The old HMORN world:

- Insured (data in claims)
- In Group Practice (data in EHR)

So we defined denominator by single yes/no indicator of coverage
The new world can look like this:

- Insured (data in claims)
- Primary Care in Group Practice (data in EHR)
- OP Mental Health in Group Practice (data in EHR)
Or even like this:

- Insured (data in claims)
- IP Mental Health (in claims, not EHR)
- Primary Care in Group Practice (data in EHR)
- OP Mental Health in Group Practice (data in EHR)
Defining denominator populations:

- Old Question: Was this person “covered” in X month?
- New Question: If this service was provided to this person in X month:
  - Would we observe it?
  - In what data source?
The good old days were not that good

- There was always some “leakage” in claims data:
  - Dual coverage
  - Paid out of pocket because of privacy concerns

- We didn’t need to distinguish between claims and EHR capture because EHR data didn’t exist
New denominator definitions:

- Likely data capture varies according to:
  - Health system structure
  - Insurance coverage
  - Geographic region within health system
  - Referral patterns

- Need new patient-level indicators that reflect likely capture of specific types of data in claims and/or EHR
New denominator definitions example 1

Group Health member insured by commercial plan thru XXX retail chain, lives in Issaquah, Washington

<table>
<thead>
<tr>
<th></th>
<th>Claims</th>
<th>EHR</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Primary Care Visit</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>OP Specialty MH Visit</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>IP Medical / Surgical Admit</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>IP Mental Health Admit</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>OP Medication Orders</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>OP Medication Fills</td>
<td>N</td>
<td>?</td>
</tr>
<tr>
<td>ED Visit</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
New denominator definitions example 2

Health Partners insured member receiving primary care from Essentia clinic and living in Brainerd, Minnesota

<table>
<thead>
<tr>
<th>Event</th>
<th>HealthPartners Claims</th>
<th>HealthPartners EHR</th>
<th>Essentia EHR</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Primary Care Visit</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>OP Specialty MH Visit</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
<tr>
<td>IP Medical / Surgical Admit</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
<tr>
<td>IP Mental Health Admit</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
<tr>
<td>OP Medication Orders</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
<tr>
<td>OP Medication Fills</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
<tr>
<td>ED Visit</td>
<td>Y</td>
<td>N</td>
<td>Y?</td>
</tr>
</tbody>
</table>
## Proposed new denominator table

One record per person per month:

<table>
<thead>
<tr>
<th>Event</th>
<th>Claims Expected</th>
<th>Claims Observed</th>
<th>EHR Expected</th>
<th>EHR Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Primary Care Visit</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>OP Specialty MH Visit</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>IP Medical / Surgical Admit</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>IP Mental Health Admit</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>OP Medication Orders</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>OP Medication Fills</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>ED Visit</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
<tr>
<td>Etc.</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
</tbody>
</table>
What is our expectation about claims data:

- **Question**: If this happened, would someone send us a bill for it?
- **Assumption**: If a provider has any hope of payment, they will send us a bill.
- **How much do we need to worry about**:
  - Dual coverage
  - High deductibles
  - Low-cost generics
  - Low-prevalence coverage variants
What is our expectation about EHR data:

- Question: If this patient received this service, would they receive it from us?
- Assumption:
- But how much are utilization patterns consistent:
  - Across types of service (primary care vs ED)
  - Across conditions (rheumatoid arthritis vs. depression)
- Lots of extrapolation needed for low-frequency events
Example: Pragmatic trial of outreach to prevent suicide attempt

- Participants identified from PHQ9 depression questionnaires recorded in EHR
- Assigned to continued usual care or to usual care plus outreach intervention(s)
- Outcome is Inpatient or ED diagnosis of definite or probable self-inflicted injury – in EHR or claims
If a PHQ9 were completed, would it be in our EHR?

- **Insured (data in claims)**
  - NO
  - MAYBE
  - YES

- **Primary Care in Group Practice (data in EHR)**
  - YES

- **OP Mental Health in Group Practice (data in EHR)**
For eligibility (PHQ9 in EMR):

- We can include any PHQ9 record
- We know that primary care will be somewhat over-represented
Would an ED visit for suicide attempt show in our claims?

Insured (data in claims)

Primary Care in Group Practice (data in EHR)

OP Mental Health in Group Practice (data in EHR)

YES

MAYBE
Outcome ascertainment (diagnosis in EHR or claims)

- We can certainly include those insured at time of PHQ9 – and censor at disenrollment
- What about those receiving care but not insured?
  - We cannot assume that EHR capture of outpatient PHQ9 implies EHR capture of ED visit for suicide attempt
  - What about ED care for other conditions? OR ED care for mental health problem?
Summary

- Increasing diversity of healthcare systems will require more complex denominator definitions (even the HMORN is not just HMOs any more)
- There is a trade-off between higher certainty of capture (claims) and much richer clinical information (EHR)
- “Coverage” or “denominator-hood” has within-person as well as between-person variation
- Documenting variation in claims and EHR coverage will usually require local knowledge (and maybe blood oaths)
- Utilization-based proxies for “denominator-hood” have promise, but certainly need more work