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

Making smart assumptions and judgements about areas of ambiguity

DEFINING THE MEASURE

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

Population criteria

- **Initial Patient Population =**
  - AND: "Patient Characteristic Birthdate: birth date" >= 12 year(s) starts before start of "Measurement Period"
  - AND: "Occurrence A of Encounter, Performed: Depression Screening Denominator Encounter Codes New" during "Measurement Period"
- **Denominator =**
  - AND: "Initial Patient Population"
- **Denominator Exclusions =**
  - AND:
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND NOT: "Occurrence A of Diagnosis, Active: Depression diagnosis" ends before start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')"
      - AND: "Occurrence A of Diagnosis, Active: Depression diagnosis" starts before start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')"
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND NOT: "Occurrence A of Diagnosis, Active: Depression diagnosis" ends before start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')"
      - AND: "Occurrence A of Diagnosis, Active: Depression diagnosis" starts before start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')"
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND NOT: "Occurrence A of Diagnosis, Active: Bipolar Diagnosis" ends before start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')"
      - AND: "Occurrence A of Diagnosis, Active: Bipolar Diagnosis" starts before start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')"
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND NOT: "Occurrence A of Diagnosis, Active: Bipolar Diagnosis" ends before start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')"
      - AND: "Occurrence A of Diagnosis, Active: Bipolar Diagnosis" starts before start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')"
- **Numerator =**
  - AND:
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND: "Patient Characteristic Birthdate: birth date" < 18 year(s) starts before start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Depression Screening Result')"
      - AND:
        - OR: "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Negative Depression Screening')" during "Measurement Period"
        - OR:
          - AND: "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Positive Depression Screening')" during "Measurement Period"
          - AND:
            - 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: "Procedure, Performed: Suicide Risk Assessment"
            - <= 1 day(s) starts after start of "Occurrence A of Risk Category Assessment: Adolescent Depression Screening (result: 'Positive Depression Screening')"
    - OR:
      - AND: MOST RECENT:"Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')" during "Measurement Period"
      - AND: "Patient Characteristic Birthdate: birth date" >= 18 year(s) starts before start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Depression Screening Result')"
      - AND:
        - OR: "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Negative Depression Screening')" during "Measurement Period"
        - OR:
          - AND: "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Positive Depression Screening')" during "Measurement Period"
          - AND:
            - 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: "Procedure, Performed: Suicide Risk Assessment"
            - <= 1 day(s) starts after start of "Occurrence A of Risk Category Assessment: Adult Depression Screening (result: 'Positive Depression Screening')"
- **Denominator Exceptions =**
  - AND:
    - OR: "Risk Category Assessment not done: Medical reason contraindicated" for "Adolescent Depression Screening LOINC Value Set"
    - OR: "Risk Category Assessment not done: Medical reason contraindicated" for "Adult Depression Screening LOINC Value Set"
    - OR: "Risk Category Assessment not done: Patient Reason refused" for "Adolescent Depression Screening LOINC Value Set"
    - OR: "Risk Category Assessment not done: Patient Reason refused" for "Adult Depression Screening LOINC Value Set"
    - during "Measurement Period"

Data criteria (QDM Data Elements)

- "Diagnosis, Active: Bipolar Diagnosis" using "Bipolar Diagnosis Grouping Value Set (2.16.840.1.113883.3.600.450)"
- "Diagnosis, Active: Depression diagnosis" using "Depression diagnosis Grouping Value Set (2.16.840.1.113883.3.600.145)"
- "Encounter, Performed: Depression Screening Denominator Encounter Codes New" using "Depression Screening Denominator Encounter Codes New Grouping Value Set (2.16.840.1.113883.3.600.1916)"
- "Intervention, Order: Referral for Depression Adolescent" using "Referral for Depression Adolescent SNOMED-CT Value Set (2.16.840.1.113883.3.600.537)"
- "Intervention, Order: Referral for Depression Adult" using "Referral for Depression Adult SNOMED-CT Value Set (2.16.840.1.113883.3.600.538)"
- "Intervention, Performed: Additional evaluation for depression - adolescent" using "Additional evaluation for depression - adolescent SNOMED-CT Value Set (2.16.840.1.113883.3.600.1542)"

Anatomy of a Measure

- **Measure logic**
  - The ANDs and ORs

- **Value sets**
  - Defining data elements
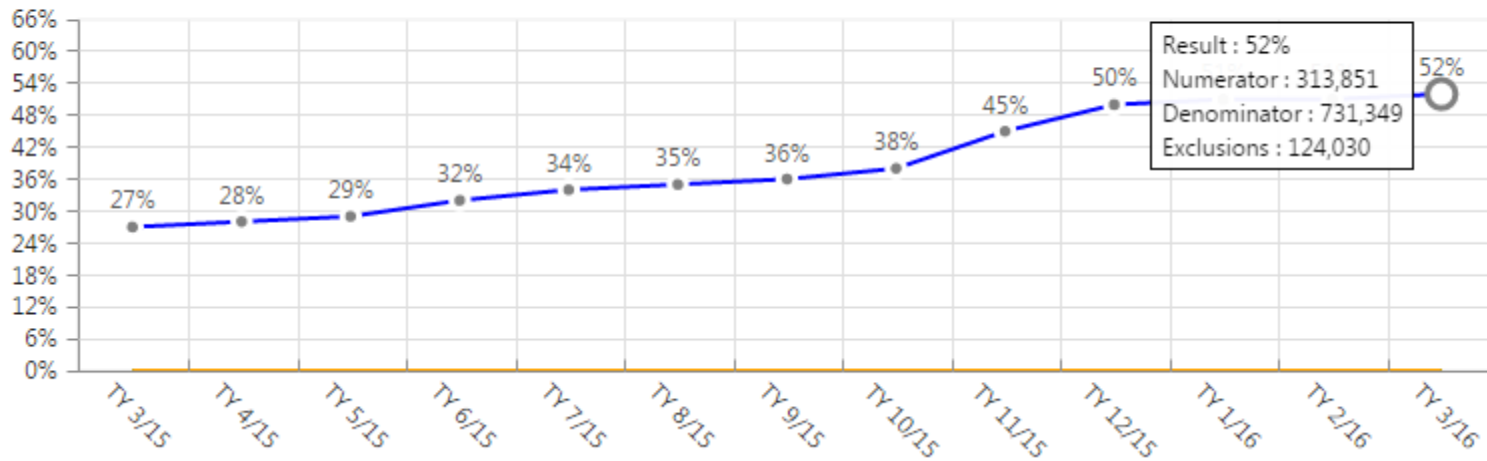 - Lists of codes

- **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

$$\text{Measure Result} = \frac{\text{Numerator}}{\text{Denominator} - \text{Exclusions}}$$

TY March 2015 to TY March 2016 Trend

Result : 52%
Numerator : 313,851
Denominator : 731,349
Exclusions : 124,030

27% 28% 29% 32% 34% 35% 36% 38% 45% 50% 52%

TY 3/15 TY 4/15 TY 5/15 TY 6/15 TY 7/15 TY 8/15 TY 9/15 TY 10/15 TY 11/15 TY 12/15 TY 1/16 TY 2/16 TY 3/16

Measure Logic – Denominator Population

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

Measure Logic – Exclusions Population

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)

Numerator	Denominator	Result
75	100	75%

75/100 = 75%

Patients reported in the exclusions population (MU)

Numerator	Denominator	Exclusions	Result
75	120	20	75%

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

Diagnosis or Assessment

Name, MRN, Gender, DOB

Qualifying Encounters
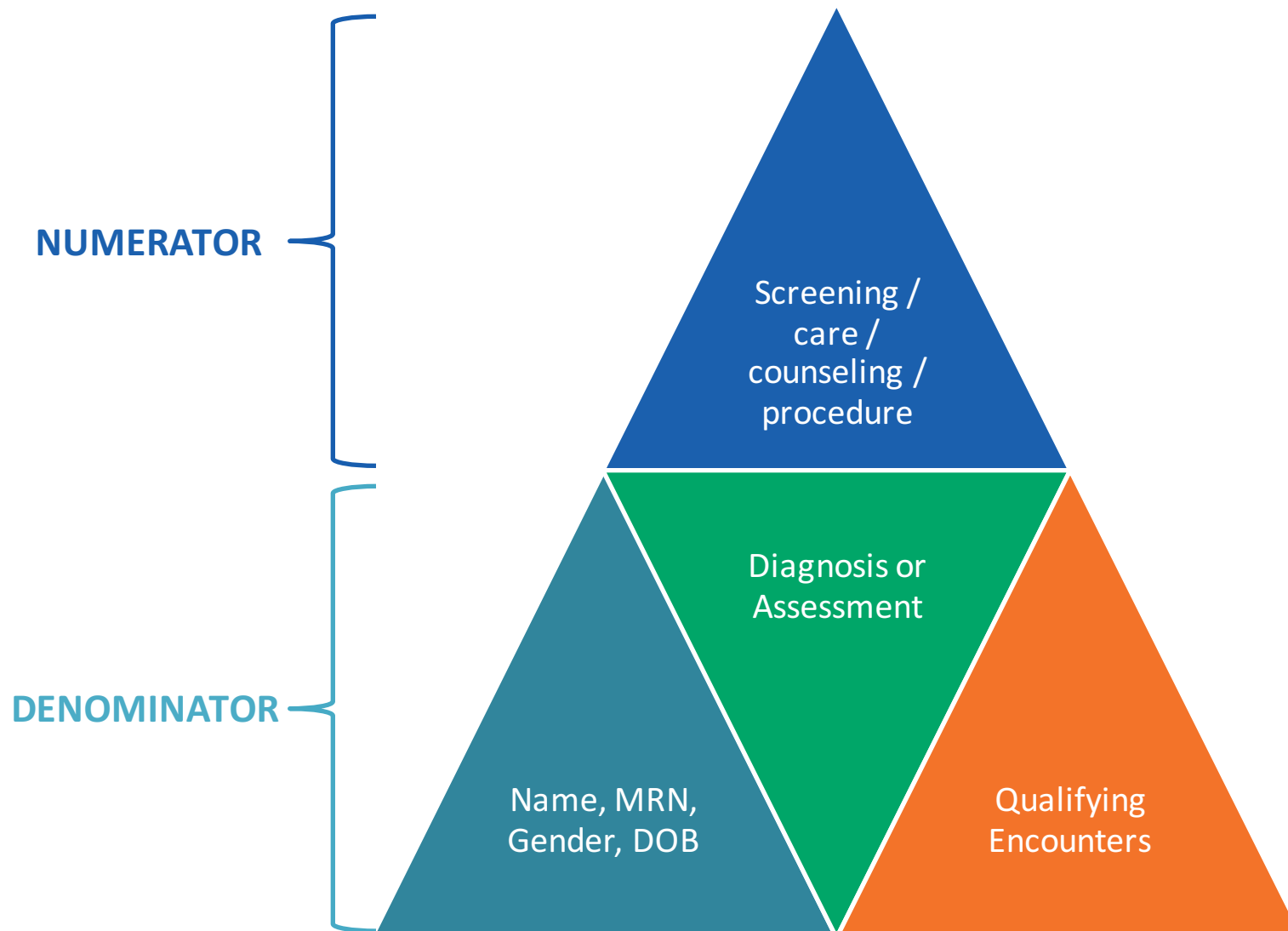
Depression Screening Data Elements
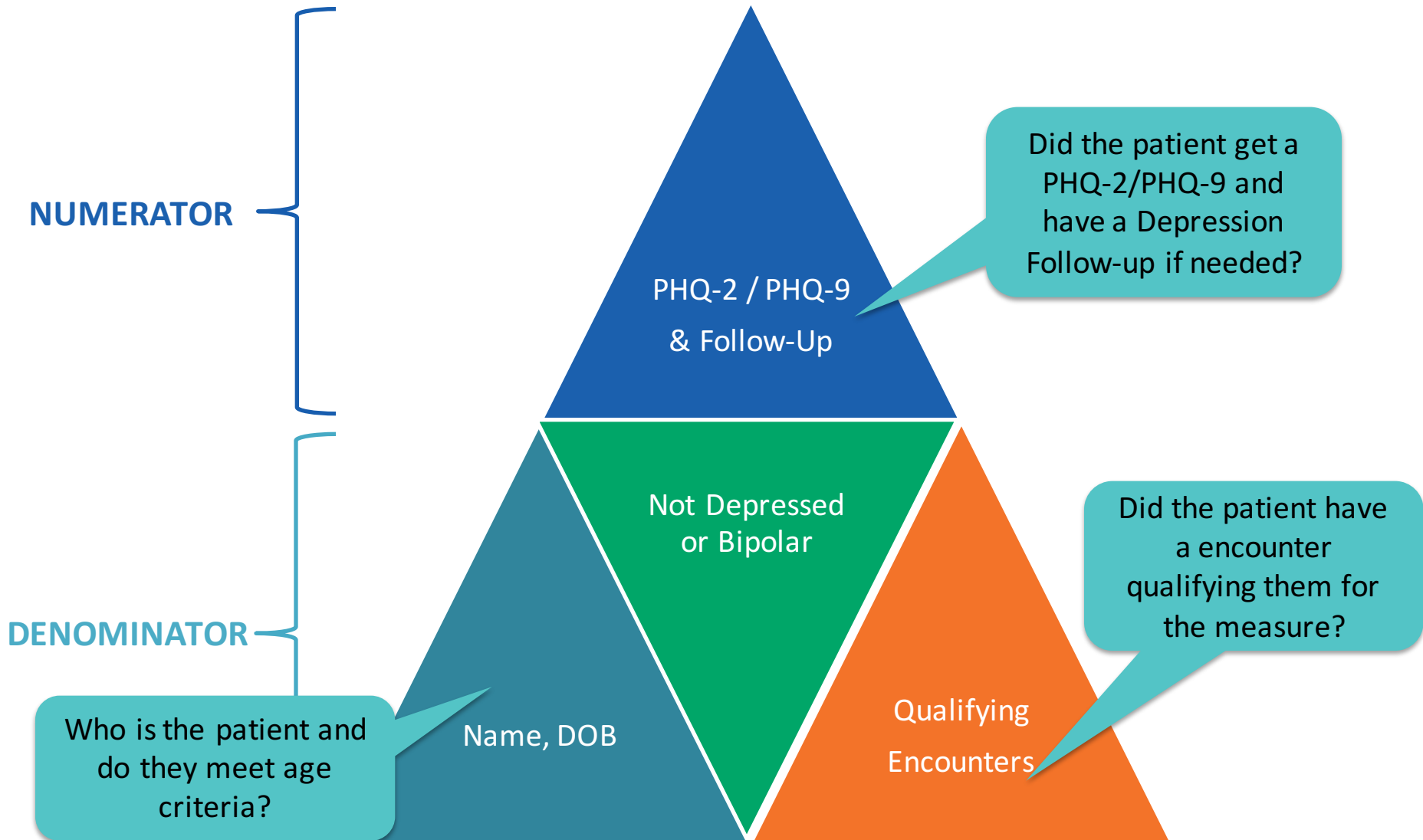
Depression Screening and Follow-Up

Missing Data

NUMERATOR

> Missing data elements are like holes in a foundation.
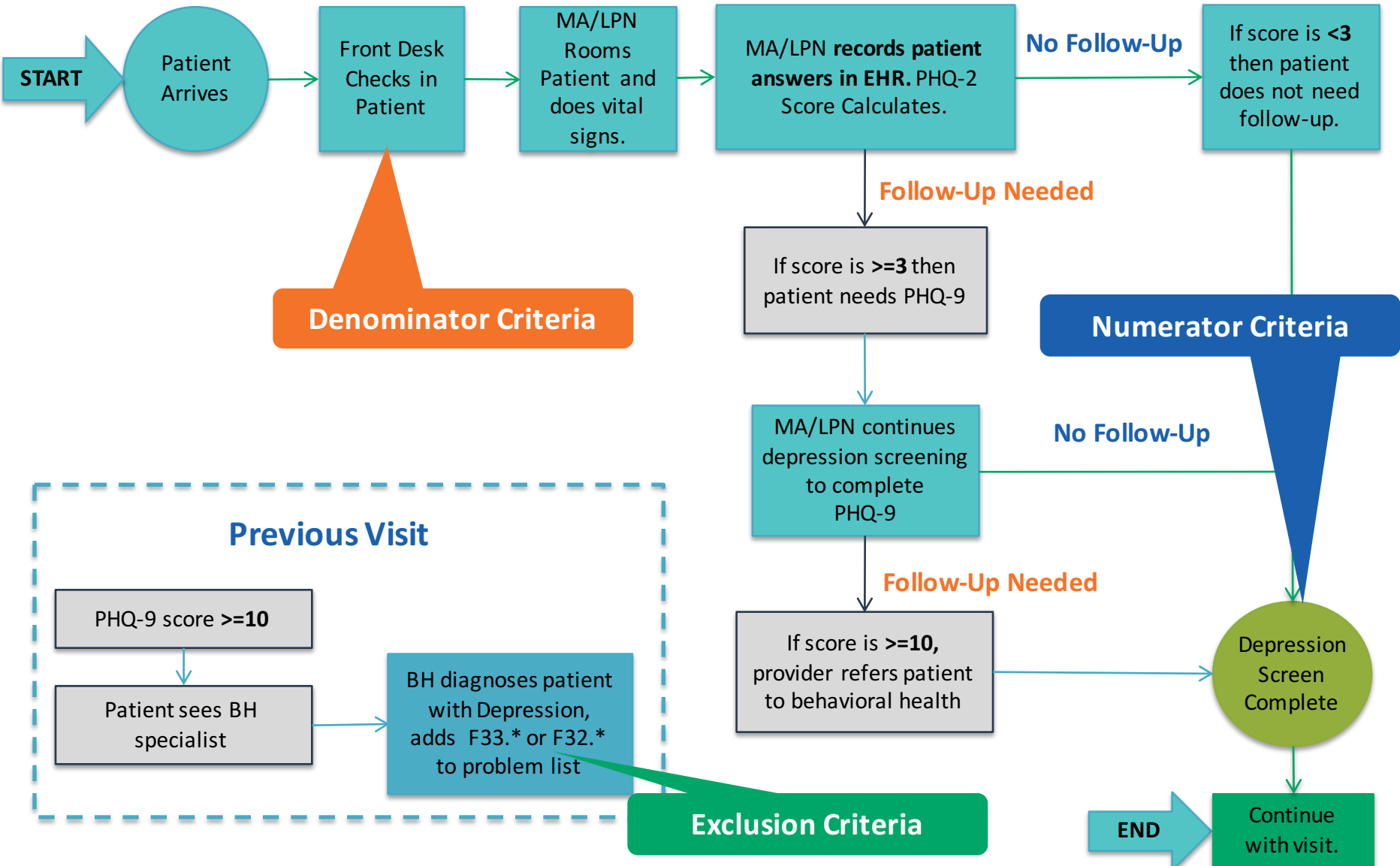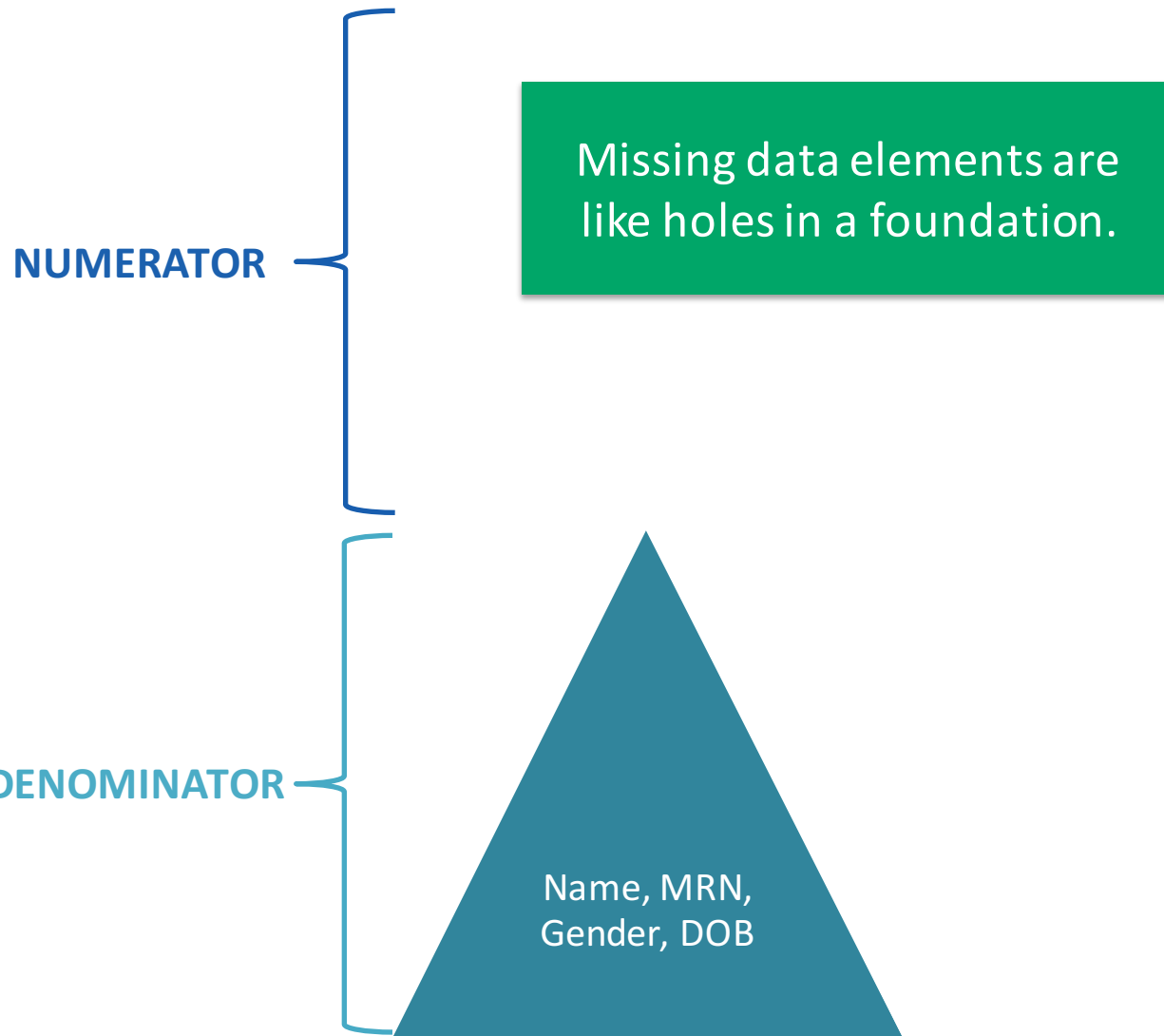
PHQ-2 done by patient on **paper**, never in EHR

Free text Comments: Patient is depressed

DENOMINATOR

Name, MRN, Gender, DOB

Patient is billed with custom CPT codes

Denominator
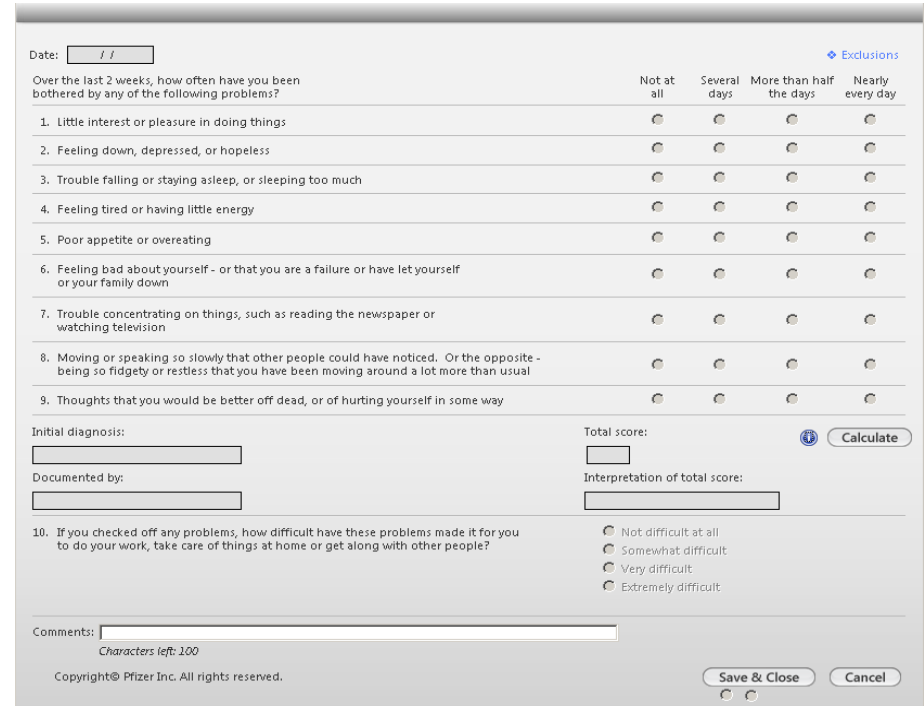
- Use of custom CPT codes, addition of modifiers

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
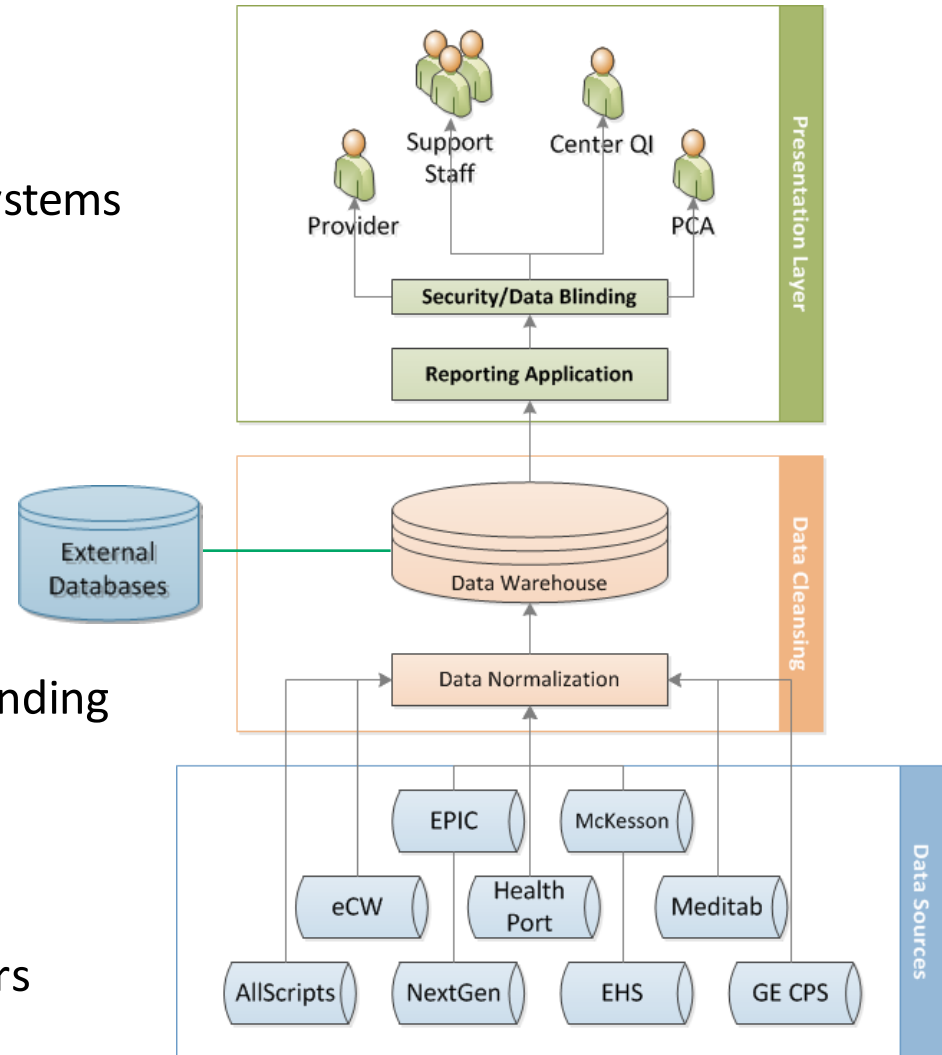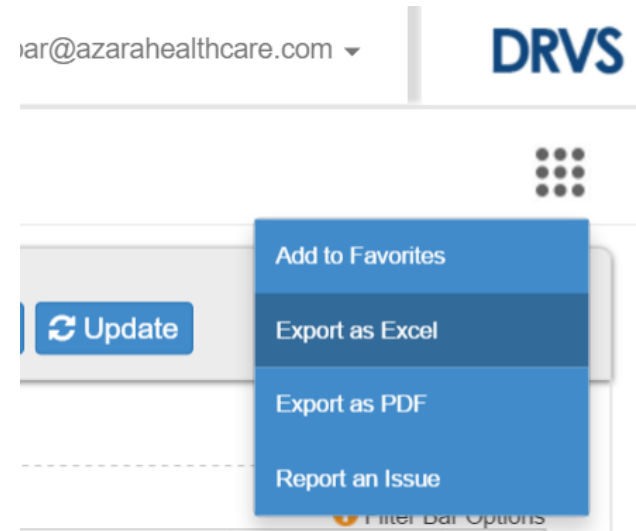
Validation Core Concepts

- 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

Screening for Clinical Depression and Follow-Up Plan (NQF 0418)
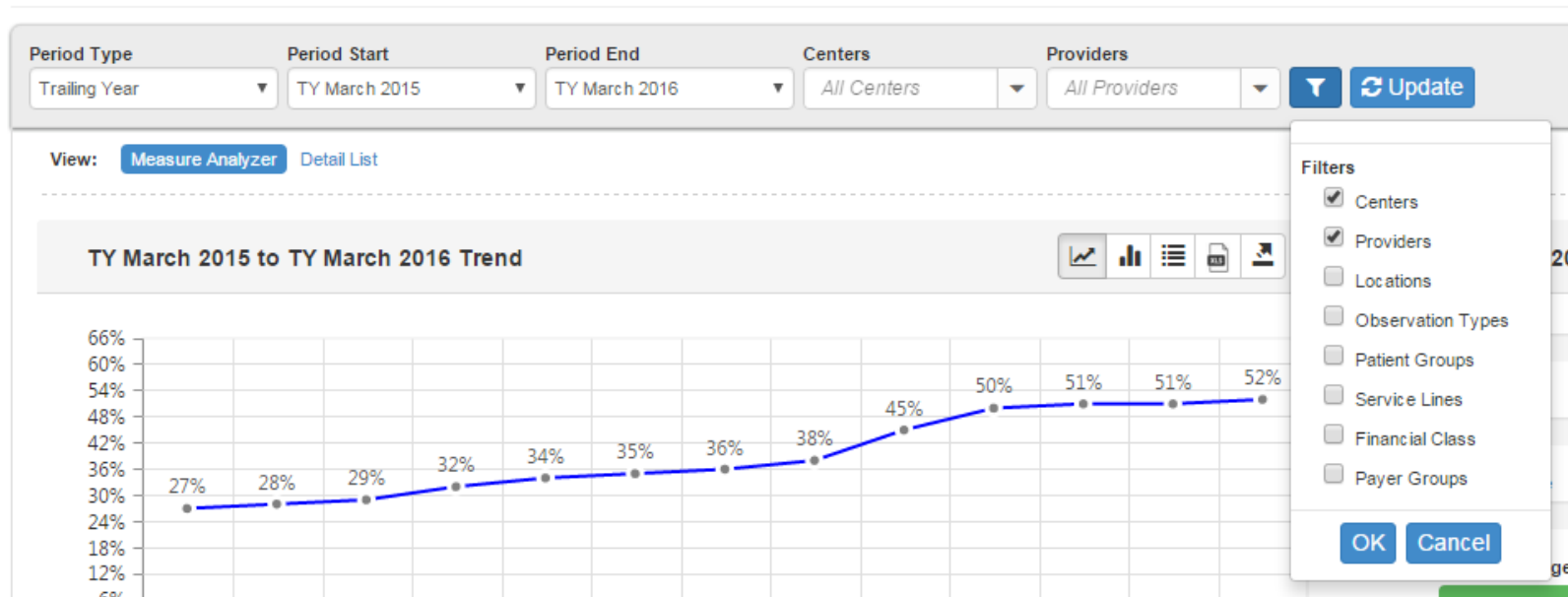
Attribution - Provider

- 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
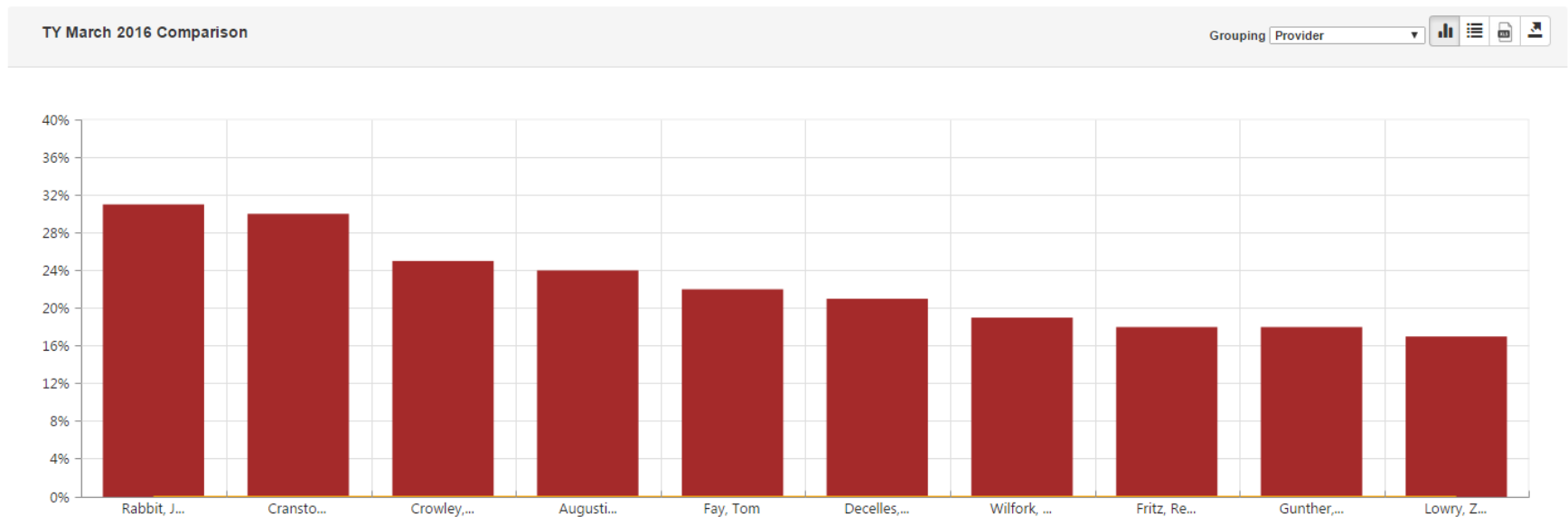
Attribution - Period

- 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!

Period Type

Trailing Year ▼

| Month |
| Quarter |
| Year |
| Trailing Year |
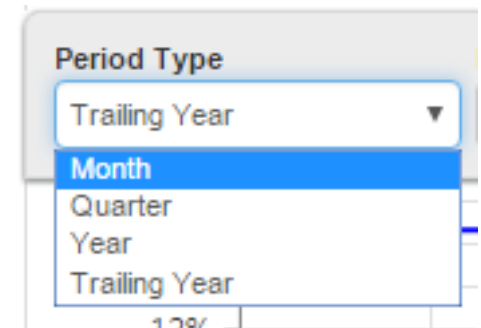
Attribution – Choosing a Period

- 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
  - https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/ecqm_library.html

- UDS 2015 manual
  - http://bphc.hrsa.gov/datareporting/reporting/2015udsmanual.pdf

- Value Set Authority Center (VSAC)
  - https://vsac.nlm.nih.gov/
  - Requires free UMLS license

- USHIK (great display of measure logic & value sets)
  - https://ushik.ahrq.gov/mdr/portals/mu?system=mu&enableAsynchronousLoading=true

- eCQI Resource Center
  - https://ecqi.healthit.gov/

- eCQM Issue Tracking
  - https://jira.oncprojectracking.org

Questions