



Handout 2 - Lead Poisoning and Health

Lead Poisoning and Health

The World Health Organization

Key facts

Lead is a naturally occurring toxic metal found in the Earth's crust. Its widespread use has resulted in extensive environmental contamination, human exposure and significant public health problems in many parts of the world.

Important sources of environmental contamination include mining, smelting, manufacturing and recycling activities, and, in some countries, the continued use of leaded paint, leaded gasoline, and leaded aviation fuel. More than three quarters of global lead consumption is for the manufacture of lead-acid batteries for motor vehicles. Lead is, however, also used in many other products, for example pigments, paints, solder, stained glass, lead crystal glassware, ammunition, ceramic glazes, jewellery, toys and in some cosmetics and traditional medicines.

Drinking water delivered through lead pipes or pipes joined with lead solder may contain lead. Much of the lead in global commerce is now obtained from recycling.

Young children are particularly vulnerable to the toxic effects of lead and can suffer profound and permanent adverse health effects, particularly affecting the development of the brain and nervous system. Lead also causes long-term harm in adults, including increased risk of high blood pressure and kidney damage. Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth and low birth weight.

Sources and routes of exposure

People can become exposed to lead through occupational and environmental sources. This mainly results from: inhalation of lead particles generated by burning materials containing lead, for example, during smelting, recycling, stripping leaded paint, and using leaded gasoline or leaded aviation fuel; and ingestion of lead-contaminated dust, water (from leaded pipes), and food (from lead-glazed or lead-soldered containers).

An additional source of exposure is the use of certain types of unregulated cosmetics and medicines. High levels of lead have, for example, been reported in certain types of kohl, as well as in some traditional medicines used in countries such as India, Mexico and Viet Nam. Consumers should therefore take care only to buy and use regulated products.

Young children are particularly vulnerable to lead poisoning because they absorb 4–5 times as much ingested lead as adults from a given source. Moreover, children's innate curiosity and their age-appropriate hand-to-mouth behaviour result in their mouthing and swallowing lead-containing or lead-coated objects, such as contaminated soil or dust and flakes from decaying lead-containing paint. This route of exposure is magnified in children with a psychological disorder called pica (persistent and compulsive cravings to eat non-food items), who may, for



example pick away at, and eat, leaded paint from walls, door frames and furniture. Exposure to lead-contaminated soil and dust resulting from battery recycling and mining has caused mass lead poisoning and multiple deaths in young children in Nigeria, Senegal and other countries.

Once lead enters the body, it is distributed to organs such as the brain, kidneys, liver and bones. The body stores lead in the teeth and bones where it accumulates over time. Lead stored in bone may be remobilized into the blood during pregnancy, thus exposing the fetus.

Undernourished children are more susceptible to lead because their bodies absorb more lead if other nutrients, such as calcium or iron, are lacking. Children at highest risk are the very young (including the developing fetus) and the impoverished.

Health effects of lead poisoning on children

Lead exposure can have serious consequences for the health of children. At high levels of exposure, lead attacks the brain and central nervous system to cause coma, convulsions and even death. Children who survive severe lead poisoning may be left with mental retardation and behavioural disorders. At lower levels of exposure that cause no obvious symptoms, and that previously were considered safe, lead is now known to produce a spectrum of injury across multiple body systems. In particular lead can affect children's brain development resulting in reduced intelligence quotient (IQ), behavioural changes such as reduced attention span and increased antisocial behaviour, and reduced educational attainment. Lead exposure also causes anaemia, hypertension, renal impairment, immunotoxicity and toxicity to the reproductive organs. The neurological and behavioural effects of lead are believed to be irreversible.

There is no known safe blood lead concentration. But it is known that, as lead exposure increases, the range and severity of symptoms and effects also increases. Even blood lead concentrations as low as 5 µg/dL, once thought to be a "safe level", may be associated with decreased intelligence in children, behavioural difficulties, and learning problems.

Encouragingly, the successful phasing out of leaded gasoline in most countries, together with other lead control measures, has resulted in a significant decline in population-level blood lead concentrations. There are now only 3 countries that continue to use leaded fuel (1). More, however, needs to be done regarding the phasing out of lead paint: so far only one third of countries have introduced legally binding controls on lead paint (2).

(1) Leaded Petrol Phase-out: Global Status as at March 2017. Nairobi: United Nations Environment Programme; 2017.

(2) Global Health Observatory: Regulations and controls on lead paint. Geneva: World Health Organization; 2018