Information Technology Is a "HIT" with Health Care

Health Information Technology offers leading-edge opportunities, challenges.

By Marc Fogarty

Health information technology (HIT) has been defined as the application of information processing – involving both computer hardware and software – that deals with the storage, retrieval, sharing and use of health care information, data and knowledge for communication and decision making.

This IT discipline intersects health care experts, patients, insurance providers, billing personnel, the government and, of course, IT professionals and vendors. When it comes to HIT, the playing field is vast.

Goals

A few HIT goals are to improve the quality and access to health care, decrease errors, mitigate public health concerns, decrease costs via increased efficiencies, and foster an exchange of information and research.

EHR

A key tool available to HIT is electronic health records (EHRs). According to healthIT.gov , an EHR is a digital version of a patient's paper chart. EHRs are real-time records that include a patient's medical history, diagnoses, medications, treatment plans and test results. An EHR can be shared securely with other providers across more than one health care organization, such as hospitals, laboratories, specialists and pharmacies.

Percentage of Office-Based Physicians in the U.S. with EHR Systems

YEAR	PERCENT
2014	83%
2013	78%
2012	72%
2011	57%
2010	51%
2009	49%

U.S. Centers for Disease Control and Prevention

After assessing its needs and planning its approach, a health care provider needs to perform due diligence in finding and selecting an EHR system vendor. A few decision points include cost (naturally), product fit, server options, privacy/security strength, integration capabilities, tech support and training.

The HITs Keep on Coming

Handheld tissue repair devices, smart pill bottles that send information to health care providers, 3D printed skin grafts and other healing technologies are today more science-fact than science-fiction.

Consumers can take advantage of HIT like never before. They can simply go to a retailer and, for less than $100, purchase a smartwatch that tracks heart rate, sleep quality, steps walked and more. According to Statista, sales for wearable health and fitness trackers are expected to reach 38 million units in 2016, up from 25 million in 2015.

Other emerging HIT categories include clinical decision support, computerized physician order entry, bar coding at medication dispensing, robots for medication dispensing, automated dispensing machines, electronic medication administration records and bar coding at medication administration.

Legislation

In 2004, President George Bush signed the Health Information Technology Plan Executive Order, which established a plan to develop and implement electronic medical record systems across the U.S. It was estimated that the widespread adoption of HIT could save the U.S. health care sector more than $81 billion annually.

In 2009, President Barack Obama signed the American Recovery and Reinvestment Act (ARRA). This legislation set aside $2 billion for programs to help health care providers implement HIT and provide technical assistance; an additional $17 billion comprised Medicare and Medicaid incentives for those that adopted HIT prior to 2015.

The ARRA incentive program is working to some degree. According to the Office of the National Coordinator for Health IT, more than 80% of the doctors in the U.S. are using EHRs. However, that number drops to 49% regarding doctors who use more than just EHRs' basic functions.

When it comes to HIT, an overarching consideration is data security and confidentiality. As part of the ARRA, the Health Information Technology for Economic and Clinical Health Act (HITECH) widens the scope of privacy and security protections available under The Health Insurance Portability and Accountability Act of 1996 (HIPPA) by increasing the potential legal liability for noncompliance as well as providing for more enforcement.

Big Data

While HIT can be transformative with respect to health care – not to mention the economy –

NJIT Receives Grant

learning, multitier mentoring – to become a part of the cybersecurity workforce urgently needed to protect the nation's critical infrastructure.

In addition to being awarded the NSF grant, NJIT, where the College of Computer Science encompasses more than a quarter of the student population, was recently designated a Center of Academic Excellence in Cyber Defense Education by the National Security Agency and Department of Homeland Security and houses New Jersey's Homeland Security Technology Systems Center, a Cybersecurity Research Center and a large volume of funded research piloted by the SCI team.

"We envision offering our graduates a rich educational experience, thanks to the academic and research environment that NJIT provides," said Oria. "We'll expose them to the latest technologies and advances in the field of cybersecurity, while attracting significant visibility to our institution and our program, thereby raising the profile of our graduates." ◼

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Expert View

what is to be done with all of that data? According to an Institute for Health Technology report, Transforming Health Care Through Big Data, health care data in the U.S. reached 150 exabytes in 2011. To put this in perspective, that would equal 150 billion gigabytes – hundreds of times more than all of the information stored in the U.S. Library of Congress. This poses enormous questions as to data use, ownership, organization, protection, storage and disposal. As such, it is incumbent upon HIT stakeholders (medical professionals, consumers, vendors, government and academia) to develop best practices to address these issues.

Resources

The U.S. Department of Health & Human Services (hhs.gov), healthIT.gov, and the Centers for Medicare & Medicaid Services (cms.gov) offer copious HIT information. The State of NJ Department of Health offers a knowledge center on its website (nj.gov/health/njhit) that includes an information exchange network, a privacy and security guide, electronic health records (EHRs) incentives and other valuable resources. ◼

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Newark Company

The National Institutes of Health has allocated over $30 million over the last few years to leading medical research facilities for Phase II clinical trials using PDT treatment on an expanding number of cancer types. Simphotek itself was a recent recipient of a Phase I grant from the NIH, and is hopeful of receiving a Phase II grant in the coming weeks. Potasek explains, "With our Phase I NIH grant we were able to use our software to accurately model treatment light measured in lab settings. With a Phase II grant, we will develop a prototype product that physicians will be able to use in their clinical trials."

Simphotek's partners include the PDT teams at both the Hospital and the Smilow Research Center at the University of Pennsylvania. Dr. Keith Cengel of the University of Pennsylvania Hospital explains that "Simphotek has developed both tools and algorithms that are targeted specifically toward photodynamic therapy (PDT), and the potential for fast … light fluence distribution calculation for clinical application is truly significant and innovative, since no commercial treatment planning system are in existence for photodynamic therapy." Dr. Theresa Busch, associate professor of radiation oncology at Penn describes Simphotek's contribution as "accelerating the entry of PDT into the era of personalized medicine."

Simphotek has also begun to work with the Roswell Park Cancer Institute in Buffalo, NY, part of the university system of the state of New York. Dr. Gal Shafirstein, professor of oncology at Roswell Park describes Simphotek's developments as, "very important to the field", adding that "much opportunity and significance exists in the development of software for modeling PDT-tissue interaction, which when applied has the potential to improve therapeutic responses."

As with any new medical technology, the regulatory path is arduous. "We've retained consultants to help us navigate the path to FDA approval" according to Dr. Gene Parilov, Executive VP of research and development at Simphotek. "And we're hoping to leverage the work already under way with our partners at Penn and Roswell Park as much as possible."

As with any early stage company, the process of raising funds is time-consuming. "We're always trying to stay one step ahead of our financing needs," according to Steve Literati, chief financial officer at Simphotek. "We're beginning to make presentations to potential investors in anticipation of future funding needs."

"We think we've got a very compelling investment proposition" says Karl Beeson, Simphotek VP of Technology. "We have two patents on the algorithms that calculate optimal light strength. And our team of four is very experienced – three PhD's and an MBA, with a great deal of both past entrepreneurial success and big company experience."

The fight against cancer continues. In Vice President Joe Biden's January speech, he concluded: "Research and therapies are on the cusp of incredible breakthroughs, an inflection point." The Moonshot, according to Biden, will require breaking down silos that slow the sharing of scientific developments. Simphotek, comprised of physicists and mathematicians, is an example of a group that is using its multidisciplinary expertise to break down silos to improve outcomes. ◼