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# Study Finds Social Challenges Amplify Negative Effects of Childhood Lead Exposure

*Research at 2017 Pediatric Academic Societies Meeting shows poverty increases impact of blood lead levels on preschoolers' cognitive and language development.*

SAN FRANCISCO – Scientists already know early lead exposure can slow a child's cognitive and language development. Findings of an abstract being presented at the 2017 Pediatric Academic Societies Meeting show lead's impact is especially strong for children in families also facing socioeconomic challenges.

Researchers will present the abstract, "Interrelationships Between Social Determinants of Health and Early Lead Exposure: A Longitudinal Analysis of Impacts on Child Development," on Monday, May 8, beginning at 10:30 a.m. in the Moscone West Convention Center.

Abstract author Bridget Wieczkowski, MD, said the goal of the study was to determine whether the impact of lead, a biotoxin, was greater for children who also faced the "toxic stress" of poverty such as exposure to violence, homelessness, food insecurity and low parent literacy.

Many studies have documented impacts of low level lead exposure on child development, she said. However, there has been limited research examining these impacts in the context of Centers for Disease Control and Prevention (CDC) guidelines updated in 2012 that recognize blood lead levels of less than half the amount previously considered safe are linked with delayed cognitive skills, inattention, impulsivity, aggression and hyperactivity.

Dr. Wieczkowski worked with a team of researchers to analyze data that had been collected as part of the Bellevue Early Language and Education (BELLE) Project, a large, National Institutes of Childhood Health and Human Development-funded study that followed 450 newborns and their families from birth.

They found that levels above 5 micrograms per deciliter of lead in a child's blood, which is the current threshold set by the CDC as cause for concern, was associated with reduced cognition and vocabulary at age 3 that continued when tested again a year and a half later. Further analysis showed larger impacts on development at age 54 months for families with psychosocial risks and low literacy.

"These findings underscore the importance of monitoring children during infancy and the toddler years, which are critical periods for both brain development and lead exposure," Dr. Wieczkowski said. Young children, with their rapidly developing brains, also are more likely to ingest lead in their environment because they put more objects in their mouths and spend more time on the floor.

"This is true for all children, but especially for those most vulnerable to lead's harmful effects because of poverty," she said.

"Our health care system needs to be funded so that it can help all children reach their potential as adults," she said, noting that programs like Medicaid are critically important to achieve this goal.

Dr. Wieczkowski will present the abstract, "Interrelationships Between Social Determinants of Health and Early Lead Exposure: A Longitudinal Analysis of Impacts on Child Development," during the Vulnerable and Underserved Populations session from 10:30 a.m. to 12:30 p.m.

Reporters interested in an interview with Dr. Wieczkowski can contact New York University Langone Medical Center media relations officer Ryan Jaslow at 212-404-3511 or Ryan.Jaslow@nyumc.org.

*Please note: only the abstract is being presented at the meeting. In some cases, the researcher may have more data available to share with media, or may be preparing a longer article for submission to a journal. Contact the researcher for more information.*

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*The Pediatric Academic Societies (PAS) Meeting brings together thousands of individuals united by a common mission: to improve child health and wellbeing worldwide. This international gathering includes pediatric researchers, leaders in academic pediatrics, experts in child health, and practitioners. The PAS Meeting is produced through a partnership of four organizations leading the advancement of pediatric research and child advocacy: Academic Pediatric Association, American Academy of Pediatrics, American Pediatric Society, and Society for Pediatric Research. For more information, visit the PAS Meeting online at www.pas-meeting.org, follow us on Twitter @PASMeeting and #pasm17, or like us on Facebook.*

**ABSTRACT**

**TITLE**: Interrelationships Between Social Determinants of Health and Early Lead Exposure: A Longitudinal Analysis of Impacts on Child Development

**Background**: Many studies have documented impacts of low level lead exposure on child development. However, there has been limited longitudinal study in the context of updated CDC recommendations and consequent lower blood levels. Furthermore, understanding interrelationships between social and biological determinants of health would inform effective policy.

**Objective**: To determine whether social determinants of health (SDH) in 2 key domains (psychosocial stressors, low literacy) impact the relationship between low levels of lead exposure and early language and cognitive development in children in low income, high risk immigrant families.

**Design/Methods**: Nested cohort analysis of mother-child dyads enrolled in a longitudinal study of child development (BELLE Project). Predictor: Peak blood lead, birth to 3y (chart review). Outcome: Child development, including cognitive (36m: Bayley Cognitive Composite Score; 54m: Woodcock Johnson Munoz [WJM] Nonverbal Working Memory) and language (36m: WJM Picture Vocabulary; 54m: Expressive One Word Picture Vocabulary Test). SDH assessed in 2 domains: psychosocial risk (including mental health, ACS involvement, exposure to violence); low literacy (WJM Letter-Word Identification in primary language). Hierarchical multiple linear regressions adjusted for wide range of potential confounders (eg. sociodemographics, depression, cognitive home environment, anemia, SDH). Subgroup analyses performed based on SDH.

**Results**: 450 eligible families enrolled at birth, 267 had complete data at 36m, and 226 had complete data at 54m. Families differed in literacy and education level between low and high lead groups (Table 1). Peak lead >5μg/dL was associated with reduced cognition and vocabulary at 36m & 54m (Table 2). Subgroup analyses showed larger impacts on development for families with psychosocial risks and low literacy at 54m but not 36m.

**Conclusion(s):** Peak lead >5μg/dL for children under 3y had significant impacts on early cognitive/language development persisting at 54m. These findings underscore the importance of surveillance during critical periods of both development and lead exposures. In the absence of therapeutic interventions for low blood lead concentrations, identifying such potentially modifiable risks for adverse developmental outcomes may provide additional opportunities for intervention alongside primary prevention.