Selected Research for Healthcare Providers on incidence, Prevalence, Severity, and Response to Elevated Blood Lead Concentrations

Researchers are continuously improving our understanding of the risks and health effects of lead exposure. In recent years, there has been a greater focus on the effects of low-level lead exposure. While we know that there is no known safe level of lead exposure in children, the latest findings show that low-level lead exposure can lead to serious, irreversible, neurocognitive deficits in children. Below, we have compiled additional sources describing the effects of lead exposure. **Links to the full text of these and more articles are available at https://nvclppp.org/provider-portal/resources-and-references/**

New Findings of the Effects of Low-Level Lead Exposure

NTP Monograph on Health Effects of Low-Level Lead. (2012, June 13). Retrieved from ntp.niehs.nih.gov/ntp/ohat/lead/final/monographhealtheffectslowlevellead_newissn_508.pdf.

- Summarizes and contrasts the health effects in children and adults at traditionally low exposure levels
- Evidence supports negative health outcomes at levels below 10 µg/dL and some effects occur at levels as low as 5 µg/dL of lead concentration, including neurological, immunological, cardiovascular, renal, reproductive, and developmental effects.

Earl, R., Burns, N., Nettelbeck, T., & Baghurst, P. (2015). Low-level environmental lead exposure still negatively associated with childrens cognitive abilities. Australian Journal of Psychology, 68(2), 98-106. onlinelibrary.wiley.com/doi/full/10.1111/ajpy.12096

- New study describes intellectual deficits of lead-exposed children in detail
- Significant negative correlation between blood lead concentration and IQ, even when controlling for socioeconomic status, environmental conditions, and familial variables
- Found irreversible changes deleterious to cognitive development, challenging the perception that IQ reductions resulting from lead exposure were not serious.

Fundamentals of Lead Exposure

Amati, Y., Bakir, H., Besbelli, N., & Boese-O'Reilly, S. (2010). Childhood Lead Poisoning. www.who.int/ceh/publications/leadguidance.pdf.

- Recommends universal blood lead testing due to the negative health effects occurring at 5 µg/dL and above
- Research shows these levels compromise health, injure multiple organ systems, and are usually absent of outward symptoms or a compelling reason to schedule an office visit
- Ingestion is the most common route of exposure for children due to innate curiosity and hand-to-mouth behavior
- Impacts of socio-economic status as predictive to exposure likelihood and severity
- Toxic effects extend from acute, clinically obvious, systematic Poisoning at high levels of exposure to subclinical (but still very damaging) effects at lower levels that are not outwardly visible

Warniment, C., Tsang, K., & Galazka, S. (2010). Lead poisoning in children. Am Fam Physician, 15(81), 6th ser., 751-757. Retrieved from www.aafp.org/afp/2010/0315/p751.html.

- Prevalence and severity of lead poisoning has steadily decreased since 1970s
- 310,000 US children aged 5 and younger have elevated blood lead levels
- Venous blood draw is the preferred method but capillary tests with confirmation are an acceptable alternative
- To reduce lead absorption, improve childhood nutrition focusing on diets high in Iron, Calcium, and Vitamin C
- Prevention is best achieved with education and avoidance of lead-contaminated products

Mason, L. H., Harp, J. P., & Han, D. Y. (2014). Pb Neurotoxicity: Neuropsychological Effects of Lead Toxicity. BioMed Research International, 2014, 1-8. www.hindawi.com/journals/bmri/2014/840547/

- Lead exposure leads to significant neuropsychological functional decline in humans
- Exposure at any age negatively impacts patients intelligence, memory, executive functioning and attention, processing speed, language, motor skills, and more functional areas