

The Mid-Atlantic Center for Children's Health & the Environment

A Pediatric Environmental Health Specialty Unit

Affiliated with the George Washington University School of Public Health & Health Services
and the
Children's National Medical Center

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Testimony of
Jerome A. Paulson, MD
before the City Council of Washington DC
on the matter of
The Lead Hazard Prevention and Elimination Act of 2008
(B17-0936)
1 October 2008.

Councilmember Graham and other members of the Washington, DC City Council: Thank you for the opportunity to present this testimony today. I am Jerome A. Paulson, MD, a pediatrician, a Fellow of the American Academy of Pediatrics, and one of the Co-Directors of the Mid-Atlantic Center for Children's Health & the Environment (MACCHE). I am an Associate Professor of Pediatrics at the George Washington University School of Medicine & Health Sciences, an Associate Professor of Prevention & Community Health and Research Associate Professor of Environmental & Occupational Health at the GW School of Public Health & Health Services. I serve on the American Academy of Pediatrics Committee on Environmental Health and the Children's Health Protection Advisory Committee for the US Environmental Protection Agency. I was a recipient of a Soros Advocacy Fellowship for Physicians from the Open Society Institute and worked with the Children's Environmental Health Network, and have also served as a special assistant to the director of the National Center on Environmental Health of the CDC working on children's environmental health issues. I was the editor of the October, 2001 and the February and April 2007 editions of Pediatric Clinics of North America on children's environmental health. I have served on numerous boards and committees related to children's environmental health.

The Mid-Atlantic Center for Children's Health and the Environment is one of ten Pediatric Environmental Health Specialty Units in the US and we are based at the George Washington University School of Public Health and Health Services and the Children's National Medical Center. MACCHE, which serves the District of Columbia and the five states in the Mid-Atlantic region, has two goals: 1) educating health professionals and others about the scientific and medical aspects of environmental health problems effecting children, and 2) providing advice to physicians, nurses, public health officials, parents, school professionals and others about children who have been, or may have been, exposed to environmental health hazards.

Because the Lead Hazard Prevention and Elimination Act of 2008 creates a primary prevention approach to the problem of lead poisoning in the District of Columbia, the Mid-Atlantic Center for Children's Health & the Environment fully supports this legislation.

Lead Toxicity

People are exposed to lead through the direct ingestion or inhalation of lead, lead-based paint flakes and dust and through the ingestion of contaminated food or water. For children, the most common exposure pathway is the oral consumption of lead-based paint chips or dust. When lead enters the body, either via the lungs or the gastrointestinal tract, it moves into the blood stream and then to the rest of the body.

It is important to recognize that lead is toxic to individuals of all ages; however, lead is more toxic to children than to adults. Lead that gets from the mother into the fetus can interfere with normal development. Also, the brain is not "finished" its development at the time of birth. In fact, brain development continues rapidly during the first three to four years of life and more slowly for a decade or longer. It is for this reason that the ingestion of lead during this time has such a great potential to do serious and permanent damage to the central nervous system. The manifestations of the toxicity vary with the age of the individual at the time of exposure, the amount of lead that one is exposed to and the length of time that the exposure continues.

If the brain is to be normal, cells in the developing brain, from the embryonic stage onward, must

1. create new nerve cells,
2. move from one place to another within the developing brain,
3. develop connections between one another, called synapse formation,
4. develop a covering, called a myelin sheath, and
5. be able to send chemical signals from one cell to another.
6. In addition, the brain must become sequestered from certain substances in the blood by the development of the blood-brain barrier.

There are studies in animals and in cell culture that show results that correlate with the brain damage experienced by some children when exposed to lead. In various laboratory models or animal models lead has been shown to:

1. increase cell death by several mechanisms,
2. impair the development and functions of cells which support the neurons (oligodendrocytes) – this interferes with cellular movement
3. cause abnormal neurotrophic factor expression (chemicals which tell cells where and when to move from one place to another),
4. cause abnormal dendritic branching patterns – which interferes with synapse formation,
5. cause abnormal myelin formation,
6. change the metabolism of messenger and signaling chemicals internal and external to neurons, and
7. disrupt the blood-brain barrier.

While these abnormalities have not been demonstrated in human brains, it is very likely that these are among the abnormalities that lead to the brain damage seen in children with lead poisoning.

In addition, because lead is chemically similar to the ubiquitous and extremely important chemical calcium, it replaces calcium in various bodily processes. Lead then exerts its toxic effects by inactivating crucial enzymes and so halting biochemical pathways essential to normal functioning. The enzymes most sensitive to the effects of lead are in the organ system where we most commonly see symptoms of lead poisoning: the brain. Other organ systems are also at risk from lead toxicity due to enzyme inhibition and impaired iron uptake and processing. These systems include the kidneys, the auditory system, the reproductive system, and red blood cell production.

Blood lead levels above 80 mcg/dL have been associated with coma, convulsions and death. Intermediate blood lead levels are also associated with significant health effects. Research by Lanphear, Canfield and others also indicates that even children with blood levels below 10 mcg/dL, the level of concern as defined by the US Centers for Disease Control and Prevention sustain a small loss of IQ points. In addition, it is very important to note that many children with elevated lead levels develop attention deficits, language problems, reading difficulties and other learning problems as a result of their exposure to lead. Some children have hearing deficits, short stature, and/or significant behavior problems as a result of their exposure to lead. The behavior problems may be severe enough to result in involvement with the juvenile justice system. These problems may have a greater impact on long-term outcome than the IQ loss.

Measurable central nervous system injury from lead poisoning does not occur in every instance of exposure. However, if it occurs, it is irreversible. There is no approved medical treatment for children with blood lead levels below 45 mcg/dL. Some of the lead will be stored in the body and some will be slowly excreted, but there is no medication or other intervention that will safely remove the lead from the body or reverse any damage that might have been done.

There is a lot of discussion about the loss of IQ points among children who are exposed to lead. While the magnitude of IQ lost for any given child might not be significant, the change in the distribution of IQ for a community is highly significant. It impacts adversely on the school system and it impacts adversely on the economic potential of the community. For example, for most children the loss of even 4-5 IQ points might not be noticeable. However, the “average IQ” in society is, by definition, 100. With an average of 100, 4% of individuals will have an IQ less than 80 and 4% will have an IQ greater than 125. If, as a result of exposure to lead in some members of the community, the “average IQ” now becomes 95, the community now needs to deal with about 16% of the population with an IQ of less than 80 and also have virtually no individuals with an IQ greater than 125. Individuals with IQs less than 80 struggle in school and markedly increase school costs. Individuals with IQs less than 80 cannot get the intellectually demanding, high-paying jobs so important to a vibrant economy. Moreover, without individuals with IQs greater than 125, the community struggles without its brilliant painters, business leaders, dancers, community and religious leaders, physicians, educators and others who are so important to creating a flourishing community.

Childhood lead poisoning is also associated with adult disease – high blood pressure, myocardial infarctions, and strokes.

Primary Prevention

The most likely source of lead exposure for children is lead-based paint in their dwelling. Lead can also come from water, toys, pottery and other sources. As we know, in the District of Columbia, there are water pipes made of lead in certain parts of the city. If the District of Columbia is serious about ending the problem of lead poisoning in its children, then it must deal with the issue of lead in paint; and lead water pipes need to be removed in a systematic and safe fashion.

The indoor use of lead paint was banned in many countries in the early decades of the 20th century. Unfortunately, that was not the case here in the US; and we are now stuck with dealing with that legacy.

Around their first birthday, children start to crawl and then to walk. Normal children of that age put their hands and anything in their hands in their mouths. Therefore, these children are the most likely to come into contact with lead-based paint that has flaked off of walls or with dust from deteriorating lead-based paint. The dust from deteriorating paint is unavoidable, sticks to children’s hands and toys and is then ingested when they put their hands and toys in their mouths. In a perverse twist of nature, lead paint chips are sweet. Therefore, when children pick up lead paint chips and put them in their mouth, they are “rewarded” with the sweetness and reinforced for continuing to ingest the chips.

While lead-based paint may be present in any dwelling build before 1978 and is highly likely to be present in dwellings built before 1951, it is deteriorating lead-based paint that presents the greatest hazard to children. Because families which are poor and which are Black or Hispanic are more likely to live in older buildings with deteriorated paint, it is the children in these socioeconomic, racial and ethnic groups who are most likely to have elevated blood lead levels.

Because there is no safe blood lead level and because there is no way to prevent or reverse the damage that may occur to a child after exposure, prevention of the exposure; i.e., primary prevention of lead poisoning, is the only acceptable means of dealing with lead poisoning. If we find children who have already been exposed, which is what screening children does, then we are using children to identify substandard housing. This is immoral and unethical. Substandard housing needs to be identified and rendered lead safe before a child moves in.

Screening dwellings at the time of turn-over, at the time of sale or rental, and making that dwelling lead-safe before a child moves in is a relatively easy, quick and inexpensive process. Once done, the improvements may last many years and through many tenants in the case of rental housing.

Opponents of this legislation will assert that legislation requiring screening a dwelling and making it lead-safe will bring economic ruination to landlords in the District, severely limit affordable housing, and make it nearly impossible for families with children to obtain housing. All of these claims have been made in other cities where primary prevention systems have been implemented and none of these doomsday scenarios have come to pass. In spite of the fact that dozens of cities have passed primary prevention laws over the last several decades, not a single study has documented that lead laws were responsible for abandonment or decreased housing affordability or that landlords refuse to rent to families with children. When HUD required Section 8 housing providers to make their offerings lead safe, some argued that those owners would leave the program if they were forced to comply with the new regulations (section 8 owners pay the cost of lead hazard control, not HUD). However, that program not only continues but has grown. Lead hazard control does cost money, just like any other kind of property maintenance. But it is a tiny fraction of an owner's operating costs and the benefits are enormous. The fact is that housing affordability, abandonment and property maintenance are driven by larger economic forces, not lead laws.

The City Council must also recognize that if primary prevention programs for lead poisoning are not implemented now, the City will be saddled with significant costs going forward. Either the limited expenses associated with inspecting and making a dwelling lead-safe can be paid now, or the City can absorb higher costs for educating children with learning disabilities, attention deficit disorder and behavior problems. Either the limited expenses associated with inspecting and making a dwelling lead-safe can be paid now, or the City can make do with a decreased tax-base because its citizens could not get the higher paying jobs because they had learning disabilities, attention deficit disorder and behavior problems. Either the limited expenses associated with inspecting and making a dwelling lead-safe can be paid now, or the City can spend more on police and incarceration because children exposed to lead are more likely to exhibit criminal behavior as young adults.

The proposal that you have before you is reasonable and prudent. It is good for children, it is good for landlords and home owners, and it is good for the District of Columbia. The proposal that you have before you deserves your support so that we can stop the immoral and unethical process of using children to identify substandard housing.

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