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LEAD POISONING: AN OVERVIEW

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A problem that should be of great concern to all of us is the lead poisoning of children. First, I would like to present a short overview concerning the reasons everyone should care about lead poisoning, then discuss the history of lead poisoning, what is happening today across the country, and the future.

Lead is a Serious, Nationwide Health Problem

Lead poisoning is the number one environmental poison of young children in the United States. It is estimated that three to four million children in this country have lead poisoning. By anyone's measure, this is of epidemic proportions. These children are suffering losses in health, they exhibit numerous behavioral problems affecting them and everyone around them, and many of these children are affected into their adulthood. Adults who suffered with lead poisoning when children demonstrate a tragic loss of productivity. NASA, who tries to hire the best and brightest, has fewer people from which to choose today because of lead poisoning. In addition, a tremendous number of lead poisoned children require remedial education, and this is a great drain on our educational systems.

Lead poisoning reduces the body's ability to metabolize vitamin D; it reduces the ability to form heme which is used to make hemoglobin in the blood; it decreases intelligence, school performance, and attention span; it increases irritability; it stunts growth; and it causes hearing loss. Lead does not discriminate, it circulates through the blood system to all tissues and bones in a child. It affects each child differently. Lead accumulates in bones and tissues, and each exposure adds to the problem. This is very bad for adults, but for children it can be devastating.

The most severe results of the ingestion of lead occur in children under the age of 6 for several reasons. First, these children are prone to put their hands in their mouths. The toys they play with are often dirty, and they put them in their mouths.

They play in the soil around their houses. They are most susceptible to lead poisoning because they live down at the level where leaded dust is found. At this age children are not fully developed, so their systems are sponge-like in seeking those things needed for development, such as calcium, iron, etc. Children up to the age of six years absorb up to five times as much lead as an adult. An adult absorbs up to 10 percent, but it does not stay in the bones and tissues of adults as long as in children. Children in this age range can absorb up to 50 percent, and it stays in the bones and tissues longer. Lead equivalent to a couple of grains of sugar over a fairly short period of time will poison a child.

Lead in pregnant women can pass to the fetus. Even if a woman is not exposed to lead during pregnancy, if she had been exposed to lead prior to the pregnancy, the pregnancy could cause the lead accumulated in the tissues and bones of the body to mobilize and enter the bloodstream.

The History -- Lead was a National Health Threat Long Ago

The history of lead goes all the way back to the Roman aqueducts. We have all heard various versions of why Rome fell. One of them is that Roman aqueducts were lined with lead. Since lead is a very pliable material and one of the first metals available to civilization, it was widely used. The Romans also used lead to make wine goblets and other drinking vessels. Today, some of you may be drinking from leaded glass and may be using leaded glass decanters. Back in the late 1790's Benjamin Franklin was very concerned that people collected drinking water off of roofs that had lead liners beneath the shingles; even then there was enough medical knowledge to know that lead was a problem.

By the 1920's there were many published reports in medical journals of childhood lead poisoning in this country. During the 1920's and 1930's many countries banned the use of paint in houses. Paint for use indoors was banned in Great Britain in 1926, in Spain in 1931, in Sweden in 1926, in Cuba in 1934, and in Poland in 1927. During that period, Australia, Belgium, Greece, and Yugoslavia also banned using paint inside houses. The United States did not ban the use of paint in houses, even though industry knew about the health hazards. The same is true with respect to the hazards of using lead in gasoline.

Up until the 1940's lead was the material of preference used by paint manufacturers. A quart of paint could contain up to 50 percent lead. This is 500,000 ppm, compared to the 100 ppm the Consumer Product Safety Commission (CPSC) is considering for the future. The Housing and Urban Development (HUD) regulations, which are the only nationwide established regulations and only used with respect to certain federally funded facilities for residences, considers 5,000 ppm in a sample the action level that should cause concern. It is estimated that 57 million houses in the United States contain some leaded paint, and that 20 million houses in the country are health hazards. It is also estimated that 3 to 4 million of these houses contain children under 6 years of age. Many of these residences have paint on the inside and outside walls that contains 300,000 and 400,000 ppm. The use of lead in paint decreased after the 1940's, but into the 1970's a substantial percentage of residences were still painted with lead-based paint containing high levels of lead -- levels still high enough to poison a child.

There are many stories of people who have traced the history of lead and its use by manufacturers and of medical consultants defending those uses because of lack of proof that it caused harm. Industries were quite successful in blocking attempts to pass legislation and regulations. It was only last April that California banned the use of lead in gasoline. Several years ago when lead was banned for use in newer automobiles, California had about a million older cars that could not run on unleaded gasoline.

Lead is very persistent. One of the big problems today is the amount of lead that is present in the soil near busy streets and freeways all over the country. We are especially familiar with this problem here in California because of the earthquake that resulted in the collapse of a 2-tier freeway in Oakland, California. The community did not want that freeway rebuilt because it cut the community in half. During testing done around the freeway they discovered so much lead present in people's yards and in school yards that the dirt was classified as hazardous waste. This meant that the soil would have to be taken to a class one hazardous disposal site.

Current Issues

Paint containing lead is a serious problem today. It is often thought that the problem arises because children eat paint chips, and this is true in a small number of

cases. But most cases of lead poisoning in children are caused by leaded dust from the paint inside and outside of houses. Children get this dust on their hands and then put their hands in their mouths.

Lead in house paint has not been banned. The lead content in paint was reduced substantially in 1978, but it can still contain 600 parts per million (ppm). More and more studies are being done on the toxicity of lead, especially for children, and the Consumer Product Safety Commission (CPSC) is considering lowering that level to an allowable 100 ppm.

There are many other sources of lead: water, ceramic tableware, tin cans, and work clothes. Recently the newspapers reported that various water districts were required by the EPA to go out and test people's tap water and report their findings to the EPA. This is not source water, just tap water. They reported that a lot of the water districts were over what the EPA considers the "bright line" for drinking water, which is 15 parts per billion (ppb). San Francisco's water district is over that bright line, and is about to take action based on the EPA requirements. EPA requires at the very least that the people in the community should know that tap water could contain lead. But when the EPA in Washington designed the guideline they neglected to consider that some people rent the dwellings in which they live. In San Francisco, 70 percent of the residents rent, and no notice of lead in the water is being sent to these renters, only to the rate payers who own the dwellings. We are now insisting that the San Francisco Water Department remedy this.

It was recently estimated that lead in drinking water may contribute 10 to 20 percent of the total lead exposure in children. The age of the house or apartment is important, and it is also important to be aware of the potential lead problem wherever one drinks. Water coolers can be a problem wherever you or your children go: schools, child care facilities, etc. Ceramic tableware, especially from Asia, Mexico, Central and South America, can also contain lead which leaches into food. The Chinatown area in San Francisco houses the largest population of Chinese-speaking people in North America. Testing was done in 1989 on ceramics sold in Chinatown, and up to 40 percent of the tableware that was inspected failed the test; that is, it leached lead in unacceptable amounts. These ceramic products are supposed to be inspected before they are allowed to come into the United States. Lead is also found in tin cans coming from Mexico and Central and South America. Some products sold in the United States,

especially in areas with Latino populations, are in tin cans that are lead-soldered. Acidic food and juice causes lead to leach more rapidly, and cans containing fruit or fruit juices are especially dangerous.

A blood test is required to determine if a child has lead poisoning. In order to detect lead poisoning in a child by appearance, the lead poisoning would have to have progressed so far that the child would be in critical condition and be hospitalized. Symptoms of lead poisoning are similar to those of a cold or the flu; the child is irritable, complains of stomachache, and does not sleep well. Unfortunately, most doctors are not yet routinely testing children.

Lead poisoning cannot be cured and its effects are fairly permanent. The level of exposure, length of time of the exposure, and diet are all factors in the permanence of lead poisoning. The best treatments include lowering the level of lead in the blood. If a child is hospitalized for lead poisoning, the blood can be treated with a drug that attaches to the lead and is then excreted, lowering the lead level. The problem is that the body tends to "equalize" the distribution of lead, so the lead in the bones and tissues will then begin to re-enter the blood stream and the treatment may have to be repeated. Prevention and good diet are the recommended treatments for children with lower levels of lead in the blood. After treatment, these children should be carefully watched for behavioral problems related to lead poisoning.

The research that has been done over the last few years has greatly improved. It is now realized that very small amounts of lead in the system can cause lead poisoning. Right now the "bright line" that determines when a child has lead poisoning is 10 micrograms per deciliter, an amount so small it is almost off the meter. Even at levels lower than 10 mg/dl, children may be affected.

There is no inexpensive, non-invasive test for past exposures. The current blood lead level test reveals exposures within the previous 30 days. This will not tell you what lead content is in a child's bones or tissues. A child can very easily have suffered from past exposures, but the test results would not indicate this. One problem that is not yet being discussed is the impact of chronic low level exposures (below 10 micrograms per deciliter) over an extended period of time.

The results of a recent study in Australia also indicate that research is improving. This study involved children with levels of lead in the blood of 10 to 25 micrograms per deciliter. It took into account the IQ of the mothers, parenting styles, other illnesses in the family, birth order of the children, parents' smoking habits, and other possible impacts on children's health. The study concluded that twice as many of the children with lead poisoning at low levels needed remedial education as compared to children who were not poisoned.

The study that really sounded the alarm in the United States was done by Professor Needleman and published in 1979. In this study baby teeth were tested to determine blood lead levels. This is not a normal test that can be done simply or inexpensively. Dr. Needleman then traced the history of these children who, by this time, were young adults. He visited the schools they attended and interviewed the teachers in an attempt to determine the characteristics of the students, their behavior and scholastic achievements. He discovered that many of these young adults who had levels of lead in the blood above the "bright line" were abnormal in their behavior. His research indicated that these young adults were six times more likely than normal to have reading disabilities and behavioral problems, and were seven times more likely than normal to drop out of school as a result of these problems. In general, these people cannot cope well with the world and will not be as productive in adulthood. This is a tragic loss. Professor Needleman's research findings have since been confirmed many times.

Many states have been trying to deal with the problem of lead for as long as 30 years. But most people are still not aware of the severity of the problem. The answer to the problem of lead poisoning is prevention, which is difficult. Many places in the United States are literally painted with lead. There is lead solder in the pipes of newer homes; the soil near highways and busy streets still contain lead; lead is still present in some paints, ceramic tableware, tin cans, and work clothes. The federal government does not have standards or guidelines for reducing lead hazard exposures in private housing. While a few states do have guidelines, many others do not. California does not. Los Angeles contains over one million houses which have been painted with lead-based paint; in San Francisco it is estimated that 260,000 out of the total of 330,000 dwellings were painted with lead.

We have a great need for new and better tools in the construction and contracting industry for the removal of lead. Even people skilled in this work find that it is very expensive to do, and removing lead from all of the houses, buildings, schools, etc., is prohibitively expensive. The removal of lead from dwellings and buildings is very invasive and causes a great amount of displacement. We need to find less invasive ways to solve the lead problem. As an example, in San Francisco, one of the most dense cities in the country, there is a problem with relocating tenants. If it is mandated that landlords must remove the lead, many tenants will be out in the street; not only because people cannot live in the dwellings while this work is in progress, but also because the landlord will pass the costs on to the tenants.

I am happy to report that in the last days of President Bush's tenure he signed an amendment to the National Housing Bill. This amendment will provide new funding for Federal-assisted housing; that is, housing with Federal Housing Administration (FHA) and Federal National Mortgage Association (FNMA) mortgages, public housing, and even private housing the federal government helps to finance and subsidize for low and moderate income people. There will be more disclosures to buyers and lessees. This amendment also contains legislation for worker training. There is a mandate that the federal government assist in private housing with respect to lead hazard reduction regulations and with public education. There will also be new Federal Occupational Safety and Health (OSHA) requirements.

You will hear more from the EPA. There will be a lot of publicity across the country, and there will be a Hotline (1-800-LEAD-FYI). San Francisco was selected as one of the target cities for publicity because of the work by the Coalition to Prevent Lead Poisoning. But how can a call to a Hotline in Washington, D.C., help people living in San Francisco?

The people answering the Hotline in Washington, D.C., cannot be expected to know anything about the San Francisco water department. In addition, San Francisco is a European/American minority city where large numbers of different racial and ethnic people live. Many do not speak English. They may not be able to read very well even in their own languages, and they do not get their information through the same sources that you and I might. These people need to be reached perhaps more than anyone else, because in some of the places they live the children are at higher risk for lead poisoning. How is that Hotline going to help these parents? How many languages will that Hotline

be able to handle? Everything we at the Coalition to Prevent Lead Poisoning do, including our literature, is in up to six languages. We work with community groups throughout the city and discuss these problems with their leaders. We request that they tell the parents in their community about these problems. There are substantial numbers of people in this country who need this information, and the EPA Hotline will not help them.

Every state is mandated by the federal government to have a "Well Child" health care program. "Well Child" programs are partially funded by the federal government and provide free medical care. Complete physical checkups, including blood-lead level tests, hearing, vision, immunizations, etc., are free to children 6 years old or younger. The program in California covers the children of people whose incomes do not exceed 200 percent of the poverty level. In San Francisco, about 75 percent of the children are eligible to receive this care. Unfortunately, the program in California is terribly underutilized, and only about 35 percent of all of the eligible children in San Francisco actually use it. Many parents who live in public housing projects are not aware of this program or do not have access to the care. It is a great tragedy that these eligible children do not have lead blood testing done.

Prior to 1991 there was no program at all in the City and County of San Francisco for anything having to do with lead. Only three children were reported to the local authorities as having blood lead poisoning in the three years prior to 1991. In 1991, a very good pediatrician who came to work for the Public Health Department was able to convince some medical facilities to begin testing for levels of lead in the blood. Out of the first 1,199 children tested, 8.3 percent, or 99 of the children were shown to have blood lead poisoning. This is a very high percentage of any target population, yet it is believed that if the children had been selected by going from door to door in high risk areas it would have been even higher. This 8.3 percent was only for current exposure and not for past exposures. A great number of the children who tested negative may already have had lead poisoning.

Seventy-five to eighty percent of the housing in San Francisco was built before 1950, and even the housing built after 1950 poses a potential problem. At any one time approximately 44,000 children in San Francisco (ages newborn through 5 years), whether they live in the upper-, middle-, or lower-class housing, are at risk.

The Public Health Department in San Francisco has a budget of over \$2.5 billion, and is the size of many State Health Departments. San Francisco had no funding for the lead problem until 1992, and we had to fight to keep the funding for three people in the Public Health Department's budget.

The Coalition to Prevent Lead Poisoning in San Francisco started with the knowledge that a substantial number of people in the community were not aware of the lead problem, and that there will never be any political will to increase the budget in the Health Department and solve this serious problem unless the public knows about it. We have many community and social service groups in the city, and they had to be made aware of the problem. This is what we have been doing. We have also been providing them with the tools needed so they can go out into their communities to educate and encourage parents, in a number of different languages, to have their children tested through the "Well Child" program.

People also need to know how to reduce the hazards where they live. The Coalition to Prevent Lead Poisoning provides libraries and social service agencies with this information. The Coalition holds workshops for health care providers and gives them fact sheets and pamphlets to distribute to their patients. These fact sheets answer questions such as, "What is lead poisoning?", "How does my child get it?", "How can I recognize it?", and "What can I do?" The Department of Social Services mails this information to AFDC and food stamp recipients. We have also been working with the Water Departments to get this information out to residents. We are also working to get legislation passed that will help increase getting the information to landlords and tenants and purchasers of products in home improvement establishments. (This legislation was passed on December 23, 1992.)

It is also important to get information concerning lead poisoning to physicians. Some physicians still resist testing children, claiming that more research needs to be done. At least one large health maintenance organization (HMO) is resisting and does not want to include testing as part of regular examinations of children. We need to make industries, including insurance companies, aware of the problem. For example, insurance companies in Massachusetts will not insure anyone doing lead hazard reduction work unless he/she has gone through a State program which requires attending courses and being an apprentice for 15 lead-abatement jobs. This helps make sure that competent contractors are doing lead hazard reduction work correctly. It is doubtful that this will

occur in California or in many other states anytime soon. There is also a law in Massachusetts that physicians can have their licenses revoked if they fail to test children at 12, 24, 36, and 48 months of age. This is not the case anywhere else in the country.

In human terms, the cost for the failure to remove lead from our society will be incredible if we do not act now. In dollar terms, there is no question that dealing with this problem will be expensive, but every study done has shown that it will be much more expensive if we do not act to prevent future lead exposures. People in federal agencies who are trying to set federal policy claim we could save \$2,000 for each child with lead poisoning if we act now, compared to what we lose in terms of medical costs, educational costs, the loss of productivity, and emotional losses if we fail to take action.

Conclusion

While this is not a story with a happy ending, more of us now know about childhood lead poisoning. The reality is that the story will not end for decades after enormous expense and significant damage to generations of people. There is a bitter lesson to be learned here. It happens time and time again that a few people in a few companies have made and continue to make decisions which have caused and will continue to cause this country great loss. These people make choices about products and allow the products to enter the environment without understanding their impact. They allow these products to be used even after they do understand their impact. Some of these decisions have cost us incredible amounts. Adding lead to paint was not necessary, it was simply determined that lead provided good qualities for paint. Adding lead to gasoline was not necessary. Yet this economic system has not found a way to consider the social, health and economic consequences of these choices.

I hope the information presented here will help you to protect your children. Please also do whatever you can in your community to help reduce lead hazards for children; they need all of the help they can get.