Expanding maternal and infant data from EHRs for pregnancy research

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OHDSI Open Studies Presentation
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Our team leads

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**Stephanie Leonard**, PhD, MS, Assistant Professor in the Dunlevie Maternal-Fetal Medicine Center at Stanford University. Expertise in perinatal epidemiology.
Pregnancy is understudied despite being extremely common

- Childbirth is the #1 reason for hospitalizations worldwide (≈4 million per year in the U.S.)
- Pregnant people are systematically excluded from most trials and studies despite often being at highest need of effective therapies
Maternal and infant mortality rates in the U.S. are higher than in similar countries

• Marginalized groups are most affected by maternal and infant complications and death
Insufficient data leads to inaccurate models and gaps in knowledge.
EHRs: Challenges and opportunities

Record linkage

Missing data

Relevant information in unstructured form
Prior Work: Obstetric data extractors

Patient timeline

-280 days

Birth – diagnosis codes

-5 days

+5 days

Progress notes

- Gravidity and parity
- Gestational age
- Plurality
- Presentation

Flowsheets

- Plurality
- Presentation

L&D delivery notes

SELECT *
FROM `som-nero-phi-nigam-starr.progress.flowsheets`
WHERE row_disp_name = 'Plurality'

""".".format_map({'work_project_id': work_project_id, 'work_dataset_id': work_dataset_id})
Prior Work: Obstetric data extractors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Precision</th>
<th>Recall</th>
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</thead>
<tbody>
<tr>
<td>Gravidity</td>
<td>0.99</td>
<td>0.98</td>
</tr>
<tr>
<td>Parity</td>
<td>0.74</td>
<td>0.73</td>
</tr>
<tr>
<td>Gestational age - weeks</td>
<td>0.95</td>
<td>0.88</td>
</tr>
<tr>
<td>Gestational age - days</td>
<td>0.76</td>
<td>0.70</td>
</tr>
<tr>
<td>Plurality</td>
<td>0.95</td>
<td>0.99</td>
</tr>
<tr>
<td>Presentation</td>
<td>0.88</td>
<td>0.70</td>
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</tbody>
</table>

Prior Work: Identifying a low-risk birth cohort for epidemiological studies

**Cohort Summary**

- **23,277 patients** with a record of birth
- **17,175 patients (74%)** with all variables
- **9,097 patients (53%)** with an NTSV birth

**Capture of pregnancy and birth variables**

- **GRAVIDITY, PARITY**
  - 21,993 patients (95%)
- **GESTATIONAL AGE**
  - 20,906 patients (90%)
- **PLURALITY**
  - 23,277 patients (100%)
- **PRESENTATION**
  - 17,914 patients (77%)

Number of patients in obstetric cohort with a birth record, by year.

Two grant proposals underway

1. **Leveraging informatics to study medication use in pregnancy**
   PI: Callahan; Stanford pilot research award
   • Expand network of continuously updated EHR-derived obstetric databases.
   • Characterize use of antihypertensive, anticoagulant, antidiabetic and antibiotic medications during pregnancy and postpartum to inform retrospective drug safety and effectiveness studies.

2. **Optimizing therapy for chronic hypertension in pregnancy**
   PI: Leonard; NIH K01
   • Compare the overall effectiveness and safety of the most commonly used medications to treat chronic hypertension in pregnancy.
   • Assess the impact of timing of initiation, dose, and patient usage on the benefits of treating chronic hypertension in pregnancy.
   • Evaluate the benefits and safety of treating mild chronic hypertension in key patient subpopulations.
Join us!

• Let us know if you’d be interested to ....
  • Contribute data to run studies
  • Collaborate to develop methods to extract additional variables
  • Lead a study over multiple sites
• Please get in touch!
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