

Lead: An accomplice to Crime

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Children Exposed to Lead

The EPA concluded that children ages 1-5 years of age are the most critically sensitive population to lead exposure (5). The *maximum* safe blood lead level for individual children is said to be 30 ug/dl and 3-4 million children are estimated to have blood lead levels of about 15 ug/dl. Early lead exposure is universally agreed to be the cause of a 5-10 point drop in IQ levels. This is correlated with learning disabilities and hyperactivity (3).



Children are vulnerable

Children have a lower threshold for adverse physiological effects due to lead poisoning. They have the potential for a greater intake of lead per unit of body weight as well as a greater physiological sensitivity due to rapid growth. The absorption rate of lead in children is 30% higher than that of a full grown adult because children have an incomplete metabolic defense system. In addition, it is not only their defense system that is developing, but all of the systems of the body. Their focus on growth causes them to be more susceptible to lead poisoning (5) (6).

From lead to Crime

There are side effects to lead poisoning that affect a child's education. Decreased IQ and attention span being a few. As a result, lead hurts a child's ability to succeed in school and could damage their development of self-esteem and self-worth. These negative feelings, combined with low levels of serotonin caused by the lead exposure (discussed in the Biology section), can lead to depression, irritability, and frustration. The frustration that comes from depression and the other negative feelings that are consequences of childhood lead exposure can only be seen as enhancers to crime rates. Furthermore, these emotions could then guide children into an adulthood where they have social issues including trouble keeping a job, which for some people could be another reason to become active in crime.

Toxicity

Chronic toxicity refers to health problems resulting from excessive accumulations of lead. Children (with blood lead levels of 15-30 ug/dl) usually have no obvious signs of lead poisoning, but over time they can develop a lot of negative effects. Subtle behavior changes, irritability, sleep disturbance, hyperactivity, a shortened attention span, hearing impairment, and a lowering of IQ are some of these problems (5).

Biological Evidence

Lead poisoning poses a lot of signs that can be seen by others such as wrist drop and Burton's blue lines. It also produces a lot of symptoms such as hallucinations, colic, and fatigue. These are easily seen effects of lead poisoning that can be identified clearly as soon as they take effect. There are, however, other aspects of a healthy body that are being affected by the foreign invader lead when it enters the biological system.

Where does lead go? What does lead do to the brain?

Lead goes into the body via the mouth to be ingested, the lungs, or through the skin. Once it is in the body it makes its way to the blood stream where it latches on to the red blood cells and uses them as a taxi service to travel through the body. Lead finds its way into the soft organs of the body and the bones. For adults, 90% of the lead that is actually taken up by the blood stream settles in the bones where it is mistaken for calcium. Lead poisoning in children tends to cause more problems because only 70% of the lead taken up by their bodies is stored in their bones (5). The other 30% affects soft tissues such as the heart and kidneys but really causes problems in the brain. Lead poisoning causes effects in the frontal cortex the most. This area is crucial to decision making and extensive thought processes. Children are a greater risk because they absorb 40% of the lead that enters their body while adult's bodies only absorb about 10% (5).



Therefore, lead intake into the body makes its way via the blood stream to organs including the brain. Through a system of events it causes the decrease in serotonin, which causes a decrease in mood quality, more anger, and increase of risky behavior: characteristics associated with criminals.

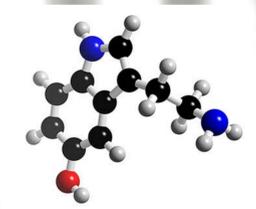
Lead is a Guilty Party

In conclusion, lead exposure to children has definite biological consequences. Some of these consequences take a toll on critical parts of the brain that control decision making and monitor mood regulation. By negatively affecting these areas, lead can cause an increase in aggression and poor decision making that results in criminal behavior. Lead poisoning has been found to be linked to crime and there is biological evidence to prove its correlation.

Studies

Lead exposed children have higher arrest rates

Two studies that were published May 27, 2008 in the Journal Public Library show that there was a smaller brain size and a greater tendency for adult criminal behavior in those people exposed to lead either prenatal or during early childhood. Of the studies, conducted by Dr. Kim Dietrich, one of them concluded that in children who had a spike in lead levels of 5 micrograms per dl at age 6 had a 50% increased risk of getting arrested in adulthood. It was also shown that there was a loss in brain volume due to high lead levels and that most of the loss was found to be from the frontal cortex. The frontal cortex is the area in the brain used for cognition and decision making. It must be known that throughout these studies factors such as socioeconomic status, mother's level of education, and use of drugs and alcohol were taken into consideration. Only children from the same neighborhoods who had educated parents and no known medical condition such as mental retardation were used in the studies (1).



Serotonin and Aggression

A study was done on the link between serotonin levels and the aggression that causes criminal behavior. It was discovered that the higher the serotonin levels were, the less violent men were, and therefore, the less likely they were to be commit a violent crime by the age of 21. There were 781 participants in this study done by Terrie Moffitt and colleagues in 1998, and they found that those men who were .56 standard deviations above the normal serotonin levels were the men who were the least violent (8). This is proof that higher serotonin levels are indeed connected to less aggressive people. It is described in the biology section how elevated lead levels lower the amount of serotonin in the brain and therefore produce more aggressive and impulsive people.

Serotonin relates to crime

During the 1980's evidence relating lead to violence mounted. Research began to show that prisoners with low serotonin levels have more frequent aggressive behavior in prison and had committed more violent crimes. The low serotonin levels cause them to act without thinking about the consequences of their actions and they do things such as set fires impulsively (10). In addition, a 1996 article in the Journal of American Medical Association demonstrated that lead is associated with aggression and delinquency in boys (10).