SMART APP TO TRACK AND REPORT STROKE CASES TO REDUCE READMISSIONS

National Center for Chronic Disease Prevention and Health Promotion
Arun Kumar Srinivasan PhD
Asha Krishnaswamy MSc, BEE
Sridevi Wilmore MPH, LMSW

Georgia Tech
Fayaz Adam MS
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MAKING OF FHIR

HL7 FHIR Workgroups

Partners in Interoperability

HIT Vendor
Payer
Research
Academia
HL7
EHR Vendor
WHAT IS FHIR TO PUBLIC HEALTH?

• Is FHIR right for PH?

• Can FHIR address?
  • current PH workflows
  • meet PH data needs

• Is it ready now?

• Where do I start?

• How do I ensure PH needs are met?
OVERVIEW

• Intro to Paul Coverdell National Acute Stroke Program

• Introduction to problem and the solution

• Methodology

• App Demonstration

• Findings
INTRO TO PAUL COVERDELL NATIONAL ACUTE STROKE PROGRAM
EPIDEMIOLOGY OF STROKE

• 5th leading cause of death in the US
  ○ Risk increases with age
  ○ 75% of stroke victims survive
  ○ ~$33 billion annually

• 2nd leading cause of death in the world
  ○ 6.5 million deaths annually
  ○ Highest rates in Asia
  ○ 69% of strokes occur in developing countries

http://millionhearts.hhs.gov/learn-prevent/risks.html
2015-2020 ENHANCING SYSTEMS OF CARE

Statewide, Data-Driven Quality Improvement across the Stroke Care Continuum for Better Patient Outcomes

3rd 5-year cycle

SYSTEMS OF CARE
ENHANCING SYSTEMS OF CARE
POST DISCHARGE COMPLEXITIES

• Multiple discharge destinations
• Multiple data collection sources and intervals (7, 30, 60 and/or 90 days)
• Varied data collection systems and formats
• How are data processed and linked
• Where are data stored
• Discharge hospital involvement

Potential Solution
• If post discharge data from EHR is referenced
• A stand alone SMART app built to collect data
PROJECT QUESTIONS?

• Can HL7 FHIR standard support the collection of post discharge data?

• Can SMART on FHIR platform support the identification of Stroke patients?

• Does FHIR support the post discharge data reporting workflow?
PROJECT GOALS

- Identify stroke patients for follow up data collection from patient records in an EHR

- Use smart phone/web-based secure instrument to collect additional data upon 30 days from discharge

- Submit as questionnaire response data back to EHR and add to the patient record using appropriate FHIR resources

- Generate a report to stroke registry using an approved file format

- Provide analytics on reporting

- Provide secure access, workflow and permission sets for healthcare providers, post discharge care provider and public health
METHODOLOGY

• Gap Analysis

• Architecture/ Approach

• Implementation
GAP ANALYSIS

• Post discharge data questionnaire assessment
• Stroke criteria and data element assessment
FHIR RESOURCE GAP ANALYSIS
LOGICAL FHIR RESOURCES

Life Cycle: Clinical Workflow, Entity Availability Workflow, or Request/Order

<table>
<thead>
<tr>
<th>MEDICATION MANAGEMENT</th>
<th>ENCOUNTERS</th>
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<tbody>
<tr>
<td>Medication</td>
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<td>Immunization</td>
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<tr>
<td>ImmunizationRecommendation</td>
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</tbody>
</table>

Category: Past, Present, Future, or Ongoing
Q1: Patient's date of hospital discharge
• 8649-6 Hospital discharge date
Q2: Discharge medications
• 8654-6 Hospital discharge medications

Extension needed? NO

FHIR FOR STROKE: THE RESULTS

PERFECT

Q1: Patient's date of hospital discharge
• 8649-6 Hospital discharge date

Q2: Discharge medications
• 8654-6 Hospital discharge medications

Extension needed? NO

IMPERFECT

• 1 - cerebrovascular
  2 - cardiovascular
  3 - other
  4 – unknown

vs.

69453-9 Cause of death [US Standard Certificate of Death]

Q2: Date of first follow up appointment
• 39289-4 Follow-up (referred to) provider /specialist, appointment date CPHS

Extension needed? YES
FHIR FOR STROKE: THE RESULTS

• 52 Post Hospital Discharge Survey Questions

• 5 Perfect Match, 2 Imperfect Match, 45 No Match
  o Questionnaire Resource for Survey Delivery
  o Questionnaire Response Resource for Survey Response Data
  o Extensions as needed
STROKE CRITERIA ASSESSMENT

CURRENT TRIGGER LOGIC (89%)
• Date of Discharge <= current date
• Patient Age >= 18
• Stroke 127 ICD-10 codes and 21 ICD-9 codes

FUTURE CONSIDERATIONS (11%)
• IV Alteplase = Y & other stroke medications
• Post-discharge form = N
• MRI and CT results
• 70182-1 NIH Stroke Scale LOINC & other stroke LOINC codes
• Stroke SNOMED codes
• Stroke key words in discharge summary

ARCHITECTURE
DATA FLOW DIAGRAM

1. Patient Data
   - Patient Data elements required to report a case

2. Post discharge trigger data elements
   - Polls on a predetermined daily schedule to determine a case
   - Questionnaire data elements and response

3. Trigger Logic
   - Pre Populated data

4. Patient Data
   - Data elements as requested by the State and CDC

5. Post discharge questionnaire data
   - Completes

6. Post Discharge 30 day follow up note

7. Data elements as requested by the State and CDC
   - State DPH and CDC
   - PCPDS Survey Administrator
TECHNICAL ARCHITECTURE
http://stroke.phiresearchlab.org
https://www.youtube.com/watch?v=0Ue-tTgx828
IMPLEMENTATION HIGHLIGHTS

• Configurable Trigger Service (looks up date range)

• Questionnaire stored and retrieved as FHIR resources

• Dynamic rendering of FHIR questionnaire resource

• Prepopulate Forms

• Support Nested Questions

• Responses stored as FHIR questionnaire responses
ON THE DRAWING BOARD

• Expanded Stroke Criteria

• User and Security Profiles

• Support Multiple Surveys

• Merge response survey to patient note
FINDINGS – PH PERSPECTIVE

• The pull vs. push: **Challenge**

• Evolving Standards and Implementations: **Challenging**
  • Application Programmable Interface (API)
  • Resources e.g. subscription resource

• Clinical Decision Support Framework: **Evolving**

• Security: Attribute-Based Access Control (ABAC): **Complex**

• EHR FHIR adoption rate: **Encouraging**
TEAM

Health Informaniacs @ GA Tech
• Fayaz Adam
• Gurpreet Singh
• Anirruddh Saddi
• Vinh Nguyen

CDC & Northrop Grumman (NG)
CDC
• Jennifer Wiltz MD MPH
• Sallyann Coleman-King MD, MSc
• Jason Bonander MA
• Susan Wilkins MLIS
• Amy Bowers
NG
• Dana Bowlin
• Matt Krystof
• Fred Sieling PhD
• Heather Patrick
• Priya Vijayasarathi MS
JOIN THE EXCITEMENT OF FHIR!!

Abstract has been accepted for presentation at the NACCHO Annual Meeting.
Contact us @
Arun Srinivasan fos2@cdc.gov
Asha Krishnaswamy fos3@cdc.gov
Sridevi Wilmore eur3@cdc.gov
Visit us @
http://stroke.phiresearchlab.org