

Lead Poisoning in Children - A Pervasive but Preventable Problem

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The Flint, Michigan water crisis attracted international attention due to corrosion problems in older lead service lines and the lead corrosion products settling in galvanized iron pipes.¹ Although lead use in plumbing was banned in 1986, older construction may still contain lead pipes, fixtures and solder. This problem is not isolated to older, industrial cities. Recent findings show a higher percentage of children with elevated blood levels in areas of California than in Flint at the height of the water crisis, and more recent discoveries of lead in public school water systems in California.^{2,3}

Adult exposure to lead is usually via workplace exposure and therefore acute. Most workplaces are aware of the exposure routes and how to mitigate them. Typical industries working with lead would be mining and smelting operations, battery and electronics manufacturing, and the soldering of equip-

ment.⁴

However, lower-level lead pollution is pervasive due to environmental contamination from paint manufactured prior to 1978 and lead additives used in gasoline prior to 1989. Flaking and sanded paint from older construction result in a "halo" of lead contamination around buildings. Likewise, when leaded fuel was used, the areas of high vehicular traffic deposited lead on the ground near roadways due to emissions. An estimated 5.9 million metric tons of lead were emitted into the US alone, as 75% of lead additives in gasoline are emitted as exhaust particulates.^{5,6} This has left heavily-trafficked urban areas with a persistent lead contamination in soils, which is typically not considered mobile except for dust blown around a contaminated area or transported via direct human intervention.⁷

In children, virtually no organ system is immune to the effects of lead poisoning. A typical child under the age of 6 ingests 100 to 400 mg/day of dust and soil.⁸ Children absorb lead much more efficiently than

adults, up to 50% of an ingested dose versus 10% in adults. The organ of most concern is the developing brain. Any disorganizing influence that affects an individual at a critical time in development is likely to have long-lasting effects, such as inattention, unpredictable disruptive behavior and loss of intelligence.

One of the mechanisms of neurotoxicity appears to be the ability of lead to substitute for other polyvalent cations with a greater affinity than calcium or zinc for protein binding sites. This can affect many significant processes, not the least of which is the developing central nervous system.⁹ An increase in blood lead levels from 1 µg/dL to 10 µg/dL results in an average six-point IQ decrement.¹⁰

With proper soil, water, household, and blood testing, lead poisoning in children is completely preventable. The economic and social cost of not testing for lead are more costly than instituting a robust testing program.¹¹

??? Did You Know ???

Cultural competence describes the ability of an individual or organization to interact effectively with people of different cultures. To produce positive change, practitioners must understand the cultural context of the community they serve, and have the willingness and skills to work within this context. This means drawing on community-based values, traditions, and customs, and working with knowledgeable people from the community to plan, implement, and evaluate prevention activities.

Source: SAMHSA

Question of the Month

Question: *I thought that Oxycodone was an opiate. If I'm testing patients for opiates, why is there a separate test for Oxycodone?*

Answer: Oxycodone, like Hydrocodone (common brand names include Vicodin and Lortab) and Hydromorphone (Dilaudid and Palladone), is a semi-synthetic opiate that was developed by scientists. Opiate drug-testing reagents used by laboratories to perform drug tests have sensitivities to Hydrocodone and Hydromorphone, as well as organic opiates Morphine and Codeine. While Oxycodone was first developed in 1916, it was the introduction of Oxycodone to the general public in 1995 that led to a rapid increase in the abuse of the drug and necessitated an Oxycodone drug test be developed. This was long after Opiate reagents, which have very low cross-reactivities to Oxycodone, had been developed. Thus, a separate reagent specifically sensitive to Oxycodone was created and needs to be used.

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