Improving Patient Outcomes Through Data

Measures 101: A Deep Dive

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Introductions

Eric Gunther

- Engineering Team Lead
- With Azara since inception
- Architect of DRVS measure calculation infrastructure
- Oversee development of new measures and features

Samuel Bar

- Sr. Implementation Specialist
- Managed new implementations and remapping projects at dozens of CHC’s
- Mapped data elements for UDS, MU, HEDIS, eHIVQUAL, and P4C
- Familiar with data entry workflows across an array of EHR systems including NextGen, eClinical Works, GE Centricity, Allscripts, and EPIC
Agenda

• Defining the Measure
  – Measure specifications & logic
  – Identifying ambiguity
  – Choosing and using value sets

• Mapping & Validating
  – Components of a measure
  – Where in the workflow does that come from?
  – Common mapping issues
  – Validation core concepts

• Processing and Attribution
  – Loading data into DRVS/CPCI
  – Attribution by provider, period, or other
DEFINING THE MEASURE

Making smart assumptions and judgements about areas of ambiguity
Start with a Question

How are we doing when it comes to depression screening and follow-up for patients who screened positive?

- Need to be more specific.
- Ambiguity is one of the main reasons a measure doesn’t meet your expectations or doesn’t match across systems.
- Be on the lookout for ambiguity!
Choose a Specification

- **Meaningful Use eCQMs**
  - Published by CMS once a year
  - Extremely specific but high learning curve
  - What we’re going to be looking at today

- **UDS**
  - Published by HRSA once a year
  - FQHC’s know it well
  - Fairly accessible specification

- **HEDIS**
  - Published by NCQA once a year
  - Requires a license
  - Historically made for claims data
Meaningful Use eCQM Spec

Population criteria

- **Initial Patient Population**
  - AND: "Patient Characteristic: Birth Date: birth date >= 12 years (s) before start of "Measurement Period"  
  - AND: "Occurrence of Encounter, Performed: Depression Screening Denominator Encounter Codes New" during "Measurement Period"

- **Denominator**
  - AND: "Initial Patient Population"

- **Denominator Exclusions**
  - OR:
    - AND: MOST RECENT: Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Depression Screening Result) during "Measurement Period"
    - AND NOT: "Occurrence of Diagnosis, Active: Depression diagnosis" ends before start of "Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Depression Screening Result)"
    - OR:
      - AND: "Occurrence of Diagnosis, Active: Depression diagnosis" starts before start of "Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Depression Screening Result)"
      - OR:
        - AND: MOST RECENT: Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result) during "Measurement Period"
        - AND NOT: "Occurrence of Diagnosis, Active: Depression diagnosis" ends before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"
        - OR:
          - AND: "Occurrence of Diagnosis, Active: Bipolar Diagnosis" starts before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"
          - AND: "Occurrence of Diagnosis, Active: Bipolar Diagnosis" starts before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"
          - OR:
            - AND: MOST RECENT: Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result) during "Measurement Period"
            - AND NOT: "Occurrence of Diagnosis, Active: Bipolar Diagnosis" ends before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"
            - OR:
              - AND: "Occurrence of Diagnosis, Active: Bipolar Diagnosis" starts before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"

- **Numerator**
  - OR:
    - AND: MOST RECENT: Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Depression Screening Result) during "Measurement Period"
    - AND: "Patient Characteristic: Birth Date: birth date < 15 years (s) before start of "Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Depression Screening Result)"
    - AND: OR:
      - AND: "Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Positive Depression Screening)" during "Measurement Period"
      - OR:
        - OR: "Intervention, Performed: Additional evaluation for depression - adolescent"
        - OR: "Intervention, Order: Referral for Depression Adolescent"
        - OR: "Medication, Order: Depression medications - adolescent"
        - OR: "Intervention, Performed: Follow-up for depression - adolescent"
        - OR: "Procedural, Performed: Suicide Risk Assessment"
        - OR: "< 1 day(s) starts after start of "Occurrence of Risk Category Assessment: Adolescent Depression Screening (result: Positive Depression Screening)"
    - OR:
      - AND: MOST RECENT: Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result) during "Measurement Period"
      - AND: "Patient Characteristic: Birth Date: birth date >= 16 years (s) before start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Depression Screening Result)"
      - AND: OR:
        - AND: "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Positive Depression Screening)" during "Measurement Period"
        - OR:
          - OR: "Intervention, Performed: Additional evaluation for depression - adult"
          - OR: "Intervention, Order: Referral for Depression Adult"
          - OR: "Medication, Order: Depression medications - adult"
          - OR: "Intervention, Performed: Follow-up for depression - adult"
          - OR: "Procedural, Performed: Suicide Risk Assessment"
          - OR: "< 1 day(s) starts after start of "Occurrence of Risk Category Assessment: Adult Depression Screening (result: Positive Depression Screening)"

- **Denominator Exceptions**
  - OR:
    - OR: "Risk Category Assessment not done: Medical reason contraindicated" for "Adolescent Depression Screening LOSING Value Set"
    - OR: "Risk Category Assessment not done: Medical reason contraindicated" for "Adult Depression Screening LOSING Value Set"
    - OR: "Risk Category Assessment not done: Patient Reason refused" for "Adolescent Depression Screening LOSING Value Set"
    - OR: "Risk Category Assessment not done: Patient Reason refused" for "Adult Depression Screening LOSING Value Set" during "Measurement Period"

Data criteria (QDM Data Elements)

- "Diagnosis, Active: Bipolar Diagnosis" using "Bipolar Diagnosis Grouping Value Set (2.16.840.1.113883.3.60.450)"
- "Diagnosis, Active: Depression diagnosis" using "Depression diagnosis Grouping Value Set (2.16.840.1.113883.3.60.145)"
- "Intervention, Performed: Depression Screening Denominator Encounter Codes New" using "Depression Screening Denominator Encounter Codes New Grouping Value Set (2.16.840.1.113883.3.60.1945)"
- "Intervention, Order: Referral for Depression Adolescent" using "Referral for Depression Adolescent SNOMED-CT Value Set (2.16.840.1.113883.3.60.5937)"
- "Intervention, Order: Referral for Depression Adult" using "Referral for Depression Adult SNOMED-CT Value Set (2.16.840.1.113883.3.60.1542)"
- "Intervention, Performed: Additional evaluation for depression - adolescent" using "Additional evaluation for depression - adolescent SNOMED-CT Value Set (2.16.840.1.113883.3.60.1542)"
Anatomy of a Measure

• **Measure logic**
  – The ANDs and ORs

• **Value sets**
  – Defining data elements
  – Lists of codes

• **Attribution**
  – Running a measure by provider or location
  – Running a measure for a month or quarter
  – Putting patients into buckets
Measure Logic – Calculating the Result

Measure Result = \frac{\text{Numerator}}{\text{Denominator} - \text{Exclusions}}
Start with the denominator

Patients who had ...

1. A qualifying visit in the past year
   AND
2. Over 12 years old

• This is Ambiguous!
  – How about “age at beginning of reporting period >= 12 years”
Measure Logic – Numerator Population

Patients in the denominator who had...

1. A negative result in their *most recent* depression screen
   OR
2. A positive result in their most recent depression screen AND follow-up documented

• Ambiguous!
  – What counts as a positive depression screen?
  – What counts as follow-up?
  – When does the follow-up have to be documented?
Measure Logic – Numerator Population Clarified

• What is a positive depression screen?
  – PHQ-2 >= 3
  – PHQ-9 >= 10
  – Other standardized depression screen marked as positive

• What is follow-up?
  – Depression medications
  – Additional evaluation for depression
  – Referral for depression
  – Can be custom mapped for your health center

• When does follow-up have to be documented?
  – MU – within a day
  – UDS (2015)– before the end of the year
Patients in the denominator who had...

Active depression OR bipolar diagnosis

See any problems with this?

Excluding people who got screened, had follow-up, and were subsequently diagnosed. Those were all numerator patients!
Measure Logic – Exclusions Population Fixed

Patients in the denominator who had...

Active depression or bipolar diagnosis **AND**
(no screen during reporting period **OR** the diagnosis was made before the screen)
Measure Logic – “Exclusion” Confusion

Patients not in the denominator population (UDS)

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Denominator</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>100</td>
<td>75%</td>
</tr>
</tbody>
</table>

\[
\frac{75}{100} = 75\%
\]

Patients reported in the exclusions population (MU)

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Denominator</th>
<th>Exclusions</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>120</td>
<td>20</td>
<td>75%</td>
</tr>
</tbody>
</table>

\[
\frac{75}{(120-20)} = 75\%
\]
Value Sets

• Lists of codes defining the data elements

• Code systems
  – CPT – procedures, office visits
  – ICD-9/10 – diagnoses
  – RxNorm – medications
  – Custom mappings
    • Takes a lot of effort compared to codified data

• Try to use standardized value sets

• Value set feedback process
  – Submit tickets through ONC’s JIRA to question value set content
  – Medications example – should Abilify be in the value set?
Value Sets - Example

Depression medication value set from VSAC (Value Set Authority Center)
What do your clinicians need to do to satisfy the measure

MAPPING & VALIDATING
Data Elements are the Building Blocks of Measures

NUMERATOR

Screening / care / counseling / procedure

DENOMINATOR

Name, MRN, Gender, DOB

Diagnosis or Assessment

Qualifying Encounters
Depression Screening Data Elements

**NUMERATOR**
- PHQ-2 / PHQ-9 & Follow-Up
- Not Depressed or Bipolar
- Qualifying Encounters

**DENOMINATOR**
- Name, DOB
- Who is the patient and do they meet age criteria?
- Did the patient have an encounter qualifying them for the measure?
- Did the patient get a PHQ-2/PHQ-9 and have a Depression Follow-up if needed?
Depression Screening and Follow-Up

**Start**

Patient Arrives

Front Desk Checks in Patient

MA/LPN Records patient answers in EHR. PHQ-2 Score Calculates.

If score is <3 then patient does not need follow-up.

If score is >=3 then patient needs PHQ-9

MA/LPN continues depression screening to complete PHQ-9

If score is >=10, provider refers patient to behavioral health

No Follow-Up

Follow-Up Needed

Denominator Criteria

Numerator Criteria

**Previous Visit**

PHQ-9 score >=10

Patient sees BH specialist

BH diagnoses patient with Depression, adds F33.* or F32.* to problem list

Exclude Criteria

Depression Screen Complete

No Follow-Up

Follow-Up Needed

Continue with visit.
Missing Data

NUMERATOR

DENOMINATOR

Name, MRN, Gender, DOB

Missing data elements are like holes in a foundation.

Free text Comments:
Patient is depressed

PHQ-2 done by patient on paper, never in EHR

Patient is billed with custom CPT codes
Common Mapping Issues

Denominator

• Use of custom CPT codes, addition of modifiers

Numerator

• Depression screening done outside EHR
• Unstructured PHQ-2 & PHQ-9 results
• Use of alternative screenings (Edinburgh Depression Scale, DUKE-AD)
• No clear follow-up workflow
• Medications dispensed without structured data

Exclusions

• Behavioral Health does not use EHR
• Depression diagnosis not entered using correct ICD9/ICD10/SNOMED`
DRVS Architectural Overview

- PCA and PCMH focused solution
- Data from disparate EHR and EPM systems
- Daily data refresh
- Data unified in EHR-agnostic Data Warehouse for apples to apples comparison
- Web-based reporting platform accessible from any major browser
- User role differentiation and data blinding
- Graphical and text based depictions of datasets
- External data links geographic characteristics to patients & providers
Validation Core Concepts

• Latency is to be expected:
  – Quality Measures (MU, UDS, HEDIS) get updated weekly
  – Registries and the Visit Planning reports get updated nightly

• Pick and stick with a period type and a measure specification

• Inconsistent workflows = Inconsistent data capture

• Start with a small number of patients, add patients until you find a problem

• Pick a variety of patients
  – Numerator = Y/N, Exclusions = Y/N
  – Different providers and locations (usual & rendering)
  – Indications of different workflows/tests
Using Aggregated Patient Detail

- DRVS allows you to view patient level detail in the application, or as excel export
- HIPAA: When exporting, keep in mind where the PHI ends up (downloads folder, email, public computer)
- Keep track of which patients are incorrectly part of numerator/denominator/exclusions by using a validation workbook
- Once you’ve found missing data screenshots! screenshots! screenshots!
How data elements from your EHR gets transformed into measure results

PROCESSING AND ATTRIBUTION
DRVS Data Processing

• Loading (ETL)
  – Nightly
  – Normalization and “scrubbing”

• Measure calculation
  – Weekly
  – All patients, all measures, “current” periods
  – Historical processing upon request

• Attribution
  – Run-time (when you use a report)
  – Aggregate measure results
Attribution

- “Slicing and dicing” the measures
- Measures are calculated per patient, attribution is how we sum up the measure results by placing patients into buckets
Attribution - Provider

- Sum up patient results into provider buckets
  - Rendering provider – patient had to have a visit with the provider
  - Patients can contribute to multiple buckets, you can’t add up all the buckets to get your center’s total
  - Usual provider – patient must be in the provider’s panel
Attribution - Period

• Most measure specs assume a year long period, so how can we run them for smaller periods like month or quarter?

• Running a measure for “March 2016”
  – Uses Trailing Year (TY) March 2016 measure results
  – Only return patients who had a visit in March 2016

• Why not just calculate measure for smaller period?
  – Don’t want to change compliance standard. Requiring depression screen in the past month, as opposed to past year, would bring down the numerator.
  – The drilldown becomes meaningless!
Attribution – Choosing a Period

• Trailing Year / Calendar Year
  – Most compliance reporting is trailing year
  – If we had to report this month, what is our result?

• Month/Quarter
  – Better for tracking progression and monitoring PDSA cycle
  – How did we do this month?
Additional Resources

• Azara Resources
  – https://www.youtube.com/channel/UC5-tw1KC6utBG8wT_fZJ-bg
  – http://www.azarahealthcare.com/blog/

• CMS eCQM Library

• UDS 2015 manual

• Value Set Authority Center (VSAC)
  – Requires free UMLS license

• USHIK (great display of measure logic & value sets)

• eCQI Resource Center
  – https://ecqi.healthit.gov/

• eCQM Issue Tracking
  – https://jira.oncprojecttracking.org
Questions