

Research Question: In children (birth to 7 yr.), do population-focused strategies reduce the risk of lead poisoning (control group-no intervention)? What are these intervention strategies?

Summary of Recommendations

Recommendation I: Primary Prevention: The IPHA Nursing Section: Lead Evidence Base Committee concludes that there is insufficient evidence to support or deny the notion that population focused educational strategies reduce the risks of initial childhood lead poisoning in the birth to 7 year old population and the committee believes that the benefits of continued Primary Prevention outweigh the harm.

Ratings: I

Rationale: The two randomized field trials reported below were used to determine the Committee's findings. Both found no statistically significant differences in blood lead levels between children receiving population-focused strategies and those in control groups. Other studies with weaker designs also found no differences in blood lead levels. One study by Brown et al. found that comprehensive education and targeted home visiting significantly decreased dust lead levels and improved family housekeeping when compared to control group.

In research done by Jordan et. al., 594 mothers were randomly assigned to control or intervention groups. Offspring blood lead levels were tested every 4 months. All participants received educational materials on basic lead prevention strategies. Intervention participants also received 20 bi-weekly educational sessions by same-ethnicity peer educators over the course of 1 year, and quarterly booster sessions for 2 years after. The intervention group's curriculum included information on lead sources (e.g. paint, dust, water, soil, and risks from home repairs and remodeling.) Of the 378 children submitting blood data, 23% had blood lead levels >10 before the age of 3. Intervention participants were more likely to maintain blood lead levels <10 than were control groups (81% v. 73%) (p=.08). However, the difference was not statistically significant. Although intensive education resulted in a lower proportion of children with elevated lead levels, education alone cannot be relied upon to prevent lead burden (Jordan, et. al. 2003).

Dugbatey et. al. hypothesized that educational intervention tailored to an individual mothers needs would reduce the probability that the infant of that mother would become lead poisoned (would have blood lead levels greater than 10mg/dl), as compared to infants of control mothers. Interventions included case management with hands-on instruction on cleaning techniques, property maintenance, hygiene, and nutrition to reduce exposure of newborns to lead. None of the interventions reduced the likelihood of lead poisoning among participating children. Of the 151 participants who were screened at baseline, only 96 returned for a second screening, 50 for the third screening and 23 for the fourth. There were no statistically significant differences between study groups for any of the follow-up blood lead measures (p=.982) (Dugbatey, et. al, 2005).

Recommendation II: Secondary Prevention: The IPHA Nursing Section: Lead Evidence Base Committee concludes that there is insufficient evidence to support or deny the notion that population focused strategies reduce the presence of subsequent sequelae in the birth to 7 year old population and at the same time the committee recognizes that the potential benefit of continued education and assistance in the area of cleaning and abatement outweigh the harm.

Rating: I

Rationale: A systematic review of literature done by Yeoh, et. al.(2008) on the Cochrane Collaboration reported that there is currently insufficient evidence that soil abatement or combination interventions reduce blood lead levels and further studies need to address this issue. Twelve studies were included (2239 children). All studies reported blood lead level outcomes and none reported cognitive or neurobehavioral outcomes. Educational interventions were not effective in reducing blood lead levels. Meta-analysis of the dichotomous data for the dust control subgroup found no evidence of effectiveness as well. The studies using soil abatement were not able to be meta-analyzed due to substantial differences between studies. (Yeoh, et. al, 2008). Neither educational interventions nor dust control interventions were effective in reducing blood lead levels.

Supporting Documents

Agency for Healthcare Quality and Research (2008). Screening for Lead Levels in Childhood Pregnancy, US Preventive Services Task Force. Retrieved on July 2, 2008 from <http://www.ahrq.gov/clinic/uspstf/uspstflead.htm>

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Guidotti, T.L. & Ragain, L. (2007). Protecting children from toxic exposure: three strategies. *Pediatric Clinics of North America*, 54, 227-235.

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Yeoh, B., Woolfenden, S. Wheeler, D., Alperstein, G., & Lanphear, B. (2008) Household interventions for prevention of domestic lead exposure in children. Cochrane Database of systematic reviews. Retrieved on May 5, 2008 from <http://www.cochrane.org/reviews/en/ab006047.html>

US Department of Health and Human Services, Center for Disease Control and Prevention. (2005). Lead poisoning in young children. Retrieved on 9/22/08 from <http://www.cdc.gov/nceh/lead/publications/PrevLeadPoisoning.pdf>