Theme: The economic and social impacts of mining and mineral resource utilization, particularly in developing countries

Industrial emissions of lead to the environment: its impact, legacy and remediation

Mark Patrick Taylor, BSc (Hons), PhD
Professor of Environmental Science
Department of Environmental Sciences
Faculty of Science and Engineering
Macquarie University Sydney
NSW Australia 2109
Email: mark.taylor@mq.edu.au

Over the past 40 years lead and other metal poisoning from mining, smelting and industrial emissions has been dramatically lowered with major problems being shifted to industrializing nations. Nevertheless, entirely preventable disease from lead exposure continues to affect millions of people, primarily in developing nations, who are already economically and socially disadvantaged. Children suffer marked deficits in cognition and behaviour, with lead exposure accounting for 9.3% of the global burden of intellectual disability. Aggressive adult criminal behaviours, including murder have also been causally linked to early life lead exposures. Further, lead exposure accounts for 4% and 6.6% of the global burden of heart disease and stokes, respectively.

The reduction of exposures has resulted from the now almost complete global ban of leaded gasoline use as well as the United Nation's Global Alliance to eliminate lead paint. However, there continue to be unnecessary uses of lead that should be eliminated: the sale of lead paint from North American countries and its production in lower to middle income countries; the continued limited use of leaded gasoline for cars and airplanes, lead bullets, wheel weights and fishing sinkers—all of which causes preventable environmental and human health harms. Moreover, the emissions and depositions of metals into the environment create a legacy that does not dissipate and subject to ongoing remobilization.

Illegal lead mining and ore smelting practices has resulted in widespread recent harm including hundreds of deaths in Nigeria and a spate of serious childhood lead poisoning epidemics in China, Senegal, and Zambia. In particular, the global challenge associated with informal lead acid battery recycling in developing nations is immense. Consequently, it is not surprising that 90% of children who have significantly elevated blood lead levels > 100 ppb live in lower to middle income countries. Globally, an estimated 6 million people suffer exposures three times the acceptable USA intervention blood lead level of 50 ppb. Populations in high income nations also remain at risk—in the Australian lead mining and smelting towns of Broken Hill, Mount Isa and Port Pirie 50% of young children have blood lead levels above 50 ppb, possibly resulting in permanent cognitive damage. Recent water contamination in Flint, USA doubled the number children exposed to toxic levels of lead.

This talk will examine some of the consequences of current and legacy lead emissions to the environment and will illustrate some of its adverse impacts along with the efforts being used to reduce exposures.