

ALL HEALTHCARE IS NOT LOCAL

THE HUMAN COST OF DISPARATE HEALTH DATA

A CASE STUDY:

Ethan, suffering from chest pains and shortness of breath, arrived in the Emergency Department (ED) via an ambulance. After the nursing staff interviewed Ethan to ask about his symptoms and take his medical history, Dr. Webber, the Emergency Department physician, asked Ethan follow-up questions to try and get a better sense of where he'd previously been seen. Ethan was foggy about some details, but confirmed that he had gone to multiple Emergency Departments within the last twelve months for the same problem. Dr. Webber logged in to his electronic health record (EHR) system to see if there was information on prior physician encounters Ethan may have had. Unfortunately, there were no records of previous encounters, leaving Dr. Webber with a difficult choice about how to make decisions without additional critical information—what medications Ethan might be taking, what procedures he might have had, his allergies, or other relevant conditions—that could help to avoid costly complications, duplications, or adverse interactions.

The risks posed by gaps in clinical information—such as those in Ethan and Dr. Webber's situation—is often further exacerbated by the fact that repeat ED users tend to be more chronically ill and frequently have comorbidities and higher two-year mortality rates.¹ "Frequent flyers," or repeat ED users (defined as any patient with two or more ED visits in six months), have also been found to have fewer and shorter inpatient admissions while having the highest rates of 30-day readmissions.

Historically, it has been up to the patient or caregiver to coordinate care and make sure the physician has as much clinically relevant information as possible. On their side, physicians haven't had the right tools nor have they been asked to coordinate care for their patients. Neither is ideal, and more must be done on both sides to ensure that patients and physicians have the most complete, actionable information to make better decisions. Giving physicians and hospitals the capability to request and receive nationwide patient record information in real time is critical to enabling better care.

STATE OF HEALTHCARE

SEA CHANGES AND SEA SICKNESS

Providers, including physicians, pharmacists, physician assistants, nurses and others across the healthcare continuum have undergone a sea change over the past decade. This change has impacted how they practice medicine, care for patients, are paid for their services, and in the technology and tools they use to do so. This sea change has been driven by myriad factors, including (i) the expansion of health insurance coverage for more than 20 million Americans, (ii) the shift in payment models from fee-for-service to various types of value-based reimbursement models, (iii) the aging of the American population, with its implications of more people living with (often multiple) chronic diseases, and (iv) federal programs that have provided financial incentives for the adoption and “meaningful use” of EHRs. A common theme among these factors is that they are either contributing to rising healthcare costs, or represent changes in the healthcare delivery system designed to address rising healthcare costs.

Despite a change in the federal government’s administration, the sea change is not likely to subside. One might empathize with clinicians for feeling seasick given the many—and continuing—changes and shifting demands made of (and requirements for) them.

While there will be no “silver bullet” to address all of the underlying issues that are causing rising healthcare costs, implementing or improving care coordination between and amongst physicians, hospitals, pharmacies and other providers has the potential to dramatically improve patient care, reduce duplicative tests and procedures that drive unnecessary costs and positively impact quality of care.

For any two organizations to meaningfully coordinate care on behalf of a patient, they must (i) know which patients they should be coordinating care for, (ii) know which providers those patients see, (iii) have procedures in place to determine when, how and

what patient information to communicate with each other and (iv) have the tools, processes and technology to be able to transfer and effectively use that information. As we demonstrate below (‘Walled Gardens of Potential’), the reality is that most physicians and hospitals must interact and try to coordinate care with numerous other clinical organizations for thousands of patients.

When the Health Information Technology for Economic and Clinical Health (HITECH) Act was enacted in 2009, it was in large part due to the promise that EHRs held to improve care coordination, enable population health management and facilitate an overall shift in how healthcare is paid, from a fee-for-value system to a value-based reimbursement system. The concept was that once EHRs were adopted, physicians and hospitals would have technology that could enable them to securely share and exchange patient health information for the purpose of care coordination.

Beyond the ability to send patient information from one physician to another, the ability for physicians and hospitals to electronically request patient information from other providers is a critical capability to truly enable interoperability and facilitate care coordination.

The financial incentives for the adoption and meaningful use of EHRs provided by HITECH for physicians and hospitals were successful only up to a point. Physicians and hospitals did adopt EHRs (see adoption levels under ‘Walled Gardens of Potential’), but getting those systems to be interoperable—allowing physicians and hospitals to exchange patient information with one another—has proven much more difficult.

Patients are clearly ready for the new benefits that healthcare technology can offer, but are relying on institutions to act without trepidation in their role as enablers of change.²

WALLED GARDENS OF POTENTIAL

On average, even the largest hospital within a hospital referral region (HRR) accounts for only 42% of all hospital inpatient days.³ This means that at least 58% of all activity within a referral region happens outside the walls of the largest hospital in that region. One hundred percent of activity outside of each respective referral region happens outside of the largest hospital within that referral region. To put this in perspective, there are 306 hospital referral regions in the United States, as defined by the Dartmouth Atlas of Health Care.⁴ For every largest hospital within a HRR, there are 305 other HRRs that have a largest hospital that could be holding a valuable piece of health information for a specific patient. Beyond this, there are data on the nearly one billion patient visits to ambulatory care sites. Simply put, no one hospital, clinic or physician should expect to have a complete picture of their patients without access to data from other physicians, hospitals and clinics.

Over the past several years (and prompted by HITECH), EHRs have become the center of the healthcare technology universe. Adoption of EHRs by office-based physicians was 86.9% at the end of 2015.⁵ Adoption among non-federal hospitals reached 96% in 2015.⁶ For providers that actively use their EHRs, every patient visit leads to the creation of multiple data points for that encounter. There are an

estimated 125.7 million hospital outpatient visits and 928.6 million physician office visits every year.⁷ Those visits, now recorded in EHRs, produce a lot of clinically valuable data.

This data, if easily accessible and shareable, creates opportunities to provide and coordinate better care. However, if data silos are created by the use of disparate EHR systems that (i) rely on different technologies, (ii) utilize distinct clinical nomenclature and (iii) may also not be interoperable with other systems, the potential for better care is lost. Even if certain health systems have high market share in their respective markets, they won't have access to all information. This challenge is compounded by the fact that they are likely to use EHR systems that other ambulatory physicians and hospitals in their area do not use. Considering that no vendor has more than 30% market share on a national basis⁸, the existence of data silos is highly likely.

The opportunity cost of choosing the path of walled off systems is high and inefficiencies can be costly. It has been demonstrated that a lack of care coordination leads to gaps and duplications in care, costing between an estimated \$148-\$226 billion annually.⁹ Over ten years, this adds up to \$1.5-\$2.3 trillion, or roughly the estimated cost of the Affordable Care Act over the same period of time.¹⁰

THE HUMAN COST IS THE MOST IMPORTANT LINE ITEM

Economic costs, no matter how high, do not compare to the devastating impact the lack of timely, actionable information has on patients; the human cost is the most important line item. Patient records are often absent for patients that have been discharged from a hospital. Only 12-34% of discharge summaries reach outpatient care teams in time for the patient's appointment with a physician.¹¹ This scenario, in which outpatient and ambulatory providers lack relevant patient information, has been found to have tangible negative impacts: an analysis of closed liability claims for care in the ambulatory care setting found that 59% of diagnostic errors harmed patients.¹² Of these, 59% caused serious harm and 30% resulted in death. Reasons listed include: failure to order an appropriate test and failure to obtain an adequate history. A knowledge deficit was noted as a causal factor in 48% of the errors. Incomplete patient information should be an avoidable culprit in an age when the newest superhero movie can be downloaded from multiple competing platforms.

The absence of patient information is not unique to the transfers between hospitals and the outpatient setting. Critically ill patients transferred between hospitals are at a high risk for adverse events

and mortality.¹³ Transfer documentation for these patients has been found to be frequently absent and to have "completeness" of only 58.3%. Adverse events occurred in 42% of critically ill patients within 24 hours of arrival after a hospital-to-hospital transfer. Overall hospital mortality for this group was 17.3%, which was found to be reduced when documentation completeness was increased. Adverse events were also found to be reduced along with duplication of labor.

It is widely known that physicians take the Hippocratic Oath, and in doing so, acknowledge the special obligations they have as a result of their chosen profession.¹⁴ While many others in the healthcare profession may not take the Hippocratic Oath, they do have a fiduciary responsibility to remember that they have special obligations to their fellow human beings and to call on colleagues when the skills of another are required. Hippocrates could not have envisioned an electronically connected healthcare system, but a natural progression of fulfilling The Oath is to push for real interoperability to share information between electronic health records, providers and hospitals.

CHALLENGES: A BREAKDOWN

Given the potential for EHRs to enable vast improvements in care coordination, efforts to facilitate interoperability between these systems have come to the forefront. Working groups, alliances and companies have advanced their approach to inter-EHR interoperability, but limited reporting by these entities that provides insight on the number of transactions flowing between disparate EHR systems makes progress difficult to ascertain.

For instance, the CommonWell Health Alliance has made substantial headway in recruiting a large number of EHR vendors to participate in its record locator service (RLS). Yet CommonWell members interviewed by KLAS reported that their use of what CommonWell had to offer was limited.¹⁵ More recently, CommonWell announced an agreement with CareQuality, a public-private organization also founded to advance interoperability by providing a forum for a

diverse set of interested stakeholders to collaborate and create a “common interoperability framework.”¹⁶ Previously, regional and federally funded Health Information Exchanges (HIEs) were once seen as the solution for interoperability. In 2009, \$564 million was given to the Office of the National Coordinator for Health Information Technology (ONC) to spur national HIE adoption.¹⁷ Yet by 2012, an ONC project manager indicated that, “There is relatively little information exchange that’s taking place across the country.”¹⁸ More recently, an evaluation of the state HIE program mentioned that seven grantees are no longer operational.¹⁹ Those that were still operational as of the date published indicated that they “may require more examples of the value-add of HIE to motivate continued stakeholder commitment and investment.”

Creating a means to share data—through the establishment of a technology network—involves overcoming a number of complex challenges.

TECHNOLOGY //

EHR vendors have unique software architectures and hospital systems maintain diverse IT infrastructures to support their various systems. The varied capabilities and standards used across entities create problems in the ways that information can flow between them. Legacy systems need to be upgraded to work with new software while new software may need to be backwards compatible. Asymmetrical product “road-mapping” (the means by which EHR vendors and others plan new product development efforts) among groups of entities can further exacerbate the problem by disrupting what versions are most up to date.

GOVERNANCE //

At the heart of network governance are the rules of participation. In short, (i) who can connect to, and transact business on, the network; (ii) what are the prerequisites and conditions for connectivity, including; what are the standards by which participants connect to the network, what message types can be transmitted, and what are the conditions of continued participation? Addressing these questions and establishing policies that are acceptable to all participants can be very challenging, given that each participant may have different preferences and valid reasons for those preferences. Furthermore, monitoring compliance with established policies is important to ensuring the integrity of the network. Information exchange is paramount, yet can be particularly difficult if there is no one organization that operates the network and accepts responsibility for monitoring for participants’ operational compliance.

ADOPTION //

The value of a network for sharing information increases with the number of participants using the network. If only one entity signs on, by definition there are no other participants to exchange information with. As a result, the value of the network is zero. As more entities become network participants, they collectively create a more valuable network for exchange. This concept, that the value of information sharing increases with the number of participants, is known as a “network effect.” Therefore, any purveyor of a network for information sharing must solve for the “chicken-and-egg” problem of how to motivate physicians, hospitals and their EHRs to join and meaningfully participate in a network when the value of doing so is contingent upon others also joining and meaningfully participating.

SECURITY //

Stolen medical records have been sold by nefarious actors for as much as \$60 per record, or four times the value of a stolen social security number.²⁰ Health records contain a large amount of information for criminals to use, including names, birth dates, address, and social security numbers. In addition, stolen medical records cannot be canceled like a credit card. A patient's medical history does not expire and it can be used to violate their privacy. Malicious actors are continuously trying to disrupt the healthcare system. Breaches have occurred at all levels, from the hospital to the payer. Confidence in the security of an interoperable network is necessary to assure users that their use of the network is low risk.

BUSINESS MODELS //

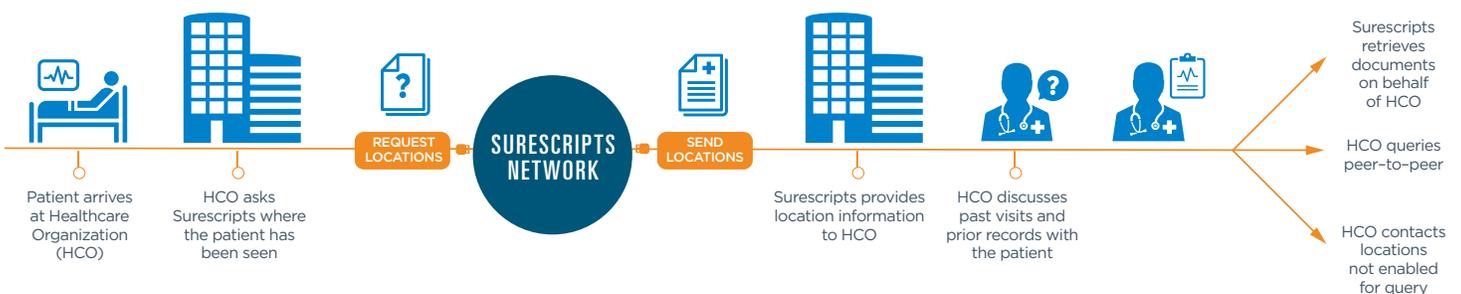
The high cost of investment can be a barrier to establishing information exchanges. Some estimates indicate that a national health information network would require a \$156 billion investment over five years with an additional \$48 billion in annual operating costs.²¹ High costs lead to longer periods of negative incomes. For instance, regional health information organizations (RHIO) were found to take 25 months to generate enough revenue to cover their operating costs on average.²² Beyond this, "most RHIOs were not able to sustain themselves financially with revenue from entities participating in data exchange, and only 28 percent of the remaining operational RHIOs believe they would ever do so." The unfortunate struggles of many RHIOs are a perfect example of how hard it is to build a network in a way that is feasible for all participants. A reasonably affordable network for participants that also generates enough capital to sustain itself requires a delicate balance and more than a little savvy.

SCALABILITY //

A successful network should not only be able to reach a critical mass of users, but must also be operationally and technologically equipped to handle all eventual participant transactional activity, and do so in a way that is financially sustainable. As demonstrated above, regional network models of exchange face a "scaling" problem in that their limited geographic market potential may not be sufficient to help them reach a point of financial sustainability within the timeline that their initial funding allows. Alternatively, purveyors of national models of exchange must be prepared to make more substantial investments in operations and technology to support a much larger source of market participants and transaction potential.

SURESCRIPTS RECORD LOCATOR & EXCHANGE

Surescripts Record Locator & Exchange lets providers find and request vital patient health information from outside systems, all within the clinician's existing EHR workflow.



WHAT MAKES SURESCRIPTS DIFFERENT?

The things that make Record Locator & Exchange different from other interoperability solutions are the same assets that contributed to Surescripts' success in operating a secure, scaled and reliable network for processing more than 10 billion clinical transactions a year. Beyond e-prescriptions, these clinical transactions include real-time pharmacy benefit eligibility checks, medication history requests and responses and true electronic prior authorizations for medications. The unique assets that Surescripts brings to supporting Record Locator & Exchange include:

Directory // Surescripts operates the nation's largest clinical directory, with more than one million healthcare professionals that actively transact each month with each other and other network participants.

Scale // Surescripts supports health information exchange on a national basis, supporting more than one million healthcare professionals and 65,000 pharmacies and pharmacy benefit managers (PBMs) that collectively transact more than 10 billion clinical transactions each year on the Surescripts network.

Real-Time Matching and Master Patient Index (MPI) // Surescripts Record Locator & Exchange hosts an

MPI with more than 230 million unique covered lives, and utilizes the MPI to deliver pharmacy eligibility, benefit and medication history information to prescribers and healthcare professionals at the point of care, during a patient event. This MPI also supports patient matching for Surescripts Record Locator & Exchange.

Trust // Surescripts works throughout the healthcare community to promote dialogue to support the future growth of interoperability and health information technology. For more than 13 years, Surescripts has operated a secure, neutral network to support health information exchange, and processes more than 10 billion clinical transactions a year. Surescripts also issues digital certificates

to support numerous products, including EHNAC/DirectTrust-related products and mutually authenticated Transport Layer Security (TLS).

Secure // Surescripts is ISO 27001 certified, the highest level of information security certification, which includes all information, applications and systems and support personnel required to operate.

Patient Location Information // Surescripts processes more than one billion eligibility transactions each year, and is able to leverage these transactions to determine where, when, and from which provider a patient has received care.

FEATURES OF RECORD LOCATOR & EXCHANGE

1. A list of records and contact info
2. Electronic coordinates for point-to-point retrieval
3. A hub-and-spoke structure for full document exchange

TRANSACTION FRAMEWORK

Surescripts leverages the Integrating the Healthcare Enterprise (IHE) transaction framework, supporting standards-based transactions among systems.²³

- **XCPD — Cross-Community Patient Discovery:** Supports the means to locate communities which hold patient-relevant health data and the translation of patient identifiers across communities holding the same patient's data.
- **PLQ — Patient Location Tracking Query:** Queries for a list of communities that may have relevant health data about particular patients.
- **XCA — Cross-Community Access:** Supports the means to query and retrieve patient-relevant medical data held by other communities.

Surescripts is committed to creating value-driven products that are easy to integrate. Technology and standards like Fast Healthcare Interoperability Resources (FHIR), which Surescripts is participating in developing, have created substantial excitement for the future of interoperability. Flexibility is important. Surescripts plans to use FHIR-based exchange for one of the future Record Locator & Exchange integration models for organizations that have not implemented IHE transactions.

TRYING TO MAKE THINGS AS EASY AS POSSIBLE

Surescripts is committed to successfully scaling Record Locator & Exchange to create value for physicians and hospitals nationwide. Surescripts is leveraging its experience, assets and capabilities to address each of the 'Challenges' described above, including:

TECHNOLOGY //

Surescripts is adhering to the Carequality interoperability framework, and is further leveraging existing IHE and FHIR technology standards to make it easy for health systems, physicians and their EHRs to connect and participate in Record Locator & Exchange. Furthermore, Surescripts network infrastructure is already mature and scaled, as evidenced by the more than 10 billion clinical transactions it processes each year.

GOVERNANCE //

Surescripts has extensive experience in bringing new participants on and then managing the interaction among complex network relationships. Surescripts already publishes certification criteria, implementation guides and network operating agreements, and has experience managing contracts with thousands of different entities, ranging from pharmacies to pharmacy benefit managers, health systems to EHRs, technology vendors to data sources and

suppliers. The Surescripts governance model has processes and procedures to establish and disseminate the rules of participation, monitor compliance with the rules and take enforcement action in the event of a breach of a rule. Furthermore, Surescripts' governance model is underpinned by the principle of Neutrality, which is the concept that all stakeholders meeting our certification, implementation and contractual requirements can participate, and can do so with the assurance that their information will be transmitted safely and securely.

SECURITY //

Surescripts is an ISO 27001-certified organization, and has an information security department staffed by industry experts to identify and anticipate risk to Surescripts and its constituents, develop and implement protection and risk mitigation strategies and keep informed of security best practices in order to facilitate continual improvement of physical and information security capabilities.²⁴

SCALABILITY //

Surescripts has a proven track record of scaling network products such as e-prescribing, eligibility, medication history, electronic prior authorizations and others. Surescripts has been operational since 2003, supporting these different network products, and has invested in appropriate technology infrastructure to securely and reliably process millions of transactions each day. This experience in scaling many different network products is unique within the healthcare industry.

ADOPTION //

Relationships are the backbone of what Surescripts does. Surescripts has success in demonstrating value to physicians, EHRs, health systems, pharmacies, PBMs and others, multiple times over. Surescripts' experience is unique in healthcare, and provides a level of confidence to participants who adopt our products. Our participants also have an opportunity to be a part of something big.

SOLVING THE TOUGHEST PROBLEM BY SERVING THE NATION

By far, the most challenging factor relating to making a record locator service successful—that is, widely used and therefore valuable to all customers—is overcoming the business model problem while trying to scale (and financially support) the service. More specifically, the challenge is how to balance (i) the need to determine a pricing model and price point that generates revenue to financially support the upfront investments and ongoing expenses associated with maintaining a record locator service and (ii) the realization that the record locator service will only start to generate real value for customers as more and more physicians and hospitals adopt and

begin using the service. This, in essence, is the “chicken-in-egg” problem: how to entice physicians and hospitals to adopt a service while recognizing that, as early adopters, the value they receive will be limited until others come on board.

The business model challenge is one that all record locator purveyors—including regional health information organizations (RHIOs), federally-funded health information exchanges (HIEs), and for-profit commercial entities—face, regardless of whether their service is regionally or nationally focused.

To date, and to our knowledge, no one organization (or collective of organizations) has solved for this problem. And yet, a mature, scalable, widely adopted, standardized record locator service is something that virtually all industry and policy experts agree could unlock the promise of EHRs, enabling dramatic and rapid improvements in care coordination that could improve the quality of care, increase patient safety and lower the cost of healthcare delivery in our country.

By delivering value from the outset, offering a scalable solution, and aligning ourselves with our customers' interests—driving additional customer adoption and utilization of Record Locator & Exchange—we believe that, for the first time in our country's history, achieving the promise of interoperable EHRs is within sight.

WHAT HAVE WE BEEN ABLE TO ACCOMPLISH IN NINE MONTHS?

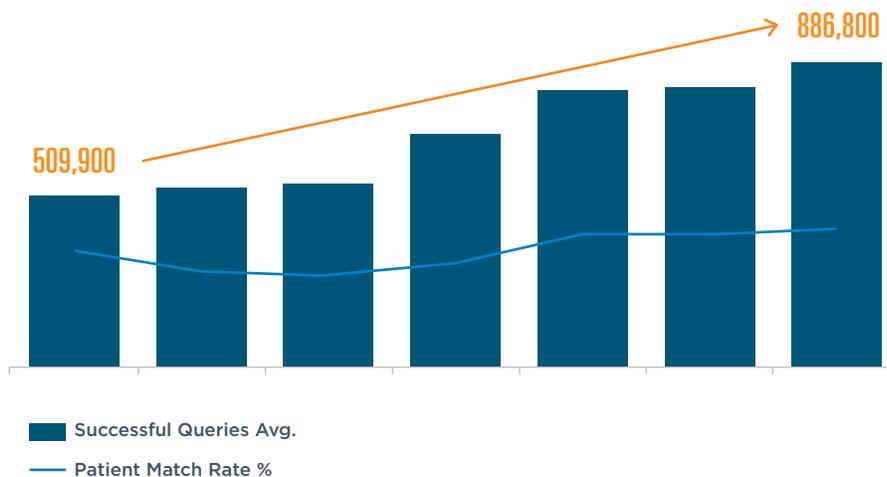
We are excited about how far we have come. Record Locator & Exchange Early Adopters are already experiencing the value that our expanding exchange network offers.

OPERATIONAL RESULTS

Surescripts Record Locator & Exchange Early Adopter participants began transacting messages in March, and steadily increased the volume of their Patient Query transactions throughout 2016, from an average of 7,900 Patient Query requests in March to more than 850,000 requests by December 2016. In total, Record Locator & Exchange has answered 6.5 million Patient Query requests in 2016, or an average of over one million Patient Query requests per participant during the Early Adopter period (through December). As a result, 2.2 million

Location Summary documents were retrieved. The data in these documents included over 43 million external patient visits to over 165,000 unique providers. In addition, Surescripts MPI "hit rate," or the proportion of time it could match patient information in its MPI and return a Record Location response, increased consistently over the Early Adopter period. Starting in February 2017, pharmacy data will be included and is expected to result in a significant increase in the patient hit rate.

AVERAGE MONTHLY PATIENT QUERIES, 2016

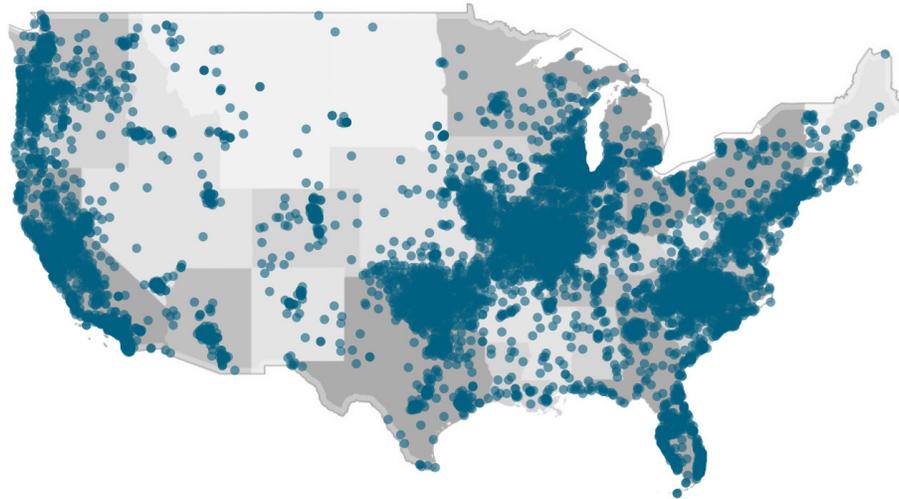


**TOTAL OF
6.5 MILLION
PATIENT QUERY
REQUESTS
IN 2016**

CLINICALLY RELEVANT RESULTS

Early data indicates that Record Locator & Exchange is a truly nationwide interoperable network. Providers at Early Adopter locations have been able to request records for patients with home locations in all 50 states. Record Locator & Exchange users are already realizing the value of scale. For example, one Early Adopter saw approximately 10,000 patients with home zip codes outside of the state.

ZIP CODES OF PATIENTS WITH SUCCESSFULLY QUERIED RECORDS



ONE HEALTH SYSTEM, PATIENTS FROM ALL 50 STATES



“We went live with Surescripts Record Locator & Exchange only two months ago, and the benefits are clear. We’ve already exchanged more than 82,000 patient records through the service, enabling our physicians to have a more complete care history of their patients regardless of where they were treated.”

Lewis Low, MD, Chief Medical Officer for Legacy Health

The locating and retrieval of electronic health records requires an ability to correctly match patients to their health records that are contained within disparate systems. Higher hit rates are indicative of a more efficient MPI, which makes it more likely that a provider will be able to locate and retrieve their patients’ respective records. Our patient hit rates for Early Adopter participants with highly active health systems (active for six consecutive months)

are increasing as the network grows. As more participants implement Record Locator & Exchange, we expect the MPI hit rate and cross-network transactions to increase. At this very early stage, Record Locator & Exchange is already providing valuable insight into how patients utilize the healthcare system. From Early Adopter data, we have found that 2% of total patients had more than 100 external visits in the last three years.

CONCLUSION

“Healthcare is local” is a common refrain among healthcare professionals and in the broader healthcare industry. Yet, the data from our Record Locator & Exchange Early Adopter program seems to corroborate—and go beyond—a 2011 study entitled (in part) “All Health Care is Not Local,”²⁵ which was focused on intrastate patient visit activity. Our Record Locator & Exchange Early Adopter program, while limited to participants in just six states, suggested patients visiting those participants collectively represented all fifty states.

Given these findings, our Early Adopter program strongly supports the need for a trusted, scalable, record locator service to support health information exchange, provider-to-provider communication and care coordination.

Care coordination is a key element not just of healthcare reform efforts, but a critical ingredient to advancing healthcare. Surescripts Record Locator & Exchange was designed to be scalable, deliver value from the outset and deliver actionable intelligence to physicians and providers to help fulfill the promise of health IT.

ABOUT SURESCRIPTS

Our purpose is to serve the nation with the single most trusted and capable health information network. Since 2001, Surescripts has led the movement to turn health data into actionable intelligence to increase patient safety, lower costs and ensure quality care.

Visit us at surescripts.com/recordlocator and follow us at twitter.com/surescripts.

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