Agenda

- Query updates
  - Long COVID report
  - Immunization and mortality
  - Delta Variant
  - Upcoming

- Patient-level data

- Manuscript update
Long COVID query update

- Distributed regression models, examining whether SARS-CoV-2 infection associated with selected symptoms and conditions
- Separate models for children/adults and used different approaches
- Issues uncovered
  - Cox model issued - fixed
  - Logistic models with high attrition of DMs – testing approach
- Following discussions with programmers, plan to utilize a more parsimonious model (20 covariates from 55)
### Adjusted ORs for SARS-CoV-2 positive vs. negative

#### Conditions 31 to 150 days

<table>
<thead>
<tr>
<th>Condition</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH</td>
<td>0.859 (0.768 - 0.961)</td>
</tr>
<tr>
<td>DM</td>
<td>1.138 (1.001 - 1.293)</td>
</tr>
<tr>
<td>Heme</td>
<td>1.197 (1.027 - 1.396)</td>
</tr>
<tr>
<td>CV Events</td>
<td>0.852 (0.743 - 0.977)</td>
</tr>
<tr>
<td>Resp</td>
<td>1.244 (1.054 - 1.469)</td>
</tr>
</tbody>
</table>

#### Symptoms 31 to 150 days

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>1.153 (1.091 - 1.218)</td>
</tr>
<tr>
<td>3+</td>
<td>1.202 (1.101 - 1.313)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>1.210 (1.087 - 1.346)</td>
</tr>
<tr>
<td>SOB</td>
<td>1.368 (1.238 - 1.513)</td>
</tr>
</tbody>
</table>
KM Curve for Diabetes 1 or 2, Adults 31 to 150 days
Immunization and death query

- Assessing addition of immunization table, boosters, computable phenotype of “fully vax’d”
- Interim report from 9 sites completed 12/1; final report pending
- Initial findings
  - Over same time period (Dec-Aug), we are observing about 2x number of vaccines (500k vs 270k for adults; 56k vs 37k for children)
  - Breakthroughs >2 x previously observed (4k adults, 200 child in 9 sites)
  - Specific definition for “fully vax’d” generates ½ compared to non-spec
  - 3000 adult, 250 child infections within 30 days of first vax
Interim 30-day Adult Death Data

- 3400 deaths within 30 days of SARS-CoV-2 positive infection
- Higher rates among those older (1.4% overall; 7% 75-84; 13% 85+), male, Other or Black race
Delta Variant and Disease severity query

- 41 sites responded

- Examined characteristics across different time periods
  - Early/ancestral (May – Oct 2020)
  - Winter (November 2020 – Feb 2021)
  - Alpha (March – June 2021)
  - Delta (July 2021– mid-Oct 2021)

- Issue with NIH grade determination – pulled in all tests
Severity Index, Defined by -7/+13 days

- Severe Acute: Respiratory failure, sepsis, respiratory support, critical care, pressors
- Severe Sequelae: MIS, encephalopathy, thromboses, AKI, hepatic failure, etc.
- Moderate: pneumonia, bronchitis/bronchiolitis, gastroenteritis, IVF
- All other
## Total N for adults

<table>
<thead>
<tr>
<th></th>
<th>SARS-CoV-2 +</th>
<th>Inpatient</th>
<th>Ventilators</th>
<th>Severe Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancestral – May – Sept 20</td>
<td>170,651</td>
<td>23,989</td>
<td>2,457</td>
<td>16,197</td>
</tr>
<tr>
<td>Winter – Oct 20-Feb 21</td>
<td>409,133</td>
<td>51,606</td>
<td>4,886</td>
<td>38,752</td>
</tr>
<tr>
<td>Alpha – March-June 21</td>
<td>80,155</td>
<td>17,907</td>
<td>1,500</td>
<td>13,263</td>
</tr>
<tr>
<td>Delta – July on</td>
<td>117,316</td>
<td>17,904</td>
<td>1,774</td>
<td>16,469</td>
</tr>
</tbody>
</table>
Adults: Care Settings, Severity Index Over Pandemic Phases

- ED
- Inpt
- Severe
- SevereSeq
- Moderate
- Vent
- Critical

Ancestral  Winter  Alpha  Delta
Proportion 65+, Over Pandemic Periods

![Bar chart showing the proportion of 65+ over pandemic periods for different conditions and variants.](chart.png)
Adult: % Black, Over Pandemic Periods

- **IP**: Ancestral 30%, Winter 10%, Alpha 10%, Delta 40%
- **Severe**: Ancestral 20%, Winter 10%, Alpha 10%, Delta 40%
- **SevereSeq**: Ancestral 30%, Winter 10%, Alpha 10%, Delta 40%
- **Vent**: Ancestral 20%, Winter 10%, Alpha 10%, Delta 40%
- **Critical**: Ancestral 20%, Winter 10%, Alpha 10%, Delta 40%
### Total N for children

<table>
<thead>
<tr>
<th></th>
<th>SARS-CoV-2 +</th>
<th>Inpatient</th>
<th>Ventilators</th>
<th>Severe Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancestral – May –Sept 20</td>
<td>36,143</td>
<td>1,399</td>
<td>82</td>
<td>558</td>
</tr>
<tr>
<td>Winter – Oct 20-Feb 21</td>
<td>102,781</td>
<td>2,775</td>
<td>130</td>
<td>962</td>
</tr>
<tr>
<td>Alpha – March-June 21</td>
<td>28,609</td>
<td>1,497</td>
<td>84</td>
<td>569</td>
</tr>
<tr>
<td>Delta – July on</td>
<td>54,007</td>
<td>1,720</td>
<td>101</td>
<td>780</td>
</tr>
</tbody>
</table>
Children: Care Settings, Severity Index Over Pandemic Phases
Proportion 13-19yrs, Over Pandemic Periods

Inpt Severe SevereSeq Vent Critical

Ancest Winter Alpha Delta
Children: % Black, Over Pandemic Periods

- Inpt
- Severe
- SevereSeq
- Vent
- Critical

Legend:
- Ancest
- Winter
- Alpha
- Delta
Query schedule

- Dec 13: Re-execute part of delta query and start testing changes to the Long COVID regression query
- Want to develop a regular schedule for queries that might change
- 2022 standard queries – rotation every few months, starting in Jan
  - Cumulative
  - Vaccine adverse events
  - Time period specific severity; Omicron next
  - Regression queries: coming are chronic disease severity/control and severe COVID; predictors of admissions/readmissions
Consideration of new short-term approach for patient-level data

- Might be more practical to obtained deidentified patient-level data on per-project basis
- When distributed queries execute, they leave behind a patient-level data set
- Could strip all identifiers, including dates, and then capture for the specific analysis desired
  - Could also do a massive “proc freq” and re-explode to get pt-level
- Balance of purely distributed approach vs. patient-level approach
Patient-level approach cont.

- Plan is to try this for our chronic disease regression query to facilitate more complex analyses; might have to do for the Long COVID regression queries too if can’t get convergence of models

- Harvard Pilgrim has sent new Data Security Agreements to accommodate all data sharing, as transition to PCORnet 3.0 Coordinating Center begins
Dissemination

- We continue to work on a number of papers that describe our work.
- Goal is to include collaborative, site authors when possible – 2 papers that we have updated repeatedly are nearly ready to enter CDC clearance process.
- All papers will involve CDC and PCORnet authors, mostly from our Scientific Advisory Group.
- Over next few months, plan to work on defining several other areas to focus dissemination efforts.
Upcoming possible papers

- Delta severity
- Pregnancy cohort
- Heart Failure cohort
- Breakthroughs and/or 2nd infections
- Descriptives on vaccines and boosters
- Advanced analytics
  - Long COVID conditions and symptoms
  - Chronic disease
  - Admissions/readmission
Moving in 2022 to develop a cadence of queries, with a rotation every few months

This week, plan to reexecute a portion of delta query and test updates to our Long COVID regression query

Newer analytic queries coming on chronic disease and admissions/readmissions

Considering a new strategy – short and long term – for patient-level data

New DSAs should be in your hands
Additional slides
Severe Disease Index, Any of following -7/+13 days

**SEVERE ACUTE**
- ARDS or respiratory failure
- Sepsis or shock
- Critical care code, mech vent
- Non-invasive ventilator, hi flow
- Pressor support

**SEVERE SEQUELAE**
- Encephalopathy, encephalitis, MIS
- Myocarditis, pericarditis, thrombosis, MI, embolism
- Acute kidney injury, acute hepatic failure, cardiac arrhythmia
- Acute viral transverse myelitis, macrophage activation syndrome
Moderate Disease Index, No Severe + Any of Following

- Bronchitis
- Bronchiolitis
- Pneumonia
- Gastroenteritis, diarrhea, nausea/vomiting
- Guillain Barre
- IV Fluids
NIH Severity Criteria

- Based on having certain characteristics met within 72 hrs of admission
  - Mechanical vent use – Grade 4
  - Non-invasive vent, hi flow O2, critical care – Grade 3
  - Respiratory failure or ARDS – Grade 2
  - All else – Grade 1