# Direct Results: An HIE Tests Simple Information Exchange Using the Direct Project



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*Some HIEs were surprised when the federal government announced a project to enable direct provider-to-provider information exchange. But CareSpark, an HIE piloting the lightweight exchange method, is seeing the benefits for users and a logical integration into the services it offers.*

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Health information exchange (HIE) has long been touted as a silver bullet, streamlining patient transfers, reducing duplication, enlightening population health, and generally improving health outcomes. It promises to connect clinicians, empower patients, feed data repositories, and trigger decision support alerts from a community-wide set of patient records, among other things. Critical to these solutions is an HIE network that is broadly adopted within a patient community and a rich flow of discrete clinical information.

Up until five or so years ago, most health information was exchanged via complex, highly customized interfaces, within the boundaries of a single hospital or hospital system. Yet information exchanges that once required teams of interface developers, convoluted data flows, and multifarious data transformations are themselves evolving. Recent strides in the definition and utilization of standards have led to a more standardized, "plug-and-play" environment for exchange.

As a result, information exchange is becoming a broad-based solution, not just linked to a specific research effort, business function, or project. As the technology has taken steps forward, so has the business of healthcare delivery, requiring health IT to simplify information exchange and promote the flow of data across applications and across organizational boundaries, care settings, and circles of trust. The Direct Project is one of the newest efforts in simplifying exchange technology to support that need.

The project is sponsored by the Office of the National Coordinator for Health IT (ONC) but led by volunteers in the industry. Direct offers a simple, nonproprietary solution for direct information exchange between two healthcare entities. CareSpark, an HIE serving northeastern Tennessee and southwestern Virginia, is having early success with Direct in a pilot test with the Department of Veterans Affairs.

### The Evolution of HIE as a Technology

Information exchange is anything but new. Health Level 7 (HL7) started to tackle cross-system exchange back in 1989, aiming to bridge gaps in IT systems within hospital-based workflows. In those days, teams of interface developers in the basement of a hospital manhandled systems and an integration engine to get a hospital's own internal systems talking to each other.

As the benefits of broader information exchange became apparent and hospitals' IT capabilities grew, a number of potential solutions came to light for information exchange across organizations, or what many call cross-enterprise exchange.

Integrating the Healthcare Enterprise, HL7, and others brought us standard specifications like Clinical Document Architecture, Continuity of Care Document, Clinical Data Repository, XDS, and others to help providers in one organization share with providers in another.

The Office of the National Coordinator for Health IT also shepherds the Nationwide Health Information Network Exchange project, including specifications and policies for exchange between one community of providers to another community (for example, one HIE network to another).

**The Evolution of HIE as a Business Enabler**

Today's healthcare world continues to focus on pay for performance and outcomes (both clinical and financial). Accountable care organizations (ACOs) and patient-centered medical homes (PCMH) are prime examples.

In order for these programs to achieve success from a clinical and financial outcome perspective, each requires a high level of connectivity across a patient's care community, for all enrolled patients. Free-flowing data, system-wide guidance in the form of care plans, protocol- and evidence-based decision support, real-time updates of patient dashboards, and even centralized financial management all are components of these programs.

These programs depend on a fabric of trusted information exchange and connectivity, with broad and deep exchange of messages, information, events, and alerts. Without careful nurturing, any or each program can fail to operate if contained within the constraints of a silo or "walled garden" of a single provider setting or IT system.

Successful ACO and PCMH initiatives also require integration into existing IT that is found within a given physician practice or care setting. Health IT adoption creeps upward as we approach the first deadlines for stage 1 meaningful use, which means more and more physicians are making technology investments.

Rather than requiring physicians to utilize multiple applications or leaving physicians on their own "data islands," today's HIEs are required to integrate with bidirectional exchange into providers' systems. This affords full, collaborative participation of the provider while removing adoption barriers or requiring significant clinical workflow redesign.

## The Direct Project

Many of today's interoperability constructs lack the fundamental elements to proactively send a simple message from one provider to another, much like the ubiquitous fax machine does today. The standards can summarize a patient record or event or allow a provider to query for records across a community. Yet fax, courier, patients, mail, and other sneaker-net types of exchange still predominate in the field.

That is essentially why ONC started the Direct Project (originally NHIN Direct). On its wiki, where much of the work takes place (http://wiki.directproject.org), the Direct Project describes itself as a "simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet."

This lightweight set of specifications is meant to encourage participation in electronic exchange of information by leveraging existing protocols and standards that can be implemented quickly and easily. Direct complements the set of technology specifications produced for the more comprehensive Nationwide Health Information Network Exchange project and is meant as an entry point for providers and introduction to more robust types of exchange.

Direct's simple starting point was fleshed out by a set of seven primary user stories that helped define the purpose and boundaries of the project. The stories consist of one or more simple, unsolicited exchanges of patient health information:

1. A primary care doctor refers her patient to a specialist. She sends the specialist a copy of the patient's clinical snapshot.
2. When the specialist completes his consult, he sends information about his findings back to the patient's primary care provider.
3. A primary care doctor refers her patient to the hospital for observation or a scheduled surgery. She sends the hospital a copy of the patient's pertinent clinical information.
4. The patient is discharged from the hospital, which also sends her discharge information to the referring provider.
5. A care provider orders a lab on a patient. The laboratory sends the results back to the care provider.

6. A provider, clinic, or hospital sends a clinical snapshot, follow-up reminders, or information about a recent visit to the patient.
7. A patient receives an immunization, and the record of the immunization is sent to public health.

The Direct Project has been a largely volunteer effort, with contributions from more than 200 individuals and 50 organizations, including those from the vendor, provider, government, and consultant communities.

One of the project's key outputs is a set of open-source codes that allow a vendor, provider, or HIE to operate a Direct Project gateway capable of sending and receiving messages in the standard format. The open-source gateway software, with separate releases for the popular Java and .net software development platforms, has already sped Direct's adoption.

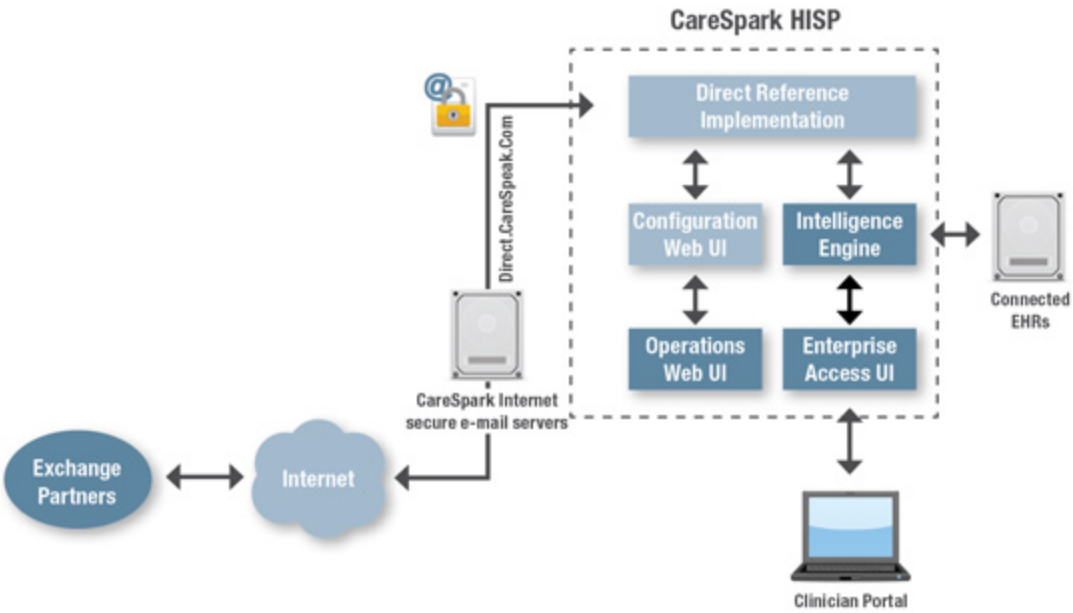
Direct is near the end of its development runway and poised to take off. Nearly a dozen different communities demonstrated Direct exchange at an ONC-sponsored interoperability showcase this past February. Projects in Minnesota and Rhode Island are in pilot production, and six more projects are working toward production operations. A number of health IT vendors are working to incorporate Direct in their products.

Direct is different because it supports critical business flows in the healthcare ecosystem that can be quickly measured to establish efficiency, accuracy, and cost savings (e.g., replacing fax machines and couriers). It lends itself to the clinical and business flows that today's healthcare system is coming to embrace.

Stakeholders in the industry are ready and willing to partially or fully subsidize the cost of these sorts of electronic exchanges. Their reasons vary from developing physician affinity through orders, referrals, and results flows to squeezing operational savings out of results delivery to capturing and digitizing clinical dialogs that will be critical to accountable care organizations and similar entities.

### CareSpark's Secure Messaging Architecture

CareSpark's platform supports exchange of Direct Project–compliant messages between its connected provider community and external business partners. Messages received securely over the Internet are routed through CareSpark directly into provider EHR systems or to CareSpark's Web-based clinician portal. The cloud-based solution reduces logistical and technological headaches that often slow the adoption of HIE technology.




## The Direct Project at CareSpark

With these business and technical innovations in mind, CareSpark has implemented a Direct Project addition to its existing standards-based HIE network. Teamed with its cloud-based secure messaging service provider, CareSpark offers health information service provider capability that supports the bidirectional exchange of data between providers and their systems. The addition of Direct and the secure messaging network gives CareSpark and its participating providers a means to push data between systems, often in unsolicited transactions.

Following its architecture principles that stress the importance of interoperable, standards-based technology, CareSpark implements Direct in a way that allows access by current standards-compliant systems as well as older legacy systems. This approach has worked in the past for CareSpark. Its network allows interconnectivity of Cross-Enterprise Document Sharing (XDS)-compliant systems and also offers "adapters" that connect noncompliant software.

This approach aligns with the industry direction while maintaining a low barrier to provider participation. Providers with nonstandards-compliant systems may participate in exchange as best they can. As an example, CareSpark might support the translation of an HL7 message into a Direct message on behalf of a provider. This translation is handled in transformation adapters within the CareSpark message router, centralizing the complex software algorithms that are required by nonstandard connectivity.

This approach is standards-based at the core, so as participants' systems upgrade and evolve and their level of support for Direct and other exchange standards matures, CareSpark need only modify that participant's connection, not the connections within the rest of the network.

## The Direct Use Case with the VA

As its first Direct use case, CareSpark is using the Direct Project specifications to facilitate information exchange between the Department of Veterans Affairs and participating providers in the CareSpark network. The VA and CareSpark are utilizing the open-source, Direct gateway code that the Direct Project team members have written and contributed.

The exchange centers on veteran patients who require service from providers outside the VA. In this instance, the local VA medical center, the James. H. Quillen VA Medical Center (VAMC), refers all mammography work out from its women's health center to private sector providers.

Before this project, the VA would fax or have patients hand carry mammogram orders to the radiology provider. After the study was done, the radiologist transcribed the report, and it was faxed (or hand carried) back to the VA. The whole process was clumsy at best, insecure and inefficient, and clearly did not integrate well into the VA's advanced health IT systems.

Now with Direct, both VA and CareSpark providers have the ability to securely transmit messages between their electronic health records. Following the mammogram use case, the VA physician writes a mammography order for the external provider. The order is routed through the VA's systems to its Direct gateway. The gateway takes the order, transforms it to a standard format, encrypts it, and routes it over to the destination radiology group at CareSpark.

This routing occurs using the Internet's predominant standard mail transport protocol (SMTP), but since the message content is encrypted, it is secured from prying eyes.

CareSpark receives the order within its Direct gateway. The message is decrypted (which includes a process to verify the identity of the message sender) and routed through CareSpark's clinician portal technology to the receiving radiologist. Currently the order is presented in a portal application displaying in an inbound orders queue, but in the near future CareSpark expects to connect directly to the provider's system and deliver the order without the manual portal step.

The VA patient arrives at the radiologist and has the mammography study done. The reading result is created with the usual information (findings, impression, and recommendations) via normal procedures within the radiology group. In fact, they have little awareness that Direct is used in the order and result process.

The radiologist's system transmits the result in a typical HL7 observational result message to CareSpark. Upon receipt, the CareSpark portal delivers the result to the ordering physician. The routing path for any physician with a VA address is via CareSpark's Direct gateway.

Following the same process in reverse, the result is standardized, encrypted, and routed to the VA via secure SMTP. The VA receives the message, decrypts it, verifies the identity of the sender (in this case CareSpark), and routes the result to the ordering physician through its own internal systems.

By the end of the process, a set of electronic messages have crossed organizational boundaries, physical locations, and radically different domains with the ability to fully integrate into EHRs. The paper chase has been removed and now data from mammograms can enjoy the same benefits and usefulness as other "internal" data within the patient's record.

Today this exchange exists merely as a demonstration, but given CareSpark's production deployment of the Direct gateway, the plan is for the VA and other providers within its region to enable Direct-based exchange within the year.

## Direct Projects Ahead

Based on the enthusiasm generated over the VA demonstration project, CareSpark is looking at a number of other exchanges that have been simplified with Direct. Any participating provider wishing to participate in a Direct project will require only a Direct Project–compatible e-mail address, such as Dr.Voigt@Direct.CareSpark.com, or ABCRadiology@Direct.CareSpark.com.

CareSpark has gathered input from local providers, and likely next areas for deployment of Direct functions include patient-to-provider messaging, broader lab result delivery, and immunization reporting.

Direct will always be a message sent from one known provider to another known provider without sharing the message with other participants, while Exchange will allow clinical data to be held and accessed through queries at the time that information is needed.

CareSpark is watching to see how the Direct Project evolves and in particular how it will play out with the Nationwide Health Information Network Exchange specifications-another key exchange capability within CareSpark's services. CareSpark expects that both Direct and Exchange will be required as cross-community HIE becomes more ubiquitous and robust.

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