QUESTIONS AND ANSWERS

International Lead Poisoning Prevention Week of action

20–26 October 2019

1. What is lead?

Lead is a naturally occurring toxic metal found in the Earth’s crust. It has many uses, including in the manufacture of lead-acid batteries for motor vehicles and energy storage, in pigments and paints, solder, ammunition, ceramic glazes, jewellery, toys and also in some cosmetics and traditional medicines. Lead additives have almost entirely been phased out of gasoline for motor vehicles, however, lead continues to be used in some aviation fuels (Avgas) for piston-engine aircraft. The processing, use and disposal of lead can result in environmental contamination and human exposure. As lead is an element, once released into the environment it persists as a potential source of exposure.

2. What is lead poisoning?

Lead poisoning refers to excessive human exposure to lead. Exposure can occur from inhalation of lead fumes and particles, e.g. from smelting, or from ingestion of lead-contaminated dust (e.g. from decaying lead paint), water (from leaded pipes) and food (from lead-glazed or lead-soldered containers). This exposure may occur over a short space of time (acute poisoning) or over a prolonged period (chronic poisoning). No level of exposure to lead that is without harmful effects has so far been identified. As a consequence, some health authorities define excessive exposure as having a blood lead concentration above the reference value for the population as a whole. This reference value is usually the blood lead concentration that characterises the top 2.5% or 5% of the population, i.e. the 97.5th or 95th percentile respectively. For example, in the USA a reference value of 5 µg/dL was established in 2012, based on the 97.5th percentile of blood lead concentrations observed in children under six years of age during the years 2008 to 2012 (1). In France 5 µg/dL is the 98th percentile value for children under seven years (2).

3. What are the health effects of lead exposure?

Lead has no biological function in the body. It accumulates in the body and affects practically all organ systems. Lead exposure can cause chronic and debilitating health impacts in all age groups, but it is particularly harmful to young children. This is because the developing nervous system is vulnerable to the toxic effects of lead, even at levels of exposure that do not cause obvious symptoms and signs. Lead exposure in early childhood can result in reduced cognitive abilities, dyslexia, attention deficit disorder and antisocial behaviour. Lead exposure can also cause hypertension, renal impairment, immunotoxicity and toxicity to the reproductive organs.
Absorption of large amounts of lead can cause coma, convulsions and even death. Children who survive severe lead poisoning can be left with permanent neurological injury such as deafness and mental retardation.

The Institute for Health Metrics and Evaluation (IHME) has estimated that in 2017 lead exposure accounted for 1.06 million deaths and 24.4 million years lost to disability and death (disability-adjusted life years (DALYs)) worldwide due to long-term effects on health. The highest burden is in low- and middle-income countries. IHME has also estimated that lead exposure accounted for 63.2% of the global burden of idiopathic developmental intellectual disability (i.e. intellectual disability not due to known causes such as genetic factors), 10.3% of the global burden of hypertensive heart disease, 5.6% of the global burden of ischaemic heart disease and 6.2% of the global burden of stroke (3).

4. What are the costs associated with lead exposure?

There are both direct and indirect economic costs resulting from lead exposure. These include health care costs in treating lead poisoning, social costs such as the need for special education to combat lead-induced intellectual impairment, and productivity losses because of reduced intelligence quotient (IQ). The estimated economic costs attributable to the neurodevelopmental impacts of childhood lead exposure amounted to 1.2% of global gross domestic product (GDP) in 2011. Expressed in terms of loss to regional GDP, the estimated cost in Africa was 4.03%, in Latin America and the Caribbean 2.04%, and in Asia 1.88% (4).

5. What are the sources of human exposure to lead?

Lead has many uses; therefore, there are many potential sources of exposure. Important sources include environmental contamination from the recycling of lead acid batteries and from poorly controlled lead mining and smelting operations; the use of lead-containing traditional remedies; lead ceramic glazes used in food containers; lead pipes and other lead-containing components in water distribution systems, and lead paint. Leaded gasoline used to be an important source of exposure but almost all countries have now banned its use (5). The continued use of tetraethyl lead in some aviation fuels exposes populations around airfields to lead (6).

6. How important are used lead-acid batteries as a source of lead exposure?

Lead-acid batteries are used in motorized vehicles, for storage of energy generated by solar panels and wind turbines, and for back-up power supplies. The growth in the use of renewable energy sources and the concomitant need for storage batteries, as well as the increasing demand for motor vehicles as countries undergo economic development, mean that the demand for lead-acid batteries is continuing to increase. Approximately 85% of the total global consumption of lead is for the production of these batteries, and over half of this demand is met through recycling (7).

Lead, as fumes, particles and dust, can be released at all stages of the battery recycling process, from draining and dismantling the batteries, to smelting and refining the lead. Environmental contamination from recycling can be extensive and can cause significant exposure to workers and to surrounding communities. People engaged in recycling, who do not wash and change their clothes before leaving work, can bring lead contamination home with them and expose household members.
Preventing lead release requires the use of adequate engineering controls, trained staff, the provision of protective equipment, and the implementation of occupational and environmental standards. In many parts of the world where lead is recycled, these measures are not available or enforced. Informal, or ‘backyard’ recycling is widely practised in many low-income countries and has resulted in serious, and even fatal, lead poisoning (8,9).

7. What is lead paint?

In the context of action to eliminate lead paint, the term ‘paint’ includes varnishes, lacquers, stains, enamels, glazes, primers and other coatings. Paint is typically a formulated mixture of resins, pigments, fillers, solvents and other additives. Lead paint is paint to which one or more lead compounds have been added to confer specific properties such as colour, corrosion-resistance or to speed up drying. Lead compounds are primarily added to some solvent-based paints, such as enamel (gloss) paints. The lead content of paint can range from less than 90 ppm (90 mg/kg) to over 100 000 ppm (100 000 mg/kg). In paints with no added lead there may be a small amount present as a contaminant of the raw materials used in manufacture, but when a manufacturer takes care to source uncontaminated raw materials the lead content is usually well below 90 ppm.

Lead paint data collected around the world shows that in every country where studies have been conducted, some paint companies are producing paint containing less than 90 ppm of lead. This demonstrates that eliminating lead in all paints is within the capability of local producers (10). Also, in most countries where no regulations are in place to restrict the use of lead paint, paint intended for household use with hazardous levels of lead is typically widely available on the market (10).

8. Why is lead paint an important source of human exposure?

Lead paint is still used in the majority of countries and, since the phase-out of leaded petrol, this paint is one of the largest sources of domestic exposure to lead for children. Intact lead paint is safe; however, as it ages the paint starts to decay, fragmenting into flakes and dust that contaminate the home environment. This aging process can be very fast in some climates. Paint flakes and dust are readily swallowed by young children who typically play on the ground and frequently put their hands to their mouths. Some children compulsively pick flakes of paint off surfaces and eat them. The removal of lead paint, for example during home renovation or maintenance of painted structures such as bridges, can also result in the release of lead-contaminated dust if it is not done in a safe manner.

Lead paint can remain a source of exposure for many years into the future. Even in countries that banned lead paint decades ago there are still many homes where lead painted surfaces can be found. The sooner that lead paint is banned in a country the sooner this toxic legacy can be eliminated.

9. What are the economic costs of lead paint?

Once lead paint has been applied in the home it becomes a potential source of lead exposure, particularly as the paint starts to age and decay. In France, while the number of children with blood lead concentrations above 10 µg/dL is now small, 74% of cases are associated with poor quality housing where there is lead paint (11).
Older housing with lead paint has also been identified in the USA as a risk factor for elevated blood lead concentrations in children (12).

Removing lead paint carries a cost, particularly as measures must be taken to prevent environmental contamination with lead during removal and disposal. In France, based on 2008 values, it was estimated that the cost of remediating all homes with lead paint would range from €133.1 million to €342.5 million (US$ 193.8–498.7 million at 2008 exchange rates) (11). In the USA the costs of remediating lead-painted homes inhabited by young children were estimated to range from US$ 1.2 billion to US$ 11.0 billion in 2009 (12).

Cost-benefit analyses have indicated that investment in lead paint abatement yields large returns. In France the estimated net benefit was €3.78 billion (US$ 5.5 billion at 2008 exchange rates) (11). These benefits were calculated on the basis of avoided health costs for the management of lead exposure and avoided social costs e.g., in relation to reduced IQ, the need for special education, and lost lifetime earnings. In the USA it has been estimated that each dollar invested in lead paint hazard control yields a return of US$ 17–221 (12).

Of course, the most cost-effective solution is to prevent the use of lead paint altogether. Eliminating the use of lead in paints does not need to be expensive and a number of manufacturers have already successfully reformulated products to avoid the intentional addition of lead (13).

10. What is the Global Alliance to Eliminate Lead Paint and what are its aims?

The Global Alliance to Eliminate Lead Paint (the Lead Paint Alliance) is jointly led by the World Health Organization (WHO) and the United Nations Environment Programme (UNEP) in accordance with their respective mandates.

The Lead Paint Alliance is a voluntary collaborative initiative that aims to focus and catalyse the efforts of diverse stakeholders to achieve international goals to prevent children’s exposure, and to minimize occupational exposure, to lead from paint. Stakeholders include governments, intergovernmental organizations and non-state actors including civil society, regional bodies, philanthropic organizations, academia, media and the private sector. Interested individuals may also participate as stakeholders. The broad objective of the Lead Paint Alliance is to promote the phase-out of the manufacture and sale of paints containing lead and eventually to eliminate the risks that such paints pose.

The background to the formation of the Lead Paint Alliance is the call by governments at the World Summit on Sustainable Development in 2002 for lead paint to be phased out. Progress on this issue was discussed at the second International Conference on Chemicals Management in 2009 (ICCM2). ICCM2 noted the success of the Partnership for Clean Fuels and Vehicles in phasing out the use of leaded gasoline and supported the establishment of a global partnership to promote the phase-out of lead paint. In 2015, the global elimination of lead paint by 2020 was re-affirmed as a global priority issue at the Fourth Session of the International Conference on Chemicals Management (ICCM4).

Click here for more information on the Lead Paint Alliance, including how to become a partner.
11. What can Member States do to eliminate lead in paint?

There are safer alternatives to lead compounds for use as pigments and driers. These have been available for a number of years and studies have shown that using these alternatives does not significantly increase the cost of paint (10). There is, however, still a general lack of awareness on the issue of lead and an absence of mandatory standards for lead in paints in many countries.

In countries where lead paint is still available, governments should introduce legally binding controls to either ban or restrict the use of lead paint. Examples of control measures include prohibiting the use of any lead compounds in paint or setting a maximum permissible limit for the lead content of paint at the lowest feasible level. Additional information on establishing legally binding control measures, including a Model law and guidance for regulating lead paint (available in Arabic, Chinese, English, French, Russian and Spanish), can be found on the UN Environment website.

Other measures include requiring the use of paint with no added lead in public buildings such as schools and hospitals, and informing the general public about the hazards of lead to encourage the purchase of paint without added lead. This market pressure can encourage paint manufacturers to take voluntary action to stop adding lead compounds to their products.

The phase-out of leaded gasoline has shown how successful such policy measures can be. The mean population blood lead concentration in many countries has greatly decreased as a result of the banning of leaded gasoline together with other lead control measures.

The Business Plan of the Lead Paint Alliance provides a target that by 2020 all countries should have adopted legally binding laws, regulations, standards and/or procedures to control the production, import, sale and use of lead paints. This target gives special attention to the elimination of lead decorative paints and lead paints for other applications most likely to contribute to childhood lead exposure; however, the goal is to control lead in all paints. As of 30 August 2019, 73 countries had informed the Lead Paint Alliance secretariat that such control measures were in place. For further information on the status of legally binding controls click here.

The phasing out of lead paint by 2020 is one of the priority actions for governments included in the WHO Road map to enhance health sector engagement in the Strategic Approach to International Chemicals Management towards the 2020 goal and beyond. This road map was approved by the Seventieth World Health Assembly in decision WHA70(23).

12. How will the elimination of lead paint contribute to achievement of the Sustainable Development Goals (SDGs)?

The elimination of lead paint will prevent future exposures to lead and the consequent toxic effects, as well as environmental contamination from decaying and waste lead paint. In this way it will contribute to the achievement of the following SDG targets:

3.9: By 2030 substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination.

12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and
significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

13. What is International Lead Poisoning Prevention Week?

International Lead Poisoning Prevention Week is an initiative of the Lead Paint Alliance, and takes place every year during the last week of October. The purpose of the campaign week is to raise awareness of the need for action to address the human health effects of exposure to lead, especially in relation to children. A particular focus of the campaign week is to urge further action by governments, industry and consumers to eliminate lead paint.

Partners in this campaign include the United Nations Environment Programme (UNEP), the World Health Organization (WHO), the United States Environmental Protection Agency and IPEN, working together as part of the Lead Paint Alliance to support campaign activities, for example by producing multilingual campaign materials for use in local, regional or national campaigns. These materials are made available through the WHO website.

During the week, a range of activities takes place around the world. These are organized by community groups, public health departments, academia, government departments and others. For information on the week of action and to find campaign materials click here.

14. What can I do?

One of the ways to protect yourself and your family from lead exposure is to be a careful consumer. You should try to get informed about sources of lead exposure in your community and avoid buying products that may contain lead. For example, when buying paint check the label to see if lead is mentioned. If you are not sure ask the vendor or the manufacturer about possible lead content. If you know that lead paint is not legally controlled in your country then lobby your politicians to do something about it.

If you are planning to redecorate a building or to renovate painted furniture, and you think the original paint may contain lead, you should get expert advice about safe methods for removing the paint.

You should also take care when buying cosmetics and traditional medicines to only buy from a regulated manufacturer, as high levels of lead have been reported in some of these products.

When you buy a new car battery take the old one back to the distributor or to a licensed recycling facility, rather than dumping the battery or allowing it to be recycled at an informal or unlicensed facility.

15. How is WHO tackling the problem of lead and its effects on health?

WHO has identified lead as one of ten chemicals of major public health concern that require action by Member States in order to protect the health of workers, children and women of reproductive age.

In order to raise awareness about the hazards of lead and the need for preventive action, WHO has made available through its website a range of information on lead, including information for policy
makers, technical guidance and advocacy materials. This includes information on the health aspects of recycling used lead-acid batteries (9). All WHO information on lead can be found at the following link.

To assist policy-makers, public health authorities and health professionals in implementing measures to protect the health of children and adults from lead exposure, WHO is developing evidence-based guidelines on the prevention and management of lead poisoning.

Since leaded paint is a continuing source of exposure in many countries, WHO has joined with UNEP to form the Lead Paint Alliance. WHO is also a partner in a project funded by the Global Environment Facility that aims to support at least 40 countries in enacting legally binding controls on lead paint.

The World Health Assembly, at its 69th meeting, recognised WHO’s contribution to the work of the Lead Paint Alliance, and endorsed the development of a road map for the health sector towards achieving the 2020 goal of the Strategic Approach to International Chemicals Management for the sound management of chemicals and waste, and contributing to the relevant targets of the 2030 Agenda for Sustainable Development (Resolution 69.4). The Road map to enhance health sector engagement in the Strategic Approach to International Chemicals Management towards the 2020 goal and beyond was subsequently approved by the 70th World Health Assembly in decision WHA70(23). This roadmap includes the phasing out of lead paint by 2020 as one of the priority actions for governments.

References


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