Interoperability: Emerging standards and electronic interfaces to support data exchange between differing information technology systems

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Health Research

- Global health
- Health economics
- Public health and policy
- Health information technology
- Health communication
- Epidemiology
Perspectives: Shaped by My Background

- **Health Level Seven International (HL7)**
  - Co-chair, Electronic Health Records Work Group, 2005-2013
  - Board member, 2010-2011
  - Chair-elect, 2011
  - Board chair, 2012-2013
  - Immediate past chair and vice chair, 2014
  - Launched new work groups: Mobile Health, Usability, Learning Health System

- **ISO Technical Committee 215-Health Informatics**
  - Transitioned to AHIMA, 2011 & directed ANSI operations for
    - Delegated Secretariat, TC 215
    - Delegated Administrator, U.S. Technical Advisory Group 223 (US TAG)
  - Subject matter expert, US TAG, 2009-2014

- **President, Public Health Data Standards Consortium, 2010-2014**
Goals for Today’s Presentation

- Share a vision of the future of healthcare, as well as standards and interoperability
- Discuss 2 major healthcare trends
  - Person-centered care
  - The Learning Health System
- Describe the current and future state of standards and interoperability
  - What we’re doing now to:
    - Enhance current standards
    - Develop new and different ways of doing things
  - What we still need to do; how far away are we to getting there
  - Address longstanding healthcare and health IT challenges
- Discuss the impacts on behavioral health information management, standards, and interoperability
- What you can do to prepare for, and shape, the future
Objectives (As Described in the Program)

- **Review**
  - Different types of interoperability needed in healthcare today
  - The latest updates in interoperability standards and future directions in new standards
  - The types of technology interfaces most widely used and new ones under development to bridge differences between different EHRs and related IT systems

- **Provide an overview of**
  - Common record structures
  - Vocabularies
  - Standardized modes of electronic transmission
  - Emerging standards for segmenting EHRs

- **Questions & answers**

Behavioral health is getting greater attention in the industry
Greater focus on both the individual person and the broader environmental context

- Not a contradiction
- But it will cause us to look at things differently

Future of standards: Staying ahead of advances in technology

- Application programming interfaces (APIs)
- Smart homes, sensors, wearable devices, mobile apps
- Tele-psychiatry, -behavioral health

Same natural tensions and challenges remain, but with greater magnitude

- Patient generated, non-healthcare vs. healthcare data
- Data proliferation vs. granularity
- Computable, discrete, coded data vs. text
Today’s Theme and Take Away Message

- **Data standards/harmonization are the keys to:**
  - Unlocking our challenges and dilemmas
  - Successful interoperability

- Behavioral health a key player in specifying solutions, especially wrt privacy; opportunities to seize the moment

- Building/implementing a strategy addressing the above will help entities/the behavioral health sector continue to thrive in the future
Healthcare & HIT Challenges & Dilemmas

- So many different requirements from so many different entities (e.g., government, payers, quality reporting)
  - Differing needs (patient care vs. research)
  - All happening at the same time
  - Difficult to satisfy them all

- Time pressures put on the provider
  - Immediate reduction in number of patients seen when implementing an EHR, due to training/time to learn, and be facile with, the system
  - Time it takes to document each patient in the EHR

- Poor usability of certified EHR technology
- Double data entry
- Requiring the provider to use of a single system

What problems are we trying to solve?

Whose problems are we trying to solve? (Doesn’t feel like mine)
You are not alone.

Why is this happening?

Nearly 17,000 physicians shared “why” in the 2013 Black Book Rankings Survey:

- **80%** (EHR) Solution does not meet practice’s needs
- **79%** Practice did not adequately assess needs before selecting original EHR
- **77%** EHR design not suited for the practice specialty or specialties
- **44%** Vendor not responsive to requests and needs
- **20%** EHR does not adequately communicate with other EHRs
- **16%** EHR will not meet newest federal requirements (ICD-10/MU Stage 2)
- **12%** Vendor too focused on meaningful use achievement
- **11%** Other practice software modules not integrating with EHR
- **5%** Setbacks have caused payment delays or disrupted work
- **14%** Other

Solutions in Context: Essential Elements of an Entity’s and a Sector’s Health IT Strategy

- Person Centered Behavioral Health
  - BH EHR to Non-BH EHR Strategy
    - Meaningful Use
    - Privacy Security
    - Quality Measures
    - Work Flow
- Data Strategy
  - Common Data Set
- HIE Strategy
- Interoperability Strategy
- Learning Health System

- Behavioral Health EHR
  - BH Functional Profile
  - Medication Record
  - Analytics
    - HIE Standards
    - Interoperability Standards
  - Interoperability Standards
  - Usability, Legal Record, Person-Generated Health Data Standards

- HL7 EHR-S FM
  - Mobile App, Sensor, Device Stds
- HL7 PHR-S FM
  - Provider EHR
  - Consumer PHR

- HIE Strategy
- HIE Standards

- Behavioral Health Sector Efforts
  - Unity & Strength
  - Market Awareness
  - Environmental Scan
  - Road Map
  - Work Group
  - Certification Criteria
  - Test Scripts
  - Public Comments
  - Coordinated Launch
Payload Now the Issue: Data & Functionality Stds Will Have Greater Importance in the Future

- Focus in last 25+ years: Getting data from Point A to Point B; we’re past this point *technically*
- Integrated functionality of record structures (e.g., care plan), and data semantics, will become increasingly important
- Must still emphasize, but go beyond, terminologies, nomenclatures, code sets, etc.

**Hit the sweet spot:**
Enhance system functionality with the broader context and all 3 areas of standards in mind
A Simple (non-BH) Example: Harmonizing the *Computable* Clinical Concept of “Bleeding”

<table>
<thead>
<tr>
<th>ACUITY Trial(^1) Major Bleeding</th>
<th>REPLACE-2 Trial(^2) Major Bleeding</th>
<th>TIMI Trial(^3) Major Bleeding</th>
<th>TIMI Trial(^3) Minor Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3 g/DL hemoglobin drop with overt bleed</td>
<td>&gt;3 g/DL hemoglobin drop with overt bleed</td>
<td>&gt;5 g/DL hemoglobin drop with overt bleed</td>
<td>≥3 - ≤5 g/DL hemoglobin drop with overt bleed</td>
</tr>
<tr>
<td>&gt;4 g/DL hemoglobin drop without overt bleed</td>
<td>&gt;4 g/DL hemoglobin drop without overt bleed</td>
<td>&gt;15% drop in hematocrit (no hemoglobin)</td>
<td>≥9% - ≤15% drop in hematocrit (no hemoglobin)</td>
</tr>
<tr>
<td>Intracranial bleed</td>
<td>Intracranial bleed</td>
<td>Intracranial bleed</td>
<td></td>
</tr>
<tr>
<td>Intraocular bleed</td>
<td>Intraocular bleed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access site bleed intervention</td>
<td>Retroperitoneal hemorrhage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematoma &gt; 5 cm diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reoperation for bleeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any blood transfusion</td>
<td>Blood transfusion: 2 or more units</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Acute Catheterization and Urgent Intervention Triage Strategy (ACUITY) Trial
\(^2\)Randomized Evaluation in PCI Linking Angiomax to Reduce Clinical Events (REPLACE 2) Trial
\(^3\)Thrombolysis in Myocardial Infarction

From James Tcheng, MD
Duke Medical Center

How can we apply this to behavioral health?
Health Care Trends: Patient Centered Care (PCC) in Behavioral Health

- Top 10 concerns of person-centered care in behavioral health

  #10 – Patient choice devalues clinical knowledge/expertise
  #  9 – PCC planning important, but the job of non-clinicians
  #  8 – Our care is already person-centered
  #  7 – PCC plan doesn’t drive care, it’s more for accreditation and reimbursement
  #  6 – PCC planning based on person’s goals, but people with mental illness may not have the ability to make clear goals

“It’s amazing what you can do when you have your mind set to it…especially when you’re no longer supposed to have one.” – woman with mental illness describing her participation in PCC planning
Health Care Trends: Patient Centered Care (PCC) in Behavioral Health (cont.)

- Top 10 concerns of person-centered care in behavioral health

  # 5 – Can’t do both evidenced-based practice and give patients what they want
  # 4 – PCC planning works best when patient is well into recovery; get them stabilized, then work on PCC planning
  # 3 – PCC planning is too time and labor intensive; don’t have the time for it
  # 2 – PCC not consistent with medical necessity; won’t be reimbursed
  # 1 – PCC increases risk and exposes clinician to greater liability

Tondura, J, et al. The Top Ten Concerns about Person-Centered Care Planning in Mental Health Systems, CMS #1L0CMS030180/01, NIMH #R01 MH067687, https://www.sccgov.org/sites/mhd/Providers/PQIC/TCP/Documents/TheTopTenConcernsaboutPerson-CenteredCarePlanninginMentalHealthSystems.pdf
How BH Health IT Can Address Those Concerns

- Re-design, re-conceptualize EHR care plan functionality
  - Capturing the person’s/family’s goals and preferences; linked to care provision
  - Making the development of the care plan more efficient and effective for all multi-disciplinary stakeholders (providers across settings, legal advocates, coaches)
  - Documentation in the record creates notifications for developing the care plan when the patient is symptomatically and functionally stable

- Greater EHR functionality that captures/measures outcomes
  - Regarding the person’s goals (e.g., a person’s reunification with the family)
  - That demonstrate benefit (e.g., reduced re-hospitalizations)

- Robust functionality: Psychiatric advanced directives

- Ensuring EHR conforms to best practices for documentation and serves as a legal record for business and disclosure purposes
Health Care Trends: The Learning Health System

- National Academy of Medicine: An ultra-large scale system (ULSS) vision for 2025
- Amount of data from non-healthcare sources will be greater than data from healthcare provider sources
  - Pharmacies
  - Grocery stores
  - Restaurants
  - Fitness centers
  - Environment
  - Sensors, wearable devices, mobile apps
- Social determinants of health
- Greater integration of (behavioral health) data needed
  - Rapid learning
  - Evidence from existing data, reducing the time and cost of randomized clinical trials

Standards are beginning to focus in these areas, but we have a dire need for a business model that can influence the integration of all the needed system & device functionality
Privacy and confidentiality will become increasingly important in the Learning Health System context

Moving from consent management to computable privacy (see Lucia Savage)

Data segmentation
- Now a closed Standards & Interoperability (S&I) Framework initiative
- Available as HL7 Data Segmentation for Privacy (DS4P)

Health Level Seven Fast Healthcare Interoperability Resources (HL7 FHIR) now the focus
- Privacy on FHIR
- URL for FHIR: http://www.hl7.org/fhir/?ref=learnmore
- Defines a set of "Resources" that represent granular clinical concepts managed in isolation, or aggregated into complex documents
- Is designed for the web:
  - Simple XML or JSON structures
  - http-based Representational State Tranfer (RESTful) protocol
  - Each resource has a predictable URL
- Security and Privacy follows HL7 Security Labeling, Data Segmentation, and Consent Directive standards
- Currently a Draft Standard for Trial Use (DSTU)

Privacy on FHIR – ONC/VA Demonstration Project

MY Apps on FHIR

Share Health Information with Your Selected Apps...
What, When and How You Want it...
all 24/7, wherever there is Internet access.

Use your Information for Healthy Living, Wellness Management and Talking to Your Doctor Online:

- My Travel App (Immunizations)
- My Diet Planner App (Diabetic)

Smart Phone ----- Tablet ----- Personal Computer

1. Create Consent Directive
2. Send Consent Directive
3. Create Application Authorization
4. Create/Send Authorization Token
5. Present Authorization Token
6. Enforce Consent Directive
7. Send/Receive Data

Consent Directives Still Somewhat of a Challenge

MY Consent Directives on FHIR
Privacy...Share Only What You Want.
Your Sensitive Healthcare Information Stays Secure.

Simple one-stop management of your privacy choices from one place for all your providers and Apps. Get a report of all disclosures.

- Privacy by Design
- Manage Your Apps
- Choose what to Share

My Consent Directive Policy

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Emergence</th>
<th>Research</th>
<th>Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-sensitive healthcare information shared for treatment or other purposes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESTRICTED</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Fire- pared restrictions on FHIR Resources
| Do Not Share Organizations
| Information shared at the provider and specialty
| Contain personal identifiers

My "Apps on FHIR" Policy

<table>
<thead>
<tr>
<th>RESTRICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire- pared restrictions on FHIR Resources</td>
</tr>
</tbody>
</table>

Provisioning
1. Create Consent Directive
2. Submit Consent Directive
3. Create Application Authorization

http://wiki.siframework.org/file/view/HIMSS15_Privacy%20on%20FHIR%20FINAL.PDF/555755441/HIMSS15_Privacy%20on%20FHIR%20FINAL.PDF
Privacy on FHIR: Now Ready for You to Test

My Standards on FHIR®

- HL7 Fast Healthcare Interoperability Resources Specification (FHIR™), Release 2 (Draft)
- HL7 Healthcare Privacy and Security Classification System (HCS)
- HL7 Implementation Guide: Data Segmentation for Privacy (DS4P), Release 1
- HL7® Patient Friendly Consent Directive (Draft)
- HL7 Version 3 Standard: Privacy, Access and Security Services; Security Labeling Service, Release 1 (SLS)
- HL7 Version 3 Standard: Security and Privacy Ontology, Release 1
- Kantara User Managed Access (UMA) V 1.0
- OpenID Foundation OpenID Connect
- IETF RFC 6749 The OAuth 2.0 Authorization Framework

Health Policy Trends: EHR-based Quality Measures

• Probably 7-8 years before EHR-based quality measures are more prevalent than measures based on claims, registries, and assessments
• Electronic clinical quality measures (eCQMs) still largely process measures
• Longstanding issue: Dearth of outcome measures
• Person-centered care provides opportunities for outcome eCQMs

National Behavioral Health Quality Framework Goals (n of Measure Areas/n NQF-endorsed)

#1: Evidence-based practice (29/10)
#2: Person-centered care (5/0)
#3: Coordinated Care (17/12)
#4: Healthy living for communities (19/3)
#5: Reduction in adverse events (13/3)
#6: Affordable/accessible care (10/1)
Meaningful Use 3: Implications for Data Strategy

- Discrete data elements
  - Very basic
  - Achievable now

- “Sweet spot” opportunities to integrate with non-BH providers, especially with the:
  - Care plan
  - Medication list (drug-drug interaction)
  - Summary of care record

- HL7 standards efforts
  - Detailed Clinical Models (DCM)
  - Clinical Information Modeling Initiative (CIMI)

Meaningful Use Requirements

- Discrete data elements
  - Date of birth
  - Race
  - Gender
  - Preferred language

- Common record structures
  - Demographics
  - Care plan
  - Problem list
  - Medication list
  - Medication allergy list
  - Laboratory tests & results
  - Vital signs
  - Summary of care record
Health Information Exchange Strategy

- 2014 Behavioral Health Data Exchange project
  - 7 states: FL, AL, KY, MI, NM, NE, IA
  - ONC State Health Policy Consortium (SHPC)
  - Used de-identified data; demonstrated that behavioral health data could be exchanged
  - Policies, procedures, educational materials, lessons learned

- Many states involved in behavioral health HIE, various stages of implementation
  - Rhode Island Current Care: segregated 42 CFR Part 2 info from EHR data
  - Maine HealthInfoNet: 4 different consent options
  - Behavioral Health Information Network Arizona (BHINAZ): Opt-in, break the glass, integration with physical health
  - Colorado RHIO (CORHIO): 39 behavioral health centers
Focus on data semantics first, then on codes
- Nomenclatures (e.g., SNOMED)
- Classification (e.g., ICD, DSM)
- Code sets (e.g., LOINC)

Continue current exchange methods (e.g., Connect, Direct)

FHIR will eventually replace Direct

Begin work, focus 2 year horizon exchange methods, on FHIR
• What is behavioral health’s sector strategy?
• Lessons learned from other sectors and the strategies they’ve developed
  – Multi-disciplinary stakeholders
    • Entities: Providers, payors, government
    • Roles: Clinicians, executives, administrative staff, policy makers
  – Meet regularly in an action-oriented manner
  – Strong government support
  – Agree on/work on a plan of action
  – Work in concert to achieve sector goals that benefit all

Behavioral Health Sector Efforts

• Unity & Strength
• Market Awareness
• Environmental Scan
• Road Map
• Work Group
• Certification Criteria
• Test Scripts
• Public Comments
• Coordinated Launch
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