

Appendix I. Published Reports of Less Common Causes of Elevated Blood Lead Levels (EBLLs) in Children.

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
Occupational Take Home Exposures				
<i>Battery reclamation</i>	Lead carried home by battery workers. (Only a minority of battery workers showered or changed clothes before going home.)	E	Twelve (75%) of 16 children of lead-exposed workers had EBLLs and a higher average BLL than neighborhood controls (22.4 vs. 9.8 µg/dL, <i>p</i> =.049).	28
<i>Ceramics</i>	Ceramic-coated capacitors made with fritted glass containing lead.	E	Case-control study of 51 children under 6 years (20 exposed, 31 controls) showed higher average BLLs in exposed children (13.4 vs. 7.1 µg/dL, <i>p</i> <.001).	31
<i>Furniture refinishing</i>	Lead carried home by workers who restored furniture that had undergone chemical stripping and was thought to be lead-free.	CR	Report of six workers and three of their children aged 4-18 months.	19
<i>Construction</i>	Lead dust on skin and clothes taken home.	E	Case-control study of 50 children under 6 years (31 exposed, 19 controls) showed 25.8% of workers' children had EBLLs compared to 5.3% of control children (OR=6.1).	53
<i>Radiator repair</i>	Lead carried home by workers who did soldering to repair radiator.	E	The mean BLL for 18 children (under 7 years) of lead-exposed workers was 10 µg/dL.	42, 34

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
Imported Cosmetics				
<i>Kohl (Middle East, India, Pakistan, some parts of Africa)</i>	A gray or black eye cosmetic applied to the conjunctival margins of the eyes. Can contain up to 83% lead. It is believed to strengthen and protect the eyes against disease. Also known as Al Kohl.	E	A study of 538 girls aged 6 to 12 years demonstrated that the application of kohl was associated with higher BLLs ($p=0.0461$).	3, 37
<i>Pakistani eye cosmetics</i>	Eye cosmetics are often applied to the eyes of children.	E	Retrospective chart review of 175 children aged 8 months to 6 years showed an average BLL of 4.3 $\mu\text{g}/\text{dL}$ for Pakistani/Indian children not using eye cosmetics and 12.9 $\mu\text{g}/\text{dL}$ for those using eye cosmetics ($p=0.03$).	50, 52
<i>Surma (India)</i>	A black fine powder applied to the eyes for medicinal and cosmetic reasons.	E	A case-control study of 62 children demonstrated higher BLLs in children using surma ($p<.001$).	2, 15
Contaminated Foods				
<i>Apple cider</i>	Cider was made in a maple syrup evaporator that had lead solder joining the interior seams.	CR	Report of a 7-year-old child.	8
<i>Flour (Middle East)</i>	Lead fillings used in stone mills contaminated flour.	E	Investigation of 43 symptomatic patients aged zero to 80 years and their families and of 563 children aged 10 to 18 years demonstrated that 33 (23%) of 146 community stone mills had lead contamination and that 171 (30.4%) of 563 children had BLLs exceeding 30 $\mu\text{g}/\text{dL}$.	25

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
<i>Lozeena</i>	An orange powder used to color rice and meat that contains 7.8%-8.9% lead.	CR	Report of brothers aged 2 and 3 years and their parents. In addition, 9 of 18 extended family members had EBLLs.	15
<i>Infant formula</i>	Infant formula was made with contaminated tap water from copper pipes with lead solder.	CR	Report (with environmental sampling data) of a 13-month-old child.	46, 47
<i>Tamarind candy (Mexico)</i>	Tamarind candy jam products from Mexico. During the manufacturing process, the candied jam is packaged in stoneware or terra cotta ceramic jars that can leach lead.	CR	Report of two children under 6 years old, six older children, and one adult.	14
Beverage Containers				
<i>Bulk-water storage tank</i>	Lead leached from soldered seams and brass fittings in bulk-water storage tanks.	CR	Report of three children aged 6, 12, and 14 months.	11
<i>Ceramic glaze</i>	Lead in ceramic glaze can leach into stored beverages, especially juices since they are acidic. The risk is highest for improperly fired containers.	CR	Multiple reports.	7, 12, 49
<i>Cocktail glass</i>	Lead leached from cocktail glass.	CR	Report of a family with one adult and children aged 4, 5, and 14 years.	22
<i>Iranian urn (samovar)</i>	Lead spot solder from the original manufacturing process leached into water used to make baby formula.	CR	Reports of a 10-week-old child with seizures and of a 4-month-old child.	33, 48

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
<i>Lead-soldered kettle</i>	Lead leached into infant formulas.	CR	Reports of a 3-month-old child and of a 1-day-old child.	40
Folk Remedies				
<i>Azarcon</i>	Also known as alarcon, coral, luiga, maria luisa , or rueda . Bright orange powder used to treat empacho (an illness believed to be caused by something stuck in the gastrointestinal tract, resulting in diarrhea and vomiting). Azarcon is 95% lead.	E	Report of 15-month-old and 3-year-old siblings who expired with seizures and a subsequent survey of 545 systematically selected households for azarcon and greta usage.	16, 15, 18, 4, 51
<i>Ayurvedic medicine (Tibet)</i>	Unnamed traditional medicine.	CR	Single case.	15
<i>Ba-Baw-San (China)</i>	Herbal medicine used to treat colic pain or to pacify young children.	E	Study of 319 children aged 1 to 7 years demonstrated that consumption was associated with increased BLLs ($p=.038$).	21
<i>Bint Al Zahab (Iran)</i>	Rock ground into a powder and mixed with honey and butter given to newborn babies for colic and early passage of meconium after birth.	CR	Report of six children aged 2 days to 3 months.	44
<i>Bint Dahab (Saudi Arabia; means "daughter of gold")</i>	A yellow lead oxide used by local jewelers and as a home remedy.	CR	Report of 10 children aged 7 days to 13 months, including three who took bint dahab.	35

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
<i>Bokhoor (Kuwait)</i>	A traditional practice of burning wood and lead sulphide to produce pleasant fumes to calm infants.	CR	Report of four children aged 16 days to 4.5 months.	27
<i>Ghasard</i>	Brown powder used as a tonic to aid in digestion.	CR	Report of a 9-month-old child who died.	17
<i>Greta (Mexico)</i>	Yellow powder used to treat empacho (see azarcon); can be obtained through pottery suppliers, as it is also used as a glaze for low-fired ceramics. Greta is 97% lead.	E	See azarcon.	4, 16, 18, 51
<i>Jin Bu Huan (China)</i>	An herbal medicine used to relieve pain.	CR	Report of three children aged 13 and 23 months and 2.5 years.	10
<i>Pay-loo-ah (Vietnam)</i>	A red powder given to children to cure fever or rash.	CR	Report of a 6-month-old child.	13, 15
<i>Po Ying Tan (China)</i>	An herbal medicine used to treat minor ailments in children.	CR	Report of a 4-month-old child.	20
<i>Santrinj (Saudi Arabia)</i>	An amorphous red powder containing 98% lead oxide used principally as a primer for paint for metallic surfaces, but also as a home remedy for “gum boils” and “teething.”	CR	Report of 10 children aged 7 days to 13 months, including 7 who took santrinj.	35
<i>Surma (India)</i>	Black powder used as a cosmetic and as teething powder.	E	A case-control study of 62 children demonstrated higher BLLs in children using surma (p<.001).	2, 15
<i>Tibetan herbal vitamin</i>	Used to strengthen the brain.	CR	Report of a 5-year-old child.	38

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
<i>Traditional Saudi medicine</i>	Orange powder prescribed by a traditional medicine practitioner for teething; also has an antidiarrheal effect.	CR	Report of three children aged 11, 22, and 44 months.	1
Miscellaneous				
<i>Automobile key-chain emblem</i>	Ingestion of lead-containing automobile key-chain emblem.	CR	Report of a 23-month-old child.	5
<i>Clothing accessory</i>	Ingestion of a "simulated watch."	CR	Report of 3-year-old child who required endoscopy.	26
<i>Curtain weights</i>	Ingestion of lead-containing curtain weights.	CR	Report of deaths of a 23-month-old child and a 2-year-old child.	30, 6
<i>Fishing sinkers</i>	Ingestion of a lead-containing fishing sinker.	CR	Report of an 8-year-old.	39
<i>Gasoline sniffing</i>	Lead in gasoline absorbed through gasoline sniffing.	CR	Report of six of seven siblings aged 10 to 17 years.	9, 24
<i>Lead bullet</i>	Lead absorbed from a retained bullet.	CR	Report of one adult and review of 18 other cases including seven children under 2 years old.	23, 32
<i>Lead pellets</i>	Ingestion of lead pellets from pellet gun.	CR	Report of a 6-year-old child.	45
<i>Lead shot and toy (boat keel)</i>	Lead shot used in a toy boat keel that was eaten by a child.	CR	Report of a 4-year-old child.	28
<i>Newsprint fireplace log</i>	Lead inhaled during burning of a log made from old newsprint.	CR	Report of a 6-month-old child.	43

Exposure Source	Description/Exposure Pathway	Study Type*	Study Description	Ref. #
<i>Pool cue chalk</i>	Lead contained in pool cue chalk.	CR	Report of two children aged 28 and 27 months.	36
<i>Vinyl miniblinds</i>	Lead dust from vinyl miniblinds.	E	A study of 92 children aged 6 to 72 months attributed 9% of lead poisoning cases to vinyl miniblind exposure.	41

*CR = case report, E = epidemiological study