Lead Exposure in the Construction Industry

Lead exposure can result in adverse health effects, such as anemia, hypertension, infertility, miscarriages, and damage to the nervous system or kidneys.[1] In the construction industry, lead exposure occurs mainly during tasks that generate fumes and respirable dust. In addition, construction workers may expose their children and other family members to lead via take-home exposure (such as lead remaining on clothing, skin, hair, and tools).[2]

The federal government banned the use of lead-based paint in residential construction in 1978.[3] However, no such federal ban exists in other construction. For many years, the Environmental Protection Agency (EPA) has regulated methods used to abate lead. In 2010, the EPA began requiring certification of workers disturbing lead-based paint in homes, schools, and childcare facilities built before 1978.[4] The Occupational Safety and Health Administration (OSHA) requires employers to institute protections for construction workers exposed to lead above the Permissible Exposure Limit on the job.[5] OSHA's "Lead in Construction" Standard also specifies removal of workers who have blood lead levels (BLLs) >50 µg/dL. Workers must not return to work that exposes them to lead until their BLLs are <40 µg/dL.

In the past decades, the National Institute for Occupational Safety and Health's (NIOSH) Adult Blood Lead Epidemiology and Surveillance (ABLES) Program has worked with states to collect BLLs from adults (≥ 16 years) in the United States to provide information on lead exposures for research and interventions.[6] The number of states participating in the program increased from 4 in 1987 to 41 in 2011. Between 1994 and 2010, the rate of BLLs ≥25 µg/dL dropped 50%, from 14 to 7 cases per 100,000 employed.[6]

Despite the improvement, in 2010, 6,309 occupational cases of BLLs ≥25 µg/dL were identified from 38 states submitting industry data to NIOSH. Cases in the construction industry accounted for 16% of the total, which is disproportionately high given that construction employment accounts for just 7% of the overall workforce (chart 36a). This number of cases is likely underestimated. One reason is that lead abatement workers are not classified under construction by NAICS. As a result, 69 such cases were not counted in construction in 2010.[7] Additionally, only tested persons are represented in the data. Therefore, states that do not participate in the ABLES program, employers who do not comply with OSHA-mandated BLL monitoring, and laboratories that do not report all tests to state health departments most likely result in fewer reported cases.

From 2002 to 2011, the overall trend in the number of cases in construction was downward except for the two most recent years (chart 36b). Among the 8,529 cases of BLLs ≥25 µg/dL in construction during this period, 25% had BLLs ≥40 µg/dL.[7] Building Finishing (NAICS 2383) and Highway, Street, and Bridge (NAICS 2373) were the two construction subsectors with the largest number of reported cases with BLLs ≥25 µg/dL (chart 36c).

The rates of BLLs ≥25 µg/dL among construction workers vary by state. Among the 23 states that reported five or more occupational cases in the construction industry in 2010, Connecticut, Massachusetts, Missouri, New Jersey, New York, and Rhode Island reported the highest rates of BLLs ≥25 µg/dL (chart 36d). In addition to potential differences in construction projects, other reasons could explain the higher rates. For example, each of these states has a long-standing surveillance program that identifies cases, conducts follow-up activities, and encourages better reporting by physicians and laboratories.

Reducing BLLs has been a national priority for more than two decades. Responding to increasing evidence of adverse health outcomes at low BLLs, both the ABLES program and the Centers for Disease Control and Prevention established a new reference for elevated BLLs as any BLL ≥10 µg/dL.[6,8] A new Healthy People 2020 (HP2020) goal also seeks to reduce the prevalence of BLLs ≥10 µg/dL among adults.[9] Given the large number of cases of BLLs ≥25 µg/dL in construction, enhanced efforts are needed to reach the HP2020 goal.

1. Association of Occupational and Environmental Clinics. 2007. Medical Management Guidelines for Lead-Exposed Adults. Washington, DC: Association of Occupational and Environmental Clinics. http://www.aoec.org/documents/positions/mmg_final.pdf (Accessed January 2013).

2. Roscoe RJ, Gittleman JL, Deddens JA, Petersen MR, & Halperin WE. 1999. Blood lead levels among children of lead-exposed workers: A meta-analysis. *American Journal of Industrial Medicine*, 36(4):475-481.

3. U.S. Consumer Product Safety Commission. 1977. CPSC Announces Final Ban on Lead-Containing Paint, Release #77-096. http://www.cpsc.gov/en/Recalls/1977/CPSC-Announces-Final-Ban-On-Lead-Containing-Paint/ (Accessed March 2013).

4. U.S. Environmental Protection Agency. 2010. Lead: Amendment to the opt-out and recordkeeping provisions in the renovation, repair, and painting program. *Federal Register*, 75(87):24,802-24,819 [40 CFR Part 745].

5. U.S. Department of Labor, Occupational Safety and Health Administration. 1993. Lead exposure in construction - interim rule. *Federal Register*, 58:26590-26649 [29 CFR 1926.62].

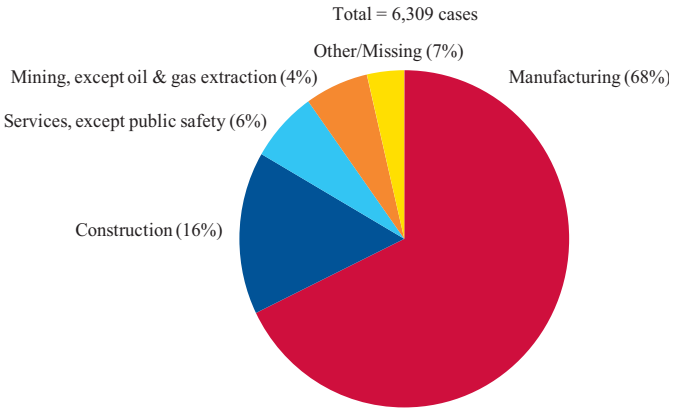
6. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. *Adult Blood Lead Epidemiology & Surveillance Program*. http://www.cdc.gov/niosh/topics/ABLES/ables.html. (Accessed January 2013).

7. Personal communication from Walter A. Alarcon, the National Institute for Occupational Safety and Health (NIOSH) Adult Blood Lead Epidemiology and Surveillance (ABLES) Program project officer, October 2, 2012.

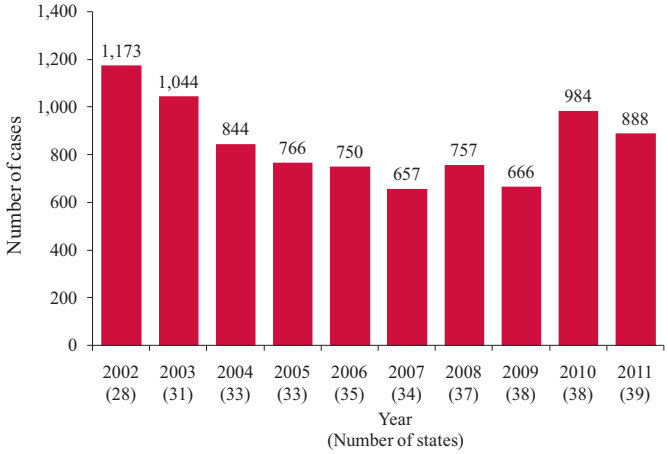
8. Centers for Disease Control and Prevention. 2010. *Nationally Notifiable Non-Infectious Conditions. Elevated Blood Lead Levels*. http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/lead_current.htm (Accessed January 2012).

9. U.S. Department of Health and Human Services. *Healthy People 2020, OSH-7 Reduce the Proportion of Persons Who Have Elevated Blood Lead Concentrations from Work Exposures*. http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=30 (Accessed January 2012).

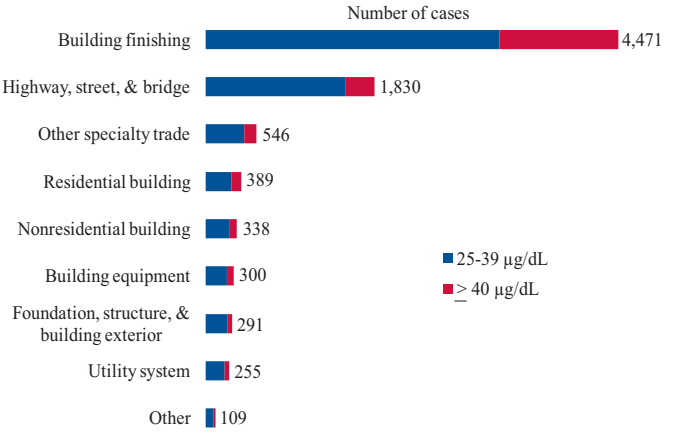
36a. Distribution of workers with BLLs ≥ 25 µg/dL, by industry, 2010



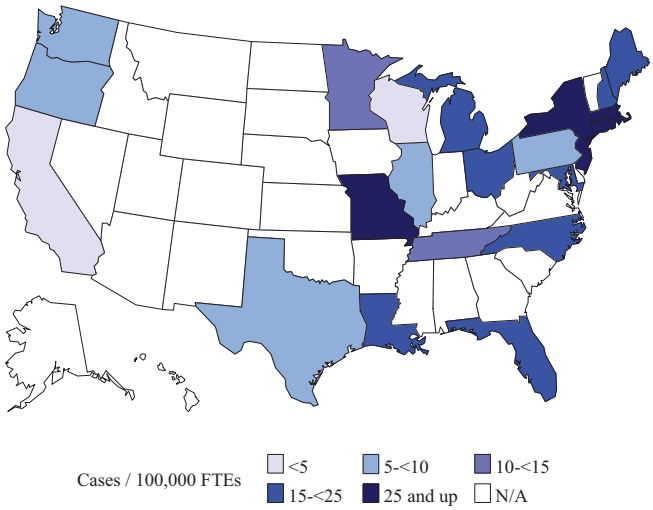
36b. Number of cases of BLLs ≥ 25 µg/dL in construction, 2002-2011



36c. Number of cases of BLLs 25-39 µg/dL and ≥ 40 µg/dL, by construction subsector, 2002-2011



36d. Rates of workers with of BLLs ≥ 25 µg/dL in construction, by state, 2010



Note: All Charts - For adults with more than one BLL in a given year, only the highest BLL for that year was included.
Chart 36a - Total may not add to 100% due to rounding. Data are based on 38 states submitting industry data to NIOSH ABLES program in 2010.
Charts 36b and 36c - When a worker had BLLs ≥25 µg/dL (or BLLs ≥40 µg/dL) reported in multiple years, this worker was counted as a case in each year.
Chart 36d - Only states reporting five or more occupational cases with BLLs ≥25 µg/dL in construction were included in rate calculations. N/A represents states not participating in the ABLES Program, states with fewer than five or no occupational cases in construction, or states not submitting industry data to NIOSH.

Source: Chart 36a - NIOSH State ABLES Programs, United States. Contact:Walter Alarcon, ABLES Program project officer.
Charts 36b and 36c - NIOSH ABLES Program, United States. Contact: Walter Alarcon, ABLES Program project officer.
Chart 36d - BLL cases from the ABLES Program, United States. Number of full-time equivalent workers was estimated by CPWR Data Center using the American Community Survey. Rates were calculated by the ABLES program project officer (Walter A. Alarcon). Data and content reviewed by State ABLES Programs principal investigators.