

Children's Exposure to Arsenic from CCA-Treated Wooden Decks and Playground Structures

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CCA-treated wood is widely used in the fabrication of outdoor decks and playground equipment. Because arsenic can be removed from the surface of CCA-treated wood both by physical contact and by leaching, it is important to determine whether children who play on such structures may ingest arsenic in quantities sufficient to be of public health concern. Based on a review of existing studies, it is estimated that arsenic doses in amounts of tens of micrograms per day may be incurred by children having realistic levels of exposure to CCA-treated decks and playground structures. The most important exposure pathway appears to be oral ingestion of arsenic that is first dislodged from the wood by direct hand contact, then transferred to the mouth by children's hand-to-mouth activity. The next most important pathway appears to be dermal absorption of arsenic, while ingestion of soil that has become contaminated by leaching from CCA-treated structures appears to be of lesser importance, except possibly in the case of children with pica. Considerable uncertainty, however, is associated with quantitative estimates of children's arsenic exposure from CCA-treated wood. Priorities for refining estimates of arsenic dose include detailed studies of the hand-to-mouth transfer of arsenic, studies of the dermal and gastrointestinal absorption of dislodgeable arsenic, and studies in which doses of arsenic to children playing in contact with CCA-treated wood are directly determined by measurement of arsenic in their urine, hair, and nails.

KEY WORDS: Arsenic; CCA; decks; playgrounds

1. INTRODUCTION

Children who contact CCA (chromated copper arsenate)-treated wood acquire arsenic on their skin. This arsenic may be ingested via hand-to-mouth activity, or absorbed by the skin. In addition, because arsenic leaches from CCA-treated wood, soil beneath CCA-treated structures can become arsenic-contaminated, and children who ingest the soil will

also ingest this arsenic. To estimate the magnitude of the arsenic dose a child may receive from playing on or under a CCA-treated structure it is therefore necessary to estimate (1) the extent of transfer of arsenic from CCA-treated wood surfaces to the skin, (2) the extent to which arsenic acquired on the skin is either ingested or absorbed by the body, (3) the amount of arsenic that may be ingested from contaminated soil, and (4) the relative bioavailability of each form of absorbed or ingested arsenic. It is the purpose of this article to review the state of knowledge of these processes, estimate the general magnitude of arsenic dose that may be ingested by children who play on CCA-treated structures, and identify key research needs.

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