

A Measurement Framework to Assess Nationwide Progress Related to Interoperable Health Information Exchange to Support the National Quality Strategy

KEY INFORMANT INTERVIEW SUMMARY REPORT
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NATIONAL
QUALITY FORUM

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INTRODUCTION

Over the last few years within both the public and private sectors, awareness has increased with respect to the ability to improve the quality and safety of healthcare with interoperable health information technology (health IT) systems. These technologies include electronic health records, personal health records, health information exchanges, and medical devices. As healthcare systems are increasing their adoption of health IT, growing amounts of data are being gathered. In order for the healthcare industry to move towards better care management for patients, preventive care, and population health management, usable clinical information needs to flow freely across networks and between hospitals and physicians. For this reason, healthcare organizations need interoperability, an efficient and secure means for hospital computer-based systems and applications to communicate and exchange patient data.

However, true interoperability is a significant challenge to healthcare organizations for various reasons, including the lack of a common, standard framework that reconciles the differences in data as well as the varying data types; hospital infrastructures with incompatible products and systems; and inability to disclose the appropriate data within a hospital and with partners in its community. Insufficient interoperability prevents effective use of health data across the facility or system and does not support continuity of care at the patient level.

One of the goals in using health IT is to provide comprehensive information on patients at the point of care. Health IT should enable integrating information across different sources and sites, so that the provider can evaluate the most appropriate options for patients based on the effectiveness of treatments, including factors such as quality, risk, benefit, and costs. As the nation moves toward greater interoperability, a measurement framework and measures would be useful to assess its impact.

The National Quality Forum (NQF), a consensus-based entity and an experienced convener of multistakeholder groups for developing consensus around diverse and challenging topics, has taken on a project at the request of the Department of Health and Human Services (HHS) to develop a common framework and measure concepts to serve as a foundation to address the current gaps in the measurement of interoperability and its impact. NQF has completed an environmental scan and key informant interviews. Additionally, NQF has convened an expert, multistakeholder Committee to provide input and help guide the creation of a framework. Throughout this project, NQF solicits input from a multistakeholder audience, including NQF membership and public stakeholders.

NQF will produce a measurement framework, which will include core principles and guidance on how to fill current gaps in measurement of interoperability as well as recommendations for future opportunities for work in the interoperability field. The framework must be comprehensive and

expansive enough to encompass both the short- and long-term goals of the ONC Interoperability Roadmap. The framework must include a core set of dimensions and domains that are defined through consensus to drive toward needed measure development. The framework must be flexible to accommodate changes in data standards, data transport mechanisms, data sources, changes in settings of care, and changes in users of these systems so that it consistently provides utility for those seeking to measure and assess the effects of interoperability and its impact on quality of care.

The environmental scan provides a discussion of the current state of interoperability in performance measurement as well as the strengths and weaknesses of each approach. Key search terms and parameters informed by the Committee guided the environmental scan. The

evidence-based and emerging best practices will also direct further scanning for interoperability issues and concept development. The information from the environmental scan will be leveraged in both the design and implementation of the measurement framework.

The key informant interviews supplemented the environmental scan and helped fill gaps related to identifying examples of the current realities of interoperability and exchange of data across disparate systems; availability of data to facilitate interoperability; use of interoperability to facilitate decision making; and the impact of interoperability on health/health-related outcomes and processes. In addition, the key informant interviewees provided recommendations for implementing a framework that would be useful from their organizational standpoint.

METHODOLOGY

The Committee provided guidance to develop criteria for selecting potential interviewees that include familiarity with and experience in developing data exchange networks; knowledge of interoperability needs of and among different users (e.g., providers, patients, and family caregivers, electronic health records, personal health records, mobile apps, etc.); knowledge of technologies that support interoperability (i.e., encounter notification systems, master patient indexes); knowledge of processes and outcomes sensitive to interoperability; and knowledge of privacy and security issues surrounding the exchange of personal health information.

Eight key informant interview candidates ([Appendix A](#)) were selected from the following types of organizations: payers, health information exchanges, integrated delivery systems, health information exchange vendors, EHR (electronic health record)/HIE (health information exchange) vendors, informatics, and patient advocacy. Additional candidates from the following types of organizations were identified but were unavailable to participate in the interview: public health organizations, precision medicine, social service agencies, and accountable care organizations. The individual candidates represented a wide array of experiences with the development, implementation, and use of interoperable systems and products. They could speak to the numerous

issues around the use and availability of data, the exchange of information across disparate systems, and the impact of that information on health outcomes and processes.

NQF contacted the selected list of candidates to arrange a one-hour phone interview in January 2017. Additionally, NQF developed a semistructured protocol ([Appendix B](#)) to guide the interview with questions that align with the evidence table developed for the literature review in addition to tailored questions for the various categories of individuals targeted (HIE, HIE vendors, patient advocacy, etc.). Interview guide questions were vetted through the Committee for guidance and input prior to conducting the interviews.

Interviews were audio recorded and transcribed, and NQF developed a summary table ([Appendix C](#)) to assist in the systematic recording of data. The table identifies the major themes from the interviews and identifies each interviewee (through an anonymous numeric code) who discussed each theme. The summary table organized data and covered key themes, concepts, questions, or ideas, such as availability of data to facilitate interoperability, the use of interoperability to facilitate decision making, and issues that surround the exchange of personal health information.

RELATIONSHIP OF THE KEY INFORMANT INTERVIEWS TO THE MEASUREMENT FRAMEWORK

The findings from the key informant interviews will help inform the development of the foundational measurement framework by providing insight into the key components necessary to develop new measures that objectively assess the ability of disparate data systems to exchange information and use of the data to affect quality of care. Additionally, the development of dimensions and core elements of the framework will assist in understanding current measures that are sensitive to interoperability that can be affected and potentially enhanced through the addition of data from additional sources outside of an EHR.

In the key informant interviews, the interviewees discussed existing measures in which interoperability affected the process or outcome of care (access to pharmacy claims data, birth outcomes, closed loop referral, etc.). In addition, interviewees provided recommendations on measure concepts affected by interoperability (care coordination, care transitions, chronic disease management, etc.).

The key informant interview guide questions probe into topics that relate to the key domains in the ONC Interoperability Roadmap: identifying examples of the current realities of interoperability and exchange of data across disparate systems; availability of data to facilitate interoperability; use of interoperability to facilitate decision making; as well as the impact of interoperability on health/health-related outcomes and processes. In addition, the interview guide questions allowed for the interviewees' recommendations for the framework. Interviewees' responses included recommendations for developing measures to assess and address gaps in interoperability, as well as recommendations of how to develop a sustainable framework.

The measurement framework will represent a synthesis of the environmental scan and the key informant interviews. The goal of the measurement framework is to advance measurement of interoperability and the measurement of interoperability's impact on health/health-related outcomes and processes.

RELEVANT FINDINGS IN THE KEY INFORMANT INTERVIEWS

Many respondents discussed initiatives or projects in which they were personally involved, but they also discussed alternative payment models that have been implemented across the nation, such as Accountable Care Organizations (ACOs), and the utility and impact that interoperability would have on those models, even if they were not directly involved. Some of the key themes and terms mentioned by at least half of the respondents included:

- The use of national standards, both in clinical vocabularies and methods of transporting data, is needed to facilitate national interoperability and is critical to understand the impact of interoperability on health and process quality measures.
- To accelerate movement towards this approach, there should be both a national data model and a standardized data dictionary for vendors, programmers, and users to reference, which would help standardize the type of data that is essential for quality reporting.
- There should be a focus on the development of standard application programming interfaces that will support interoperability across diverse systems in order to reconcile the semantic differences in nomenclature.
- Apart from the exchange of information across systems, it is equally important to ensure that the information is timely and accessible when needed so that providers have real-time information at the point of care to facilitate better decision making and provide greater insight into whether a quality metric is reached during the patient encounter.
- Authorization by patients to release secure data to providers will facilitate greater transmission of data when authorized and will enable use of the data to help provide care during an encounter. Consumers must

have this ability to authorize release of their information and trust in its security. Otherwise, the development of infrastructure to support interoperability can have little impact on health outcomes and processes, and the exchange of the data to support this would be significantly hindered.

- Interoperability is not just measured by the exchange of data between systems, but also by the ability and ease for a patient to access data from these systems.
- Interoperability cannot be measured as just bidirectional exchange of information, but also multidirectional as well.

Interoperability and the Exchange of Data across Disparate Systems

Half of the respondents discussed the impact of interoperability on the exchange of data for patient engagement, care management and coordination, and the ability to provide data for reporting electronic clinical quality measures. While the interviews included discussion of controlled clinical vocabularies and evolving message standards, such as the Fast Healthcare Interoperability Resource (FHIR) developed by Health Level Seven (HL7), the primary responses were on the development and use of specific interoperable networks maintained and used by each respondent. These included the following.

Patient-Centered Data Home – This model is based on two overarching principles: (1) a patient has a right to a full, comprehensive longitudinal data record that is accessible whenever it is requested, and (2) information integrated from multiple data streams for a patient provides a better foundation for measuring quality. Patient data from an electronic health record, a Qualified Clinical Data Registry (QCDR), or another source are stored and secured at a local patient-centered

data home. When any patient receives care outside of that patient's coverage area, those data are sent back to the area in which the patient resides, and the information is stored in the data home. When that patient goes back to see the primary care provider (PCP), the full record with all the available data is accessible, regardless of where the clinical event occurred, and without the patient having to go through additional administrative procedures to gain approval for access. Apart from delivering a comprehensive care record to both the patient and the provider, the data can provide greater value to assess quality because they incorporate all the variables from multiple providers and report quality on a whole patient level.

Provider Portal – One respondent discussed a system that grants access to claims data gathered from multiple sources and delivered monthly to providers. Within an ACO, providers can see the processed claims on the patients who are attributed to their ACO. In this manner, an ACO would know whether patients who are attributed to it are seeing ACO providers for care or are going to the emergency room, an urgent care center, or some other clinical setting.

Standard Interfaces – One respondent discussed the development, implementation, and use of a standard outbound admission/discharge/transfer (ADT) interface that was implemented across provider systems within an ACO. This system has standard data on patients' demographics, medical history, and current diagnoses, procedures, and medications. This record gave each provider a common history to use in providing care. Furthermore, this standard data also led to consistency in loading and transforming the data within the ACO's enterprise data warehouse. It then became easier to use analytics to assess the health of the population within the ACO; determine where there were efficiencies and inefficiencies in the provision of services; and find out which services patients use most.

Consumer Empowerment – Two respondents discussed the ongoing development of portals or

ancillary systems to the EHR that allow consumers to request electronic medical records from providers. The system automates a request from the patient, which is then routed to the primary care physician who can authorize the release of information. It is either sent through a secure transport mechanism and delivered electronically, or through other means (such as fax) based on the capabilities of the patient. One respondent discussed the development of a system that will incorporate encounters from all the physicians that patient has seen, even if the encounters were not with a provider designated as the primary care physician.

The Availability of Data to Facilitate Interoperability

All the respondents discussed the increased availability of data resulting from the rise in adoption of EHRs; the development, expansion, and continued use of data registries; and the proliferation of patient portals and mobile devices to capture personal health information. Additionally, they all discussed that the data reflect a historical period that can cover upwards of three years for a single patient. This provides physicians, administrators, and patients the ability to query systems to find out relevant and necessary information that can aid in the provision of care. Each of the respondents also emphasized that healthcare organizations will need this data to understand the health of their patient population and use that data to better understand how to improve the quality of care provided to patients. The use of this clinical data is necessary to enable the development and utilization of population health management, translational research, and personalized medicine. One respondent stated that a best practice is to understand the types of data streams that are changing rapidly, as well as the data needs of both providers and patients. Interoperable systems must be fluid, transparent, and responsive to those changes.

Respondents provided several examples illustrating how the increase and availability of data can facilitate interoperability.

Patient Engagement – One respondent stated that patients do not have a desire to log into physician systems to retrieve their data, because they do not want to log into multiple systems. Rather, having an interoperable mechanism to manage their data is desirable, as it facilitates the exchange of information between patients and providers, and allows consumers to access the data as needed.

Use of Historical Data Integrated Across Health Systems– Another respondent discussed a current system—which provides between one to two years of emergency room data (which contained diagnosis, procedure, and utilization information), three years of admission data, and over two years of pharmacy data—that allows physicians to query the system to find out the disposition of the patients that were attributed to them. In this manner, providers can gather data that are integrated across several systems to determine improvements in the patient’s quality of care.

Integrated System Development – Two respondents discussed the need to continue to develop and expand systems such as QCDRs because they integrate data from multiple systems. This can simplify quality reporting for physicians since they will have a single place to report quality measures for the Merit Incentive Payment System (MIPS); for the Comprehensive Primary Care Plus (CPC+), which is a national advanced primary care medical home model that aims to strengthen primary care; and for ACOs.

Multisourced Quality Measures – Over half of the respondents stated that quality measurement would improve if no single measure from a single EHR carries a disproportionate weight in the overall measure score. Those measures have little meaning and do not represent the overall quality of care for a single patient as they only into account a single encounter. One example is that monitoring HbA1c for diabetic patients from an EHR record is not representative because sick patients see multiple doctors, and the sicker the patient is, the more doctors they see, so there are varying values of HbA1c that are not included in the measure. Data for these measures are often located in

other systems, and the lack of interoperability hinders the inclusion of this information. The use of multisourced quality measures, in which data come from regional data aggregators or health information exchanges (HIEs), would provide greater value to measures as they could report at a community or whole patient level.

Interoperability to Facilitate Decision Making

A majority of the respondents stated that the healthcare industry is increasingly becoming a knowledge-based community in which hospitals, clinics, pharmacies, and consumers are sharing knowledge to improve the quality of care. Because of this, the success of healthcare depends on the collection, analysis, and exchange of information between disparate systems and across organizational boundaries. Each of the respondents interviewed described how interoperability could affect decision making among both patients and providers, and the most effective ways of measuring the success of interoperability.

Patient Engagement – All the respondents concurred that increasing the ease and ability of patients to access a comprehensive health record, which would contain a complete data file from multiple sources, would improve patient engagement with their providers. Many respondents stated that this leads to better communication between providers and patients, improves the patient experience, helps advance population health, and would improve efficiency and reduce the overall costs of care.

Improvements in Efficiency – In addition to improving patient engagement, the respondents expanded on the idea that interoperability can improve the efficiency of healthcare. Several types of efficiency were described: cost efficiency in that the risk of duplication or redundant tests would be reduced; time efficiency in that a complete data record for a patient would be available to providers and practices when needed; and clinical efficiency in that physicians have access to the

most current data to base future health decisions on and could incorporate data such as social risk factors to understand their relationship to disease and their effect on outcomes.

Identification of Cost Trends – A couple of respondents discussed the ways in which interoperability would provide access to data to identify cost trends and utilization of services. One example involved patients with multiple chronic conditions who had the highest cost for a healthcare program because they were high utilizers and the systems between primary and specialty care are not always interoperable. Therefore, providers delivering services to these patients were not always aware of what had been provided, which led to an inability to optimize management of the conditions and develop effective treatment protocols that could keep the patient out of hospitals and/or physician offices. Consequently, the patient may experience poor health outcomes and high costs.

Refreshing the Evidence Base for Quality

Measures – One respondent expanded on the theme of moving to multisourced measures and away from quality reporting from a single EHR. With more data, providers would better identify the relationship between an action and an outcome, which leads to better decision making in the future. A respondent cited beta-blockers as an example. They are effective in slowing heart rates, but it is up to providers and those that develop quality measures to prove that measurement results in better outcomes, better efficiencies in care, and reductions in costs. While a significant amount of that information is already available, the accessibility and integration of current data streams to expand the source of the related measure beyond an EHR will continually refresh the evidence. This potentially leads to continual refinement of the measure to ensure that the medical action delivered leads to improved health outcomes.

Reducing Adverse Outcomes in Health – Based on answers given by six of the eight respondents, the use of interoperability can expand the

potential for quality measure development, which can assist in reducing adverse outcomes such as emergency room visits, overall morbidity, and complications from chronic disease. One respondent discussed the exchange of data between a prescription-monitoring program and providers, which allows them to identify patients who were abusing opiates so that they could act to decrease the rates of abuse. Another example was the exchange of data between a claims system and a social service agency to review birth outcomes to identify babies who were opiate-exposed, so the agency could determine if and when treatment was provided. Additionally, the respondent stated that the use of expanded data streams could expand the measurement of clinical events such as ambulatory sensitive conditions. This would, in turn, reduce adverse outcomes such as complications of procedures, urinary tract infections, and bacterial pneumonia, among others. Providers and measure developers could potentially look for relationships between items such as mental health and cardiovascular disease to understand where adverse events may occur by not treating one of the underlying conditions.

Clinical Workflow – Every respondent agreed that even if systems become interoperable, it is crucial that the data must be available within the clinical workflow in a trusted and prioritized format. Providers cannot spend significant time outside of the care of a patient accessing data and interpreting multiple files. Data must be in a format that providers can use immediately as a source of truth before a decision is made.

The Impact of Interoperability on Health/Health-Related Outcomes and Processes

Half of the respondents interviewed discussed quality measures they are currently using within their organizations that are interoperability-sensitive as well as those that are currently under consideration. Table 1 shows the existing measures that respondents identified as currently in use, and Table 2 shows the measures under consideration for use.

TABLE 1. EXISTING QUALITY MEASURES CURRENTLY IN USE

Measure Concept	Care/Clinical Process Enabled by Interoperability	Outcome/Process Sensitive to Interoperability	ONC Roadmap Domain
Electronically identifying birth outcomes from external sources such as birth certificate data	Neonatal care	Identifying outcomes such as opiate-exposed babies to develop appropriate treatment protocols	Data use
Access to pharmacy claims data	Medication reconciliation	Ensuring patients are filling and complying with medication orders	Data availability
Access to integrated clinical and nonclinical data streams	Identification of social determinants of health	Identifying rate of child protection for individuals whose parents have a history of chemical dependency	Data availability
Electronically send and receive referrals	Closed loop referral	Identification of eye exams given in a state to determine future treatment	Data exchange

TABLE 2. MEASURES UNDER CONSIDERATION FOR USE

Measure Concept	Care/Clinical Process Enabled by Interoperability	Outcome/Process Sensitive to Interoperability	ONC Roadmap Domain
Electronically sending and receiving information across providers	Care coordination and care transitions	Long-term care services and supports	Data exchange
Electronically querying data from integrated sources	Care coordination	Identifying the providers that patients with chronic disease are seeing for treatment	Data availability
Incorporating social risk factors	Chronic disease management	Incorporating social risk factors which are most predictive of clinical outcome and cost	Data use
Expand the focus of ambulatory sensitive conditions	Chronic disease management	Examining the relationships between two conditions, such as mental health and cardiovascular disease to identify improved outcomes and a reduction in adverse events	Data use
Electronically send and receive summaries of care	Care Coordination	Reduction in hospital stays, reduction in readmissions, reduction in emergency department visits	Data exchange

PRINCIPLES FOR THE MEASUREMENT FRAMEWORK

Each of the respondents discussed some of the realities that will meet the implementation of the interoperability measurement framework once it is completed. While some of these concerns related to general discussions of interoperability, the respondents specifically pointed out that the lack of interoperability affects both the healthcare system as whole as well as quality measurement. While several respondents discussed the use and impact of interoperability on their systems, they pointed out that those systems became a reality when the diverse data sets found within separate systems were standardized and a recognized transport mechanism to move the data across systems (while retaining its meaning and structure) was implemented. The measurement framework should demonstrate the need for standardization across data sets by illustrating its impact and effect on quality of care, efficiencies of care, and reduction in cost.

Recommendations for the Framework

When asked about developing measures to assess and address gaps in interoperability, respondents offered several recommendations. Several key respondents indicated that the first step in the process should be to identify specific core domains of interoperability. The ONC Interoperability Roadmap identifies four core distinctive, but interconnected domains:

- Exchange of data across disparate systems
- Availability of data to facilitate interoperability
- Use of interoperability to facilitate decision making
- Impact of interoperability on health/health-related outcomes

Current outcomes and/or process measures under review should be aligned to one or more of these predetermined domains to conclude if the measure would benefit from interoperability, and if so, how. During the measures review portion of this project, NQF and the Committee will use these domains while determining which measures to incorporate into the framework.

Some of the respondents agreed that current measures may not demonstrate the full spectrum of measures that could benefit from an interoperable environment. When identifying gaps, interviewees thought it is best to assume that complete interoperability had been achieved. This bottom up approach would allow stakeholders to identify areas of measurement without the constraints of current implementation barriers. Once those areas that would most benefit from complete and timely data are identified, measure concepts can be developed to enable stakeholders to build systems that can pull the necessary data. This method would allow stakeholders not only to develop measures that consolidate data for a single patient but to go further into building stronger public health information that would enhance providers' understanding of their community and patient base.

When evaluating both current measures and measure concepts, respondents emphasized the need to create a test environment to validate interoperability-sensitive measures and to determine the data sources that capture that information. The test framework would allow the framework to prioritize measures by identifying those that have the most impact on clinical quality, patient experience, and reduction in the costs of care. These priority areas were highlighted in the literature review of the environmental scan and Committee comments at various meetings.

The respondents were asked about methods for making the framework sustainable in the long term. There was general agreement that gaining stakeholder buy-in was necessary, and the best way to do so is to involve them in the framework development process, especially by incorporating feedback from professional organizations and patient advocacy organizations. Through the multistakeholder Committee, key informant interviews, and various opportunities to comment on the work of this project, NQF hopes to achieve this buy-in.

To be sustainable, the framework will also need to provide guidance on how to gather high-integrity data that will provide accurate, consistent, and timely information. Respondents also stressed that the measurement of interoperability should show both the extent to which data exchange and use leads to better outcomes as well as reduced costs.

This will shift the priority from merely accessing the data to using it to improve performance and achieve cost savings. Several interviewees expressed concern that the current interoperability environment focuses solely on the exchange of information instead of availability, use, and most importantly, impact. Lastly, over half of the respondents stated that the government would need to reinforce the need for a national standard for developing and using an interoperable system through regulation to make this framework successful. Many advances in interoperability have occurred through the development and implementation of the Meaningful Use program and the impending implementation of the 2015 Medicare and CHIP Reauthorization Act regulations. To move this work forward, the government will need to encourage the expansion of interoperability.

SUMMARY

The key informant interviews revealed themes and ideas that provided a basis for the development of measure concepts and identification of existing measures that would assist in the measurement of interoperability:

- An interoperable environment can create a comprehensive patient record that patients can access without logging onto multiple systems, which would facilitate greater patient engagement.
- Interoperability reduces the dependency of a quality measure that would otherwise come from a single EHR and increases the value of that measure. In an interoperable environment, a measure would focus on the entire patient across the continuum of care and can gather data from multiple sources to help measure health outcomes and processes across populations.
- The integration of data provides access to numerous streams that can potentially help reduce adverse events for patients as well as assisting providers in seeing improvements in a patient's care over time.
- Interoperability can lead to better cost-effectiveness in healthcare, as providers would have access to a complete patient medical file to facilitate decision making.
- In order for interoperability to influence health outcomes and processes, the data must be available in the clinical workflow in a protected format that is readily available.

When identifying current gaps in interoperability measurement, one should assume that interoperability is already possible and attainable. In this manner, measures can be developed without the constraints imposed by the current lack of interoperability.

APPENDIX A:

Key Informant Interview Participants

Topic	Interviewee Type	Organizations	Respondents
Interoperability and the exchange of data across disparate systems	Payers	State Medicaid Agencies, Minnesota Medicaid	Jeff Schiff
Availability of data to facilitate interoperability	Health information exchanges	MyHealth Access	David Kendrick
	integrated delivery systems	Banner Health Systems	Ryan Smith
	Integrated delivery systems	Intermountain Health Care	Sid Thornton
Use of interoperability to facilitate decision making	Health information exchange vendor	Medicity	Brett Poirier
Impact of interoperability on health/health-related outcomes and processes	Electronic health record/health information exchange vendor	Athenahealth	John Voith
	Informatics organizations	American Medical Informatics Association (AMIA)	Doug Fridsma
	Patient advocacy	National Association from Trusted Exchange (NATE)	Robert Cothren

APPENDIX B:

Key Informant Interview Guide

Testing Materials

Audio recording equipment

Speaker phone

Interviewer clock

FOR TELEPHONE: At the start of interview, interviewer will ask if the participant agrees to be interviewed and audiotaped.

Key Informant Interviews

(60 minutes total)

Introduction

(start at ____ 2 min end at ____)

Did you have a chance to read the consent form? Do you have any questions? I want to confirm that it is OK to audiotape this interview.

Ground Rules

Everything you tell us will be confidential. To protect your privacy, we won't connect your name with anything that you say.

At any time during our conversation, please feel free to let me know if you have any questions or if you would rather not answer any specific question. You can also stop the interview at any time for any reason.

Please remember that we want to know what you think and feel and that there are no right or wrong answers.

Background

(start at ____ 5 min end at ____)

I'd like to begin by asking you some questions about your current job.

- Can I please confirm your role within your organization? What are your major responsibilities in your current position?
- How long have you been with [organization]?
- Can you tell me a bit about your work and experience as it relates to interoperability? (Probe particularly for aspects of the current job that relate to the exchange of health information; work on federal programs that support interoperability, such as cooperative health information exchange programs or Beacon communities; and the work in their own organization as it relates to interoperability.)

Experience Developing, Using, and Maintaining Interoperable Systems

(start at ____ 10 min end at ____)

Now, let's talk about your organization.

- What is your organization's experience with developing, using, and maintaining interoperable systems (Get details—with whom, what they know, what have they tried, how they assessed, etc.)
- What prompted your organization to get involved in this issue?
- What was the goal of your effort? What did you hope to accomplish?

Please use questions from the table below that correspond to the category of the interviewee:

Interviewee Category	Specific Questions
Public health organizations	<ul style="list-style-type: none"> • Describe your experience in developing and/or using interoperable health networks for public health events? • Describe how you integrated various data streams to identify and analyze public health events?
Precision medicine	<ul style="list-style-type: none"> • What are the greatest challenges you face with regard to data and information needed for your work and/or decision making? • What types of data elements are the easiest to obtain? Which are the most challenging?
Social service agencies	<ul style="list-style-type: none"> • In your opinion, what are the key data elements required for an interoperable network between healthcare and social services? • What are the greatest challenges in creating a shared information model between health and social services?
Payers	<ul style="list-style-type: none"> • What are the greatest challenges you face with regard to data and information needed for your work and/or decision making? • What are the key issues in facilitating interoperability between those providers/organizations that receive reimbursement from you?
Health information exchanges (HIEs)	<ul style="list-style-type: none"> • Describe your processes in extracting, integrating, and exchanging diverse data streams across medical providers. • What were the most valuable components of your HIE to those participants that used it?
HIE/EHR vendors	<ul style="list-style-type: none"> • Describe how you reconcile and integrate various data streams into a common format for data exchange. • How do you connect with data sources outside of an EHR (such as a registry, surveillance system, etc.)?
Accountable care organizations	<ul style="list-style-type: none"> • What are the essential data elements that an interoperable network provides for your ACO? • What have been the biggest obstacles in developing an interoperable network and in getting users to participate?
Informatics associations	<ul style="list-style-type: none"> • In your opinion, what standards or models will be significant in developing and maintaining an interoperable health network? • What are the key issues in advancing interoperability?
Patient advocacy organizations	<ul style="list-style-type: none"> • In your opinion, what is the effect of interoperability on patient care? • Where could interoperability have the most value for patients?
Integrated delivery systems	<ul style="list-style-type: none"> • What are the essential data elements that an interoperable network provides for your network? • What challenges have you faced in implementing an interoperable network that covers all areas of your delivery system?
Specialty societies	<ul style="list-style-type: none"> • Describe how your registries connect with an HIE and/or HIE vendor? • What specific data elements within your registry would have the greatest value to participants in an interoperable network?

Conceptualization of Interoperability

(start at ____ 15 min end at ____)

A key goal of our project is to understand the impact of interoperability on health outcomes and appropriate ways to measure it objectively.

- I'd like to get your opinion about the concept of "interoperability." What do you think is meant by that term? How would you describe it in your own words?
- In your opinion, what is the ultimate goal of interoperability?

Please use questions from the table below that correspond to the category of the interviewee:

Interviewee Category	Specific Questions
Public health organizations	<ul style="list-style-type: none"> • How would you assess the impact of interoperability on public health? • What are the greatest public health challenges that would benefit from an interoperable network?
Precision medicine	<ul style="list-style-type: none"> • Where do you see the impact of interoperability on healthcare quality and individual patient health? • How could interoperability affect cost and resource use within healthcare organizations?
Social service agencies	<ul style="list-style-type: none"> • What organizations outside of healthcare settings could benefit the most from an interoperable network? • Are there measures for these organizations that could benefit from interoperability?
Payers	<ul style="list-style-type: none"> • Where do you see the impact of interoperability on healthcare quality? • Where do you see the impact of interoperability on care coordination?
Health information exchanges (HIEs)	<ul style="list-style-type: none"> • What do you still perceive as the largest obstacles in expanding HIE to a statewide or national level? • In your opinion, how will your HIE affect patient quality of care and provide data for value-based purchasing models?
HIE/EHR vendors	<ul style="list-style-type: none"> • In your opinion, what products will you offer in the future to expand interoperability and why? • How will legislative requirements, such as MACRA, affect your products?
Accountable care organizations	<ul style="list-style-type: none"> • How could an interoperable network provide for patient care in your organization? • What are the specific clinical areas within your organization in which interoperability provides a benefit?
Informatics associations	<ul style="list-style-type: none"> • In your opinion, do you believe that using web-based resources (i.e., semantic web) increases interoperability and why/why not? • What are the most important factors to consider in advancing interoperability?
Patient advocacy organizations	<ul style="list-style-type: none"> • In your opinion, how can the privacy and security concerns of patients be addressed as interoperability advances? • What are the most effective ways of demonstrating the value of interoperability to patients?
Integrated delivery systems	<ul style="list-style-type: none"> • How do you objectively assess the impact of interoperability within your delivery system? • What specific patient quality-of-care areas would affect interoperability the most?
Specialty societies	<ul style="list-style-type: none"> • In your opinion, what are the barriers and limitations to interoperability within your network of providers? • What would be the added value to your registry of collecting data elements not currently available through an interoperable network?

Best Practices and Implementation

(start at _____ 15 min end at _____)

Now, let's talk about best practices in interoperability and using interoperable systems.

- What would you take into consideration if you were developing new quality measures that evaluate the impact of interoperability?
- What strategy do you believe will provide data for quality measures that will objectively assess interoperable data exchange?
- What infrastructure is in place today that would enable the measurement of interoperability and its impacts?
- In your experience, what do you consider to be the best practices in interoperability within your setting?
- What facilitates those best practices?
- What are some challenges to those best practices?

Recommendations for the Framework

(start at _____ 10 min end at _____)

This project will produce a measurement framework to provide a foundation for the future development and use of quality measures that incorporate interoperability. We'd like to get your input on the content of the framework. The framework will contain current outcome and process measures that can be enhanced through interoperable health systems, as well as dimensions and key elements of interoperability that can serve as a standardized approach for future measure development.

- What do you think are the priority topics and content areas for the framework?
- Where can the framework effect the most change?
- What is needed to get different stakeholders to "buy in" to the framework? Hospital leadership? Healthcare professionals? Vendors? Patients?
- What information or guidance should be included in the framework?

For the next few questions, we are interested in learning about the best ways to ensure that the framework gets used.

- How would you foresee using the framework? What format would be most useful? [If needed, for example, web-based, video, written materials, and/or PowerPoint presentation.]
- What are the best ways to disseminate the framework?

Closing

(start at _____ 3 min end at _____)

- What is the most important message that you want us to take away from this interview?
- Is there anything else that you would like to add about any of the topics that we've discussed or other areas that we didn't discuss but you think are important?
- If you know of any research, tools, or resources that may be useful to include or adapt for the framework, please send them to me.

Thank you for your time and participation in this interview. The information that you provided to us will be very helpful in this project.

APPENDIX C:

Key Informant Summary Sheet

Interoperability and the Exchange of Data Across Disparate Systems

Key Themes from Interviews	Interviewee Number
Patient Centered Data Home – where all of the patient’s healthcare data comes to rest, regardless of vendors or type of data or where patient lives	#1,2,4,8
Provider Portal – where providers have access to a monthly claim stream on the patients who are attributed to their ACO (ER visits, Meds, etc., on their patients)	#1,2
One outbound admission/discharge/transfer (ADT) interface from an ACO registration system with standard data that is received from all participating physicians	#1,2,3,5
Program/system for consumers to request electronic medical records from providers	#1,2,3,8
Certification plans recommended as strategy to provide data for quality measures	#4

Use of Interoperability to Facilitate Decision Making

Key Themes from Interviews	Interviewee Number
Improvement in patient engagement as there is greater ability to access comprehensive data	#1,2,3,4,8
Greater efficiencies in care and cost because of reducing items such as duplicate or redundant tests and procedures	#2,3,5,8
Identifying cost trends and utilization of services for patients with multiple chronic conditions	#1,8
Identification of patients who are high utilizers of health services	#1
There is significant value to measures reported at a population, community, or a whole patient level	#1,2,4,6
Reduction in morbidity, chronic disease, and emergency department visits	#8

Realities in Implementing the Framework

Key Themes from Interviews	Interviewee Number
Common data set/standard of collaborative data	#1,2,3,4,5,6,7
Agreement on a prioritized set of use cases to improve quality	#1,3,4,5,6
Don’t reinvent structures for data integrity, but look at other market sectors who solved this already	#4,7
Since interoperability will evolve over time, the framework needs to be fluid, transparent, and responsive to changes in requirements and data needs	#1,2,3,4,5,7
Reduce the value of measures reported from an EHR and a practice	#2
Demonstrate what is not currently working with interoperability and how the framework can correct those problems	#1,2,3,4,5,6
Tracking patient satisfaction in measures	#1,8

Potential Barriers to Interoperability Measurement

Key Themes from Interviews	Interviewee Number
Data/information not available (e.g., was outpatient follow-up done)	#1,2,3,5,8
Lack of incentives to build interoperable systems	#2,3,4,7
Unclear policy and legal governance	#1,2,4,6,7,8
Privacy and security concerns of patients	#3,4,6,7,8
Need to stick to a code specification for a type of data feed	#2,3,5
Lack of vocabulary and terminology standards	#3,5,6
Multiple data streams with limited ways to integrate them	#1,5
Lack of data transport and receiving data/accessibility by others (e.g., DIRECT)	#5
Lack of sharing of basic levels of data (e.g., registries)	#1,2,3,7
Patient identification (100% credibility that right patient record has been accessed)	#2,3,4
Data collection (e.g., physicians not entering data into systems right way)	#1,3

Recommendations for the Framework: Developing Measures to Assess and Address Gaps in Interoperability

Key Themes from Interviews	Interviewee Number
Identify core domains of interoperability and align outcomes and/or process measures for them	#1,2,3,4,6
Identify measure gaps and create measures that people will then built systems toward	#1
Develop measures that include community-reconciled data prior to the visit (e.g., use cases such as all of the pregnancies in a community, all neonates, end-of-life, etc.)	#1,2,4
Base future process measures on completeness of record and timeliness of its availability	#4
Create test environment to validate interoperability-sensitive measures and the data sources the information comes from	#1,3,4
Prioritize measures that will have most impact on clinical quality, patient experience, and reduced costs	#1,2,4,5,6,8

Recommendations for the Framework: Sustainability of the Framework

Key Themes from Interviews	Interviewee Number
Input from professional organizations and patient advocacy organizations	#1
People can trust what's going on and that their data are being used appropriately (governance)	#2,4,8
Stakeholder buy-in to the framework: enough data and evidence (evidence on better outcomes and reduced costs)	#2,4
Stakeholder buy-in to the framework: needs to be a national standard developed by government or government requiring it (i.e., MACRA, Meaningful Use)	#3,7,8
Education is important whether geared towards providers or patients (i.e., what is allowed from a regulatory standpoint). Also important for patients to have education on patient consent for exchanging information	#2,5,8
Should focus less on access and data, and more on utility and performance	#2,4,5,6,7,8

APPENDIX D:

Interoperability Committee and NQF Staff

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