The Office of the National Coordinator for
Health Information Technology

High Impact Pilots (HIP) and Standards Exploration Awards (SEA) Cooperative Agreement Program

ONC Interoperability in Action Day
Monday, March 20, 2017

SHARE

State Health Alliance FOR Records Exchange

"Standards Exploration Award"
The Arkansas Experience

March 20, 2017

Shirley Tyson, OHIT Interim Director

Information and associated activities supported by funds provided by the Office of the National Coordinator for Health IT, Department of Health and Human Services, Grant Number 90AX0009/01-00

SHARE OVERVIEW

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SHARE BACKGROUND

- **S**tate **H**ealth **A**lliance for **R**ecords **E**xchange
- Statewide health information exchange (HIE)
- Services Include:
  - Bi-Directional HIE Integration Clinical Data (HL-7 & CCD/A)
  - Results Delivery
  - Public Health Reporting (Syndromic, Electronic Lab Results, Registries and Immunization)
  - Notification services
  - Web-based virtual health record and Direct secure messaging
  - Analytics

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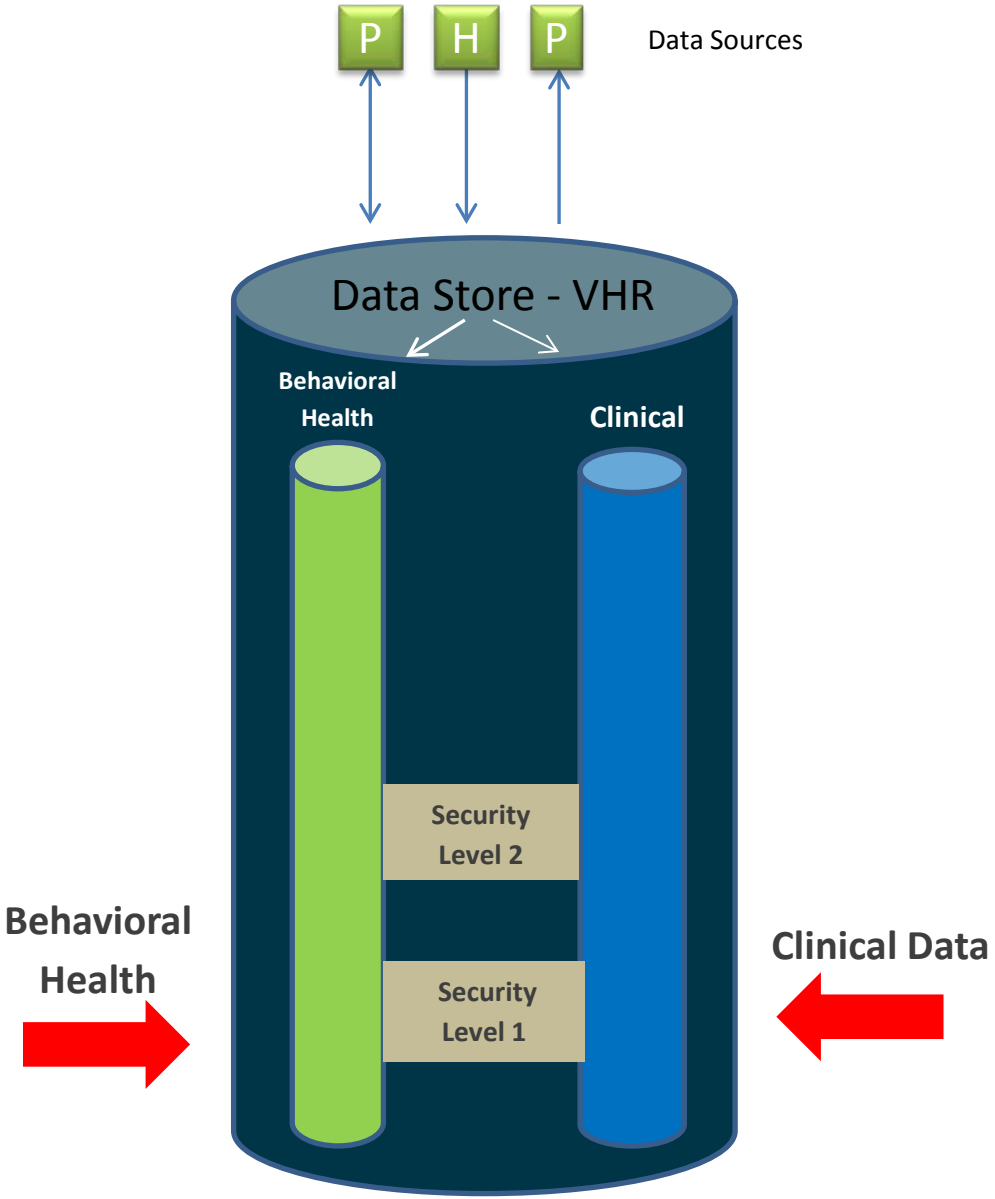
SHARE DATA STRUCTURE



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SOLUTION INFRASTRUCTURE

- Goal is to increase integrated behavioral and physical health care provider organizations to assist in addressing:
  - Failure to adequately transition patient to step down facility
  - High incidence and cost of the treatment of mental illness
  - High mortality rate of high risk behavioral health patients
  - Need for improved clinical outcomes among homeless population and others
  - Need for improved patient safety
- Emerging reimbursement models are focusing attention on healthcare's "high needs and high costs" members

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BH BI-DIRECTIONAL INTEGRATION

- Partnership with a BH EMR vendor(s), the STARR (Stakeholders in Treatment, Advocacy, Research and Recovery) Coalition and the Arkansas Homeless Coalition, BH Committee (AHCBHC), conducting a pilot project to address implementation of bidirectional exchange of BH data.

- BH-focused HIE that will serve as the landing place for BH data and will push to provider EMRs clinical and appropriate BH data to achieve interoperable exchange.

- OHIT is achieving this level of functionality by utilizing standards identified for HL7 interfaces and XDS.b that promote the exchange of continuity-of-care documents using consolidated clinical data architecture (CCD/A).

SECURE MESSAGING AND VIRTUAL HEALTH RECORD

- HISP Services
  XDR Integration for CCD exchange and supports ability to send CCD/As and consume CCDs into EHRs

- Secure Messaging (SM)
  Secure, encrypted email exchange

- Virtual Health Record (VHR)
  View patient health data in SHARE through secure portal
  No EMR/EHR needed

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BH BREAK OUT

Behavioral Health Hospitals	Behavioral Health Outpatient Clinics	Behavioral Health Total Sites
10 Using Secure Messaging /Virtual Health Record	**133** 13 Clinics - HIE Integration 120 Clinics- Using SM/VHR	**143**

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PRE-GRANT STATS

Metric	Pre-Grant
Number of Facilities—Bi-directional Exchange	0
CCD Requests	0
CCD Response/Retrievals	0
CCDs Sent via Direct Secure Messaging	2
Clinical Data Patient Queries	12

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SEA GRANT METRICS/PROGRESS

Metric	Standard (1st Quarter)	Progress (1st Quarter)
Number of Facilities—Bi-directional Exchange	1	13
CCD Requests	0	0
CCD Response/Retrievals	0	0
CCDs Sent via Direct Secure Messaging	6	416
Clinical Data Patient Queries	25	14

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BEHAVIORAL HEALTH FOCUS

In collaboration with the Arkansas Homeless Coalition Behavioral Health Committee (AHCBHC), OHIT has reached out to central Arkansas homeless shelters with the following results:

Implementing as of February 2017

Jericho Way Day Treatment Center
River City Ministry
River City Ministry Medical Clinic
Little Rock Community Mental Health Centers (6 Sites)

Recruiting as of February 2017

ArkStart (Statewide), The Salvation Army, GAIN, Professional Counseling Associates (6 Sites), Little Rock Compassion Center, Union Rescue Mission, Inspirations Day Treatment, Inc.

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EVALUATION

- OHIT will evaluate the value of the BH bi-directional exchange. In collaboration with the AHCBHS, OHIT will survey the BH providers including but not limited to:
    - How well could you access the information?
    - Could you access the clinical and behavioral health information?
    - How did the implementation process go—including the training and workflow?
- OHIT will also be seeking success stories that identify use cases in which BH providers were able to access the patient's medication history and record through SHARE in order to improve TOC's.

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SEA GRANT BARRIERS

- Lack of knowledge regarding available HIT resources, etc. and lack of HIT resources in the homeless shelters

- Potential RESISTANCE by providers who are concerned that the Arkansas Medicaid Behavioral Health Managed Care Organization (MCO) Initiative may require expenditures for Health Information Technology in addition to those being requested by OHIT and Credible for Integration.

- Cost prohibitive module required by NetSmart to connect to SHARE.

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HOW TO GET CONTACT SHARE

SHAREarkansas.com

OR

Call 501.410.1999

info@sharearkansas.com

GO to Who SHAREs:
http://www.sharearkansas.com/providers/who-shares

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WHO SHARES?


More than 2,371,928
patients participate in SHARE

WHO SHAREs?

Hospitals	Provider Practices/Other
64 Total Sites	**1,192 Total Sites**
52 Live	1,018 Live
12 Implementing	174 Implementing

**** Approx. 46 Oklahoma Hospitals (that can send ADTs) via MyHealth Access Network are now sending ADT's for Event Notifications based on Arkansas Zip Code to PCMH clinics.**

LIVE Hospitals (ADC):	3071 Beds
Connecting Hospitals (ADC):	862 Beds
Total:	**3962 Beds= 80% (ADC) beds with SHARE**

Live Sites *= Data feed(s) in production and/or VHR/SM training completed*
Implementing *= Participation and Pricing agreement(s) in place and/or technical/operational activities underway*

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As of March 2017

SHARE USAGE

Secure Messaging

(Jan – Dec 2016)

524,513 sent by 1,115 users

604,096 rec'd by 7,843 users

Patient Queries

(Jan – Dec 2016)

35,213 Queries

1,441 VHR Users

CCD Exchanges

(Jan – Dec 2016)

82,939 sent

41,206 rec'd

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Cincinnati Children's Hospital Medical Center Standards Exploration Award Project Summary

Interoperability in Action Day

Keith Marsolo, PhD
Division of Biomedical Informatics
Cincinnati Children's Hospital Medical Center
March 20, 2017

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changing the outcome together

Cincinnati Children's Hospital Medical Center (CCHMC) – FY16 numbers

- 629 inpatient beds
- 1.3M patient encounters
- 15K+ employees
- $200M in research grants & contracts (3rd in pediatrics)

- Informatics / Information Technology support
  - Operations – Department of Information Services (IS)
  - Research – Division of Biomedical Informatics (BMI)

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CCHMC Biomedical Informatics Data Services

- Service areas
  - Research data warehouse & Honest Broker service
  - Support for distributed research networks
  - *Infrastructure & standards to support learning health systems*
  - *Integration with the electronic health record (EHR) to support quality improvement (QI) & research*
- Structure
  - ~25 staff, mix of application & database developers, project management
  - Led by staff director & faculty advisor (Marsolo)
- Project is a collaboration with Information Services

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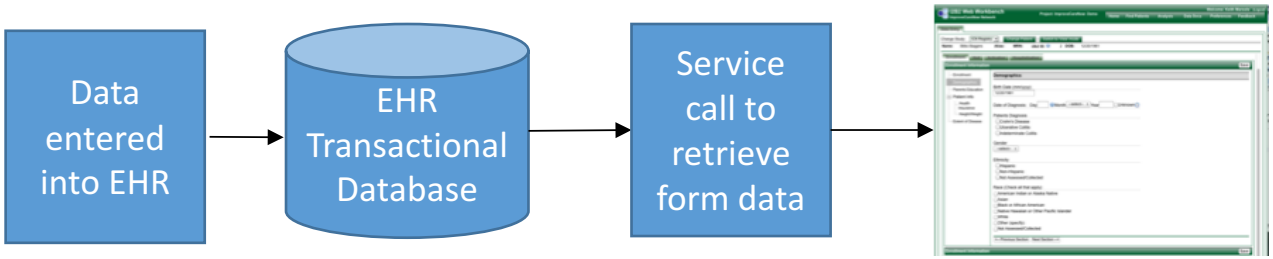
Problem statement

- Motivation – learning health system
  - Cycle – knowledge to practice, practice to knowledge
  - Data captured in EHR supports care, QI & research
- Reuse of EHR data - typical workflow(s)
  - Data into EHR -> abstracted onto paper case report form (CRF) -> re-entered into web-based CRF
  - Data into EHR -> extracted through custom process -> transformed to mimic field in CRF
- EHRs allow for capture of structured custom elements, but process to develop/deploy forms is cumbersome at scale

Revised workflow

- *Capture data in EHR -> pre-populate eCRF -> coordinator completes remaining fields*



Coordinator completes remaining elements

- Potential benefits
  - Save time on chart abstraction
  - No need for specific EHR form
- Potential drawbacks
  - Resources need to configure & maintain are unknown

Relevant Standards

- Retrieve Form for Data Capture (RFD)
  - Retrieve Form
  - Display & complete Form
  - Return data to requesting application

- Fast Healthcare Interoperability Resource (FHIR)
  - Application Programming Interface (API)-like approach to healthcare data
  - Web service-based requests for common data elements

- Structured Data Capture
  - Successor to RFD
  - May eventually allow external form to write to EHR & to external repository
  - Very early in adoption

Proposed project

- Description
  - Collect data on time required to complete eCRFs using double-data entry compared to eCRFs launched from the EHR with pre-populated fields
  - Test using ongoing pragmatic clinical trial, CCHMC as testbed

- Interoperability need(s):
  - Leveraging the EHR and other health information technology (HIT) systems to integrate healthcare and clinical research
  - Pre-population of research CRFs from EHRs

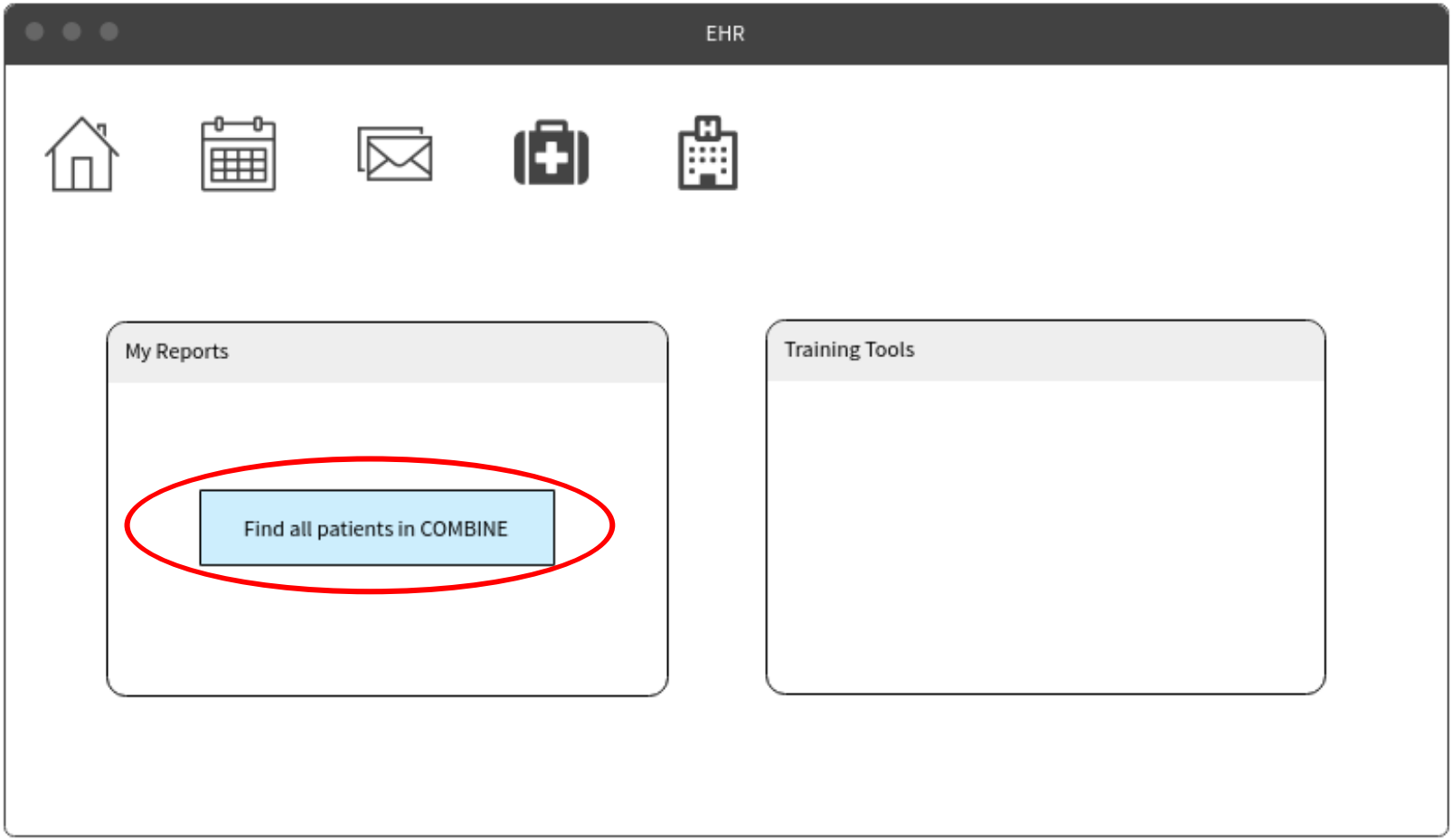
- Priority category – Self-identified

- Impact Dimensions – Cost Efficiency
  - Initial metric – time to complete form
  - Will also expand to measure time spent on chart abstraction

Trial information

- Clinical Outcomes of Methotrexate Binary treatment with INfliximab or adalimumab in practicE (COMBINE)
  - Funded by the Patient-Centered Outcomes Research Institute (PCORI)
  - Compare outcomes of patients with Crohn's Disease who receive anti-tumor necrosis factor (anti-TNF) medications with those that receive anti-TNFs and low-dose methotrexate
- Patients recruited from centers in the ImproveCareNow (ICN) Network
  - 95-center quality improvement & research network focused on pediatric Inflammatory Bowel Disease
- Trial data are collected in a module of the ICN registry
  - 10 sites currently participating
  - 19 patients consented

Example Workflow



*Mockup. Epic withheld permission to share screenshots publicly.

Example Workflow

EHR

File Edit View Help

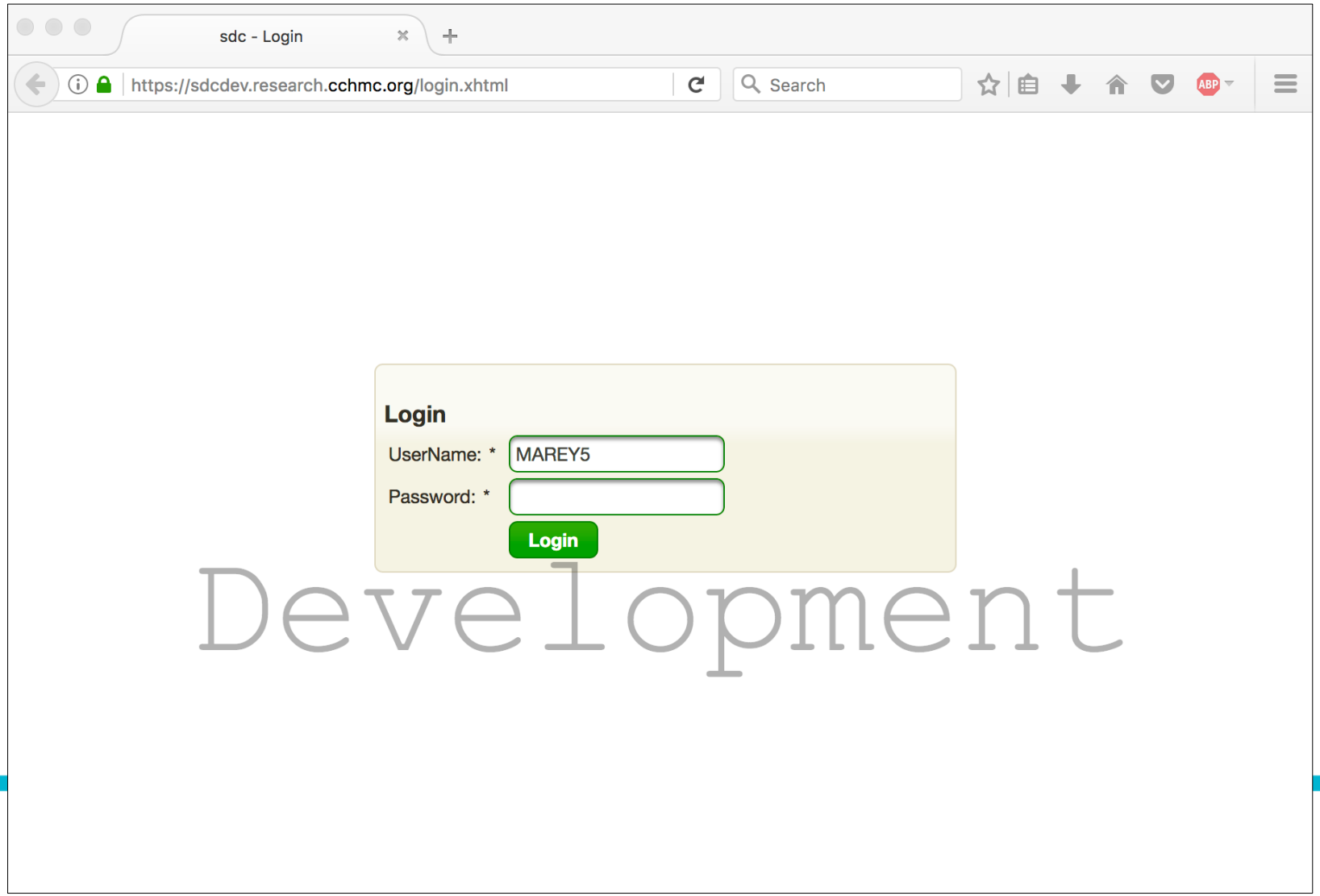
MRN	Patient Name	Age	Sex	Enrollment Status	Study Identifier
12345	Patient Test1	7 yrs	Female	Enrolled	CCHMC IRB#2015-8936
12346	Patient Test2	8 yrs	Male	Enrolled	CCHMC IRB#2015-8936
12347	Patient Test3	10 yrs	Female	Enrolled	CCHMC IRB#2015-8936

COMBINE Hyperlink Report

Launch COMBINE Study CRFs

*Mockup. Epic withheld permission to share screenshots publicly.

Example Workflow



Example Workflow

sdc - Structured Data Capt...

https://sdcdev.research.cchmc.org/index.xhtml

Search

MRN: 60007909 ICN ID: 2

View Mode | Logout

Welcome, Keith Marsolo

W4 (week 2-6) | W14 (week 10-22) | W26 (week 22-30) | W39 (week 33-45) | W52 (week 46-58) | W65 (week 59-71) | W78 (week 72-84) | W91 (week 85-97) | W104 (week 98-110) | Additional Study Visits

COMBINE pragmatic trial Case Report Form

Save

- Visit Information
- Exam
- Labs
- Visit Review
- Provider Review

Date of Visit:

02/22/2017

Next Section

COMBINE pragmatic trial Case Report Form

Save

Development

sdc - Structured Data Capt...

https://sdcdev.research.cchmc.org/index.xhtml

Search

MRN: 60007909 ICN ID: 2

View Mode | Logout

Welcome, Keith Marsolo

W4 (week 2-6) | W14 (week 10-22) | W26 (week 22-30) | W39 (week 33-45) | W52 (week 46-58) | W65 (week 59-71) | W78 (week 72-84) | W91 (week 85-97) | W104 (week 98-110) | Additional Study Visits

COMBINE pragmatic trial Case Report Form

Save

- Visit Information
- Exam
- Labs
- Visit Review
- Provider Review

Please complete the Adverse Events form for any abnormal lab value which results in a change of methotrexate / placebo dose, including discontinuation of methotrexate / placebo.

ALT

Date of Lab:

Result (IU/l):

Upper Limit of Normal

AST

Date of Lab:

Result (IU/l):

Upper Limit of Normal

Development

Next steps

- Pre-population of form data fields using FHIR web services
- Continue to collect baseline metrics
- Test full technology stack
- Deploy to production
- Collect post-deployment metrics

Challenges / Lessons learned

- Initial sequencing of events posed a challenge (e.g., tried to request access to web service first)
  - Learned to bring all functions together first
  - All understand the necessary hand-offs and sequencing
  - Frequent huddle to ensure that progress continues

- Expect validation challenges with FHIR
  - New standard, not widely implemented
  - Mapping abstract reference to already existing data
  - Will need to figure out how to request appropriate context (patient, encounter, time range, etc.)

Acknowledgements

- Project team
  - Keith Marsolo
  - Dan Jeffers
  - Billy Shuman
  - Jeremy Nix
  - Ron Bryson
  - Katie Lake
  - Jareen Meinzen-Derr
- IS resources
  - Jason Napora
  - Kevin Leaton
  - Frank Menke
  - Pushya Ramaswamy
  - Wayne Geers
  - Megan Bachman
  - Nicole Slonaker
  - Steve Metz

For more information, please contact:
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SEA-ONC award
Midpoint project update

Sysbiochem, LLC

Date: Mar 20, 2017

Agenda

- Project Overview
  - Objectives and Goals
  - Planned Tasks and Deliverables
  - Present Status
- Product Presentation
  - Rationale
  - Present state
  - Demo
- Q & A

Project Objectives and Goals

- Build a minimal viable product for FHx FHIR harmonization and return of validated analytics w/ message intact.
  - To provide merged risk assessment mappings with FHIR message – standardized and unified by working with the appropriate workgroups
    - Merging genetic test data to FHx message
  - Build a module that will merge FHIR messages from various sources to create the standard FHx message
  - Create a web-service for getting risk propensities for the patient.

Project Deliverables

- Standards for CDS analytics (FHIR/HL7)
  - **Interoperable Message**: Provide cancer risk assessment mappings for integration into any third party system
    - Production and testing of a round-trip workflow for
      - merging Clinical data and Family History data into a FHIR message
      - submission of message to analytics application and
      - return of validated values to clinicians for use in decision support.
  - **Standards Harmonization**: Validate Family Member History tools to support the round-trip payload for CDS. (including genomic test observations)
    - Provide beta demonstration tool for vendors and hospitals to integrate analytics for use by providers

Planned Tasks, Deliverables and Status

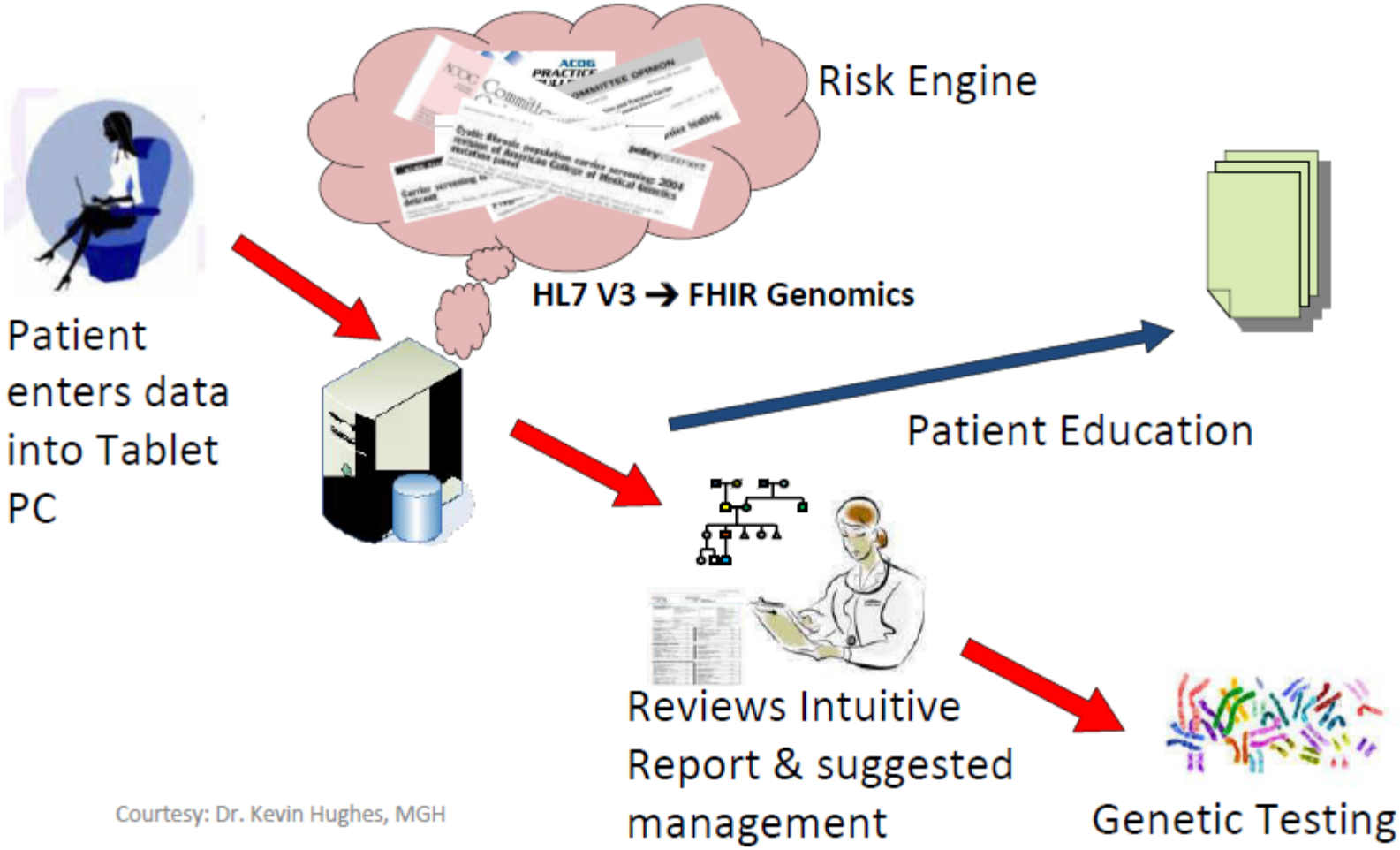
Task Name	Planned Milestone Date	Present Status
ONC-SEA FHIR based Breast Cancer Pilot (grant number 90AX0011/01-00)	09/16/16	
Project Execution	09/16/16	
Technical Project Details		
Solution Deployment	10/05/16	Presently Deployed
First submission from Intermountain	3/31/2017	On target
Translator Module Implementation Upgrades	03/31/16	Being built
Merge Module Development	05/31/2017	Being built
Processor Webservice Development	06/06/2017	
Identification of CDS rules	07/11/2017	
CDS Hook Feasibility	07/12/2017	

Product presentation

Why do it?

* There is a need to harmonize and standardize FHIR messages used for FamilyMemberHistory
  * Use-case based requirements
  * Willing parties
  * Ultimately the patient benefits

Current Data Flow (at best)



Courtesy: Dr. Kevin Hughes, MGH

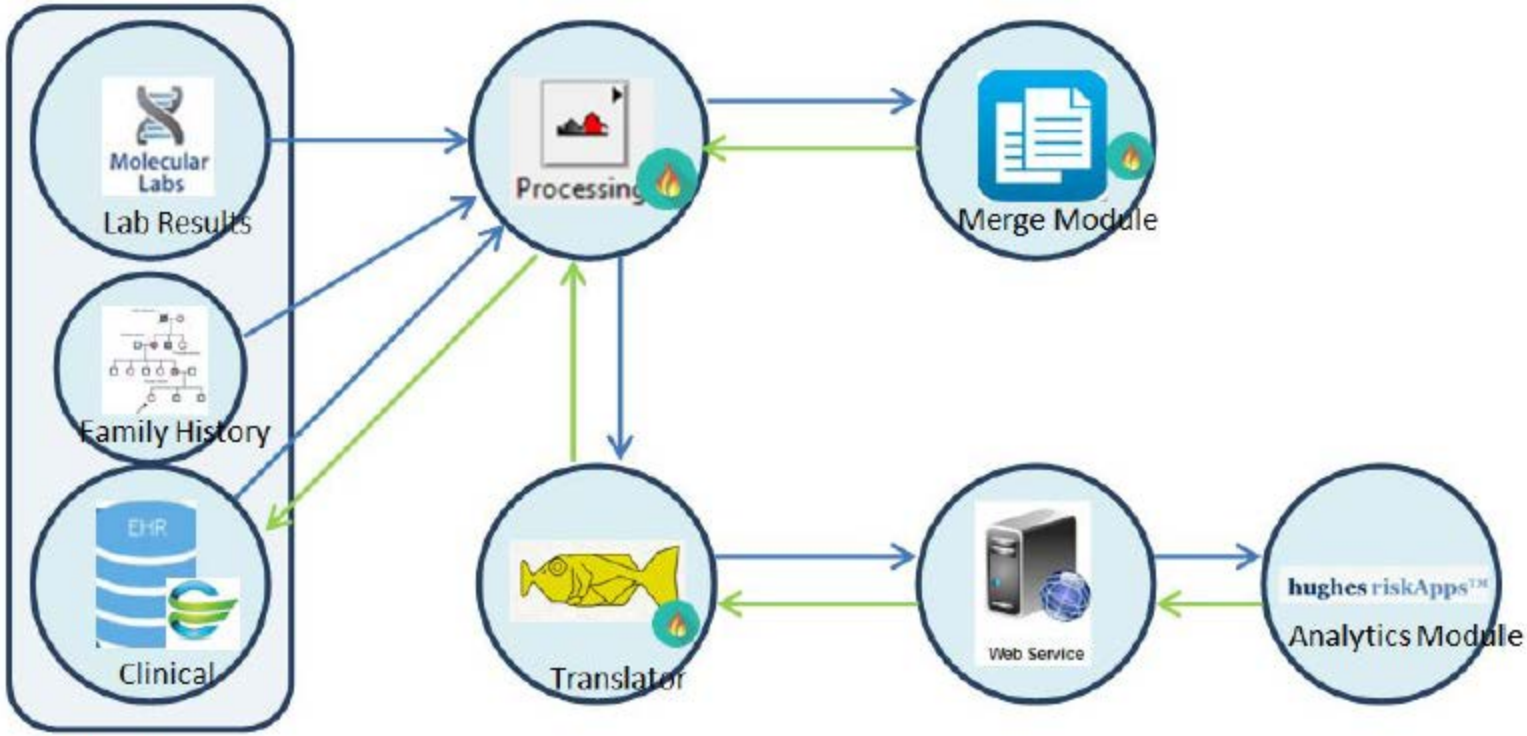
Challenges

* **Data Silos**
* **Harmonization of Standards**
* **Integration into clinical practice**

Why Us?

* Our collaborators
  * Mass General Hospital/Dana Farber
  * Intermountain Healthcare
* Our Expertise
  * Clinical Genomics
  * HL7 (including FHIR, V3, and V2*)
* Our Delivery
  * Agile, goal-oriented, expedited

Solution Description



Goals

* Build a common/Harmonized FHIR based FamilyMemberHistory profile
* Build round-trip application
  * Submit FHIR based message to a RiskApp
    * By translating the message that application understands
  * Return Risk profile
    * By translating the message into FHIR based message
  * Consume the message for display to clinician

FamilyMemberHistory

Minimum Data Elements - HughRiskApps

Demographic	Age
	Gender
	Alive or dead
	HL7 Fx Structure – relationship
	Identical Twins
	Race / ethnicity
Disease / Condition Hx	
	Age of onset
	Ovarian Cancer
	Breast Cancer
	Oophorectomy
	Mastectomy
Genetic Observation	
	Code
	Category
	Interpretation

FamilyMemberHistory

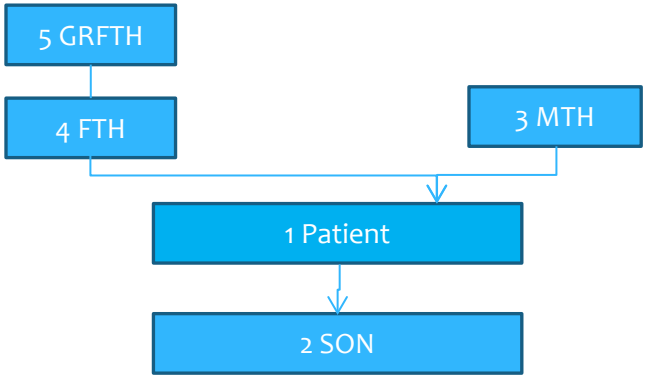
* Provide a complete message to the Standards community for input and feedback
* Assumptions
  * FamilyMemberHistory message in FHIR
    * Using Resources and extensions in DSTU3
  * Attributes limited to that used in the HughesRiskApps
  * Where possible standard extensions as defined on the HL7 FHIR website are used

FHIR resources profiles and extensions

Resource	Profile and extensions
* FamilyMemberHistory	* FamilyMemberHistory-Genetic profile * family-member-history-genetics-parent extension
* Observation	* family-member-history-genetics-observation extension

FamilyMemberHistory profile - Example

* Bundle
* Id: genetic
* Status: current
* Mode: snapshot
* Code: History of family member disease : (details: {LOINC code '8670-2' = "History of family member diseases", given as "history of family member diseases})
* Subject : Anne Patient
  * contained
    * id: 1 status: completed; name: Anne; father (Details: extension{details: http://family-member-history-genetics-parent {http://hl7.org/fhir/v3/RoleCode code 'FTH' = 'father', given as 'father', id: 4}}; mother: {Details: extension{details: http://family-member-history-genetics-parent { {http://hl7.org/fhir/v3/RoleCode code 'MTH' = 'mother', given as 'mother', id: 3}})
  * contained
    * Item id: 2
  * contained
    * Item id: 3
  * contained
    * Item id : 4
  * contained
    * Item id: 5



Achievements

* Harmonized FHIR based FamilyMemberHistory with RiskAssessment
* Built a web-service to consume the FHIR message
  * Return FHIR response including RiskAssessment
* Successfully transmitted message from IMH
* Building a harness to submit large datasets from IMH

Impact Measures

* Interoperable Exchange
  * Process the data through interoperable FHIR enabled pipeline, and return the results back
  * Track the number of FHIR messages being translated via the application interface

Interoperable exchange		Q1 Actual	Q2 Actual	Q2 Actual	Q4 Actual
Baseline	0				
Q1 Target	0	0			
Q2 Target	10				
Q3 Target	1000				
Q4 Target	1990				

Family Member History

Summary Status

* What we have so far:
  * Extension added to FMH – Genetic parent
    * http://hl7.org/fhir/StructureDefinition/family-member-history-genetics-parent
  * Extension Genetic Observation
    * http://hl7.org/fhir/StructureDefinition/family-member-history-genetics-observation
  * Mapping between Risk V3 and Risk Assessment FHIR
    * https://www.hl7.org/fhir/riskassessment.html

* What needs to happen:
  * US realm based profile – Family Member History
    * Containing race and ethnicity
      * https://www.hl7.org/fhir/extension-us-core-race.html
      * https://www.hl7.org/fhir/extension-us-core-ethnicity.html

Demo?

Questions?

Contact information

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