

## **Maternal Obesity And Intergenerational Health: Current Evidence, The Role Of Public Health Prevention, And The Urgency For Addressing Health Disparities**

AUTHOR(S): Janne Boone-Heinonen, Lynne C Messer, Jonathan Snowden, Frances Biel, Aaron B Caughey, Stephen P Fortmann, Larry Wallack, Kent Thornburg

Moderator: TBD

TOPIC/TARGET AUDIENCE: public health students and professionals in research and practice

ABSTRACT: Obesity in pregnancy poses clear risks to mothers and offspring at birth and throughout the life course. Several issues critical for public health are understudied, including the possibility that perinatal processes differ by race/ethnicity, the role of public health in mitigating maternal obesity-induced effects in the offspring, and the contribution of early life development to health disparities in children and adults. This panel presentation will present current evidence on each of these topics, including a summary of the state of the science and original research by the authors. The session will end with a discussion of future directions for public health research and practice.

OBJECTIVE(S): First, describe current evidence and research gaps in the interrelationships between maternal BMI, race/ethnicity, maternal health profile, obstetric procedure use, and adverse maternal/neonatal outcomes. Second, describe current evidence of the role of physical activity and diet in mitigating the impacts of maternal obesity on offspring health. Third, describe how social patterning exacerbates prenatal exposures on childhood and adult health outcomes.

**PANEL ABSTRACT 1:** Obesity in pregnancy and adverse perinatal outcomes: adding nuance to what is known

Presenter: Jonathan M Snowden

It is now firmly established that obesity in pregnancy increases the risk for adverse birth outcomes for the mother and the neonate, in the short term and over the life-course. Specific outcomes include: stillbirth, infant death, macrosomia, preeclampsia, and gestational diabetes. Maternal BMI also has complex associations with obstetric procedure use. The risk of cesarean delivery increases with maternal BMI in a dose-response fashion, and after the first cesarean there are increased risks of adverse outcomes and decreased chance of subsequent vaginal birth. Although individual perinatal and obstetric outcomes of maternal obesity are well-documented, the complex interrelationships between maternal obesity, other maternal characteristics, and outcomes are under-studied. We present our original research examining this topic and others, for example, do the racial disparities in obesity contribute to the persistent racial disparities in birth outcomes? Rigorous research now documents the impacts of labor induction; do effects differ by maternal BMI? Both maternal obesity and epidural analgesia slow labor progression, but what is the joint impact of these factors on labor and birth outcomes (e.g., independent, synergistic, other)? This talk will discuss the nuance of maternal BMI in pregnancy and birth outcomes, to inform applied public health, epidemiologic research, and clinical practice.

**PANEL ABSTRACT 2:** What is the role of public health in mitigating the intergenerational health impacts of maternal obesity?

Presenter: Janne Boone-Heinonen

Maternal obesity has well-described impacts on fetal development that induces elevated obesity and disease risk in the offspring. Potential strategies to reduce maternal obesity-induced risk later in life have been largely overlooked. We (1) reviewed animal and human research that considers how maternal obesity interacts with diet or physical activity in childhood or beyond to alter risk for later disease, (2) developed a conceptual framework for the role of diet and physical activity in mitigating the long-term effects of adverse fetal programming, and (3) conducted original epidemiologic research in this emerging area of investigation. Results of the review support the hypothesis that diet and physical activity after early life can attenuate disease susceptibility induced by maternal obesity, but human evidence is scant. Our conceptual framework emphasizes the importance of novel prevention strategies throughout childhood that target and tailor according to prenatal conditions. Recent epidemiologic research strengthens human evidence that the impacts of physical activity and diet is magnified in children with adverse prenatal development. Amelioration of the intergenerational cycle of obesity requires ongoing interdisciplinary research and discourse that translates mechanistic and clinical evidence of fetal programming to population and public health intervention and policy.

**PANEL ABSTRACT 3:** The intersection of intergenerational obesity and the exacerbation of intergenerational health disparities

Presenter: Lynne C. Messer

Racial and/or ethnic minorities carry the highest burden of many adverse health outcomes intergenerationally. We propose a paradigm in which developmental programming exacerbates the effects of social patterning of adverse environmental conditions, thereby contributing to health disparity persistence and exacerbation. Evidence that developmental programming induces a heightened response to adverse exposures (?second hits?) encountered later in life is considered. We evaluated the evidence for the second hit phenomenon reported in animal and human studies from the environmental, stress and nutrition literature. Evidence suggests that prenatal exposure to air pollution, chronic or episodic stressful events, and Western-style diets induce adverse synergistic effects on health outcomes including airway hyper-reactivity, maladaptive behaviors, and metabolic dysfunction. These developmental programming effects may result in an enhanced response to ongoing, racially or socioeconomically patterned, adverse exposures, thereby exacerbating health disparities across generations. Evidence for the relationship between racial and economic segregation and environmental quality will be presented. Empirical assessment of the hypothesized role of priming processes in the propagation of health disparities is needed. Future epidemiologic research must explicitly consider synergistic relationships among social environmental conditions to which gestating females are exposed and offspring exposures when assessing causes for persistent health disparities.

**PRIMARY CONTACT INFORMATION:**

Janne Boone-Heinonen, PhD

Assistant Professor  
Oregon Health & Science University  
Portland, OR  
503-494-9055 | boonej@ohsu.edu

CO-PRESENTER(S):  
Jonathan Snowden | snowden@ohsu.edu  
Lynne Messer | lymesser@pdx.edu