



## The Environmental Toxin called Lead Paint - Part I

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We are all aware of liability suits being pursued in class action lawsuits such as asbestos, silicone breast implants, tobacco and Baychol. According to some legal experts, lead paint is the next big wave in lawsuits to take front seat in environmental toxins. Since the late 1980's, a correlation between lead paint and cognitive dysfunction in children started to show in medical literature. Many landlords of both commercial and residential housing constructed before late 1970's, are being taken to the court due to claims children have developed decreased cognitive abilities from lead poisoning. Multimillion-dollar awards have been awarded in Maryland, New York, Pennsylvania, Michigan, Kentucky and other states in the Northeast part of the United States. Some cases have been documented in California.

### History of Lead

In order to understand lead poisoning, one needs to understand the history of lead. There are many famous people who have been "lead poisoned", however, as one learns about lead poisoning, the litigator (whether plaintiff or defense) must understand where lead started.

Lead has been associated since BC times. The earliest recorded lead mines was in Turkey in 6500 B.C. In 250 B.C. Nikander of Colophon, a Greek philosopher described some of lead poisonings typical symptoms of abdominal colic and pallor. Early societies such as the Roman Empire noted chronic lead poisonings because of its use in cooking pots (transfers heat evenly) and use of water supply lines. Egyptians made jewelry from lead and Japan's gusha women used lead-based powder to whiten their faces. In the 18th and 19th centuries, port and wine caused people to suffer lead's toxic effects. Due to use of preservative and bottling practices, beverages contained from 300 to 900 mg per liter. A famous composer, Beethoven, had elevated levels of lead he ingested. At his autopsy he was determined to suffer from undiagnosed kidney disease. He supposedly suffered from chronic diarrhea, irritable bowel syndrome, cirrhosis of the liver, chronic pancreatitis and asthma. It is speculated his hearing loss is due to lead toxicity. Medical literature has since linked the two together. These are just a few examples of people who had lead poisoning.

But let's jump back to the 20th century. Lead is not specific to the United States but can be found in Europe and other parts of the world. At the beginning of the century, in 1904, physicians in Australia were baffled by a disease they called "Toxicity of Habilitation". Children developed stomachaches and cramps, paralysis, limb pain, seizures and even died. A physician at Brisbane Hospital for Sick Children was able to determine the source. It was a sweet-tasting, white powder that was chalking off houses and other buildings. The white lead was an important paint ingredient. Do you remember the "Dutch Boy"? Well, it was a Dutch process of producing white lead, made in Holland. White lead is a substance called lead carbonate. The paint's quality was determined by the amount of white lead in the paint. The white lead paint could be tinted, just like we do today.

By 1920, there was a world wide movement to ban the use of lead paint. According to Holt's Diseases of Infancy and Childhood (8th Edition) reported on eight cases "caused by child nibbling & swallowing the paint from furniture", including baby cribs. Several years later, it became known there was a relationship between lead paint and pica. Pica is described as children putting anything in their mouths during the late infant and toddler stages. This includes toys, food, hands/fingers, clothing, soil and many other sources of lead ingestion.

During the 1940's, the United States Office of Education and Lead Industries Association (LIA) joined forces and recommended white lead paint for farm buildings and interior surfaces of residential buildings. Harvard University School of Public Health even cosponsored a symposium with LIA. As a result the death rate from lead poisoning rose.

In 1977, Congress passed the Lead-Based Poisoning Prevention Act restricting use of lead paint. Be aware some paints are not covered by this Act. These include: marine, farm equipment, automobile paints and industrial finishes. They still contain lead.

## **Where is the Lead Found?**

Generally any residential buildings built before 1976. Tap water is a potential source due to the lead solder used to put copper pipes together. Other sources include furniture, canned foods, perfume, makeup, dishes, leaded gasoline and many more sources as those mentioned above.

Housing lead paint is typically found on woodwork around doors and windows, especially inside the windowsill. It appears like an "alligator" pattern. Public health departments use x-ray devices to measure lead paint. Housing sites are measured by the use of an apparatus called the XRF gun. The drawback with this device is the device not only measures the outer most layer of paint for lead, but also measures the substrate layers (those under the outside coat). This could produce a false positive reading. There are very specific guidelines in using this device and the person needs to have been trained on the device. Also there are required calibrations that need to be done, in a sequence of the readings otherwise the test could be deemed invalid.

## **Basic Facts about Lead Poisoning**

Although we raise children in homes and yards, lead still is a major contaminant. According to the Environmental Protection Agency (EPA) reported approximately one in ten preschool children have unacceptable blood levels of lead. The EPA also indicates even low levels of lead can block an infant's mental development. Small children spend most of their time in residential buildings or outside playing. Children can absorb up to 50% of the lead they ingest. This occurs during the time from birth to approximately five years of age when the central nervous system and brain are developing. During this time, the brain is affected by changes in cognition deficiencies, lower IQ, motor deficiencies, Attention Deficit Hyperactivity Disorder (ADHD) and Attention Deficit Disorder (ADD). Some literature reports severe cases may cause violent tendencies and children who are so severely damaged, they will be unable to be employed in nonskilled labor settings.

Unfortunately no one is immune to lead paint intoxication. Although it is not class specific, increased rates are generally seen in the lower socioeconomic income levels, especially inner city children. Studies have been done on various socioeconomic groups with findings greatest in the middle to higher class children. Lead poisoning is thought of as affecting urban areas but some parents of the country are finding increased levels in rural areas.

Children who are at the greatest risk are those who are between nine months to five years of age. Children who do not receive enough iron, develop iron deficiency anemia and tend to be at a higher risk. This is due to the chemical effects of lead mimicking calcium. The Women, Infants and Children (WIC) program offers lower socioeconomic families' incentives to provide increased calcium products. They will screen for lead poisoning and iron deficiency anemia. With the anticipation rise in cost of dairy products due to supply and demand principles, it is very possible there may be an increase in blood lead levels because families will not be able to purchase the dairy products especially those in the lower socioeconomic income levels.

## **What are the Characteristics?**

Lead is invisible, sweet tasting and odorless. Studies show long term consumption of low levels may be more hazardous than a single ingestion. As the Lead Poisoning Prevention Act became more known, the average blood lead levels (BLL) have decreased. Changes have occurred due to the ban on paint and in gasoline, but also with the food industry stopping use of lead-soldered cans. The average blood lead level was 17 mcg/deciliters (dl) in 1976 and now averages range approximately 4 mcg/dl.

## **How Early Childhood Development is affected by Lead?**

During the first six months of life, a child's blood lead level remains relatively constant. This corresponds to a child who is just starting to talk, crawl and sit up. From six to twenty-four months, there is generally a sharp increase. Children are beginning to eat using their hands and progressing to table utensils, talking, walking, learning to stand and grabbing onto objects such as windowsills.

A known pioneer in the field, Dr. Julian Chisholm, from the Kennedy Krieger Institute in Baltimore indicated the best judge of how well a child will perform on standardized tests at age ten will be the child's blood lead level at twenty-four months. His studies show that during the second year, the human brain reorganizes itself. The brain is developing new nerve connections called synapses. It is these synapse or nerve pathways, which sends messages intermittently. Lead interferes with the synapse.

During this time period, a child's physical behavior also includes developing gums and teeth, increased hand to mouth activity all lead to increased lead ingestion. During these developmental milestones, infants can pick up lead dust from the floor, toys, pets, dishes, soil and many other sources, and then puts the objects in their mouths. Children often eat with their hands and suck their thumbs.

So if lead poisoning causes physical changes then how does the brain react when lead is absorbed in the body? Studies have found a reduced intelligence as demonstrated in lower IQ levels. Literature reports for every 10 mcg/dl rise, there is an approximate one to three points decrease in IQ scores. Some other studies report a decrease of four to six points decrease in IQ scores for every 10 mcg/dl. Other medical research indicates reading and learning disabilities leading to failure to graduate from high school and to criminal and violent behaviors are associated with lead toxicity.

Both parents and educators have reported students with increased blood lead levels demonstrate behavioral problems including Attention Deficit Disorder. and Attention Deficit Hyperactivity Disorder. Lead can be associated with physical effects including low birth weight and size (associated with prenatal care), hearing loss, generally with inability to hear high frequencies; frequent ear infections called otitis media and delayed physical development as demonstrated by developmental milestones including talking, walking and standing.

## **How is Lead Measured?**

Lead is measured by several methods. Most social services programs administered by the state's Department of Health, issue funds for programs like WIC, test children for blood lead levels and iron deficiency anemia. When a blood level is done, it may be done either by a venous sample or by a capillary sample. The venous sample is the most accurate and is usually sent to a specific laboratory. Testing may be done by a pediatrician or through pediatric health clinics. The finger stick may have a false positive reading unless he finger is prepped accordingly.

The Center for Disease Control (CDC) has gradually lowered the toxic level. In the mid 1960's, the toxic level was 60 mcg/dl. In 1978, the CDC lowered the toxic level to 30 mcg/dl. In 1985

the level was reduced to 25 mcg/dl and by 1991, the level was lowered to 10 mcg/dl, which is the level currently accepted. The CDC considers any reading between 10- 25 mcg/dl as being borderline toxicity. In this range, there are usually no symptoms. When levels over 25 to 60 mcg/dl occur, some physical symptoms, nausea, stomach cramps, headaches, weakness usually lead to some brain damage. Some behavioral changes may be tired, cranky, and clumsy or have a lost interest in play. Since young toddlers are unable to verbalize their complaints, a diagnosis of lead poisoning may be difficult.

## Diagnosis

Common symptoms include headaches, cramps, poor appetite, crankiness, clumsiness, constipation, stomachaches, vomiting, sleep disorders, fatigue, lethargy, anorexia and no interest in play. Depending on the severity of symptoms and the level of the blood results, the CDC has developed a five level classification system. This can be found on the CDC's web site.

## Treatment of Lead Poisoning

The method of treatment is called chelation. Usually the treatment can take up to 30 days. During this time, the blood lead levels can fluctuate like a roller coaster. During the treatment, lead is released from the bone into the blood stream until it is excreted via the kidneys. Once chelation therapy is completed, the CDC recommends retesting in one to three weeks to determine if retreatment is necessary.

The most popular agents used in chelation are Cuprimine (D-penicillamine) which is an oral agent. Another oral agent is Succimer (Chemet) and recommended for blood lead levels over 45 mcg/dl. An intramuscular agent, BAL in Oil (Dimucaprol) must be used with caution due to the peanut oil base. Finally, there is the intravenous agent, Calcium Disodium Versenate (Edelate Disodium Calcium).

## Conclusion

Lead poisoning has been around for thousands of years. Many efforts have been made in the last century to reduce lead levels. Generally, most children have elevated lead levels but some children have a much greater blood lead level than others. Some confounding variables which could cause elevated blood lead levels include poor iron intake and a lower socioeconomic income level. The ground may still contain lead contaminated lead dust associated with poorly managed lead abatement procedures. Efforts have been made in making lead screening a mandatory test for infants and toddlers already. Programs such as WIC perform screening. Other screening measures include prompts on nursing assessment sheets in the emergency room. Another problem could be the procedure of blood lead testing i.e. fingerstick and /or venous samples. If not done properly, a false positive test could be generated. A referral for the residential testing using an XRF device may also yield false positive readings if not done properly. All of these factors can impact the litigation and trial outcome.

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In part two, the litigation process will be discussed. This includes discovery, motions, neuropsychological reports and the trial process.

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