NEXT STEPS

MEETING #1: Interest level, Feedback on study elements, Scheduling

MEETING #2: Chemicals of interest, Data collection tools

MEETING #3: Health outcomes, Timing of exposure

MEETING #4: Tying it all together

MEETING #5: Apply for pilot funding to collect preliminary data
Personal PM + VOC monitors

Access Sensor Technologies
PM + Filter

Wynd Air Quality Tracker
PM only

Plume Lab Monitor
PM + VOC

AtmoTube
PM + VOC
HEALTH OUTCOMES
HEALTH OUTCOMES

- Difficulty conceiving
- Miscarriage
- Stillbirth / fetal death
- Gestational diabetes
- Hypertension
- Preeclampsia

- Preterm birth
- Gestational age at birth
- Low birth weight
- Small for gestational age
- NICU admissions
- Head circumference (OFC)
- Respiratory health (cough, wheeze)

- Infant mortality
- Growth (stunted / obesity)
- Immune dysregulation (IL-6, IL-8)
- Respiratory health
- Developmental outcomes
- Neurodevelopmental outcomes
- Cognitive outcomes (IQ, ADHD, etc.)
Difficulty conceiving
Miscarriage
Stillbirth
Preterm birth
Gestational age at birth
Low birth weight
SGA
NICU
Infant Mortality
Immune dysregulation
Respiratory health
Developmental
Cognitive

Weighted Rank  Interest Level

Increasing interest
COLLECTION TOOLS
## BIOLOGIC SAMPLES

<table>
<thead>
<tr>
<th>BIOLOGICAL SAMPLES</th>
<th>BLOOD</th>
<th>URINE</th>
<th>PLACENTA CORD BLOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires blood draw(s).</td>
<td>Collects chemicals in the bloodstream at the time of sampling.</td>
<td>Single or multiple urine collections.</td>
<td>Collected at birth.</td>
</tr>
<tr>
<td>Collects chemicals in the bloodstream at the time of sampling.</td>
<td>Collects chemicals and chemical metabolites in urine at the time of sampling.</td>
<td>Collects chemicals in the cord blood or placenta at time of sampling.</td>
<td></td>
</tr>
<tr>
<td>NATIONAL VITAL STATISTICS</td>
<td>ELECTRONIC HEALTH RECORDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>---------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-variates</td>
<td>Medical History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal characteristics</td>
<td>Medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal care</td>
<td>Allergies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health care</td>
<td>Diagnoses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth rates</td>
<td>Lab &amp; test results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertility rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm birth rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant mortality rates</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://www.cdc.gov/nchs/nvss/births.htm
### Apgar Scoring

<table>
<thead>
<tr>
<th>Apgar Sign</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance (skin color)</td>
<td>Normal color all over – hands and feet are pink</td>
<td>Normal color (but hands and feet are bluish)</td>
<td>Bluish-gray or pale all over</td>
</tr>
<tr>
<td>Pulse (heart rate)</td>
<td>Normal (&gt;100 bpm)</td>
<td>&lt;100 bpm</td>
<td>Absent (no pulse)</td>
</tr>
<tr>
<td>Grimace (reflex irritability)</td>
<td>Pulls away, sneezes, coughs, or cries with stimulation</td>
<td>Facial movement only with stimulation</td>
<td>Absent</td>
</tr>
<tr>
<td>Activity (muscle tone)</td>
<td>Active, spontaneous movement</td>
<td>Arms and legs flexed with little movement</td>
<td>No movement, “floppy” tone</td>
</tr>
<tr>
<td>Respiration (breathing rate &amp; effort)</td>
<td>Normal rate and effort, good cry</td>
<td>Slow or irregular breathing, weak cry</td>
<td>Absent (no breathing)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>Health outcome</th>
<th>Age</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayley Scales of Infant &amp; Toddler Development</td>
<td>Developmental (Cognitive, Developmental, Language)</td>
<td>1 – 42 months</td>
<td>30 – 70 min</td>
</tr>
<tr>
<td>Wechsler Preschool and Primary Scale of Intelligence</td>
<td>Developmental (Cognitive, Developmental, Verbal, Non-verbal)</td>
<td>2:6 – 7:7</td>
<td>30 – 60 min</td>
</tr>
<tr>
<td>Peabody Developmental Motor Scales</td>
<td>Developmental (Fine and gross motor skills)</td>
<td>0 – 5 years</td>
<td>45 – 60 min</td>
</tr>
</tbody>
</table>
QUESTIONNAIRES

Health Questionnaires (maternal/child health)

- Control for co-variates
  - Current Klamath surveys
  - Standardized surveys
  - Research surveys

Sociodemographic Questions (education, income)

- Control for co-variates
  - Standardized surveys

Behavioral Questions (smoking, exercise)

- Control for co-variates
  - Current Klamath surveys
  - Standardized surveys
  - Research surveys

Access to information (Internet, Facebook)

- Inform educational interventions
  - Current Klamath surveys
  - Research surveys
PUBLIC DATABASES

Area Deprivation Index
https://www.neighborhoodatlas.medicine.wisc.edu/
Develops neighborhood rankings by socioeconomic disadvantage (income, education, employment, and housing quality).

Behavioral Risk Factor Surveillance System (BRFSS)
https://www.cdc.gov/brfss/index.html
Collects state-level data on health-related risk behaviors (e.g., alcohol consumption), chronic health conditions (e.g., asthma) and use of preventative services.

NHANES
https://www.cdc.gov/nchs/nhanes/about_nhanes.htm
CDC studies that assess the health and nutritional status of adults and children in the US. Includes interviews and physical examinations and biological samples.
Blood
Placenta
Vital Statistics
Surveys
Health records
Developmental scales

Health data collection tools weighted rank

Increasing interest

SURVEY DATA
STUDY DESIGN

WHEN TO SAMPLE

PREGNANCY TIMING

GROUP 1

GROUP 2

GROUP 3

Recruitment
April - June

July - Sept
NEXT STEPS

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QUESTIONS?