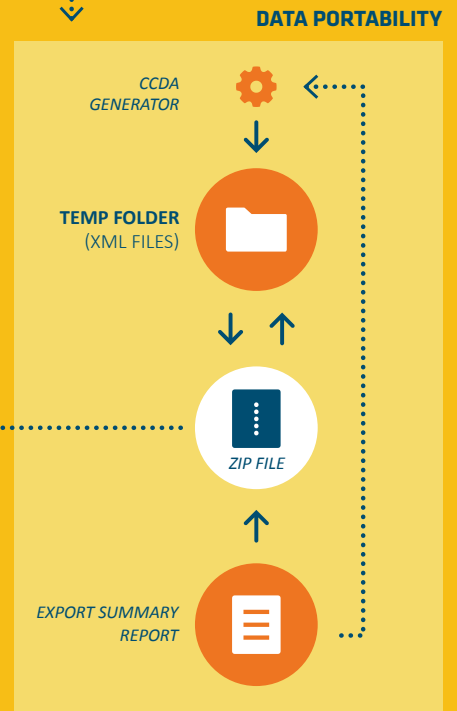
Integration Architecture

● Developed by emids

CCDA DESIGN



VDT ARCHITECTURE



Case Study 3: Developing an Interoperability Interface for Using Clinical Data to Correctly Interpret Tests

Business opportunity:

The client's EHR system needed the capability to send HL7-based messages to other healthcare applications, as well as CCDs (Continuity of Care Documents) to other health systems.

Solution:

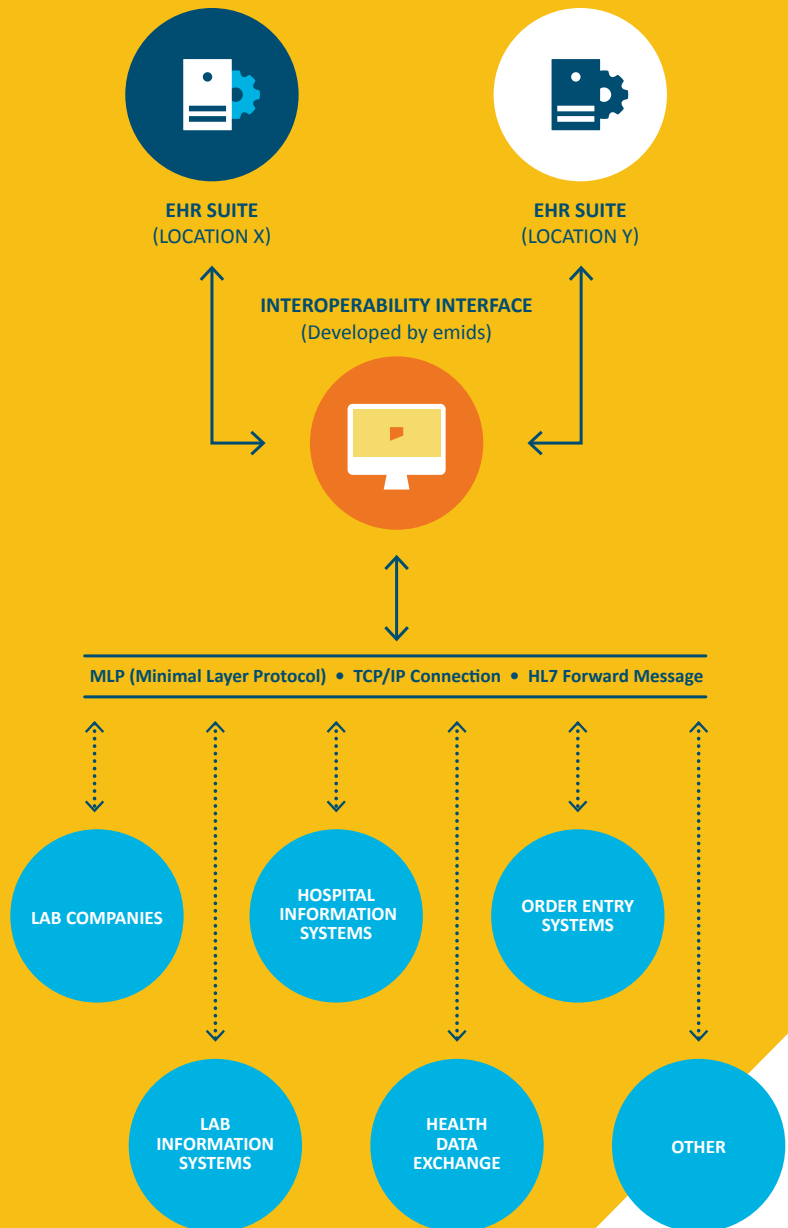
- Developed middleware to receive the HL7 ADT (admission, discharge, transfer) message from other systems and translate it into XML format.
- Developed a tool to create and send the ADT and DFT (detailed financial transaction) messages to external systems.
- Developed a pharmacy interface to send newly prescribed medication for patients in HL7 as RGV-015 format.
- Developed a referral interface to send HL7 as I12 and I13 messages.
- Developed interface enabling the vendor's EHR system to exchange CCD data with other healthcare systems.

Results:

emids developed an interoperability interface that allowed the client's EHR system to exchange messages in various formats with other healthcare applications and health systems, ensuring the correct interpretation of tests. emids also helped the client reduce development costs and speed up time to market for its EHR platform.

Integration Architecture

● Developed by emids



References

1. At Datapalooza, Biden Makes Case for Open Data to Play Role in Cancer Moonshot, <http://www.healthcare-informatics.com/article/datapalooza-biden-makes-case-open-data-play-role-cancer-moonshot>
2. Why Ireland has a National Patient Identifier (and we don't), <https://healthstandards.com/blog/2016/08/31/national-patient-identifier/>
3. ECRI: Patient identification errors common, potentially fatal, <http://www.fierce-healthcare.com/healthcare/patient-identification-errors-a-common-and-potentially-fatal-issue>

About the Author

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With over 35 years of technology management and healthcare innovation solutions consulting experience, Mr. Patin leads emids Technologies' integration and interoperability practice, which include emerging applications technologies such as Mobile Health and Mobile Device Plug'n'Play, TeleHealth, Med Reconciliation and other related workflows that involve clinical or claims related data. His past experience includes leading consulting projects for client engagements for Capgemini, Walgreens/Take Care Health, HCA and more.

About emids

emids is a premier provider of healthcare IT services and solutions. emids enables healthcare entities to achieve accessible, affordable and high-quality care by providing custom application and data solutions. Our clients experience true partnership with us as together we navigate the challenges of a rapidly changing healthcare industry.