Leveraging popHealth® and an active open source community to improve heart health in small- to medium-sized practices

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http://www.healthyheartsintheheartland.org/
Motivation

• EvidenceNOW
  – AHRQ-funded initiative to implement and evaluate quality improvement strategies for cardiovascular care

• Healthy Hearts in the Heartland (H3)
  – Led by Dr. Abel Kho, Northwestern University
  – Work with small- to medium-sized practice clinics in the Midwest.

• Improve quality in accordance with the following quality measures:
  – Aspirin therapy
  – Blood Pressure Control
  – Cholesterol management
  – Smoking cessation

• Need to measure quality & show progress
Considerations

• Multiple EHR vendors
• Cholesterol measure definition
  – Narrative developed for EvidenceNOW
  – In-progress eCQM specification in MAT
• Options
  – Get the data to the logic (extract from each EHR)
  – Get the logic to the data (implement in each EHR)
Requirements

• Allow practices access to a measure dashboard
• Introduce new/modified versions of measures
  – What-if analyses, version comparisons
• Generate patient lists for intervention
  – Depending on randomization arm
• "Facilitator" role – manage multiple practices
• Manage all access centrally
Requirements

- Allow practices access to a measure dashboard
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- "Facilitator" role – manage multiple practices*
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* but these can be added!
Solution Overview

• Extract clinical data from 250 small- to medium-sized practices

• Centralize the aggregation and reporting of clinical quality measures
Data Extraction

• 20+ EHR vendors
• Local, vendor and cloud hosted
• Differing data export capabilities
  – CCD, reporting feature, none
• Park Street Solutions
  – Managing technical solutions for project
• Secure client to transmit patient-level data to the central server
Data Aggregation

• ETL-type process to clean, normalize and transform the data
  – Extract specific to EHR vendor/implementation
  – NLP for non-coded data (e.g. smoking status)
  – Mapping of local terms to standard terms
    • Allows review with each extract

• Configuration is done per practice
Terminology Mappings

- Quality measures use value sets
- Value sets are collections of terms in standard vocabularies
- Local codes aren't always in standard vocabularies
- Three solutions
  1. Map local codes to existing value set terms
  2. Edit value sets to include local codes
  3. Map semantically equivalent terms to the appropriate value set
Terminology Mappings

• Customization #1 – allow Bonnie to generate a value set matcher
• Defined an "H3 Bundle" – can be shared
H3 popHealth® Instance

• Application server
  – 2 CPUs
  – 4GB RAM

• Database server
  – 4 CPUs
  – 16GB RAM

• Security assessment performed
• Benchmarking and scaling planned
Data Loading

• "Standards" – in some instances, EHR export is insufficient
  – Customization #2 – Direct JSON import to MongoDB

• Invoke API to load a ZIP of JSON documents, per practice

• Invoke calculation jobs when data loaded
  – Customization #3
Dashboard

• Show progress on ABCS quality measures
• Compare progress to benchmarks
  – Customization #4 – benchmark report
• For those not randomized to PM arm, remove access to patient lists
  – Customization #5 – restrict access by user
  – Allows facilitators to still see patients
### Measures

#### ABCEs

<table>
<thead>
<tr>
<th>Measure Description</th>
<th>Percentage</th>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS 165v4 - Controlling High Blood Pressure</td>
<td>50%</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>CMS 164v4 - Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic</td>
<td>50%</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>CMS 138v4 - Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention</td>
<td>18%</td>
<td>2</td>
<td>11</td>
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<tr>
<td>CMS 347v0/40280381-4555-E1C1-0145-F85B04DF5504 - Statin Therapy for the Prevention and Treatment of Cardiovascular Disease</td>
<td>25%</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>LDL Test (result (\geq) 190 mg/dL)</td>
<td>50%</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Diabetes w/ LDL Test (result &lt;190 and (\geq) 70 mg/dL)</td>
<td>50%</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
## Measures

### ABCS

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<td>4</td>
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<tr>
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<td>2</td>
</tr>
<tr>
<td></td>
<td>Diabetes w/ LDL Test (result &lt;190 and &gt;=70 mg/dL)</td>
<td>50</td>
<td>1</td>
<td>2</td>
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<td>------------------------------------------------------------------------</td>
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<td>------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Controlling High Blood Pressure</td>
<td>50.0%</td>
<td>Data not available</td>
<td>64%</td>
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<tr>
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<td>Data not available</td>
<td>54%</td>
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<tr>
<td>Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention</td>
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<td>Statin Therapy for the Prevention and Treatment of Cardiovascular Disease</td>
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<tr>
<td>History of Clinical ASCVD</td>
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1. These figures are taken from the presentation by Jane Wright, Executive on July 10, 2014 on "Status of ABCS" on Slide 4. The presentation is available at: https://www.cms.gov/eHealth/downloads/Webinar_eHealth_July10_MillionHearts.pdf
# Practices Facilitated

- **Practice A**
  - **Remove**

Add new practice:
- **(Select)**
  - H3 Root
  - **Practice A**
  - **Practice B**

<table>
<thead>
<tr>
<th>Facilitator Role</th>
<th>View Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes - revoke</td>
<td>Yes - revoke</td>
</tr>
<tr>
<td>No - grant</td>
<td>No - grant</td>
</tr>
<tr>
<td>Yes - revoke</td>
<td>Yes - revoke</td>
</tr>
</tbody>
</table>
Working with OSEhra

• Developers & Users
  – Reducing duplication of effort
  – Fixes for things we didn't catch
  – Sounding board for "what's useful"

• EHR Data Accessibility & Extraction (DAX)
  – Realization that we're not alone!
  – Collective intelligence for solutions
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Thank you!

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