Interoperability: What does the future hold?

John Glaser, PhD
Senior Vice President, Population Health

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Interoperability occurs when **information flows freely** across organizational, vendor, technology and geographic barriers.
Interoperability will be molded by several factors

- Federal government legislation and regulations
- Provider consolidation and interoperability speciation
- Industry collaborations
- Expansion of the range of “data”
- Evolution of the interoperability “stack”
Federal government legislation and regulations
Congress is focusing on interoperability

01.20.16

Alexander, Murray Release Bipartisan Senate Health Committee Staff Draft of Bill to Help Improve Health Information Technology for Doctors & Their Patients

Senate health committee seeks expert feedback to revise and improve upon draft legislation to help achieve interoperability

WASHINGTON, D.C., Jan. 20 – To inform the committee’s final legislation, Senate health committee Chairman Lamar Alexander (R-Tenn.) and Ranking Member Patty Murray (D-Wash.) today released for feedback a staff discussion draft of the committee’s bipartisan legislation to improve health information technology, including electronic health records.

The draft legislation released today is the product of a bipartisan, full committee health information technology working group announced by Alexander and Murray in April—as well as a series of bipartisan hearings in the committee.
Interoperability provisions in the draft HELP legislation

- Convenes existing data sharing networks to develop a model framework and common agreement for the secure exchange of health information across existing networks to help foster a “network of networks.”
- Creates a digital provider directory to both facilitate exchange and allow users to verify the correct recipient.
- Requires that HHS give deference to standards developed in the private sector.
- Creates a process for prioritizing the adoption of standards to focus on the most pressing problems faced by the health care community.
- Establishes an initial set of common data elements, such as a standard format for entering date of birth, to facilitate interoperability and streamline quality reporting.
Interoperability in Medicare Regulations: Beyond Meaningful Use

- Medicare Access and CHIP Reauthorization (MACRA) – “Doc Fix”
  - Established exchange of health information through interoperable EHRs a “national objective”
  - Secretary must establish metrics on how to measure interoperability by July 2016
  - Interoperability must be achieved by December 31, 2018
  - Information blocking
    - Effective April 16, 2016, participants in the EHR incentive programs must attest that they are not knowingly or willfully limiting the interoperability of certified EHR technology

- Physician Fee Schedule (PFS) 2016 NPRM
  - Upcoming appropriate use criteria (AUC) requirements will affect interoperability (due 11/2015)
  - Highlights importance of interoperability for ACOs

- Medicare Shared Savings Program (MSSP); Accountable Care Organizations (ACOs)
  - Encouragement to monitor the degree of interoperability. No concrete thresholds or standards.

- CHIP Programs
  - Seeking feedback on provider directory APIs. No concrete thresholds or standards.
FDA draft guidance – medical device interoperability

• Released January 26, 2016

As electronic medical devices are increasingly connected to each other and to other technology, the ability of these connected systems to safely and effectively exchange and use the information that has been exchanged becomes increasingly important. Advancing the ability of medical devices to exchange and use information safely and effectively with other medical devices as well as other technology offers the potential to increase efficiency in patient care.

117 the information that has been exchanged becomes increasingly important. Advancing the ability of medical devices to exchange and use information safely and effectively with other medical devices as well as other technology offers the potential to increase efficiency in patient care.

118 FDA intends to promote the development and availability of safe and effective interoperable medical devices. FDA is issuing this draft guidance to assist industry and FDA staff in identifying specific considerations related to the ability of electronic medical devices to safely and effectively exchange and use exchanged information. This document highlights considerations that should be included in the development and design of interoperable medical devices and provides recommendations for the content of premarket submissions and labeling for such devices.

119 FDA’s guidance documents, including this guidance, do not establish legally enforceable responsibilities. Instead, guidance describes the Agency’s current thinking on a topic and should be viewed only as recommendations, unless specific regulatory or statutory
ONC and its FACAs and Working Groups will continue their focus
Provider consolidation and interoperability speciation
Accountable Care Organization growth

Growth And Dispersion Of Accountable Care Organizations In 2015, Muhlstein, Health Affairs
For providers the primary driver of interoperability is the move to value-based payment.
# APM Health IT framework

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
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<tbody>
<tr>
<td>Fee for Service - Link to Quality &amp; Value</td>
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<td>APHs built on Fee-For-Service Architecture</td>
<td>Population-Based Payment</td>
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<td>A) Foundational Payments for Infrastructure &amp; Operations</td>
<td>B) Pay for Reporting</td>
<td>A) APHs with Upgrade for Performance</td>
<td>A) Condition Specific Population-Based Payment</td>
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<td>C) (Rewards for) Performance</td>
<td>D) Benefits &amp; Prevention for Performance</td>
<td>B) APHs with Upgrade for Managing Population Risk</td>
<td>B) Comprehensive Population-Based Payment</td>
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## Ideal Health IT Infrastructure

- Organizational EHR with interoperable summary of clinical data
- Organizational EHR with all clinical data interoperable
- EHR & community-based services system with all clinical data interoperable

### Key

- EHR System
- Care Coordination/Management
- Quality Measurement
- Data Aggregation & Attribution
- Risk Scoring

### Event specifications integrated into workflow

- Limited claims data sent from payer to provider organization
- Real-time risk scores from claims & clinical data
- Real-time risk scores from claims, clinical & socio-economic data

### Aggregate real-time (commerical, Medicare, & Medicaid) adjudicated claims data & multi-organization clinical data that’s available to all participants in APHs

### Interoperable provider directory – hierarchical & relational

### 100% accurate linking of claims and clinical data from multiple organizations

### Real-time patient-centric cCOIls calculated across systems or contracts

### Real-time patient-centric cCOIls calculated across a set population

### Value score available at time of order – cost & quality

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Audacious Inquiry, ONC, 2016
ACOs will have multiple classes of HIE/interoperability

- **Purpose**
  - Insurance transactions
  - Supply chain
  - Devices
  - Prescriptions
  - Electronic health records data exchange
  - Shared applications

- **Forms**
  - Collectively owned versus privately held
  - Narrow versus broad focus
  - Horizontal versus vertical
Industry collaborations
Interbank consortium - SWIFT

• In 1973, 239 banks from 15 countries got together to solve a common problem: how to communicate about cross-border payments.

• The banks formed a cooperative utility, the Society for Worldwide Interbank Financial Telecommunication, headquartered in Belgium.

• SWIFT went live with its messaging services in 1977, replacing the Telex technology that was then in widespread use, and rapidly became the reliable, trusted global partner for institutions all around the world.

• The main components of the original services included a messaging platform, a computer system to validate and route messages, and a set of message standards.

• The standards were developed to allow for a common understanding of the data across linguistic and systems boundaries and to permit the seamless, automated transmission, receipt and processing of communications exchanged between users.

www.swift.com
Interbank networks have different implementations

<table>
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<tr>
<th>Major economy</th>
<th>Interbank network name</th>
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<tbody>
<tr>
<td>Australia</td>
<td>Electronic Funds Transfer at Point Of Sale (EFTPOS)</td>
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<tr>
<td>Canada</td>
<td>Interac</td>
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<tr>
<td>China</td>
<td>China Union Pay</td>
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<td>France</td>
<td>Groupement des Cartes Bancaires CB</td>
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<td>Germany</td>
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<td>LINK</td>
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<td>United States</td>
<td>New York Currency Exchange (NYCE), Pulse, STAR</td>
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<td>Robert A. Stringer, General Foods</td>
<td>Fritz Biermeier, Red Owl Stores, Inc.</td>
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<td>K. Marvin Everts, Jr. Stokley Van Camp</td>
<td>Alan Haberman, First National Stores, Inc</td>
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<td>William J. Hollis, American Can Company</td>
<td>Arthur D. Jueam, Lelan &amp; Fink Products</td>
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<td>Robert R Koenig, Super Valu Stores, Inc</td>
<td>Curt Kornblau, Super Market Institute</td>
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<td>Robert F. Lee, Johnson &amp; Johnson</td>
<td>Donald P. Lloyd, Associated Food Stores, Inc</td>
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<tr>
<td>Thomas P. Nelson, General Mills, Inc</td>
<td>William E. Oddy, Jewel Food Stores</td>
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<tr>
<td>John L. Strubbe, Kroger Company</td>
<td>Wilbur Stump, Stump's Enterprises, Inc.</td>
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Advancing healthcare interoperability through several industry collaborations
CommonWell Network continues to grow – 40 members
Argonauts – vendor collaboration to develop interoperability APIs

- **Deliverables**
  - Standard set of “core” FHIR resources and profiles
  - Ensure broad industry support (vendors, providers, and innovators)

- **App use-cases**
  - Provider apps – EHR workflow
  - Patient apps – portal + phone app

- **Authentication and Authorization**
  - OAuth2 profile for healthcare
Device interoperability collaborative

WE ARE ACCELERATING THE SEAMLESS EXCHANGE OF INFORMATION TO IMPROVE HEALTHCARE FOR ALL

SEE OUR LATEST FEATURED ARTICLE, "MAKING TECHNOLOGY TALK" »
Early efforts to establish IoT standards

The Global Standards Initiative on Internet of Things (IoT-GSI) concluded its activities in July 2015 following TSGA3 decision to establish the new Study Group 20 on “IoT and its applications including smart cities and communities”. All activities ongoing in the IoT-GSI were transferred to the SG20. For more information see SG20 webpage or contact tbsps20@itu.int.

IoT-GSI aimed to promote a unified approach in ITU-T for development of technical standards (Recommendations) enabling the Internet of Things on a global scale. ITU-T Recommendations developed under the IoT-GSI by the various ITU-T Questions - in collaboration with other standards developing organizations (SDOs) – will enable worldwide service providers to offer the wide range of services expected by this technology. IoT-GSI also aimed to act as an umbrella for IoT standards development worldwide.

The Internet of Things (IoT) has been defined in Recommendation ITU-T Y.2000 (06/2012) as a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.
Expansion of the range of “data”
Summary of a population health plan delivered to an EHR
Complex event processing

- Events from multiple systems
- Stateful data evaluation
- Data model based on FHIR
- Access to ontologies
- Drug classification

**Conceptual View**

- Client Driven Extensibility
- In Memory Data Grid
- Real Time Analytics
- Person Centric Model
- Lambda Speed

**Service Providers**
- Soarian
- Cerner
- Big Data
  - Batch Analytics

**Event Emitters**
- Lambda
  - Batch

**Orchestration**

**Pub/Sub Messaging**

**Event Filtering**

**Aggregation**

**Correlation**

**CEP**

**Non-Cerner Service Provider**

**Real Time Analytics**

**Person Centric Model**

**Lambda Speed**

**In Memory Data Grid**

**Client Driven Extensibility**
Capturing Social and Behavioral Domains in Electronic Health Records (IOM)

**Sociodemographic**
- Sexual orientation
- Race/ethnicity
- Country of origin
- Education
- Employment
- Financial resource strain

**Psychological**
- Health literacy
- Stress
- Negative mood and affect
- Psychological assets

**Behavioral**
- Dietary patterns
- Physical activity
- Tobacco use and exposure
- Alcohol use

**Individual level social relationships and living conditions**
- Social connections
- Exposure to violence

**Neighborhood and communities**
- Neighborhood and community compositional characteristics
Evolution of the interoperability “stack”
The New Middle – Population Health

Big data

- Claims
- Clinical
- Wellness
- Satisfaction
- Social/public
- Longitudinal record
- Population record
- Data marts
- De-Identified

Data transformation

Org or member consent

Programs

- Evidence
- Algorithms
- Learned knowledge

- Identify
- Predict
- Measure
- Attribute
- Intervene
- Analyze

Community care management

- Registries & scorecards
- Longitudinal record
- Member engagement

- Home health assistant
- Physicin
- Health coach/care manager

Programmability

- Objective
- Organizations
- Provider networks

- Programs/rules
- Evidence, knowledge, algorithm

Analytics

- Open data
- Pharmacy
- Payer
- HIE

Client opt in/out

Research (HealthFacts)

De-identified
FHIR/SMART is early but potentially potent
Boston Childrens: SMART growth chart
Categories of IoT Health Care Use Cases

• Monitoring and management of patient health status
  • Monitoring of physiological and health status with alerting of material condition change
  • Monitoring of performance of implanted and external patient devices
  • Feedback to guide/encourage desired health behaviors
Categories of IoT Health Care Use Cases

• Process optimization
  • Management of inpatient throughput through coordination of patients, providers, equipment and rooms
  • Dynamic scheduling and locating of equipment based on utilization
The IoT Technology Stack

Porter, HBR, 2015
What does the future hold?

• Interoperability is quickly evolving from a model rooted on:
  • Exchange of clinical data
  • Using health information exchange technologies

• Interoperability is becoming a very complex, multi-faceted challenge/phenomena; molded by:
  • Federal government legislation and regulations
  • Provider consolidation and interoperability speciation
  • Industry collaborations
  • Expansion of the range of “data”
  • Evolution of the interoperability “stack”

• It is unclear where this will all go

• The primary levers are:
  • Government
  • Industry collaborations
Questions?