

Multi-Grantee Technical Assistance Meeting: The Emergence of Community and Statewide Health Information Exchange (HIE)

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1. Background

The Agency for Healthcare Research and Quality (AHRQ) Health Information Technology (IT) Portfolio provides ongoing technical assistance to grantees in the form of Webinars, one-on-one technical assistance, and peer-to-peer teleconferences through the National Resource Center for Health IT (NRC). Webinars provide opportunities for grantees to communicate shared experiences, address common challenges, become informed of proven successful research methods, and share other considerations in an open format.

Health information exchanges (HIEs) are gaining traction in the marketplace and provide ample opportunities for health IT research. In this Webinar, the speakers discussed the emergence of different approaches to HIE, including the data repository model and the directed exchange model, and how each approach is playing out at the State and community level. The discussion will be centered on how HIE will affect current research projects and the new research questions that are arising given recent HIE evolution.

This multi-grantee meeting, titled “The Emergence of Community and Statewide Health Information Exchange (HIE),” was held on January 17, 2013, from 3:00 p.m. to 4:30 p.m. EST. The objectives of the Webinar were to—

- Showcase emerging HIE models and provide current real life examples.
- Emphasize current progress areas and barriers.
- Guide discussion among grantees of the impacts that emerging HIE capabilities may have on current research as well as new research questions needing to be addressed.

The Webinar was facilitated by Erin Grace, M.H.A., senior manager, Health IT Portfolio and senior advisor for rural and community health at AHRQ. Presenters for the Webinar were as follows:

- Chris Muir, M.P.A., Senior Program Analyst, U.S. Department of Health and Human Services, Office of the National Coordinator for Health IT (ONC)
- James Walker, M.D., FACP, Chief Medical Information Officer, Geisinger Health System
- Andrea Hassol, M.S.P.H., Principal Associate, Abt Associates
- Mark Belanger, M.B.A., Director of Advisory Services, Massachusetts eHealth Collaborative (MAeHC)

2. Meeting Summary

Presentations

The facilitator, Erin Grace from AHRQ, provided a high-level introduction to the Webinar's topics, an outline of the event's objectives, and background information on each of the subject matter experts.

*Presenter: Chris Muir, M.P.A., Senior Program Analyst, U.S. Department of Health and Human Services, Office of the National Coordinator for Health IT (ONC)
"Statewide Health Information Exchange"*

Mr. Muir's presentation focused on the status of HIE implementation across the country through ONC's State HIE Cooperative Agreement Program. This program has awarded \$564 million across all 50 States, 5 territories, and the District of Columbia (DC). The goal of the program is to enable HIE across each State according to the national standard and to ultimately establish a nationwide HIE network.

Mr. Muir began by providing a background of the 4-year program, which is currently in its third year. It was authorized and funded through the Health Information Technology for Economic and Clinical Health (HITECH) Act, a part of the stimulus funding under the American Recovery and Reinvestment Act (ARRA) of 2009. At the time the program was launched, most States already had some sort of statewide HIE effort in place and had begun planning for the necessary infrastructure to facilitate HIE statewide. ONC created the program to support and complement the States' efforts, accommodating pre-existing models of exchange while simultaneously encouraging them to use national standards and follow national policies. When the program was initiated, no two States looked exactly alike in terms of their approach to HIE or level of investment in HIE infrastructure. Some States were working on a single statewide HIE, some were using a market-based approach, and others were trying to drive HIE through policy.

ONC identified four main categories of current HIE models, although Mr. Muir noted that no State fell cleanly into any one of the models. The categories are as follows:

- 1) The Elevator Model: States who employ the elevator model aim to create a directed or "push-based" exchange. Many States begin with the elevator model with the goal of adopting another model in the future. This was a newer model when the State HIE Cooperative Agreement Program began and was used to describe States with very little exchange taking place who were trying to meet the anticipated Medicare and Medicaid Electronic Health Records (EHRs) Incentive Program's Meaningful Use Stage 1 criteria.
- 2) The Capacity-builder Model: In this model, a State enables exchange at a sub-State level, so a State might have several Health Information Organizations (HIOs), Regional Health Information Organizations (RHIOs), or other types of regional networks that the State will support with technical assistance and grants.
- 3) The Orchestrator Model: This model characterizes situations in which there are several different types of exchange entities already in existence, and the State provides a thin layer of exchange across the networks to connect them, thereby preventing the development of information silos disconnected from each other.
- 4) The Public Utility Model: In the case of a public utility model, there is a single exchange across the State along the lines of a statewide HIO or RHIO. Exchange of health

information takes place across the entire State, with a wide spectrum of HIE services provided directly to end-users and to sub-State exchanges where they exist.

Mr. Muir discussed some consistent challenges among the various State HIE models as well as strategies being employed to address those issues.

- Many States have widespread rural areas with very little exchange or no health IT altogether, also known as “whitespace.” Directed exchange is being used to fill those gaps.
- Some States have issues with duplication, i.e., the existence of different exchange entities performing the same functions and competing for the same search and retrieve resources. One solution is the formulation of shared services at the State level such as provider directories and master patient indexes.
- Another challenge is the presence of information silos, i.e., isolated networks and exchanges within a State. The solution in this case is to connect the nodes and enable information flow across the entities. Even if each exchange entity is performing well individually, it does not serve the general interest if data cannot follow a patient. Health information must flow, and the silos must be connected.
- Disparities in resources among health care entities pose another challenge. Regional Extension Centers (RECs), another ONC program, offer services such as technical support and grants to providers, critical access hospitals (CAHs), independent labs, and pharmacies. One example is a program in California that educates pharmacy technicians who are still in training to assist rural pharmacies begin e-prescribing.
- Local networks are emerging, and it is a challenge to help them on the ground level to get up and running and to become operational.
- States are responsible for public health monitoring, so there is significant health information exchange taking place to support public health.
- In each community, there must be trust among those who want to exchange data. States are addressing this challenge by creating accreditation and validation models for entities offering exchange services. To be recognized by the State and to obtain the State’s seal of approval, exchange entities must follow a privacy and security framework that conforms to national standards.

Mr. Muir highlighted examples for each of the four categories of HIEs. Guam is an example of the elevator model; when the exchange was initially launched, a directed approach was used. This approach was quite successful immediately, and a partnership with the Veterans Affairs (VA) and the Department of Defense (DOD) was created for the purpose of HIE. The initial use case was mammography referrals for VA patients. The military presence in Guam will be expanding in the near future due to various military base consolidations, and the directed approach will be used to increase capacity to meet this need.

The Oklahoma Health Information Exchange Trust (OHIET) is an example of the capacity-builder model. OHIET is a non-profit trust which is charged with implementing the State’s strategic plan for HIE, but does not intend to become an exchange itself. The focus is enabling statewide exchange through regional HIOs. Currently, three HIOs exist that are committed to connecting to each other.

Oklahoma has a voucher system in which providers remit a voucher to connect to the HIO of their choice, and the HIO subsequently redeems this voucher with the State. Currently, about half of the State’s 80 rural hospitals, 150 primary care providers, and the State’s medical schools have

taken advantage of this program. A number of behavioral health providers have joined as well. The State has approached OHIET to provide statewide services, including a provider directory.

An example of a public utility model is the Chesapeake Regional Information System for Our Patients (CRISP) in Maryland. CRISP is a statewide HIO, with all 46 Maryland hospitals participating in the exchange. These hospitals are feeding Admission, Discharge, and Transfer (ADT) messages to CRISP which is then able to take the messages and provide alerts to primary care providers and care coordinators whenever a patient enters into or is discharged from a hospital. In addition, CRISP geocodes the ADT information and maps it. This data supports a State program to reduce health care disparities, and can be used to identify areas with disparities to target for investment.

In conclusion, Mr. Muir presented a map of the United States, which displayed the HIE enabled by his program as of the end of the third fiscal quarter (Q3) of 2012. The States are color coded by the extent and type of exchange available. He noted that as little as a year ago, most of the map would have indicated little to no HIE present. He cited several examples, such as Massachusetts and the District of Columbia (DC), whose exchange status has increased significantly since the creation of the map.

He also presented some numbers that can be attributed in large part to ONC's statewide HIE program:

- Ninety-four (94) percent of pharmacies are actively e-Prescribing
- Forty-three (43) States and territories have directed exchange
- Over 60,000 clinical and administrative staff have access to directed exchange
- Twenty (20) States have statewide query-based exchange
- Twelve (12) additional States have query-based exchange within regions
- Over 71,000 clinical and administrative staff nationwide have access to query-based exchange
- Only four States and four territories report not having directed or query-based exchange (Q3 2012 data)
- During Q3 2012, there were 80 million directed exchange messages
- During Q3 2012, there were approximately 3 million patient queries

***Presenters: James Walker, M.D., FACP, Chief Medical Information Officer, Geisinger Health System & Andrea Hassol, Principal Associate, Abt Associates
“Improving Rural Healthcare Transitions: Research Experience”***

Dr. Walker and Ms. Hassol presented an overview of their research to improve rural health care transitions through the use of HIE in Pennsylvania. Dr. Walker provided an overview of Keystone Health Information Exchange (KeyHIE), which currently includes 35 separate care delivery organizations throughout the State of Pennsylvania including hospitals, practices, home health agencies, long-term care facilities, and pharmacies. The end goal is to include all members of a patient’s care team, including the patients themselves, by creating a connectivity infrastructure and providing valuable information services in the context of the infrastructure.

KeyHIE has a community data warehouse, to which members can send data and receive back different types of analytics. There is a master patient index (MPI) and ADT-based alerts. Additionally, KeyHIE has a networked personal health record (PHR) program with approximately 2,000 users. Through this PHR, patients have a direct connection to their data, are able to schedule appointments and message their providers directly, and can assign proxy access to a person of their choosing.

In 2010, the research team began with a straightforward research design which included plans to evaluate the following elements:

- Measure the impact of HIE on patient outcomes using claims data.
- Assess the pattern of admissions and how the pattern differed between patients whose providers used KeyHIE and those whose providers did not.
- Monitor how the exchange was used (i.e., what types of clinicians and patients used KeyHIE) and whether the patterns were changing.
- Measure patient and clinician perspectives through surveys and focus groups including assessing usability and determining barriers to use of the exchange

The team experienced challenges throughout the project, and Dr. Walker and Ms. Hassol outlined each significant challenge as well as the solution that was implemented.

Governance

When they began KeyHIE in 2005, they thought that it would be clearer to those involved if they used KeyHIE for treatment purposes only and excluded payment and operations, two additional uses permitted under the Health Insurance Portability and Accountability Act (HIPAA). In retrospect, this scope was too narrow and the team needed to go back to all original participants and amend the data use agreement (DUA) to add language-enabling research.

Patient Authorization

Patient authorization has presented a significant challenge. Currently, there are 4 million patients in the 40-county area served by KeyHIE. When this exchange began, Pennsylvania was an opt-in State; however, a year ago a law was passed to allow patients to opt-out of exchange participation. As a result of the regulation, specially protected information such as drug, alcohol, sexually transmitted disease, and psychiatric data is now excluded from the exchange. According to the team’s interpretation of the current law, a patient must sign consent for *each* health care company from which they receive services. The task of patient authorization is difficult and

expensive. Some facilities have high rates of consent and some have very low rates. Dr. Walker's team is currently assessing a tool which it hopes will accurately automate searching of clinical documents to detect any sensitive information. This method has found that 97 percent of documents do not contain specially protected information and, as such, can be made available. After testing and validation, the team hopes this tool will provide a cheaper and more effective way to incorporate all patient information into KeyHIE automatically.

Data from multiple platforms

Another challenge is reconciling data from multiple platforms. This project began with legacy homegrown platforms, which were linked together to form an HIE infrastructure. Many users have subsequently been transferred to a newer commercial platform. Currently, there are three types of users: those using the legacy system, those using the newer commercial platform, and those who access KeyHIE through their EHR. This presents a problem of different information being available about a given user depending on his or her method of access. The legacy systems have limited user profiles, while the commercial platform tracks users and contains a standard user profile so that researchers have information about these users. However, the research team has no information on those users who access the exchange through their EHR. It presents a research challenge when equivalent information is not available across users. The team has worked to backfill the legacy users' profiles and is working with the EHR vendors to extract information about users to standardize information across mediums. The use of parallel systems can make it extremely difficult to obtain data comparability.

Data sources

Dr. Walker's team was unable to obtain claims data as hoped, and the lack of this data source presents difficulties in assessing patient outcomes. The HIE itself contains both clinical and Admission, Discharge, and Transfer (ADT) information, so the team is planning to rely exclusively on the exchange to look at patient outcomes. However, this presented a new challenge: Are the data in KeyHIE accurate and complete? The team compared ADT dates from KeyHIE with billing data from four hospitals and found almost no discrepancy, implying that this data was accurate and complete. Next, the team needed to determine whether diagnoses in the HIE matched EHR data. Unfortunately, the admitting diagnosis in the HIE did not match the final diagnosis documented in the EHR more than 90 percent of the time. Further confounding this effort is the format of continuity of care documents (CCDs). These are static documents with embedded data, making the data difficult to analyze. The team is currently testing a tool that it hopes will be able to extract diagnostic information from CCDs and make it available as discrete, analyzable data to meet research needs.

Surveys are another data source used by the team. Without a complete list of all patients in KeyHIE, it has been a challenge to find good lists of patients and clinicians to survey. Their solution has been to use convenience samples: obtaining patient lists from a large participating insurer and surveying those patients with case managers. They are gathering input on patients' thoughts and concerns about the use of HIE and the sharing of their electronic data, as well as assessing patients' use of their PHR. Additionally, the team is surveying clinicians who have registered to use KeyHIE about their experiences to see if they find the exchange useful and usable.

The research team is using focus groups to learn about non-users in order to avoid any selection bias. Former KeyHIE users, as well as frequent and infrequent users, were invited to participate.

The team tried to make the focus groups as convenient as possible and have offered phone interviews where a subject could not attend the focus group in person. They have also tried to reduce participant burden by stretching out the interval of surveys so participants are not overwhelmed.

Dr. Walker and Ms. Hassol noted that the biggest challenge for research is the continual and quick evolution of HIE and offered several examples of their attempts to adapt to the rapidly changing HIE environment. Home health care (HHC) providers and nurses have difficulty participating in exchanges, as they have few spare resources. However, they are required to send electronic documents to Medicare for payment, and these documents contain considerable clinical information. Dr. Walker's team worked with the Department of Health and Human Services to create a clinical extract of these documents that is used to transform the relevant information into CCDs which then become a part of KeyHIE. As a result, HHC providers could contribute valuable patient information to the exchange.

The team is also surveying non-Geisinger and college student users of the PHR to try to understand how those groups use the PHR and what their thoughts are on related topics such as information security. They are currently planning a survey of all State HIEs to see which organizations are aware of their HHC clinical data transforming tool and which groups are considering using it to increase HIE data inclusion.

Presenter: Mark Belanger, M.B.A., Director of Advisory Services, Massachusetts eHealth Collaborative (MAeHC)
“The HIway: A Look at the Massachusetts Model”

Mr. Belanger presented an overview of the HIE model currently being implemented in Massachusetts. On October 16, 2012, Massachusetts held a “Golden Spike” event, named after the 1869 East-West joining of the transcontinental railroad in Utah. At this event, nine organizations sent production transactions over the Massachusetts HIE, HIway. Massachusetts’ Governor Deval Patrick’s medical record was the first to be sent over the exchange.

Several different types of patient summary record transactions occurred during this event, including sending continuity of care documents (CCD) from—

- Eastern hospital to western hospital
- Accountable Care Organization (ACO) to ACO
- Hospital to practice
- Suburban hospital to academic medical center
- ACO to quality data warehouse
- Hospital to referring primary care physician (PCP)
- ACO to health plan

The demonstration was intended to show that the barriers to information exchange between health care organizations in Massachusetts are decreasing and that everyone can use the HIway to send information. The strategy employed was to build a simple technical infrastructure first and once the value of the HIE had been demonstrated, the infrastructure could be built upon. Massachusetts spent time simplifying its policy in order to remove any initial complexity that might impede the formation of the HIway. Currently, the HIway is experiencing quick adoption and the hope is that it will be the predominant intraorganizational exchange in Massachusetts.

Phase 1 of the exchange consists of secure email, with no centrally stored information. There is no centralized consent management: patient consent is pushed out from the HIE to members who are responsible for gathering consent.

Phase 2 is in the planning stages. The concept behind this phase is to enable analytics and population health. The key difference in the Massachusetts model is the lack of centralized data. There will be a clinical data repository held by Medicaid and also potentially at the Department of Public Health so that these organizations can perform each of their functions; however, the HIway will be used for data transport, not storage. There are several ACOs in the State that will require complex data exchange and will be setting up their own exchanges at the regional level. The HIway will likely combine these exchanges with complex analytics and bring in payment data as well so that the ACOs can participate in the Medicare Shared Savings programs.

The ultimate goal is to progress to phase 3, which will contain a search and retrieve infrastructure.

The phase 1 technical infrastructure is very simple: it consists of a provider directory and a certificate repository, which is a set of keys to help lock and unlock messages. There is also an adapter that can consume different types of messages and transform them from one standard to another without opening so that security is not compromised during transfer over the HIway.

Finally, for those who do not have robust EHRs, there is a lead portal mail box so that everyone can have access to the exchange in some manner.

Massachusetts has organizations across the spectrum of health IT sophistication; some have highly advanced systems, and some still do not have EHRs. The Massachusetts HIway decided to meet organizations where they are and work with their current level of health IT implementation. HIway created three different ways to connect to the exchange. For those with EHRs that can communicate with the HIE, the clinician need never leave the EHR to access HIway; the connection will appear seamless. For those without any form of EHR, there is a Web browser that can be used to access the exchange. Finally, for those with systems with impediments to getting information out of the EHR, there is a workaround called a LAN appliance. The LAN appliance can take almost any type of information from an EHR, package it, and send it to the HIway.

Looking forward, phase 2 of the HIway is moving toward new services to determine medical record location. There is value to understanding where a patient is going for his or her health care services. Once that ability is in place, the HIway will build a retrieval mechanism, so that providers can pull the patient's record into their system and query it.

Massachusetts has advanced public health reporting, including the ability to send reports to the immunization and cancer registries, send information regarding opioid treatment and childhood lead poisoning, as well as report syndromic surveillance.

Future plans also include patient-directed messaging. Patient authentication is difficult and presents one of the biggest challenges, so the HIway is working with the health insurance exchange to provide patient authentication. Eventually, there will be patient participation in the HIway, and later stages of this will require centralized consent. Massachusetts has a new health reform law that contains new language around the topic of consent, and the HIway will need to adapt to meet the needs of the new language.

The Massachusetts HIway is ultimately designed to enable community level exchanges, such as ACOs, to complete their work. Health data will accumulate in the ACOs and the State government agencies. This community-level aggregation of data is an important shift, and the interest in population health is growing.

3. Questions and Answers

This section contains all the questions asked by participants throughout the Webinar and the presenter and facilitator responses.

Question 1: *Can you please clarify what is meant by “Stage 1 Meaningful Use”?*

This refers to the health IT funding that was included in ARRA in 2009 that established the EHR incentive program. This included a requirement that CMS, in collaboration with ONC, develop criteria to show that providers are meaningfully using EHRs in order to qualify for incentives. The Meaningful Use (MU) criteria are being implemented in three stages. MU Stage 1 was implemented in 2011, MU Stage 2 will be implemented this year, and CMS is currently working on criteria for MU Stage 3. You can learn more about this at the ONC Web site here: <http://www.healthit.gov/policy-researchers-implementers/meaningful-use>

Question 2: *Is there a standard data dictionary for HIE?*

Although there is quite a bit of variation in the market, there is convergence on the continuity of care document (CCD), which defines the data fields exported/imported among contributing EHR systems. Vocabulary is converging in several areas such as medications (RxNorm) and labs (LOINC). Currently, individual HIEs are creating their own data dictionaries. For example, Dr. Walker’s research team created a data dictionary for KeyHIE so they would have standard definitions for core concepts; however, they are not aware of any broader standards. Another attempt to move toward standardization is found in the Meaningful Use certification process for EHRs. The requirements are becoming more granular as relates to EHR data elements, and HIE will need to be able to support these data types, so over time more consistency in data elements will be observed.

Question 3: *Is KeyHIE facilitating directed exchange in addition to query-based exchange? Is it able to manage unstructured messages and portable document format files (PDFs)?*

Yes, KeyHIE is currently facilitating both directed and query-based exchange. It is able to capture PDF files and does support secure messaging, which is email between clinicians and patients in a secure environment.

Question 4: *I have been trying to do research with HIE data for awhile, and it’s good to hear that some of the challenges are common across different platforms, States, and policies, etc. Like Dr. Walker’s team, I have also experienced issues with diagnosis data. Regarding the sequestration program Dr. Walker’s team is putting in place which separates sensitive information, how does it handle nontextual fields such as problem and medication lists? Although sensitive diagnoses might be picked up, there are many other elements in an EHR which point toward certain sensitive diagnoses and problems that need to be handled accordingly.*

The team’s understanding is that the sequestration tool does not look through medication lists to sequester those that are related to protected diagnoses, so that is a potential weakness in the

program. However, it is in the process of being tested, so there may be more information on this issue in the next few months.

Question 5: *How can we leverage HIE and EHRs for chronic disease surveillance on a population basis? In order to track patients across multiple hospitals, we need a way for EHRs to interconnect. What are the HIPAA implications?*

The idea of interconnectivity across places of service is what everyone wants to move toward. This will enable real case management as well as cost reduction and improvement in care for communities. There are two exciting developments taking place: (1) the world of HIE is enabling systems to talk to each other for the first time, and ONC's work is helping to standardize data and reconcile vocabularies; (2) there has been a powerful shift towards ACOs. CMS is working rapidly to change payment models in health care, and this forces the reorganization of workflow and services around the patient. Entities who did not communicate previously are now talking to each other and trying to coordinate patient care and reduce duplication of services. These developments will allow new entry points for health IT research as new points of data aggregation develop and are defined by communities as opposed to companies.

Question 6: *I'm interested in strategies for integration of push HIE processes into clinical workflow and approaches to "closing the loop" on messages to ensure follow-up. Given the number of changes in HIE over the past decade, I'm hoping to gain a better sense of future direction and priorities to adapt my program of research accordingly. Who out there is looking at how the increased number of directed messages is affecting clinical workflow?*

ONC is keeping track of the increase in directed messages and has noted exponential growth in this area. The main work has been to standardize data so it can be more easily shared. An example of a use case lending itself to directed exchange is "closing the referral loop," i.e., a PCP will send a message to a specialist, and the specialist will see the patient and push a message back to the PCP. ONC is working with vendors to understand how this process works. There is still much work to be done on directed exchange; this is a nascent form of sharing data and the infrastructure to do so is just barely in place. Health care organizations are not yet at the point where they are overwhelmed with the volume of messages, which is an indication that HIEs can achieve much greater integration into clinical workflows.

Appendix A: Presenter Bios

Presenter: Chris Muir, M.P.A.

Chris Muir joined the Office of the National Coordinator for Health Information Technology (ONC) in January 2007. Currently, he is the State Health Information Exchange (HIE) Cooperative Agreement program manager, responsible for grantee oversight and support for all 56 States and territories.

Chris is also the project officer for ONC's technical assistance contract with Deloitte Consulting, which provides technical assistance to all the grantees in the State HIE Cooperative Agreement Program. Previous to ONC, Chris was the strategic projects manager for the State of Arizona, CIO's Office. Chris led key information technology projects including Arizona's Health-e Connection initiative.

Chris received an undergraduate degree in political science and a master's degree in public administration from Arizona State University.

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Presenter: James Walker, M.D.

Dr. Jim Walker designs care-coordination and health IT systems that support safe and effective patient care. He is the chief health information officer of the Geisinger Health System, where he leads Geisinger's development of a fully integrated inpatient and outpatient EHR; a networked patient health record (PHR) used by 191,000 patients; a health information exchange that serves 2.5 million patients; and the Keystone Beacon Community. He leads ONC- and AHRQ-funded studies on care coordination, health information exchange, and health IT safety.

Dr. Walker is a member of the HIT Standards Committee of HHS and chair of the Committee's Clinical Quality Work Group. He is a member of the National Committee on Vital and Health Statistics and consults regularly with NIH and IOM. He has published numerous peer-reviewed articles and a widely used book entitled *Implementing an Electronic Health Record System* (2005). Dr. Walker earned his medical degree at the University of Pennsylvania before completing a residency in internal medicine at the Penn State Hershey Medical Center.

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Presenter: Andrea Hassol, M.S.P.H.

Andrea Hassol is a principal associate and evaluation specialist with Abt Associates in Cambridge, MA. Ms. Hassol specializes in evaluating federally funded health IT initiatives. She collaborates with Dr. Walker and currently leads the evaluation teams for Geisinger's Health Information Exchange research grant and their Beacon Community program. In the past, they together evaluated the Geisinger patient health record portal and an early clinical decision support effort to improve preventive services for diabetics; they recently developed and tested a Web-based tool to consistently categorize and manage health IT hazards.

Ms. Hassol is the principal investigator for Abt's ACTION network and directs a current ACTION project to explore the workflows in ambulatory physician practices that use health IT to gather patient-reported information. She earned an M.S.P.H. in health policy research from the UCLA School of Public Health.

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Presenter: Mark Belanger, M.B.A.

Mark Belanger leads the Massachusetts eHealth Collaborative's (MAeHC's) statewide health information exchange projects for Massachusetts, New Hampshire, North Carolina, and Missouri. Mr. Belanger has expertise in health care strategic planning and multistakeholder workgroup facilitation as well as deep experience in the health care information industry. Prior to joining MAeHC, Mr. Belanger was a member of the Booz Allen Hamilton Healthcare and IT practice, where he led large and complex multistakeholder health care information technology projects in the United States and Australia.

Mr. Belanger holds a master's degree in business administration from Babson College and a bachelor's in music education from the University of New Hampshire.

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