**Utah Valley Air Pollution in the 1980s:**
Implications for Pregnancy and Offspring Health Outcomes

Jeanette Carpenter, Jathine Wong, Karen Curtin, Heidi A. Hanson, Ken R. Smith
University of Utah

**BACKGROUND**
- Air pollution is a ubiquitous prenatal exposure.
- The effects of prenatal exposure to air pollution on the health of offspring remains understudied.
- Limited data suggest that offspring exposed prenatally to air pollution may be at greater risk for disorders such as asthma.
- During this time, the mill was the predominant source of large particulate pollution (PM10) in Utah County.
- The mill closed Aug. 1986-Sept. 1987, resulting in a natural experiment to study health effects of air pollution exposure.

**OBJECTIVES**
- Utilize the resources of the Utah Population Database to:
  - Determine if prenatal exposure to air pollution is associated with an increased risk for long-term adverse health outcomes for offspring.
  - Determine if maternal education modifies the effects.

**METHODS**
- Study group:
  - 36,244 women in Utah County with a birth between 1985 (first PM10 levels recorded) and 1993.
  - PM10 levels (EPA data), Total and Average Exposure In Utero:
    - 1985: Lindon, UT monitor only; 1986-1993: All 4 Utah County air monitors—PM10 levels averaged across sites.
    - 1st trimester exposure: Low: lowest 25%; Med: mid 50%; High: highest 25%
- Offspring outcomes:
  - Adolescent (age 11-20) hospital admissions for most common diagnoses: asthma, pneumonia, mental health disorders, appendicitis.
  - Logistic regression to determine the association between average PM10 exposure during 1st trimester and the above outcomes.
  - Confounders:
    - Gestational age, maternal age, offspring gender, year of birth, season of birth, maternal education (<HS, HS, >HS).

**RESULTS**
- **Asthma**
  - PM10 Exposure: Low: 1.06, Med: 1.64, High: 2.54, *p<0.05*
  - Odds Ratio: 1.10, 1.46, 2.99, *p<0.05*

- **Pneumonia**
  - PM10 Exposure: Low: 1.03, Med: 1.79, High: 2.90, *p<0.05*
  - Odds Ratio: 1.03, 1.79, 2.90, *p<0.05*

**CONCLUSIONS**
- Prenatal exposure to elevated levels of PM10 is associated with an increased risk for pneumonia and asthma.
- The effects are greater among women with low education.
- Offspring born to the most vulnerable women may suffer disproportionately from prenatal exposure to air pollution.

**FUTURE DIRECTIONS**
- Expand analysis of long-term outcomes to include University of Utah and Intermountain Healthcare outpatient diagnoses.
- Comparison of long-term outcomes between siblings.

**Acknowledgements:**
The Pedigree and Population Resource of the Huntsman Cancer Institute, University of Utah for providing the data and valuable computing support.
The University of Utah Program for Air Quality, Health, and Society Seed Grant for funding the project.