Title: Exploratory study on lead and other heavy metals in breast milk based on donor's race/ethnicity, birth country, socioeconomic status, geographic location, and potential sources of exposure

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Background:

Lead exposure via breast milk is a known risk for infants born to immigrant mothers and elevated lead levels (ELL) cause developmental delays in exposed infants. Mothers are exposed to lead in developing countries through contaminated soil, spice, cookware, make-up, and home remedies, which may still be used once in the US. The CDC and the American College of Obstetricians and Gynecologists (ACOG) recommend serologic testing of immigrant females who are pregnant and/or breastfeeding for ELL.[1-3] However, the adoption of this screening guideline has been limited.[2,4] A novel approach to identify potential risk of lead and other heavy metal exposure in infants and children is to test the parents' breast milk.

Objective:
1. Determine the prevalence of lead and other heavy metals in a cross-sectional sample of breast milk samples.

2. Describe the distribution of detectable levels by the participants' demographics and self-reported exposures.

Design/Methods:

Breast milk samples were selected from the UCSD Human Milk Research Biorepository. Samples were selected if the mother met one or more of the following criteria: 1) reside along the US-Mexico border (CA, AZ, MX, and TX) at the time of sample collection; 2) born in a developing country; or 3) annual household income less than $50,000 per year. Data accompanying samples included maternal age, race, ethnicity, birth country, education, zip code, and maternal exposures. Each sample was tested for lead, arsenic, cadmium, chromium, and mercury using Inductively Coupled Plasma-Mass Spectrometry. Each heavy metal was reported with frequency and quantification of any detectable levels alongside parental and infant data.

Results:

A total of 142 unique milk samples were analyzed. The average maternal age was 32 years; the majority of maternal participants were White, born in the US, received at least some college education. The average infant age was 5 months; the majority were female, born full term, and

exclusively breast fed. Lead, arsenic, cadmium, and mercury were not detected in any milk samples. Chromium was detected in 6 milk samples, with concentrations ranging from 1.4 to 14.6 μg/mL.

Conclusion:

Lead, arsenic, cadmium, and mercury were not detected in any milk samples, while chromium was detected in 4% of samples. The limited sample size and low number of immigrant participants in this study likely does not reflect the overall prevalence of heavy metals in breast milk. This pilot study informs larger investigations that will recruit breastfeeding/chest feeding parents in minoritized communities, including immigrants, and standardize expanded data elements collection.