

8.1 Taking a history to Identify the source(s) of exposure

The many possible sources of exposure to lead are described in section 4.1. Identification involves taking a thorough environmental and/or occupational history and may involve environmental investigations such as measurement of the lead content in drinking-water, household paint or soil. Questions should be asked about the use of traditional medicines and cosmetics. In pregnant women, the possibility of pica leading to ingestion of soil, clay or other lead containing materials should be explored (136). Examples of approaches to history-taking are provided by WHO (20) and the US Agency for Toxic Substances and Disease Registry (233). In the case of occupational exposure, it may be necessary to investigate work practices and the existence and effectiveness of engineering controls and occupational hygiene measures.

When a case of lead exposure has been identified, it is important to investigate the possibility that others may also be exposed, such as siblings, other household members or work colleagues. This is particularly likely when the source is environmental or a consequence of inadequate occupational control measures.

8.2 Evaluation of the severity of exposure

The blood lead concentration provides an indication of the severity of exposure, but the patient should also be evaluated for symptoms and signs of lead poisoning. These include GI features such as anorexia, abdominal pain, nausea, vomiting, diarrhoea or constipation; neurological features such as headache, lethargy, irritability, ataxia, tonic–clonic convulsions, opisthotonus, cerebral oedema and raised intracranial pressure; haematological features such as anaemia, possibly with basophilic stippling; and signs of renal and hepatic dysfunction. Young children with lead exposure should undergo a neurodevelopmental assessment.



Seams of lead ore in Uganda. Credit: WHO / Christopher Black

It is also important to take a dietary history to determine whether the patient has adequate nutrient intake, particularly of iron and calcium, as deficiency in these minerals is associated with increased absorption of lead and exacerbation of toxic effects (34, 172–174).

8.3 Reduction and termination of exposure, including improving nutrition

Means for terminating exposure depend on the source. In the case of lead ingestion, this may require GI decontamination (see section 7.1). In environmental exposure, identification of the source is important and may require the involvement of local public health or environmental health services. Measures to reduce and terminate exposure may include rehousing, remediation of contaminated soil or removal of lead paint, as well as longer-term measures such as implementation of environmental lead emission controls.

Occupational exposures may require temporary removal from work with lead. This should be followed by investigation of the cause(s) of exposure and implementation of the appropriate corrective measures. The regulatory limits for blood lead concentrations from occupational exposure vary around the world, some countries setting relatively high values. A review of national regulations showed that the concentration at which a worker should be removed from exposure ranged from 20 to 70 µg/dL for men and 10 to 70 µg/dL for women (234). The values are under review in some countries. In the European Union, for example, a limit of 15 µg/dL for men and avoidance or minimization of exposure for women of childbearing age have been recommended for adoption (235, 236). There are no WHO guideline values for this purpose.

The patient or carer should be given information about the harmful health effects of lead, about sources of exposure and how exposure can be reduced or avoided, including the importance of good nutrition, in particular adequate intake of iron and calcium and of vitamins C and D, as these facilitate absorption of iron and calcium, respectively (195). If necessary nutritional supplementation should be given (see section 7.2).

8.4 Chelation therapy

Issues in the choice of chelating agent for treatment are discussed in section 7.3.9. Table 2 provides a summary of information on chelating agents used for lead exposure. The systematic evidence reviews of chelating agents found that a variety of dosing regimens were used; however, the data were inadequate to compare the safety and efficacy of different regimens (10–14). The dose regimens listed in Table 2 are taken from WHO formularies, pharmaceutical reference books and summaries of product characteristics provided by manufacturers. Information on adverse effects is taken from the same sources and from the systematic evidence reviews in which this was reported.