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# PopHealth, HHS ARRA Spending Signal Accelerated Pace of Health IT

Recent investments by the Department of Health and Human Services (HHS) to expand health information exchanges, along with the rollout of open source software to improve healthcare decisions by measuring data from specific subsets of the population, underscore the accelerating pace of change within federal health IT today.

In mid-March, HHS rolled out an additional \$162 million in ARRA funding to advance health IT. The health information exchange (HIE) awards provide approximately \$162 million to 16 states and qualified state-designated entities (SDEs) to facilitate non-proprietary health information exchange that adheres to national standards, completing the HHS awarding of cooperative agreements. On February 12, HHS awarded \$385 million to 40 states and SDEs.



*Alarming as it seems, projections of the federal government's obligations for health care expenditures are startling. Sky-rocketing healthcare costs are driving many technological advances.*

*Source: HHS, CMS and INPUT*

Meanwhile, separately, to better understand and analyze the health of patient populations and simplify reporting on quality measures, a software tool called popHealth has been made available to healthcare providers who can use electronic health records (EHR). The popHealth program is a prototype open source tool that integrates with a provider's EHR system to produce summary quality measures on the provider's patient population, streamlining the reporting of those quality measures. The software is free to download, use and redistribute in products. It was funded by the Federal Health Architecture E-Gov program, managed by the Office of the National Coordinator for HIT (ONC) within HHS.

The quality measures enable providers to look at patient

populations across core demographics such as age and sex to screen and manage diseases such as diabetes, hypertension, hypercholesterolemia, breast and colon cancer to recommended community standards, or evaluate if populations have been vaccinated for influenza or other infectious diseases. This information can also be used to share quality measures with public health organizations. "This prototype demonstrates how a provider can use the solution to submit quality measures or public health data as part of their existing workflow," said Vish Sankaran, program director, Federal Health Architecture.

An alternative approach to the legacy model of centralized population health data collection and analysis, popHealth performs analysis within a healthcare provider's infrastructure, producing summary data for evaluation and submission. This differs from existing models where providers must transport large quantities of data, to simplify the reporting and review process.

The popHealth program is a web-based service, developed and tested for use in Firefox 3.0 and higher, Internet Explorer (IE) 7 and IE 8, as well as Safari 4. The software relies on the HITSP C32 data standard to extract report data from a patient's continuity of care records. The software runs atop the Laika infrastructure, a widely-used open source EHR testing framework. "We hope to guide the evolution of population health reporting standards, by live pilots and deployments," Sankaran said.

The tool also uses the Physician Quality Report Initiative (PQRI) registry XML for reporting output and will eventually support multiple standards, including CDA documents, HL7 CCD, ASTM CCR, and the HL7 QRDA. The tool runs on JRuby, atop the Java Virtual Machine (JVM). The popHealth software has also been integrated with the CONNECT File Transfer Adapter plugin. More information is available at [www.projectpophealth.org](http://www.projectpophealth.org).

According to Rick Peters, MD and founding partner, OpenHealthConsulting, in San Francisco, all of the largest suppliers, integrators, government oversight and healthcare institutions, along with pharmaceutical suppliers are interested in trying to figure out what to do with the information made available via EHR and popHealth. "In the coming months, it will be important to keep an eye out for more comprehensive offerings featuring enterprise-class application sets," he said, because the ability to capture and analyze data is moving so fast. □



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# Health IT Standards Continue to Develop

A new standards initiative formed in March will expand the Nationwide Health Information Network (NHIN) to support a wider audience of participants who want to use simple, standards-based, widely deployed and supported methods for securely transporting health information.

Based on recommendations from a federal advisory committee within the Office of the National Coordinator for Health IT (ONC), the NHIN Direct Project was created to enable standards-based health information exchange in support of Stage 1 'Meaningful Use' requirements. The NHIN Direct Project is developing a set of standards and services to enable simple, secure transport of health information between authorized care providers, according to Dr. Douglas Fridsma, MD and PhD, the Acting Director of Interoperability and Standards within the ONC.

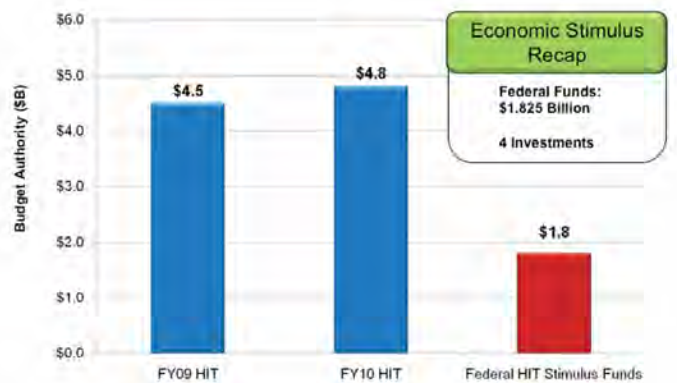
The NHIN Direct Project supports core Stage 1 Meaningful Use measures, including communication of summary care records, referrals, discharge summaries and other clinical information for continuity of care and medication reconciliation, along with the communication of lab results to providers. The current NHIN Architecture describes a method for universal patient lookup and document discovery and exchange between National Health Information Organizations, including federal providers such as the Veterans Health Administration, Department of Defense Military Health System and others. The NHIN Direct Project will expand that to cases of pushed communication between providers, hospitals, laboratories and other health settings. Current members of the NHIN Limited Production Exchange will be able to engage in the NHIN Direct Project, and providers and enabling organizations for the NHIN Direct Project will scale to support the discovery and exchange use cases. Both models are required and will be in use at the same time for the same participants, depending on the information exchange needs, said Fridsma, who explained, "Interoperability isn't 'one size fits all.' We must recognize everyone is at different stages in the ability to exchange information, and many participants will need help with heterogeneous information exchange to achieve meaningful use."

The NHIN Direct Project supports specific use cases, such as:

- A primary care provider referring a patient to a specialist;
- A hospital that wants to send discharge information back to a referring provider on patient discharge; and
- A clinical testing lab has preliminary, final or amended test results to deliver.

To help drive rapid innovation, Fridsma said the ONC is

deliberately constraining the scope of NHIN Direct to a spare set of specifications and standards that solve well-defined pain points. "In doing so, we do not intend to devalue any particular health information exchange area or need, but merely to define a scope that both advances the state of nationwide health information exchange and is achievable in the short term."



State and Local governments received lion's share of stimulus funding: over \$149 billion in total health care funding. Federal health IT funding was roughly \$1.8B.

Source: INPUT

ONC expects NHIN Direct specifications and services will be used to transmit unstructured messages, including simple text and PDF, semi-structured text (e.g., CDA), and highly structured messages and documents, including HL7, CCD, and CCR documents with well defined vocabulary. Fridsma said later work on NHIN Direct may create specific profiles for end-to-end semantic interoperability such as the transmission of HL7 2.5.1 ORU messages with SNOMED and UCUM codes in support of laboratory results. But the ONC doesn't want to constrain innovative uses of NHIN Direct in the future. Fridsma also expects NHIN Direct specifications and standards will allow an enabling organization to perform content negotiation to enable health information exchange between systems that support different standards. Ultimately, there will be "a range of products available to provide interoperability solutions that achieve meaningful use. Whether such solutions could be cloud, service, application or web-based, remains to be seen. We want to describe what's needed, and let the market create to fill that need," he said.

More information on the NHIN Direct Project is available at <http://nhindirect.org>. □

# Social Security Administration Speeds the Processing of Eligibility Claims

The Social Security Administration (SSA) will process disability claims for more than 3.3 million people this year, up 27 percent, or about 700,000 more applications than in 2008, and agency officials report it will also boost the number of healthcare records transmitted electronically to aid in faster decision-making.

As an early participant in the Nationwide Health Information Network (NHIN) project, SSA's modernization effort is already demonstrating for a select few organizations how to more quickly evaluate healthcare records, accelerating the process for authorizing benefits to citizens with disabilities, according to Jim Borland, SSA's special advisor for health IT in the Office of the Commissioner.

Borland said in an interview with 1105 Custom Media the goal is to reach 120,000 cases impacted by health IT, up dramatically from the 4,500 cases tested last year with partner MedVa. In the last month, SSA announced the expansion of its medical evidence gathering program to include 15 healthcare providers in 13 states. The providers received \$17.4 million in contract awards to provide electronic

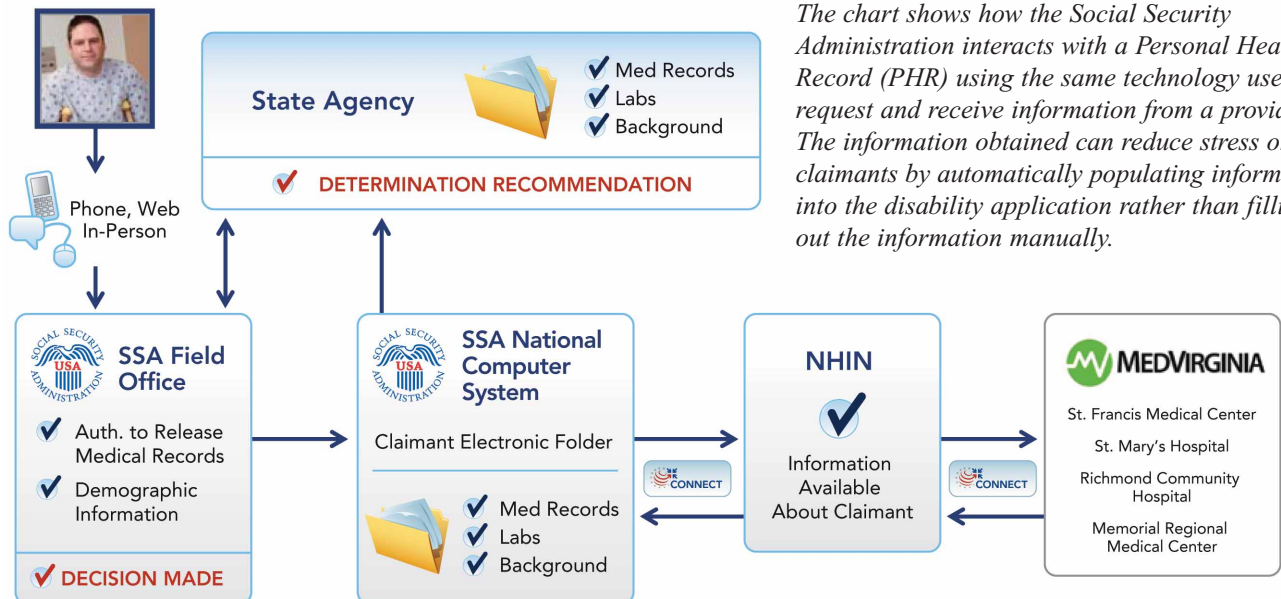
medical records to the agency. "Ultimately, this will help us spread the concept of making faster disability decisions, helping improve the speed of payments to 120,000 patients across 13 states," said Borland.

## How Processing Electronically Works

SSA requests medical evidence receipts from patient healthcare providers. The medical evidence is then used to authorize patients for SSA benefits. Using the NHIN, SSA said medical examiners gain access to more of each patient's medical history information, which dramatically speeds the process of authorizing a patient for SSA benefits. The process, which once took up to three months can now be largely completed in minutes, dramatically speeding the processing of patient authorization requests.

And the success of SSA's effort has led to another benefit – more funding. Approximately \$24 million from the ARRA initiative is currently being spent on the implementation of fixed price contracts with providers, regional health information organizations and HIEs to expand the program, Borland said.

## Processing Claims with Authorized Release of Information



The chart shows how the Social Security Administration interacts with a Personal Health Record (PHR) using the same technology used to request and receive information from a provider. The information obtained can reduce stress on the claimants by automatically populating information into the disability application rather than filling out the information manually.

Bringing on more partners, largely providers with electronic health records as well as regional health information exchanges will further demonstrate how speedy processing of eligibility requests for patients and providers can accelerate payment and improve an organization's overall efficiency.

Contracts were awarded to the following organizations:

1. Cal RHIO, San Francisco, CA - \$1,625,000
2. CareSpark, Kingsport, TN - \$1,363,000
3. Center for Healthy Communities, Wright State University, Healthlink, Dayton, OH - \$999,000
4. Central Virginia Health Network/MedVirginia, Richmond, VA - \$1,139,000
5. Community Health Information Collaborative (CHIC), Duluth, MN - \$977,000
6. Douglas County Individual Practice Association, Roseburg, OR - \$502,000
7. EHR Doctors Inc., Pompano Beach, FL - \$1,000,000
8. HealthBridge, Cincinnati, OH - \$1,400,000
9. Lovelace Clinic Foundation (LCF), Albuquerque, M - \$1,083,000
10. Marshfield Clinic Research Foundation, Marshfield, WI - \$998,000
11. Memorial Hospital Foundation & Memorial Hospital of Gulfport Foundation, Inc., Gulfport, MS - \$1,100,000
12. Oregon Community Health Information Network (OCHIN), Portland, OR - \$284,000
13. Regenstrief Institute, Inc, Indianapolis, IN - \$350,000
14. Science Applications International Corporation (SAIC), Reston, VA - \$1,587,000
15. Southeastern Michigan Health Association, Detroit, MI - \$2,988,000

### SSA Healthcare Web Portals

In other healthcare-related news, SSA launched two new websites for anyone seeking information on diseases and prescription. The site [www.healthfinder.gov](http://www.healthfinder.gov) provides detailed information about specific diseases. For example, an applicant with breast cancer, rheumatoid arthritis,

**The use of health IT will dramatically improve the speed, accuracy, and efficiency of this process, reducing the cost of making a disability decision for both the medical community and the American taxpayer.”**

*– Michael J. Astrue, Commissioner of Social Security*

### Lessons Learned

SSA's Borland maintains SSA's pilot tests to speed processing of disability claims via electronic health records transmitted using the NHIN, or a compliant gateway, has proven in concept that the process works, improving service to claimants, and lowering the cost of processing payments for taxpayers and healthcare providers.

Other lessons learned include the need to test for compliance, and build processes and services using industry standard, open source technologies wherever possible. “The joke around here is, if you have seen one HIE, you've seen only one,” he said, as each health information exchange is different, varying dramatically in the formats and processes used. The SSA has worked to achieve standardization in document types, formats and data sets to enable the interoperable sharing of those data sets. If clinicians and HIEs remember to focus on standards for those elements, we'll get interoperability,” he said.

Another key to the SSA's success was what Borland referred to as the administration's strategy to, “Start small, but aim high.” It works best to start with a single data set that the organization can share, first internally and then examine standards for content to build the rest of the data clinicians collect into interoperable data sets that can be shared. “This step will get any organization to compliance with ‘meaningful use’ requirements, but more importantly, this will ensure the enabling technology actually enables something useful to the healthcare organization.

Alzheimer's disease, diabetes, or other diseases can go to the site to gather information about diagnosis, symptoms, treatment, ongoing research and local resources available to people with those diseases.

The website [www.healthfinder.gov/rxdrug](http://www.healthfinder.gov/rxdrug) links people to the Partnership for Prescription Assistance, which directs people to information on reduced cost or free prescription drugs offered by drug companies, state and local governments, and local organizations.

Meanwhile, more information about the SSA's strategy to address the unprecedented increase in disability benefit applications, is available at [www.socialsecurity.gov/legislation/testimony\\_111909.htm](http://www.socialsecurity.gov/legislation/testimony_111909.htm).

In April, SSA will publish an Open Government plan to aid the administration's effort to comply with the President's Open Government Directive, and become more open and transparent. SSA officials stressed that the organization will continue to vigilantly protect personal information to ensure transparency doesn't put that information at risk.

More information on Social Security's use of health IT is available at [www.socialsecurity.gov/hit](http://www.socialsecurity.gov/hit). □

# Technology Will Lead Healthcare's Transformation

Technology will likely lead the charge in modernizing healthcare services, by driving costs down and creating countless efficiencies.

So many aspects of healthcare, from vital records to networking, IT security, scanning, digitizing, document conversion, training, data storage/warehousing, ePharmacy, Radiology, Laboratory, personal health records, electronic medication administration records and resource and patient management systems (RPMS) stand to benefit from the influx of new technologies and integration. These advances “will transform U.S. health, improving care, safety, control, knowledge, cure rates, and life expectancy. It will also reduce costs and malpractice cases,” said Lauren Jones, a principal

analyst for federal market research firm INPUT in Reston, Va., author of the INPUT report, Health IT Transformation: FY2009-FY2014 Federal Market Forecast.

Based on insights from Jones, the Department of Health and Human Services and various healthcare IT industry executives, specific technologies are already starting to transform healthcare in the U.S., including: Telehealth; electronic health records; health information exchanges (HIE); and clinical decision support (CDS) tools. The 1105 Government Information Group Custom Media has taken a closer look at these transformative technologies, noting key obstacles and providing a quick forecast for what lies ahead.

## Telehealth

### *What and Why*

The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. Videoconferencing, the internet, store-and-forward imaging, streaming media and terrestrial and wireless technologies and applications are used to connect doctors and other healthcare providers to each other and patients in remote areas.

Telehealth makes specialty care more accessible to underserved rural and urban populations. Wireless apps allow doctors to monitor patients remotely. Video consultations from a rural clinic to a specialist can reduce patient travel costs. Videoconferencing also creates opportunities for education and training and can also cut the cost of providing medical care for patients in rural areas.

### *Applications*

- Patients and physicians can complete consultations using videoconferencing to connect two or more geographically dispersed healthcare facilities.
- Digital images and other clinical data are captured at the point of care, temporarily stored and later forwarded to another location.
- Home-based monitoring devices are used to capture and transmit clinical data such as glucose levels and blood pressure over the internet to assist doctors assisting chronically ill patients.
- Through a secure web portal, health insurers offer ‘e-consult’ services that leverage email and phone communications.

### *Benefits*

- Improved access to specialty care and personal health information
- Improved efficiency (lab results available online usually within 24 hours)
- Decreased costly, unnecessary emergency room visits, using 24X7 nurse lines
- Improved convenience and accessibility for patients
- Improved physician-patient communication
- Decreased use of office visits and physician phone calls
- Remote patient monitoring
- Lowers treatment costs for chronic patients by reducing hospitalization expense
- Enables early, proactive intervention for follow-up care
- Enables providers to take a more active role in patient care
- Allows medical professionals to focus on patients who need them most
- Improved training and education of medical interns

### *Obstacles*

- Consumer awareness considered still quite low;
- Providers worry about liability concerns, still lack the electronic records that would allow them to collect and store recorded healthcare data;
- State-specific licensing and regulatory requirements create a barrier;
- Data interoperability, compatibility and portability issues remain.

### *Forecast*

The market for telehealth devices and services is expected to generate \$3.6 billion in annual revenue within five years,



according to a study by Silver Spring, Md., research firm Pike & Fischer. Mobile communications companies, such as AT&T, Verizon, Sprint and Nextel are expected to dominate the provision of wireless healthcare services. Funding from the American Recovery and Reinvestment Act also will support a surge in broadband-enabled telehealth services, such as remote patient monitoring and mobile access to electronic health records. Within five years, the Pike & Fischer report said wireless applications, devices and services will account for more than 70% of the market.

Meanwhile, according to INPUT's research report, available at [www.INPUT.com](http://www.INPUT.com), telehealth will leverage mobile technologies such as iPhones and wireless internet applications to monitor patients in remote areas, provide emergency care and remote monitoring of patients via the internet, by collecting real-time performance data from pacemakers and insulin pumps. Patients will be able to chat with doctors online about their conditions. Webinars will be presented for patients with similar illnesses and chronic diseases.

## Electronic Health Records (EHR)

### *What and Why*

Patient demographic and clinical health information recorded in digital format and capable of being shared across healthcare providers. These records may include a range of data in comprehensive or summary form, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images and billing information. EHRs are generated and maintained by hospitals, integrated delivery networks, clinics and/or physician offices. The information in an EHR can be used to provide clinical decision support, support physician order entry, capture and query information relevant to health care quality and exchange electronic health information. The HHS' Office of the National Coordinator for Health IT (ONC) is spurring nationwide adoption of EHRs via its HITECH Act, which provides up to \$44,000 in incentives to providers who can prove 'meaningful use' of an EHR system. Incentives will be offered on a sliding scale, with penalties for healthcare providers who fail to comply by 2014.

### *Applications*

An array of data capture and collaborative decision support services, systems that capture basic demographic information regarding patients (data capture and sharing) to more sophisticated systems which house X-ray images electronically, computerized physician order entry, and completely paperless care delivery systems (advanced clinical processes/decision support). EHRs can demonstrate 'meaningful use' by facilitating any of the following services:

- Clinical decision support
- Computerized Physician Order Entry (CPOE)
- Exchange of Data
- Quality Reporting

### *Benefits*

Considered a first crucial step toward paperless, integrated healthcare delivery, digitizing health records and achieving 'meaningful use' compliance will enable significant and measurable improvements in population health, improving efficiency and reducing costs. EHRs allow better analysis of patient data to aid patient care.

Key gains include:

- Improve quality, safety and efficiency
- Engage patients and their families
- Improve care coordination
- Improve population and public health, reducing disparities
- Ensure privacy and security protections

### *Obstacles*

The biggest challenge is how to get wide spread adoption of EHR systems among health care providers, who must somehow justify, finance and implement EHR systems and applications. Change management is a key factor, as cost saving benefits from an EHR implementation will require changes to business and workflow processes. INPUT's Jones reports that providers counting on stimulus money to fund their EHR investment and implementation aren't likely to receive government incentives until after they have implemented systems. And she adds some providers maintain stimulus money won't be enough to cover actual EHR implementation costs.

### *Forecast*

The North American market for EHR systems will exceed \$5.4 billion by 2015, according to a February report published by Global Industry Analysts Inc., San Jose, Ca. The report said market growth will be driven primarily by increasing recognition among healthcare providers that digital records help in effective communication between the clinical staff, increasing operational efficiency. As clinicians and physicians spend less time searching and filing data, there's also an increased level of patient satisfaction.

The HIT Policy Committee's framework for achieving 'meaningful use' through 2015 maintains that health reform will be enabled by Health IT in phases:

- 2009, policy development;
- 2011, capture/share data;
- 2013, advanced care processes with decision support;
- 2015, improved healthcare outcomes.

INPUT's Jones said healthcare providers should look for creative financing options from industry suppliers and examine emerging hosting and/or Software as a Service (SaaS) 'cloud computing' offerings as they become available.



## Health Information Exchanges (HIE)

### *What and Why*

Organizations formed to accomplish healthcare information exchange. HIEs move clinical information among disparate health care information systems, while maintaining the meaning of information being exchanged.

### *Benefits*

As health care information is electronically mobilized within a region or community, HIEs exchange information with physicians, insurance providers, federal oversight organizations and others to improve the safety, quality and efficiency of healthcare as well as access to healthcare services. Most HIEs are non-profit, receiving ongoing revenue from subscription/membership fees charged to hospitals. HIEs facilitate access and retrieval of clinical data to provide safer, more timely, efficient, effective, equitable, patient-centered care. HIEs also provide the infrastructure for secondary use of clinical data for purposes such as public health, clinical, biomedical, and consumer health informatics research as well as institution and provider quality assessment and improvement. Primary stakeholders exchanging data with HIEs include hospitals, physicians, community/public health clinics, specialty care physicians, independent labs, outpatient/ambulatory surgery centers, pharmacies, mental health providers and health insurance providers. To build a national network of interoperable health records, a critical initial step is to develop HIEs at the state and local levels, to share healthcare information regionally.

### *Obstacles*

A new report from Orem, Utah-based KLAS, a health industry market research firm, Health Information Exchanges: The Reality of HIE Adoption, validated 89 live HIE organizations that use commercial technologies to share patient data viewed by doctors. All HIEs included in the study had to be exchanging data among facilities that are not owned by the same organization. “So far, the most successful HIEs are those with the least complex approaches,” said Jason Hess, KLAS general manager of clinical research and author of the HIE report. “The eclectic way that clinical information is structured, stored, labeled and shipped makes it very difficult for vendors to connect all of the discreet data elements. In the majority of cases, HIE vendors are opting to pass around packets of information without necessarily taking ownership of what is in the packet.”

Hess said there are also a number of administrative challenges to deploying an HIE. Topping the list are, “IT

governance concerns regarding privacy, security and patient consent, as well as the financial viability and sustainability of the HIE,” according to the KLAS report. In fact, when it comes to financing an HIE, KLAS found that among 89 validated sites, more than 70 percent are funded with state or federal grants. The full report is available at [www.KLASresearch/reports.com](http://www.KLASresearch/reports.com).

### *Forecast*

The HIE market is definitely heating up as \$564 million dollars of ARRA stimulus funding has been funneled into the market for creating statewide HIEs, including the February HHS announcement of \$386 million to 40 states and territories to help establish public HIEs. According to research from Chilmark, about 20-22 states are expected to issue RFPs for technical infrastructure over the next 6-12 months.

Unfortunately, the market that hasn't settled on a clear set of requirements for HIEs, public or private, according to senior analyst Matt Guldin, and analyst John Moore, at Chilmark Research, a healthcare technology research firm in Cambridge, Mass. Meanwhile, private HIEs are skeptical about many state-run, federally funded HIEs. “A couple of big hospital CIOs told me that they are not interested in paying the fees to support these top-heavy, government run initiatives. This may lead to a delicate political balance, even brinkmanship in determining how State HIE initiatives will interface and work with existing private, multi-stakeholder exchanges,” Guldin said in a recent blog post.

According to the abstract for a soon to be released report, Health Information Exchange (HIE) Market Analysis: Leading Vendors, Market Trends and Evolution, while statewide HIE contracts are a big win for a any industry supplier, the real value won't come from the initial contract to ‘connect the pipes.’ The real long-term value will come from “deploying higher-value add applications and services such as analytics, quality reporting, transactional services,” said Guldin, who added that so far, no clear HIE technology leader has emerged. He predicts a wide open market with significant activity in the coming 9-12 months.

Ultimately, this is just beginning what will likely be a long, arduous journey to put in place the infrastructure for true health information exchange across the healthcare system. “While the funding is welcomed by many in the industry, creating regional and statewide HIEs will prove challenging as to date, there are still no demonstrable and repeatable business models to create such exchanges that are truly self-sustaining,” the Chilmark Research team reports.

## Clinical Decision Support (CDS) tools

### What and Why

At its core, Clinical Decision Support systems link health observations with knowledge to influence health choices by clinicians for improved health care. Assisting doctors at the point of care, these analytic tools can greatly aid doctors in determining a diagnosis and analyzing patient data.

### Applications

Pharmacy and prescription ordering systems now perform batch-based checking of orders for negative drug interactions and report warnings to the ordering professional. Such systems commonly exist both in clinical settings as well as in more commercial settings, such as in the software used by local or chain pharmacy stores.

In billing and claims filing, since many hospitals rely on Medicare reimbursements to maintain operational status, systems have been created to help examine both the proposed treatment plan and current rules of Medicare to suggest plans that maximize both patient care and the financial needs of the institution.

Analytic tools aimed at diagnostic tasks have found success, but are often very limited in deployment and scope.

### Obstacles

Clinical decision support systems face steep technical challenges largely because biological systems are profoundly complicated, and clinical decision tools must utilize an enormous range of potentially relevant data. Many such tools are currently only stand alone applications, requiring a

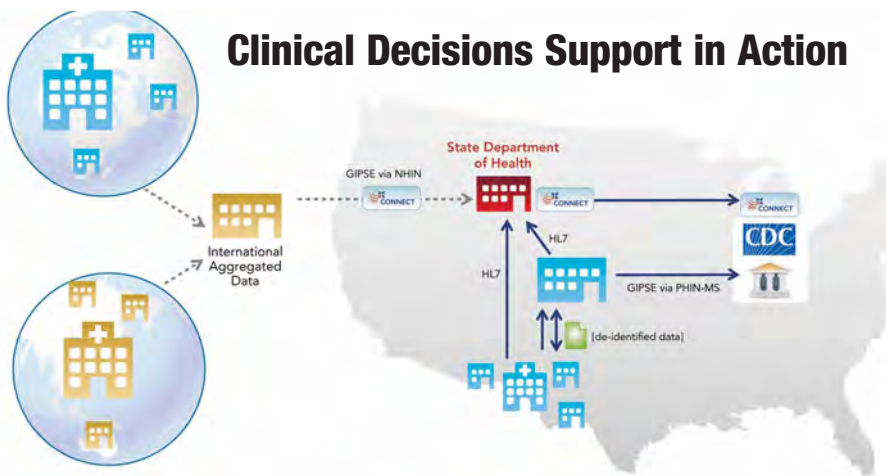
physician to cease working on one report system, switch to the CDS tool, input necessary data, and receive information. These added steps don't often work, from the clinician's perspective, adding cost and taking too much time. Also, it's difficult to keep CDS tools updated with the extensive quantity of clinical research being published on an ongoing basis.

### Forecast

CDS tools are still considered to be a market in its early infancy. According to INPUT's research, effective analytics begins with data capture from electronic medical records (EMR), electronic health records (EHRs), personal health records (PHR), electronic medication administration records (eMAR), pharmacy and eligibility systems. Interoperability and integration of these systems will allow for collaborative decision support. "Once all hospitals, medical facilities, doctors' offices, and government entities automate their health records, the next stage involves integrating information, so it can be analyzed for better health care decision making," said INPUT's Jones.

Collaborative and integrated decision support will allow doctors and other health organizations to mine knowledge bases, clinical data repositories (CDR), clinical decision support systems (CDSS) and health information exchanges (HIE) to make decisions on the care of an individual or on subsets of the population. Associated technologies, such as biosurveillance, telehealth and geographic information systems will connect with records systems to accomplish analysis, health/data modeling and health related projections, Jones explained.

As more medical information is digitized and captured, INPUT predicts growth in data warehousing, data mining, advanced networking, analytics and modeling of medical data will improve the health of both individual patients, and entire populations. "This market will also drive comparative effectiveness research by empowering providers and government health organizations to quickly and easily determine the most effective treatments for patients and population groups," she said. In the future, INPUT expects claims processing will shift to a 'pay for outcomes' approach, rather than the current 'pay for service' model. □



*This graphic highlights international disease surveillance. An international physician diagnoses a patient with Influenza A within their EHR and uses a situational awareness (SA) solution to visualize real-time Influenza cases voluntarily reported by other contributing providers. The case management system is used by public health epidemiologists to review individual cases, aggregate outbreaks for analysis, and create a public response. Nightly aggregates of case reports are formatted using the GIPSE format and shared with U.S. state public health officials.*