

Lead Poisoning Global Question:

After decades of poor policy decisions, the United States finally implemented policies that substantially reduced or eliminated the use of lead-based paint and lead gasoline. These policies subsequently resulted in a dramatic reduction in environmental lead exposure and childhood lead poisoning. Many countries, however, still do not have such policies in place, and continue to use, in particular, leaded gasoline.

Which country(ies) are still using leaded gasoline, and how has its continued use impacted public health in that (or those) countries? What are the obstacles to implementing the use of non-lead gasoline in those countries, and how may they be overcome?

LECTURE ABSTRACT

Industrialization/Lead Poisoning Lecture

The mining of the earth's minerals for the production of coal, asbestos and metals has led to adverse consequences on the health of miners. Indeed, much of what we know about various metal toxicity syndromes was learned first through studies of the health of miners, who are often exposed to unusually high concentrations of hazardous substances. Environmental exposure to lower doses of metals is also associated with an increased prevalence of comparable syndromes. An example of this phenomenon, developed in this lecture relates to childhood lead poisoning. Epidemics of childhood lead poisoning began to appear in the mid-nineteenth century secondary to the use of lead-based paint. Thus, seven countries banned lead-based paint in 1922; the U.S. was not one of these. The addition of lead to gasoline in the 1920's in the U.S. and elsewhere contributed further to an increase in the prevalence of childhood lead poisoning. The developing nervous system appears to be much more sensitive to the adverse effects of lead than the adult nervous system. At high blood lead concentrations (> 80 ug/dl), children can experience lead encephalopathy, a condition associated with seizures, mental retardation and even death. This effect is believed to be mediated through an adverse effect of lead on the blood-brain barrier, which leads to increased intracranial pressure. At lower blood lead concentrations, there is an impressive body of evidence linking lead exposure to impaired cognitive function in children. Indeed, there appears to be no threshold for this effect; that is, on average, the lower the blood lead, the better children perform. This effect is likely due to a myriad of effects on brain function. Drugs, called chelating agents, are effective in preventing death in children with encephalopathy, but have not been effective in restoring cognitive function in those exposed to lower levels of lead. In the U.S., policies to eliminate lead-based paint, the use of lead pipes, and the elimination of leaded gasoline have led to a profound fall in the prevalence of lead poisoning.