



Interoperability Success Stories: The Journey Continues

June 2017

Introduction

For healthcare providers and their patients, interoperability holds the promise to substantially improve quality and reduce costs, while enabling coordination of care and engagement of patients with their caregivers. For some, the promise and the reality of widespread interoperability are obvious. For others, challenges remain in recognizing the value that interoperability has already provided. Nonetheless, all stakeholders agree that more needs to be done to better measure the impact of interoperability vis-a-vis other advances in health IT processes, skills, and knowledge. Because so many factors influence the improvements we seek in our healthcare system, it is often difficult to determine the individual contribution of interoperability.

The Electronic Health Record Association (EHRA) Standards and Interoperability Workgroup set out to identify methods to quantify the impacts of interoperability. One method that we decided to address is the gathering of statistics on interoperability volumes from EHRA member companies. We expect to report on this data in the near future. We also agreed that volume alone does not tell the full story, as it's important to understand both the extent of exchange and the actual impact of the data exchanged and accessed on the relevant stakeholders. This combined view can provide a more complete picture of the true impact of interoperability in operational healthcare settings. The EHRA is uniquely positioned to provide specific examples of our members' customers' experiences and related benefits where interoperability has made a clear impact on quality, cost, or care coordination. To deepen the understanding of all stakeholders, EHRA supports efforts of independent organizations to go beyond success stories and address deeper qualitative assessment of the impacts of interoperability on healthcare delivery.

The success stories shared here suggest that the 'information exchange glass' is half full – and filling rapidly. Positive impacts of interoperability in the use cases that follow include:

- Reduction in duplicate tests
- Up-to-date clinical information
- Improved care coordination
- Access to a patient's immunization records

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- ED visit prevention
- Aggregated data
- Providing more time with patients
- Millions of dollars in shared savings
- More accurate documentation
- Less faxing
- More complete documentation available before surgeons meet with patients
- Improved surgery start times
- Better informed decisions
- Accelerated ED discharges
- Reduction in ED-to-inpatient admissions
- Allergy reaction prevention
- Reduced phone calls
- Eliminating hand-written correspondence

These stories clearly demonstrate that interoperability is improving the healthcare experiences of both patients and their clinical support teams. More success stories will become available as interoperability allows all healthcare stakeholders to connect more broadly and effectively with providers across communities and, eventually, across the nation. All EHRA members are committed to the advancement of interoperability and are pleased to share these success stories with you.

Site Description	Allina Health Minneapolis, MN	
Organizations Involved	Allina Health is a nonprofit system of hospitals, clinics, and other care services in Minnesota and western Wisconsin.	
Use Case Description	A study done by the Division of Applied Research and Department of Emergency Medicine at Allina Health ¹ , conducted in 2012 and published in 2014, focused on using C-CDA exchange for treatment purposes in emergency departments via XCA and XDS.b IHE standards.	
<i>Operational Efficiencies and/or Cost Savings</i>	<i>Improvements in Staff and/or Patient Satisfaction</i>	<i>Improvements in Data Access</i>
<ul style="list-style-type: none"> According to the 2014 study of 1,488 ED visits at four Allina hospitals, clinicians avoided 560 duplicate tests and procedures and identified 28 cases of drug-seeking behavior because they were able to first check patients' records from other organizations. Filling in the information gaps in a patient's record helps clinicians provide more efficient care. 	At Allina Health, clinicians are using their EHR in the emergency department to request patients' medical records electronically and get a more complete medical history to provide faster, more effective care.	

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Site Description	Avera Health Sioux Falls, SD	
Organizations Involved	<p>Avera Health has more than 330 locations in 100 communities, stretching across five states: South Dakota, North Dakota, Iowa, Minnesota, and Nebraska.</p> <p>The integrated health system provides a care continuum that includes 55 hospitals, more than 200 clinics, 23 long-term care facilities, and 20 home health and hospice care agencies.</p> <p>Avera implemented a health information exchange that securely exchanges patient information with 17 states.</p>	
Use Case Description	<p>Avera ultimately chose to establish a single HISP/HIE for the five-state area. They determined this would minimize capital investment risk, implementation costs, and maintenance.</p> <p>Using one HIE also enabled Avera Health to adopt the “opt-out” patient consent process, allowing the default for health information of patients to be included automatically in the exchange.</p> <p>Avera has embedded the exchange of C-CDAs into clinician workflow, resulting in more than 1,100 providers at close to 200 facilities having sent or received more than 642,000 Direct message transactions across Avera’s HIE.</p>	
Operational Efficiencies and/or Cost Savings	Improvements in Staff and/or Patient Satisfaction	Improvements in Data Access

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<ul style="list-style-type: none"> • Avera Health exceeded meaningful use requirements on this front, with all Stage 2 eligible hospitals and 97% of Stage 2 eligible providers having attested. • By streamlining the exchange of C-CDAs into the workflow, providers are able to use up-to-date clinical information to assess, diagnose, and treat patients. • The exchange results in better care coordination. • Clinicians are no longer wasting time on the telephone or waiting by fax machines — the information is now at their fingertips. • Receiving providers appreciate the most recent medication list and point to a decrease in redundant tests (e.g., lab, CT), saving time and money. • Avera collaborates with South Dakota Correctional Health to provide telehealth services to six correctional facilities, which helped to prevent 322 ED visits in 2015. 	<ul style="list-style-type: none"> • South Dakota QuitLine: Avera uses Direct² exchange to send referrals to South Dakota QuitLine for smoking cessation, replacing the old paper process. • AveraNow Virtual Office Visits: C-CDAs are transmitted to ensure up-to-date information is included in the EHR for AveraNow virtual office visits — mobile video visits via a smartphone, tablet, or laptop. • Avera eLong Term Care: Point-of-care exchange enables geriatricians and pharmacists to review patients' charts, including care plans and orders entered at discharge, before patients arrive at the long-term care facility. 	<ul style="list-style-type: none"> • One of the nation's few bidirectional immunization interfaces, this exchange has created enormous efficiencies for Avera hospitals and clinics. • The IDN is maximizing its potential to share information, streamline communication, and, above all, improve patient care.
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Site Description	Clalit Health Services Tel Aviv, Israel	
Organizations Involved	<p>The desire to aggregate patient information from disparate sources, to do it quickly, and to present it in a way that made sense to caregivers gave rise to what is now called the Ofek Network. It connects multiple health systems that serve Israel’s 8.3 million residents.</p> <p><i>Note: This use case is the same for many U.S. provider organizations, where the same tools and technologies are also available to support it.</i></p>	
Use Case Description	<p>Clalit Health Services executives determined that an information aggregation system should provide a medical record that follows the patient through the system – regardless of location – to create a continuum of care. This capability would return relevant, complete information to caregivers in real time at the point of care, subject to permissions and privacy regulations.</p> <p>The ultimate goal was to improve the quality of care through a reduction of medical errors and to provide proactive care by giving clinicians everything they need to be effective.</p> <p>Clalit uses CCOW for point-of-care integration with EHRs, XDR WS and CCD/CCDA to load data from source systems, SMART on FHIR to integrate other applications (e.g., messaging, medication reconciliation) and SAML to integrate with PACS.</p>	
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Physicians in a typical Clalit Health Services	An executive from Clalit Health Services said,	An integrated record also promotes proactive

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<p>primary care practice have just 7 to 9 minutes with each patient. The quick aggregation of data gives physicians more quality time with patients, which leads to better outcomes.</p>	<p>“The system does not require any change in workflow or the way providers work. It presents all information in one view, which is user-friendly. It only takes a minimum of guidance, 10 to 15 minutes, to train a new doctor on the system.”</p>	<p>and preventive care that logically reduces the inherent costs to the healthcare system.</p>
<p>Site Description</p>	<p>Holston Medical Group (HMG) Kingsport, TN</p>	
<p>Organizations Involved</p>	<p>HMG is a multi-specialty physician group, seeing an average of 40,000 patients per month across its 41 offices in Northeast Tennessee and Southwest Virginia. Physician-owned and physician-led, HMG manages a diversified group of more than 150 primary care physicians, specialists and mid-level providers. Its mission is to provide quality medical care that exceeds patient expectations and builds lasting relationships.</p> <p>HMG helped form a physician-led accountable care organization (ACO), Qualuable Medical Professionals; and a healthcare transformation company, OnePartner, which includes a private health information exchange (HIE). Together, these organizations are improving the overall health of the communities HMG serves by championing a patient-centered, data-driven approach to care.</p>	
<p>Use Case Description</p>	<p>HMG consistently captures data for individual patients, and across patient populations, to assess progress toward achieving better outcomes. HMG uses data and analytics to identify patients with high probability for an adverse event, such as a hospital admission, readmission,</p>	

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	<p>multiple emergency room visits, or medicine complications.</p> <p>HMG uses data from its EHR to stratify patient populations according to the complexity of their conditions. The information helps clinicians address various conditions, including the top four disease states of HMG’s patient population: hypertension, diabetes, depression and asthma.</p>	
<i>Operational Efficiencies and/or Cost Savings</i>	<i>Improvements in Staff and/or Patient Satisfaction</i>	<i>Improvements in Data Access</i>
<ul style="list-style-type: none"> • Earned \$7.2 million in value-based payments in 2015. • Generated \$40 million in shared savings, earning net payment of \$19 million (for performance years 2013, 2014 and 2015). • 91.67% of primary care physicians met meaningful use requirements in 2015, better than the national mean of 76.22%. 	<p>An executive from HMG said, “We’re seeing more unity among the physicians in the ACO. More access to patient data means as a group we make more intelligent and timely decisions to keep costs down and quality up.”</p>	<p>With better access to patient records through the EHR, HMG is better able to effectively treat patients, avoiding unnecessary and costly trips to the emergency room.</p> <p>HMG physicians find tremendous clinical value in being able to view patient information through the HIE. This capability also enables physicians to code their visits at a higher, more accurate level. For example, if a physician is able to review a diagnostic exam or document patients with multiple chronic conditions, it is coded differently than a regular office visit. Appropriately coded visits increase risk scores and payment rates.</p>

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Site Description	Lewis and Clark Information Exchange (LACIE) Kansas City, MO	
Organizations Involved	LACIE includes 20+ hospitals, 300+ clinics, 7,000+ providers, and Kansas City Head Start, Kansas City, MO. The use case discussed here focuses on Kansas City Head Start.	
Use Case Description	Kansas City Head Start’s staff used the LACIE HIE to identify trends in medical information for some children who frequent the emergency room. The HIE helped centralize the data in the children’s health documents from multiple providers. These exchanges are query-based, and use HL7 C-CDA documents, HL7 V2 messages, and IHE XDS.b, XCA/XCPD for document exchange transport methods.	
<i>Operational Efficiencies and/or Cost Savings</i>	<i>Improvements in Staff and/or Patient Satisfaction</i>	<i>Improvements in Data Access</i>
<ul style="list-style-type: none"> • Having a significant amount of the information that Head Start is required to report in the HIE has helped the staff spend less time calling providers to get health documentation and more time checking up on the children and providing their guardians with additional education. • Using the HIE has also helped streamline 	The burden for the staff to call providers and request the required health information by fax has been reduced because they can now query for this information in the HIE.	The staff can query for various information regarding children’s immunization status, wellness checks, medications, height, and weight.

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<p>the ability to produce documentation to receive federal funding.</p>		
<p>Site Description</p>	<p>Lowell General Hospital Lowell, MA</p>	
<p>Organizations Involved</p>	<ul style="list-style-type: none"> ● Precision Surgical Specialists of Lowell in Chelmsford, MA ● Lowell Surgical Associates – North Chelmsford, MA ● Massachusetts Ear, Nose and Throat Associates in Chelmsford, MA ● Riverside Surgical Associates in Lowell, MA <p>All sites use the HISP network.</p>	
<p>Use Case Description</p>	<p>Lowell General Hospital wanted to focus on improving the efficiency of the operating room and staying on schedule with their surgeries. The first surgery often didn't start on time and would postpone cases for the rest of the day by up to 1 to 2 hours. Patient information and lab results were getting lost in the system, which caused delays. Lowell General Hospital determined what they wanted their optimal workflow to look like and incorporated Direct messaging (using the XDR standard) to help them get more timely surgery schedules.</p>	
<p><i>Operational Efficiencies and/or Cost Savings</i></p>	<p><i>Improvements in Staff and/or Patient Satisfaction</i></p>	<p><i>Improvements in Data Access</i></p>
<ul style="list-style-type: none"> ● With Direct² messaging, staff has set up standard data exchange workflows to ensure the patient data and surgery 		<p>Data does not get lost in the system as it did with faxing.</p>

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<p>information go directly to the providers who need them.</p> <ul style="list-style-type: none"> • A high rate of histories, physicals and consent forms get into patients' charts before the surgeons enter their rooms. • Because the information is easier to find, surgeons and nurses can review the information and get into the operating room with better first start times and hit their benchmarks. 		
<p>Site Description</p>	<p>MetroHealth Cleveland, OH</p>	
<p>Organizations Involved</p>	<p>MetroHealth is an integrated health system with an acute care hospital housing a Level I Adult Trauma and Burn Center, a skilled nursing facility, and more than 25 locations (mostly ambulatory clinics) throughout Cuyahoga County, OH.</p>	
<p>Use Case Description</p>	<p>A study³ published in <i>American Journal of Managed Care</i> in 2013 analyzed survey responses from all providers that had used the HIE at least once within the first 5 to 7 months after its implementation. The study focused on using C-CDA exchange for treatment purposes in emergency departments via XCA IHE standards.</p>	

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<ul style="list-style-type: none"> 85% of providers surveyed said that the HIE saves time, while 84% said it reduces unnecessary lab and imaging tests. The HIE improves patient care in other ways according to 82% of providers, with 15% reporting that it prevents unnecessary admissions. 	<ul style="list-style-type: none"> In a survey of their primary care, inpatient care, specialty care, and emergency department clinicians, MetroHealth found that 93% of providers found value in using the HIE to exchange patient records electronically. 	
Site Description	Michigan Medicine Ann Arbor, MI	
Organizations Involved	Michigan Medicine is home to one of the largest healthcare complexes in the world.	
Use Case Description	Michigan Medicine conducted a year-long study ⁴ , using information from 2,163 adult and pediatric emergency department visits to their health system. This study focused on using C-CDA exchange for treatment purposes in emergency departments via XCA IHE standards.	
<i>Operational Efficiencies and/or Cost Savings</i>	<i>Improvements in Staff and/or Patient Satisfaction</i>	<i>Improvements in Data Access</i>
<ul style="list-style-type: none"> Providers order fewer duplicate 	Patients leave the emergency department	

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<p>diagnostic tests – reducing the number of MRIs, X-rays, and CT scans by 1.6–2.5% – resulting in average reduced care costs of \$1,187.</p> <ul style="list-style-type: none"> When clinicians have electronic access to patients’ health records, clinicians are able to make informed decisions faster, and patient care is improved. 	<p>nearly 53 minutes faster, and the likelihood of hospital admission is 2.4% lower.</p>	
<p>Site Description</p>	<p>New York Presbyterian (NYP) New York, NY</p>	
<p>Organizations Involved</p>	<p>New York Presbyterian (NYP), a nonprofit university hospital, started using open APIs to achieve interoperability in 2014.</p>	
<p>Use Case Description</p>	<p>According to an NYP executive, “Based on the continuing success of early projects, APIs have become a go-to technology for new projects because they are easy to use, well documented and capable of growing quickly.”</p> <p>NYP uses open application programming interfaces (APIs) to access or share patient data across applications/devices from various vendors to improve patient care.</p>	
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<p>In 2014, doctors practicing in the hospital were documenting in the inpatient EHR, but had to go back to their offices and document again to bill. This situation required double data entry, wasting valuable time and creating the opportunity for error. To link inpatient documentation with outpatient billing, the team used in-house staff with expertise using open APIs to build a custom application, which streamlined the billing process and linked notes to bills, eliminating the need for double entry.</p>	<p>Traditional interfaces between EHRs and devices capturing vital signs were slow and required extra steps. Nurses sometimes entered the results in the EHR directly and circumvented the interface, writing down notes to keep track of data, or standing in front of the EHR waiting for vital sign information to appear. An API solution now immediately sends results from the vitals device to the EHR and eliminates additional steps to associate the data with the patient’s medical record. Increased accuracy of data and reduced omissions of data have freed clinicians to spend more quality time with patients and have also improved clinician satisfaction.</p>	<p>Users in NYP’s burn unit were concerned about the time spent uploading patient pictures, which help clinicians track progress. Clinicians wanted the pictures to automatically upload into the EHR. NYP turned to a small company that was a partner in their EHR supplier’s developer program. The solution is now live, and existing users identify that they are saving 5 to 10 minutes per patient uploading the pictures. The initial rollout to 30 users has rapidly expanded to hundreds of users that can take advantage of this application.</p>
<p>Site Description</p>	<p>Rocky Mountain Care Salt Lake City, UT</p>	
<p>Organizations Involved</p>	<p>Manages eight skilled nursing facilities</p>	
<p>Use Case Description</p>	<p>Rocky Mountain Care uses CommonWell Health Alliance⁵ to access and share patient information with other healthcare professionals to provide better patient care. An executive from the organization stated, “A resident was admitted to one of our skilled nursing facilities from a hospital. The paper document from the hospital said the patient was allergic to codeine, but when the CommonWell record came up, it showed that not only was the patient allergic to</p>	

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	codeine, but all opiates. So, we look at it as a re-hospitalization averted, and an allergy averted, because immediately any drug that patient was on that was an opiate was discontinued.” The exchange is based on the IHE Document Exchange profiles and HL7 C-CDA documents standards.	
<i>Operational Efficiencies and/or Cost Savings</i>	<i>Improvements in Staff and/or Patient Satisfaction</i>	<i>Improvements in Data Access</i>
Providers can view a more complete patient medical record from various organizations.	Patient information from the CommonWell record can alert providers of allergies not captured in paper documents, which can help the patient avoid a potential re-hospitalization from newly prescribed medication.	
Site Description	Tucson, AZ Community-Based Data Sharing Collaboration	
Organizations Involved	<ul style="list-style-type: none"> ● Arizona Community Surgeons ● Tucson Medical Center ● Carondelet – Saint Joseph’s Hospital ● Northwest Medical Center <p>Three different EHRs from different companies are used by these four unaffiliated organizations.</p>	

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<p>Use Case Description</p>	<p>Arizona Community Surgeons is a general and orthopedic surgery practice whose physicians perform surgical procedures at many local hospitals in the Tucson area. These sites are currently in production using standards-based protocols and connectivity via Direct messaging to communicate, coordinate, and exchange clinical data with each other in preparation for a patient’s surgery.</p> <p>Included in this Direct message are documents, images, and a current C-CDA on the patient. Documents and images sent typically contain a recent history and physical, recent X-ray, and lab results needed for the surgery. All of this information is received and consumed by the local hospital system’s EHR in preparation for surgery. Once the surgery is completed by the local hospital, they create a discharge summary and send a C-CDA back to Arizona Community Surgeons via Direct messaging. This C-CDA contains new information from the recent surgery visit that can be discretely imported back into the Arizona Community Physicians’ EHR.</p>	
<p><i>Operational Efficiencies and/or Cost Savings</i></p>	<p><i>Improvements in Staff and/or Patient Satisfaction</i></p>	<p><i>Improvements in Data Access</i></p>
	<p>Using this fully electronic method of communication drastically increases staff efficiency by eliminating phone calls, handwritten correspondence, chart pulling, and the manual scanning and faxing of patient documents.</p>	<p>The most current patient information is available online to all care providers at all sites, improving both the quality and efficiency of care.</p>

Notes and References

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¹ T. J. Winden (1), L. L. Boland (1), N. G. Frey (1), P. A. Satterlee (2), J. S. Hokanson (2), (1) Division of Applied Research, Allina Health, Minneapolis, Minnesota USA; (2) Department of Emergency Medicine, Abbott Northwestern Hospital, Allina Health, Minneapolis, Minnesota USA, *Appl Clin Inform* 2014 5 2: 388-401, <https://doi.org/10.4338/ACI-2013-12-RA-0100>

² Launched in March 2010 as a part of the Nationwide Health Information Network, the Direct Project was created to specify a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the internet. The Direct Project has more than 200 participants from over 50 different organizations. These participants include EHR and PHR vendors, medical organizations, systems integrators, integrated delivery networks, federal organizations, state and regional health information organizations, organizations that provide health information exchange capabilities, and health information technology consultants. More information is available at <https://www.healthit.gov/policy-researchers-implementers/direct-project>.

³ Kaelber, D.C., Waheed, R., Einstadter, D., Love, T. E., Cebul, R. (2013). Use and Perceived Value of Health Information Exchange: One Public Healthcare System's Experience. *American Journal of Managed Care*, 19 (11 Spec No. 10), 337-343.

⁴ Everson, J., Kocher, K. E., & Adler-Milstein, J. (2016). Health information exchange associated with improved emergency department care through faster accessing of patient information from outside organizations. *Journal of the American Medical Informatics Association*, 2016 ocw116. doi: 10.1093/jamia/ocw116

⁵ CommonWell Health Alliance is a not-for-profit trade association dedicated to achieving cross-vendor interoperability that assures provider access to health data regardless of where care occurs. Members believe that provider access to this data must be built into health IT at a reasonable cost for use by a broad range of healthcare providers and the people they serve. More information is available at <http://www.commonwellalliance.org>.

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