

HISTORY OF LEAD USE



Significant production of lead began about 3000 BC, and large mines in Spain and Greece contributed to the global atmospheric redistribution of lead. The Roman Empire was the first society to use lead widely; in fact, the word plumbing is derived from *plumbum*, Latin for lead, which also gave rise to the chemical symbol for lead, Pb. Lead is slightly sweet to taste, making it a good additive for fine Roman wine that was then shipped all over Europe. Even in those times, there were reports that lead caused severe colic, anemia, and gout. Some historians believe that lead poisoning hastened the fall of the Roman Empire. (Photo: lead pipe in Roman baths.)

Lead in Paint

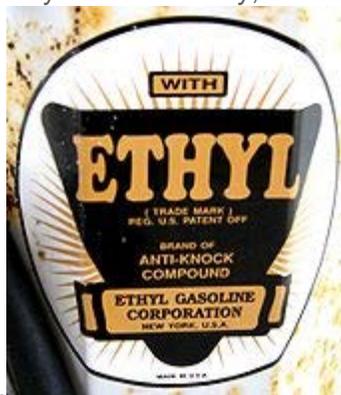
In more modern times, the durability of lead made it an excellent paint additive, but the sweetness made it tempting to young children. Childhood lead poisoning was linked to lead-based paints in 1904. Several European countries banned the use of interior lead-based paints in 1909. At one time baby cribs were painted with lead-based paint, which resulted in infant illness and death. In 1922, the League of Nations banned lead-based paint but the United States declined to adopt this rule. In 1943, a report concluded that children eating lead paint chips could suffer from neurological disorders including behavior, learning, and intelligence problems. Finally, in 1971, lead-based house paint was phased out in the United States with the passage of the Lead-Based Paint Poisoning Prevention Act.

Homes built prior to 1978 may have lead-based paint either inside or outside, and homes and apartments built prior to 1950 are very likely to have lead-based paint both inside and outside and should be inspected carefully. This is a particularly serious problem for children living in older housing in large cities. A CDC report found that 35% of African-American children living in inner cities with more than 1 million people had blood lead levels greater than 10 µg/dL, which is the CDC action level established in 1991. In the 1990s, the [EPA](#) required that information on lead be disclosed when a home or apartment is sold or rented. In addition, specific training is required for workers removing lead from homes or apartments. Lead-based paint continues to remain a serious problem for many children. The history of the use of lead-based paint is summarized in the table below.

Year	Event
1887	US medical authorities diagnose childhood lead poisoning
1904	Child lead poisoning linked to lead-based paints
1909	France, Belgium and Austria ban white-lead interior paint
1914	Pediatric lead-paint poisoning death from eating crib paint is described
1921	National Lead Company admits lead is a poison
1922	League of Nations bans white-lead interior paint; US declines to adopt
1943	Report concludes eating lead paint chips causes physical and neurological disorders, behavior, learning and intelligence problems in children
1971	Lead-Based Paint Poisoning Prevention Act passed
1978	Lead-based house paint banned

Lead in Gasoline

The addition of lead to gasoline is one of the greatest public health failures of the 20th century. Tetraethyl lead (TEL) was discovered in 1854 by a German chemist and in 1921, [Thomas Midgley](#) of the US found that it reduces engine knock. This was a period of tremendous competition in the automobile industry and of growth in the oil, gas, and chemical industries in the United States. A year later the US Public Health Service issued a warning about the potential hazards associated with lead. In 1923 the Du Pont Corporation began the first large-scale production of TEL and the first workers died from lead exposure. The same year, leaded gasoline went on sale in selected regions of the country. During this period Du Pont acquired a 35% ownership of General Motors, and General Motors and Standard Oil formed a joint company, Ethyl Corporation, to produce TEL. In 1924 five workers died from lead poisoning at the Ethyl facility in New Jersey, although the total number of workers affected by lead exposure



is unknown.

In 1925 sales of TEL were suspended while the U.S. Surgeon General reviewed the safety of TEL. The next year, a committee approved the use of TEL in gasoline and sales were immediately resumed. By 1936, 90% of the gasoline sold in the U.S. contained lead, and the Ethyl Corporation was expanding sales in Europe. In the early 1950s the U.S. Justice Department investigated anticompetitive activities associated with Du Pont, General Motors, Standard Oil, and Ethyl Corporation. Environmental concerns were highlighted in a 1965 report documenting that high levels of lead in the environment were caused by human use of lead. In 1972 the U.S. EPA gave notice of an intended phase-out of lead in gasoline and was promptly sued by the Ethyl Corporation. Four years later the EPA standards were upheld in court and in 1980 the National Academy of Sciences reported that leaded gasoline was the greatest source of environmental lead contamination. In 1979, the effects of lead on the intellectual development of children were documented in a seminal paper written by Herbert Needleman and others. (Photo: Sign on an antique gasoline pump advertising tetraethyl lead by the Ethyl Corporation.)

The fight over phasing out leaded gasoline was far from over when, in 1981, then Vice President George Bush's task force proposed to relax or eliminate the lead phase-out program.

The relationship between leaded gasoline and blood lead levels was demonstrated when the EPA reported that blood lead levels declined by 37% in association with a 50% drop in the use of leaded gasoline between 1976 and 1980. Subsequent studies showed a correlation between the increase in gasoline use during the summer and a rise in blood lead levels. By 1986 the primary phase-out of lead from gasoline was completed but in some areas of the country, such as Washington State, leaded gasoline was available until 1991. The World Bank called for a ban on leaded gasoline in 1996 and the European Union banned leaded gasoline in 2000.

It is estimated that 7 million tons of lead were released into the atmosphere from gasoline in the United States alone.

Occupational Exposures



Occupational exposure to lead has decreased from the overt cases of death and disability in the 1930s and 1940s, but, as case studies illustrate, it continues to occur. In the past, painters using lead-based paints suffered from health problems such as wrist and foot drop or as Ben Franklin reported, the "dangles." Lead paint removal from bridges and buildings is now regulated. Radiator repair and battery recycling continue to be sources of lead exposure. Battery recycling facilities in less-developed countries are a serious source of worker lead exposure and environmental contamination. Public safety officials that train at shooting ranges using lead ammunition may be exposed to elevated levels of lead. Occupational exposure is a potential hazard not only to the adults but also to their children as the lead may be brought home on clothing. (Photo: worker ladling molten recycled lead into billets in a lead-acid battery recovery facility. Photo from [NIOSH photostream](#).)

Other Uses: Hobby Supplies, Solder, Children's Products, PVC Plastic, and More

Home hobbies or businesses can also be a source of lead exposure. Lead is commonly used in painting and soldering and in making stained glass, jewelry, pottery, ammunition, or fishing sinkers. Exposure can also occur from stripping lead-based paint from furniture or wood work. Lead-glazed pottery has caused a number lead poisonings, particularly when high-acid foods, which leach lead from the glaze, are consumed from the pottery.

At one time canned foods were a significant source of lead because of poor-quality solder joints in the cans. High-acid foods, such as tomatoes, would leach lead from the cans. Finally, contamination of drinking water with lead occurs primarily from the use of lead solder joints or old fixtures, and occasionally, from the use of lead pipes. As with many metals, lead was used in a number of health remedies, some of which are still available and used by some ethnic groups.

Lead continues to show up in a range of products, many destined to be used by children. Because lead is cheap and easy to use it is found in jewelry and other trinkets. These products are used and handled by children, resulting in additional lead exposure. Lead is used as a stabilizer for [PVC](#) plastics and has been found in mini-blinds for windows and in school lunch boxes. Cosmetics such as lipstick were discovered to be contaminated with lead. Recently lead-based paint has been found on children's toys. Even candy and candy wrappers have been found to be contaminated with lead. State and national laws have been enacted to ban what seems to be obvious: the sale of children's products that contain lead.

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