ISEE Call for Action for Global Control of Lead Exposure to Eliminate Lead Poisoning

Lead poisoning is one of the most pervasive, well-established, and preventable environmental hazards worldwide. We in the International Society for Environmental Epidemiology (ISEE) add, therefore, our voices to the call for a concerted global effort to eliminate lead poisoning.

We specifically call for:

1. The governments of all nations to:
    a. Ban the manufacture, import, and export of lead-containing fuels, paints, plumbing fixtures, and plastics;
    b. Vigorously explore replacements for the lead content, wherever possible, in other consumer and commercial products;
    c. Implement, to the greatest extent feasible, effective procedures to reduce occupational exposure to lead and its compounds, especially in mining, manufacturing, and construction;
    d. Implement, to the greatest extent feasible, effective procedures to reduce emissions from smelters and lead battery manufacturing and recycling facilities;
    e. Implement regulations for safely recycling used batteries containing lead and for preventing the illegal dumping of lead-containing materials and products;
    f. Implement, to the greatest extent feasible, programs to identify and remediate lead contaminated public and residential areas, and surveillance programs to identify heavily exposed individuals, populations, new sources of lead exposure, and trends in lead exposure;
    g. Investigate and reduce lead exposures from contamination of food and from hazardous waste sites;
    h. Increase the training of health professionals in the identification and prevention of lead poisoning;
    i. Ratify and implement the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.[1]
2. The governments of countries with high-quality blood analytical capacity to provide assistance (expertise, material resources, and training) to other countries in developing this capacity.
3. The elimination of lead poisoning to be included in the United Nations Sustainable Development Goals, with indicators and targets set accordingly.
4. Professional organizations to support the efforts of international organizations working for lead poisoning prevention and, in particular, to encourage their members to contribute to the efforts of the Global Alliance to Eliminate Lead Paint.[2]
5. WHO and UNEP to take a lead in coordinating and assisting the efforts of all countries in implementation of the above actions.

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RATIONALE

THE LEAD POISONING PANDEMIC

Lead poisoning is pandemic. Globally, there are an estimated 674,000 deaths annually attributed to lead exposure, including many from cardiovascular diseases, and 600,000 cases of intellectual disability among children.[3,4] There is no evidence of a threshold for the effects of low-level lead exposure on cognitive functioning in children.[5] Moreover, there is substantial evidence that childhood lead exposure elevates the risk of behavioral problems, like Attention Deficit Hyperactivity Disorder (ADHD)[6,7] and antisocial behaviors.[8–10] Lead is an established risk factor for hypertension and chronic renal failure, and a potential risk factor for cognitive decline in adults.[11–13] Lead is an endocrine disruptor that may delay sexual maturation in children.[14–16] Lead is a risk factor for spontaneous abortion, fetal death, and reduced birth weight.[17–19] There is no safe level of lead exposure.[20]

Progress in reducing lead exposures has been achieved over the last four decades, but exposure is still ubiquitous, especially in low- to-middle-income countries.[21] Lead exposure continues to be an occupational hazard in manufacturing, mining, and smelting,[22] and it is often found in consumer products.[23] In addition, the vestiges of past lead use, such as lead-based paint remaining on surfaces on the interior and exterior of housing and schools, provide widespread opportunities for exposures, particularly for children, painters, and construction workers. Use of lead in plumbing fixtures and water supply lines can result in excessive exposure and remains a concern in many countries.[24]

Lead-containing paint for residential use is available in retail stores in more than 40 countries.[25–27] Companies based in countries that have restricted domestic use of leaded paint, such as in the U.S., Canada, and the European Union, continue to export more than 25,000 tons of lead–containing pigments annually.[28] Operations for recycling of lead batteries, which can result in substantial exposures to workers and the surrounding community, are largely uncontrolled in many countries.[29–31] In the U.S., where there are environmental regulations to control these exposures, companies often export used batteries for recycling to countries where there is less stringent regulation.[32]

Exposure to lead also occurs from food stored or cooked in ceramics or cans containing lead or aluminum cookware and from proximity to hazardous waste sites.[33–36]

Reduction in lead exposure across the age spectrum is essential. Lead has a potential half-life in bone of 27 years. Consequently, exposure at any age can result in residual exposures as bone stores are mobilized. This is of particular concern during pregnancy, when mobilization results in fetal exposure.[37,38] Children with poorer nutrition (e.g., iron deficiency) may absorb more lead and are at greater risk from exposures.[39] Inadequate nutrition (e.g., calcium deficiency) can also exacerbate the release of lead to the fetus during pregnancy.[40]

Globally, there are inadequate resources and insufficient government infrastructure for managing and reducing lead poisoning. Many countries have little or no laboratory capacity for blood lead tests.[41] Moreover, funding for lead poisoning screening and prevention programs is often inadequate.[21]

AVAILABILITY OF METHODS TO REDUCE EXPOSURE

Various methods are available to reduce exposure to lead. Safer alternatives exist for most products that contain lead.[42] Methods exist to reduce industrial emissions and control occupational exposures, and techniques exist to safely remediate homes that are contaminated with lead paint and lead-contaminated house dust.[43] Because of the widespread historic and current use of lead compounds as paint additives, many dwellings and other structures contain lead hazards. It is important to identify residential lead hazards and take measures to prevent exposures before children are exposed. Lead paint remediation, if done incorrectly, can actually increase exposures; remediation must be properly guided by scientific methods and clearance dust measurements following cleanup. Some remediation methods such as abrasive blasting, power sanding, and burning off lead paint have been shown to be dangerous.[43]

THE ECONOMICS AND ETHICS OF LEAD POISONING PREVENTION

The burden of disease and disability due to lead poisoning falls disproportionately on low-income and minority communities globally. Acute fatalities in children due to lead poisoning have largely been eliminated in high-income countries but still occur in low- and middle-income countries.[44,45] It has been estimated that, worldwide, 240 million people have blood lead levels >5 μg/dL (>50 μg/L), including 40% of the world's children. Of these children, 90% live in "developing regions."[46] In the U.S., African-American children are more than twice as likely to have blood lead levels >5 μg/dL (>50 μg/L) than white children. Children in families whose income is less than 130% of the poverty line have been shown to have more than three times the likelihood of having elevated blood lead levels compared to other children, and their homes are nearly twice as likely to contain lead-based paint hazards.[47,48]

The economic cost of lead poisoning is substantial, primarily due to lost lifetime economic productivity. The economic cost for low- and middle-income countries is estimated to be $977 billion annually.[49] The cost in the U.S. is estimated to be $50 billion annually.[50]

Lead poisoning prevention is cost-beneficial; it has been estimated that for every dollar spent in controlling residential lead hazards, there will be a return of $17 to $221 in societal benefits.[51] This compares favorably with the most widely accepted form of public health intervention,

childhood vaccination, which is estimated to return $5.30 to $16.50 for every dollar spent.[51]

In summary, lead exposures cause death and disability that are almost entirely preventable with a very high benefit-to-cost ratio.

UNEVEN PROGRESS IN REDUCING LEAD EXPOSURES

Considerable progress has been made over the last few decades to reduce the health burdens due to lead exposure. Virtually all countries restrict the use of tetraethyl lead in gasoline but most have not banned the use of lead in paint and other products. Average blood lead levels have declined in many countries.[52,53] The U.S. CDC has reduced the level at which actions should be taken to reduce childhood lead exposure, from 10 μg/dL (100 μg/L) to 5 μg/dL (50 μg/L).[54] An international treaty (The Basel Convention) places restrictions on the transfer of lead-containing waste between countries and makes recommendations for the proper handling of lead containing waste.[55] However, the Convention has not been ratified by the U.S., which is a large exporter of lead-containing waste, and has failed to eliminate widespread transfers of this waste to low- and middle-income countries.[32,56] In addition, the enforcement and compliance provisions of the convention are unevenly implemented and lack effectiveness.[57]

LEAD POISONING PREVENTION ADVOCACY

Many organizations and agencies have advocated for increased efforts to eliminate the lead poisoning pandemic. Examples of some of these are given in the Appendix.

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APPENDIX

Examples of Organizations Advocating for Increased Efforts to Eliminate Lead Poisoning

World Health Organization: http://www.who.int/ipcs/assessment/public_health/lead/en/ (accessed March 5, 2015)

United Nations Environmental Program: http://www.unep.org/chemicalsandwaste/LeadCadmium/LeadPaintAlliance/tabid/6176/Default.aspx (accessed March 5, 2015)

International Labour Organization: http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:51:0::NO:51:P51_CONTENT_REPOSITORY_ID:2542964:N (accessed March 5, 2015)

Public Health Association of Australia: http://www.phaa.net.au/documents/140919PHAA%20Environmental%20Lead%20Policy.pdf (accessed March 5, 2015)