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Driving Adoption and Innovation In Health Information Exchange

HIT Standards Committee - Implementation Workgroup

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Driving Adoption and Innovation in H.I.E.

There is nearly universal recognition of the need for change in our healthcare system and of the central role that H.I.T. will play in accomplishing our broad health care goals:

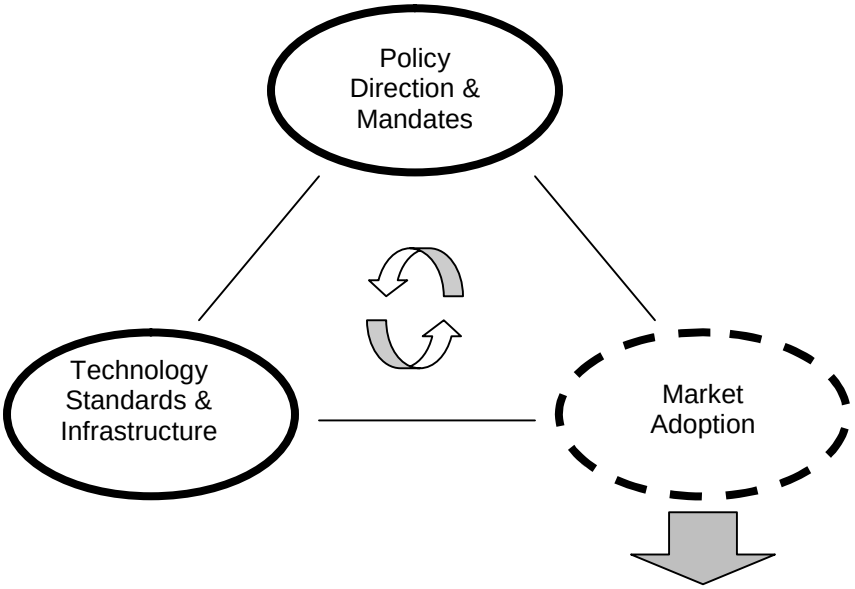
- Support evidence-based improvements in the quality of treatments
- Have wellness and chronic condition management play a more prominent role in cost and quality management
- Operationalize innovative new payment mechanisms to drive the desired cost and quality outcomes
- Protect patient privacy in a new age of broadly available electronic clinical information

HHS is making significant investments to help meet these goals by driving the adoption of NHIN and electronic medical record systems. These efforts have helped the industry recognize the complexity of the adoption task at hand. The early comments on the CMS NPRM by many industry participants illustrate this adoption challenge.

To drive the automation of health care, HHS has clearly identified policy mandates and the technology standards which will enable them. . There has been less discussion of the specific requirements of market adoption beyond the technical and policy choices that describe how the infrastructure should work. Adoption should be considered a third dimension with its own unique requirements that drive H.I.T. strategy.

This discussion will focus on developing a framework which supports strategies that drive adoption and will suggest some specific approaches to help with the adoption challenge. Without broad market adoption, the goals established through the remarkable work of the ONC Policy and Standards Committees cannot be realized. “Meaningful Use” is intrinsically dependent upon adoption; without widespread adoption, we will not reach the goals that promise to transform our healthcare system

The Three Dimensions Driving Health Care Automation



Market Adoption Requirements	
Value Proposition	Broad market acceptance of a clear value proposition for each participating organization
Business Case	Sufficient ongoing ROI for investments in deploying new technology for each participating organization
Operating Feasibility	Change management/industrial engineering analysis of the feasibility of required workflows, data availability and operating processes
Critical Mass	Sufficent availability of the key data and processes necessary to support the business case and value proposition (“*the chicken and egg dilemma”)*
User Acceptance	Sufficient end-user value proposition and/or the organizational ability to mandate use
Time to Market	Broad market adoption must be accomplished in a time frame that retains market interest and creates momentum
Liability	Participating organizations must have mechanisms in place to protect against the liability associated with the sharing of health information
Privacy	Consumers must trust the confidentiality and safety of protected health information (PHI) and must be empowered to manage their participation and consent

HHS/ONC has certainly recognized the importance of adoption. The availability of ARRA funding to strengthen the business case for providers and Dr. Blumenthal's encouragement of the need for providers to automate as a "professional" requirement are clear examples. However, our policy and technology choices to date have led us to a largely "all or nothing" adoption strategy of health information exchange (HIE). No single method of exchange is likely to be able to achieve broad market adoption and facilitate the innovation we need to succeed in meeting our health care goals.

Methods of Exchange

We need to explore multiple exchange approaches to help us meet our adoption goals . NHIN Direct is a good example of an emerging new adoption strategy. NHIN Direct recognizes the market opportunity to facilitate a more limited version of health information exchange by lowering the cost of participation and leveraging existing provider workflows. There are many other methods of exchange which should be explored and could help drive adoption. The following table suggests several methods of exchange which should be considered.

Methods of Exchange	Description
State or Community-Based RHIO	NHIN "network of networks" with comprehensive patient data made available to treating providers through EMRs
Affiliated Multi-Site Organizational Exchange	A single organization establishes business relationships and an internally controlled exchange of clinical data
Provider to Provider Direct	Enables provider controlled exchange through direct office-to -office communication
Third Party Patient Aggregators	Organizations with a business interest in individual patients assemble and disseminate individuals' clinical information across the continuum of care
Targeted Process Automation	Specific outcomes are directly targeted with programs that aggregate the necessary patient data to support the business/clinical process and deliver to providers the automated process needed to complete the targeted transaction.
Consumer Centric Aggregators	Organizations that recruit and support consumers in managing their health care

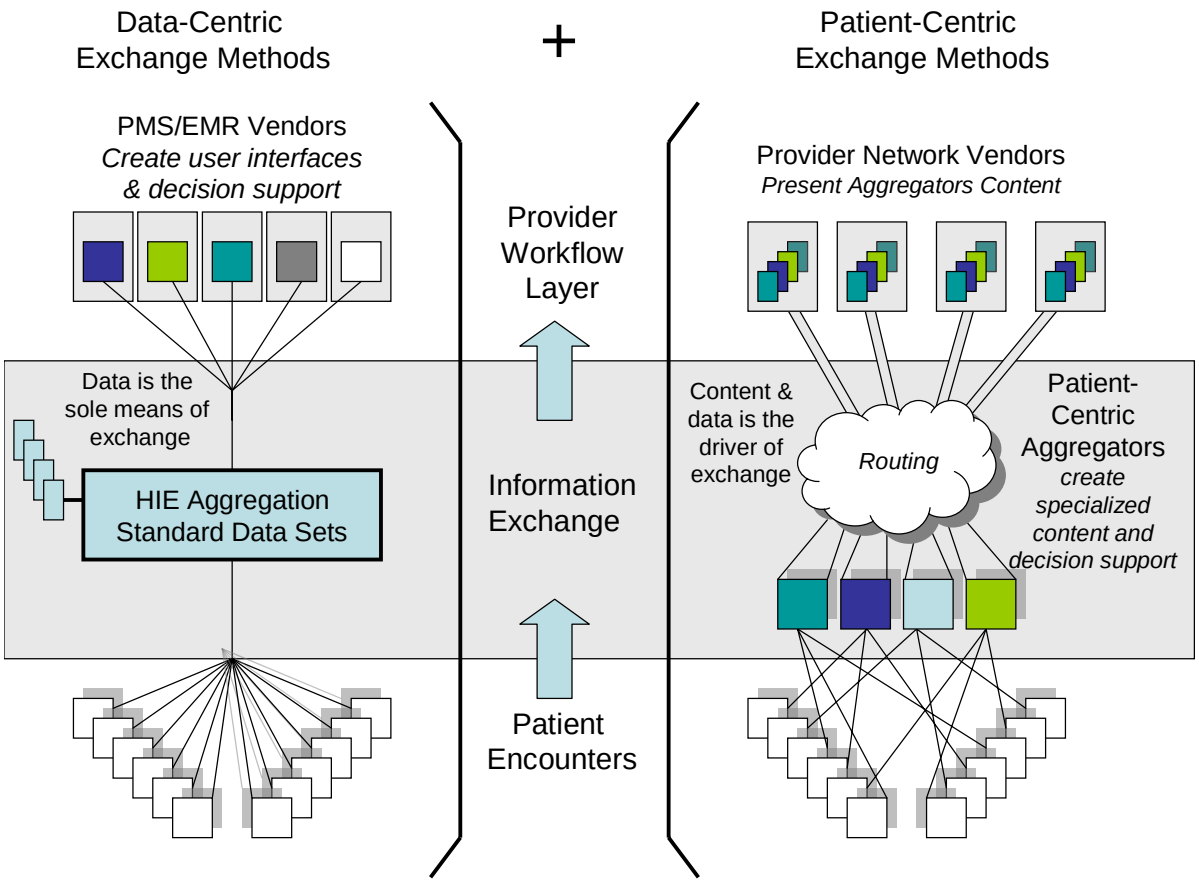
Each of these methods of exchange has a unique set of characteristics that both support and challenge the method's ability to meet the market adoption requirements. By combining the two proceeding tables, these differences become more clear.

Evaluating Variability of Adoption Requirements for Each Method

Market Adoption Requirements	Method of Exchange					
	Data-Centric		Messages	Patient-Centric		
	State or Community-Based RHIO	Affiliated Multi-Site Organizational Exchange	Provider to Provider Direct	Third Party Patient Aggregators	Targeted Process Automation	Consumer Centric Aggregators
Value Proposition	Better coordinated care	Better outcomes and patient support are competitive differentiators	More cost effective and simpler communication	Diverse set of value propositions	Rapid time to market with clear ROI	Better support for patients in navigating their health care needs
Business Case	Evolving but still unclear	Increased market share and customer satisfaction	Lowers cost of office-to-office communication	Supports core businesses (e.g., disease management, wellness, behavior change, health plans, etc.)	Processes are identified and prioritized based on ROI and feasibility, accelerating innovation and refinement	Multiple proven and emerging business models from advertising to direct consumer payments
Operating Feasibility	Significant technical and goverance challenges	Exchange enabled by intra-organizational control and pollicy	Leverages an existing market process of exchanging clinical information between offices	Intra-organizational control of aggregation and dissemination		
Critical Mass	Requires broad community support and EMR adoption			Data and process aggregation occurs at the level of a single transaction	Fragmentation requires new methods of engaging providers to obtain critical mass but enables single organizations to create complete content/process	
User Acceptance	Function of EMR adoption			Leveraging existing provider office workflows required to address fragmentation of sources		
Time to Market	3-5+ years		Nearly immediate within established networks; otherwise, an extended process of establishing new networks			
Liability	TBD	Effectively no change because the liability already exists within existing business models				
Privacy	Determined by politics and regulation	Organizationally controlled subject to regulations	Patient-centric nature of exchange enables flexibility to extend regulatory minimums to meet individual needs and help drive adoption			

In developing our national strategy for creating health information exchange, we must be both pragmatic and recognize that innovation in clinical practice, behavior change, and payment mechanisms must all be supported and encouraged by our frameworks for exchange. No single method of exchange can address the full complexity of the health care industry and also meet the market adoption requirements. We must develop and support many methods of exchange to accomplish our broad health care goals.

In fact, the entire industry will be restructured by the methods of exchange that are ultimately selected. The following diagram demonstrates the market models that would emerge with different methods of exchange.



In the data-centric methods of exchange, both the user interface and decision support are embedded in EMR vendor applications. Information exchange occurs in these methods through the passing of raw data obtained from RHIOs and other centralized approaches to data aggregation. Effectively, the industry would evolve into two branches: the application vendors that directly support the users and the data aggregators that feed data to those EMR vendors.

In the patient-centric methods of exchange, the industry structure would be more evenly and widely distributed across multiple layers of industry participants. First, data aggregation would be distributed across multiple organizations that would each independently support the specific needs of the patients/consumers that participate with their organization. These organizations would have great flexibility in selecting the best sources of data, analyzing and synthesizing that data, and presenting the information to end users. Due to the wide variability of requirements necessary to support different kinds of patients

and their caregivers, there would be significant specialization in the approaches to exchange here. Given that there are multiple sources of patient information, a second layer of industry participants would create provider networks to receive the content and aggregate the presentations into a user friendly workflow

Driving Industry Innovation

Every method of exchange becomes a new platform for innovation. But again, the ground rules for innovation in each method of exchange are different.. The following table highlights some of these differences.

Broad Health Goals	Data-Centric Exchange	Patient-Centric Exchange
Support evidence-based improvements in the quality of treatments	NHIN access to broad data sources to identify best practices which are then incorporated into EMR vendors' individual applications as part of an ongoing certification process	Aggregators control of end-user screens allows for more rigor in clinical data collection (for example, in drug trials) and enables each aggregator to provide clinical decision support directly to treating providers
Have wellness and chronic condition management play a more prominent role in cost and quality management	NHIN access enables patient support vendors to obtain patient information and allows innovation in approaches to patient support	Aggregators control of end user screens enables patient aggregators to engage providers directly in innovative new shared accountability models for patient support
Operationalize innovative new payment mechanisms to drive the desired cost and quality outcomes	Institutional quality metrics can form the basis for new payment mechanisms with numerator/demoninator based formulas	Wide opportunity for innovation as patient aggregators can independently deliver new financial incentives at the level of a specific patient and are not limited by the user interfaces of each local office EMR application
Protect patient privacy in a new age of broadly available electronic clinical information	Requires the establishment of broad sets of widely trusted relationships that limits innovation in supporting patient privacy	Each aggregator obtains patient consent and can offer innovative extensions to meet the needs of individual patients

A good example of the value offered by expanding the methods of exchange can be illustrated by looking at the “Meaningful Use” quality metrics developed by ONC. These quality metrics are excellent candidates for demonstrating the value of the targeted process automation method of exchange and for showing the importance of focusing on market adoption requirements as a critical component in developing an exchange strategy. The appendix discussion on Patient Centered Quality Practices (PCQP) describes this opportunity

Market Experience with Patient-Centric Methods of Exchange

NaviNet is one of several provider network players in the market today that can support new methods of exchange for clinical data, information and process. Over the past 12 years, NaviNet has built a network of over 850,000 providers in the United States. The NaviNet platform is currently delivering content from patient aggregators in the form of care alerts and personal health records in exactly the manner described above, across a broad network of providers. While NaviNet is in the early stages of establishing this new category of clinical exchange, our customers are seeing significantly improved rates of closure for care gaps using this method of exchange and notification. Incorporating payment reform into these transactions is a natural next step.

In addition, our experience with this model challenges some assumptions that lie at the foundation of the H.I.T. industry. Many believe that users will only accept data presented in a homogenous fashion within their end-user applications. That has not been our experience. We are providing our end users with both standard and non-standard presentations of data and processes. This flexibility allows patient aggregators to automate their unique business process directly with end users in the NaviNet network. As a result, the range of self-service options and real-time process automation is much broader and more effective than what has been achieved by the industry though a standards-only based approach.

NaviNet achieves high provider satisfaction across the network by making real-time processes available with detailed, aggregator-controlled screens that enable offices to avoid phone calls and other manual processes. Our provider office users voluntarily elect to conduct hundreds of millions of real-time transactions per year with our business partners. The vast majority of these transactions are presented on non-standard screens. The industry savings from the adoption of these automated processes results in significant cost savings and much faster turn-around times.

By making existing provider networks, like NaviNet, a component of our NHIN strategy and architecture, ONC can significatly accelerate progress in exchange and simultaneously establish an infrastructure framework for innovation in the industry. At the same time, broadening the methods of exchange can leverage the expertise and capabilities of other industry players to better support the complex requirements of our healthcare system. Good examples of these industry players include disease management companies, clinical research organizations, consumer health vendors, modular application vendors like those in the Clinical Groupware Collaborative, and technology companies such as Microsoft and Google.

Conclusion

Market adoption requirements must be carefully considered in the development of our NHIN strategy. By broadening the industry's vision of exchange and the definition of NHIN, ONC can both accelerate exchange and enable the rapid innovation necessary to meet our health care goals. Innovative new approaches can seldom be accomplished at a national scale. In today's environment, there are currently no established best practices for payment reform or patient behavior change, and our best clinical practices will continue to evolve. In each case, evidence-based market experimentation and adoption will be essential to determining the effectiveness of our health information exchange strategies. NHIN can and must facilitate innovation by enabling new approaches for exchange and by encouraging the adoption of new best practices. The best path to achieve this innovation is broadening the methods of exchange.

APPENDIX:

Example of Targeted Process Automation Method of Exchange

Automating Quality Improvement: Patient-Centered Quality Practices

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The Changing Landscape of Healthcare

With the impending healthcare reform legislation, both the public and private sectors appear ready to take action on improving the quality, reducing the cost and expanding the accessiblity of healthcare. As we move forward, there is a nearly universal recognition of the need for change in our healthcare system to accomplish the following goals:

- Support evidence-based improvements in the quality of treatments
- Have wellness and chronic condition management play a more prominent role in cost and quality management
- Operationalize innovative new payment mechanisms to drive the desired cost and quality outcomes
- Protect patient privacy in a new age of broadly available electronic clinical information

To accomplish these objectives, healthcare in the 21st century must focus on effectively operationalizing the following:

- Measuring and reporting quality outcomes based on compliance with evidence-based practices and evolving clinical knowledge
- Driving the behavior changes necessary to implement these practices with both providers and patients
- Automating the healthcare industry to support the aggregation of data, the delivery of clinical information and to operationalize new business and clinical processes
- Ensuring appropriate patient privacy and public support for clinical data sharing

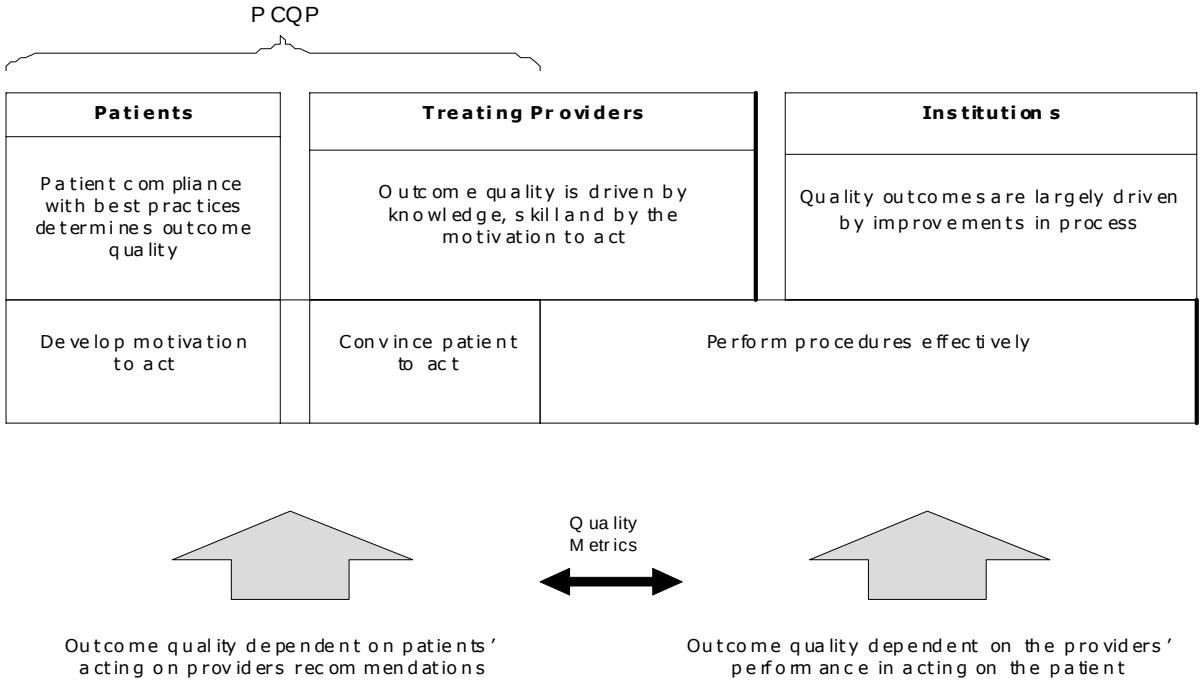
The current healthcare reform legislation and the ARRA/HITECH Act both recognize the importance of quality and automation as key drivers in moving the US healthcare system forward. As the industry begins to implement the HITECH Act, there is also a growing awareness of the complexity of the task at hand. The industry needs to consider all available tools in addressing this complexity. This document discusses an approach to complement the current efforts at deploying electronic health records and Health Information Exchanges (HIE).

Introducing Patient-Centered Quality Practices (PCQP)

PCQP focuses on the patient's behavior as a critical driver of quality outcomes. Consider a very common scenario with quality outcomes: When a physician orders a new prescription for a patient, in compliance with evidence–based guidelines, the actual improvement in outcomes is still dependent on the patient. If the patient fails to take the medication there will be no improvement in quality. No matter how much we improve clinical delivery, there are many cases where the improvement in outcomes is totally dependent on the patient's compliance with the evidence-based best practices recommended by his/her providers. This joint accountability must be addressed if we are to drive improvements in cost and quality.

The public sector is investing heavily in establishing institutional quality metrics and in supporting the adoption of electronic medical records to deliver evidence-based clinical decision support and report on clinical quality. PCQP complements this approach by focusing on the patient's role in improving outcomes. PCQP recognizes the role of the patient in maximizing quality outcomes by leveraging the trusted relationship that patients have with their providers to help drive patient behavior change.

Behavior change needs to recognize the shared accountability of all three participants in the process: patients, providers and institutions.



PCQP defines a collection of programs and approaches because there will never be a single best practice for changing individuals' behaviors. There is a growing body of evidence in the behavioral sciences of the need to tailor behavior change programs to the individual. (See Motivational Interviewing in Health Care: Helping Patients Change Behavior, Stephen Rollnick, William R. Miller, and Christopher C. Butler, 2007.) This knowledge, however, will be ineffective unless the industry creates the mechanisms and infrastructure necessary to support behavior change programs.

PCQP also recognizes the challenges faced by treating providers in supporting patient behavior change. Current payment approaches don't reward providers for supporting patient behavior change. When information about a patient's non-compliance is made available to providers, they can mention it to patients, but without additional financial support, providers are unlikely to be able to either make follow-up phone calls with the patient or spend the time with the patient to find the most effective way to motivate that patient to commit to becoming compliant. PCQP enables the delivery of incentive payments to physicians at the level of the individual patient to enable treating providers to invest the time and resources necessary to support an individual patient's behavior change.

A good example of PCQP would be medication compliance. Hypertensive patients who are not taking their blood pressure medication drive up long-term costs and reduce their quality of life. In this example, PCQP supports patient behavior change by notifying providers of the individual patient's non-compliance with a known best practice, and delivers the necessary incentives and process support to motivate the provider to engage in changing that individual's behavior. By contrast, in an institution-centric approach to mediation compliance, the individual patient would be grouped with all other hypertensive patients in a practice and the institution would be measured based on the percent of hypertensive patients in the practice who are taking the recommended medication. This numerator-denominator approach is a very indirect and far less effective approach to drive behavior change at the individual patient level by recognizing the patient's motivational requirements. In addition, it delays progress in paying for outcomes until a full HIT infrastructure is in place. Current expectations are that the government will begin to reward providers in 2016 if all goes according to plan.

Finally, PCQP enables some important new options in delivering automation and interoperability in support of our cost and quality objectives. By focusing at the level of the individual patient and delivering a complete package of clinical data, patient support programs and business process support to treating providers for that individual, we can enable innovation in quality and drive investments in interoperability. There is a whole industry of emerging players who are focused on leveraging new Web technologies with new patient support programs to drive improvements in quality. These programs, by necessity, will be enabled by investments in aggregating clinical data on behalf of individuals and delivering to providers the necessary clinical information and decision support tools needed to help patients change their behaviors.

Principles for PCQP

- Recognize the critical role of individuals' behavior in driving many quality metrics
- Engage providers to leverage their trusted relationships with their patients to help drive patient behavior change.
- Provide incentives for treating providers to reward improvements in quality at the patient level not just the practice level.
- Leverage Web-based technologies to provide automated support for the delivery of aggregated and relevant patient information, notification of incentive opportunities, process automation, and reporting.

- Address the wide variability in individual needs for privacy by allowing patient privacy to be an individual choice.
- Facilitate investment in the aggregation and presentation of meaningful clinical information at the individual patient level and enable multiple parties to create and distribute content and process.
- Measure outcome results at the patient level not just the institution level.

HHS/ONCHIT Meaningful Use Quality Metrics

In its proposed rule making for implementing the Electronic Health Record Incentive Program, CMS has numerous examples of quality metrics with patient-controlled outcomes; from screenings that require patients to schedule follow-up visits or go to the lab for tests, to compliance with medications or recommended post discharge self-care. In each case, under the proposed CMS rules, providers will be evaluated based on their actions in ordering test and drugs, not on patient compliance. Notifying patients that they need to stop smoking or lose weight is unlikely to result in the behavior changes necessary to improve quaility outcomes and reduce cost.

In implementing the HITECH Act, HHS/ONCHIT developed a set of quality metrics to ensure that the investments made in HIT would be directed towards meaningful quality metrics that would deliver improvements in cost and quality. The following table lists the 2011 ONCHIT recommended quality metrics. Reviewing these metrics closely will reveal the importance of developing a more patient-centric approach to healthcare quality programs. For the majority of the metrics, quality improvements are dependent on shared patient and provider accoutabililty.

ONC HITECH Meaningful Use Quality Metric Recommendations

Outcomes Patient Centric	Outcomes Institution Centric	2011 Meaningful Use Quality Measures
X		% diabetics with A1c under control
X		% of hypertensive patients with BP under control
X		% of patients with LDL under control
X		% of smokers offered smoking cessation counseling
	X	% of patients with recorded BMI
	X	% eligible surgical patients who received VTE prophylaxis
	X	% of orders (for medications, lab tests, procedures, radiology, and referrals) entered directly by physicians through CPOE

(ONC HITECH Meaningful Use Quality Metric Recommendations, continued)

Outcomes Patient Centric	Outcomes Institution Centric	2011 Meaningful Use Quality Measures
	X	Use of high risk medications (Re: Beers criteria) in the elderly
X		% of patients over 50 with annual colorectal cancer screenings
X		% of females over 50 receiving annual mammogram
X		% patients at high risk for cardiac events on aspirin prophylaxis
X		% eligible patients who received flu vaccine
	X	% lab results incorporated into EHR in coded format
	X	Stratify reports by gender, insurance type, primary language, race, ethnicity
	X	% of all medications, entered into EHR as generic, when generic options exist in the relevant drug class
	X	% of orders for high-cost imaging services with specific structured indications recorded
	X	% claims submitted electronically to all payers
	X	% patient encounters with insurance eligibility confirmed
X		% of all patients with access to personal health information electronically
	X	% of encounters for which clinical summaries were provided
	X	Report 30-day readmission rate
X	X	% of encounters where med reconciliation was performed
	X	Implemented ability to exchange health information with external clinical entity (specifically labs, care summary and medication lists)
	X	% of transitions in care for which summary care record is shared (e.g., electronic, paper, e-Fax)
X		Report up to date status for childhood immunizations
	X	% reportable lab results submitted electronically

PCQP can accelerate the implementation of many of the HHS quality metrics. One of the advantages of treating the quality metrics associated with patient behavior separately, is the ability to speed their implementation. CMS has already recognized the challenge providers face in reporting a numerator and a denominator for calculating institution-centric quality metrics and may further delay implementation. The expectation is that it will be 2016 before the government can begin to pay providers for quality outcomes.

With PCQP, multiple sources are available for identifying individuals at risk and for identifying patient compliance. The example of hypertensive patient used earlier is a good case in point. Hypertensive patients could be identified in multiple places: local pharmacies, community centers, health fairs, health clubs, etc. Once indentified, a provider would be notified of the at-risk patient at the time of check-in as a part of the normal eligibility and benefits verification process. The provider would then encourage the patient to take his/her medications and would be evaluated based on the patient's compliance with their recommendation. Pharmacy benefit management (PBM) records would demonstrate whether the provider was successful in changing the patient's behavior. This PCQP could be implemented in 2010 because it leverages existing technology infrastructure and existing provider office workflows. There are many other similar examples.

Patient-Centered Quality Practices Support Interoperability

The healthcare industry has focused its automation efforts on client server-based architectures utilizing data standards as the mechanism to drive interoperability between stand-alone applications. Clearly, these are important components of our national healthcare IT infrastructure, but we should not limit our thinking to just one architectural model. Web-service architectures have received much less focus and can make a significant contribution.

We do not need to wait for the full deployment of Electronic Medical Record (EMR) systems and HIEs to begin measuring and rewarding for quality metrics that relate to patient behavior. Unfortunately, the HITECH act is being interpreted as having established an all or nothing incentive program that requires the full implementation of an EMR before individual physicians can receive any stimulus payments. We believe this was an oversight in the HHS interpretation of the HITECH Act and should be reconsidered.

There is an emerging industry of new Web-based solutions that can directly target improvements in the quality outcomes related to patient behavior change. The implementation of these new technologies and programs can enable the broad deployment of quality metrics as early as 2010 and facilitate the acceleration of cost and quality improvements by years. They do not replace the need for institutional quality metrics, but can supplement them.

The following matrix summarizes some of the key architectural challenges that must be solved in implementing institutional quality metrics. It also demonstrates the advantages of focusing on patient-centric quality metrics because they are much easier and faster to implement.

Architectural Challenges	Data-Centric Methods of Exchange	Patient-Centric Methods of Exchange
Inherent complexity of clinical data across all specialties and patient situations	Data standards must be operationalized consistently across all vendor applications, which limits both the accuracy and scalability of comparative effectiveness	Distributed data models and aggregation of patient data enable more granular control and require consistency only within an aggregator's methods - not dissimilar from industry practice around clinical trials
Lack of standard vocabulary and limited human ability to categorize consistently	A "network of networks" requires that all participants consistently use a standard vocabulary for tens of thousands of variables	Distributed aggregators can specialize in supporting specific knowledge domains and create methods for improving accuracy and consistency
Personalization of medicine	EMR vendors must individually expand their applications to support all aspects of personalization including both data and process. The result will be "orphan patients" who lack sufficient populations to justify creating new capabilities in vendors' EMRs.	Patient-centric models can support small groups of patients in the same way that the Web provides highly targeted capabilities to very small groups of individuals. In addition, because each aggregator controls the end-user screens, new discoveries can be implemented in Web time rather than requiring the establishment of new standards and then EMR compliance with the new standards – a multi-year process.
Payment reform methods are still in their early stages	Without established best practices for reimbursement, EMR vendors without standards will be unable to support new payment methodologies. Data/EMR-centric models effectively limit payment reform to institution-based quality metrics, with limited applicability to independent providers and specialists.	Reimbursements can be tied to specific patients, providing the platform for driving behavior change for both patients and treating providers. Most of the quality metrics in the MU matrix are about patient behavior change. For example, medication compliance and screening compliance are primarily about changing the behavior of individuals. It matters little whether it's a PCP or a specialist that convinces a patient to take their blood pressure medication. There is no need for both a numerator and a denominator in that equation.
Patient behavior change methods are highly variable – e.g. there is no single best practice for smoking cessation or weight loss	Data-centric architectures are effectively limited to alerting providers of the need for a behavior change on the part of the patient. EMR vendors cannot support a variety of patient support approaches inside their applications.	Distributed patient-centric architectures can deliver a full package of data and process support for treating providers to leverage the trusted relationship between patient and provider.

Architectural Challenges	Data-Centric Methods of Exchange	Patient-Centric Methods of Exchange
Privacy is highly variable, based on individual situations and needs (e.g.abused spouse sees provider – sensitive info for one individual not for another)	Consensus building is required to establish a common method for enabling patient privacy	Each aggregator of patient data can establish a unique privacy policy and enable patients to select that aggregator by managing release consent through their chosen aggregator. This enables a new market to meet consumers' personalized need for privacy.
Clinical decision support localized to EMR vendors' applications	NHIN is focused on establishing access to data, leaving providers' vendors to accomplish the decision support at the office level. Relying on providers to make the necessary investments in clinical decision support is unrealistic and in the case of specialists may be largely irrelevant.	Sophisticated clinical decision support can be accomplished by large and sophisticated organizations (including specialty organizations, disease management companies, etc.) and then delivered to treating providers as a simple Web-based process in support of an individual patient. This is highly scalable and the distribution of analysis can deal with the inherent complexity of healthcare.

Conclusion

Recognizing the role of the patients' behaviors in improving outcomes is critical and must be a key component of our technology infrastructure decisions. Recognizing the need to automate both institutionally-based quality metrics and patient-controlled quality metrics is critical. The industry needs to be clear in its technology objectives; HIT is a means and not an end. Ultimately, success will not be based on the number of providers utilizing EMR technology, but on the actual improvements in outcomes. In many cases those outcomes are dependent on patients' behaviors.

The best practices we need to improve outcomes will be discovered over the coming decades and the real success of automation efforts will be measured by the ability of new infrastructures to operationalize these new best practices. These innovations will range from new payment mechanisms, to new clinical approaches, to new ways of driving behavior change in our quest to drive quality improvements and reduce the overall costs of the healthcare system. PCQP will be an important driver in these efforts.

Its time we stop talking about the miracle of the ATM machine in healthcare and start talking about the miracle of 90 million independent Web sites that we all know how to find and use. Over the past decade we witnessed the transformative power of a well-crafted technology infrastructure to change and form whole new industries. The development of the Web created an infrastructure that stimulated and enabled both the public and private sector to transform their operations. The Web browser framework turned the Internet from a low cost network to a platform for innovation that stimulated the transformation of American commerce and American politics. We need to ensure that the new NHIN infrastructure framework can do the same for healthcare.