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Background

According to the Immigration and Naturalization Service, 3,637 children were adopted from China in 1997. China has no environmental protection laws. Lead-containing gasoline, coal burning, smelting factories, and lead-containing paints are responsible for most of the lead contamination of the air, water, soil, and food in China.

Objective

This study was performed to assess the prevalence of lead intoxication in children adopted from China.

Design/Methods

Retrospective chart review from 1994 to 1998.

Results

One hundred and eighty-four adopted Chinese girls were tested for lead by venous phlebotomy within two weeks of arrival in the United States in an ambulatory pediatric setting. The ages range from four months to forty-three months. The mean age was fifteen and one half months. Using CDC guidelines for lead intoxication, one hundred and sixty-three children (88.6%) had lead levels in the range 0-9. Twenty-one (11.4%) children had lead levels greater than nine. Eleven (6.0%) children had lead levels in the 10-14 range. Six (3.3%) children had lead levels in the 15-19 range. Four (2.1%) children had lead levels in the 25-54 range. A 14 month old Chinese girl with a lead level of forty-seven was treated with Chemet for 19 days. Thirteen months after treatment the lead level was twenty-four. Conclusions As lead intoxication in children significantly decreases in the United States, there may be a lessening awareness of the threat of lead. It is imperative that pediatricians know that children adopted from China are at risk for lead intoxication and that they should be screened during their initial health assessments.

Lead Exposure in Chinese Children

As I started my pediatric internship in Long Branch, New Jersey in the summer of 1986, I could have been in Eastern Europe or China. There wasn't a clinic day or a night on call when I didn't admit a young child with an elevated lead level requiring treatment. In a matter of 25 years the situation has profoundly changed in the United States, primarily because of the elimination of leaded gasoline. With the Clean Air Acts of 1970, 1977 we did indeed make an amazing impact on children's lives in our part of the world. The major source of lead now for children in the U.S. is the lead-containing paint present in pre-World War II housing. As the painted surfaces of homes deteriorate, lead-containing dust is ingested by young children through breathing and hand-to-mouth contacts. When beautiful old homes are renovated, lead dust becomes a health threat. Other sources of lead include poorly glazed ceramic pottery, lead dust carried on the clothes of factory workers from smelting factories, fumes from burning batteries, electrical wire coverings. Over the past 25 years, as we have gathered data and attempted to understand how lead affects the growth and development of children, the acceptable lead level has plummeted.

At the beginning of my training in 1982, we were okay with a lead level of 30 and then in 1985, the Centers for Disease Control (CDC) guidelines decreased the threshold blood lead level to 25. In 1991, based on research findings showing neurocognitive deficits associated with lead levels as low as 10, the CDC issued new guidelines using less than 10 micrograms per deciliter as the new cutoff. Universal screening has been recommended by the CDC and the American Academy of Pediatrics (AAP), but this recommendation is controversial. Many physicians believe that if a child lives in a region which is not affected by lead, they should not be screened. The world is one and lead is in our atmosphere; we cannot isolate ourselves. Children all around the globe are at risk and should be screened at least once during the first few years of life.

The symptoms of lead poisoning are very non-specific and the intensity of symptoms does not correlate with the lead level. Some children have recurrent belly aches, constipation, and vomiting. Kids can display learning problems, concentration difficulties, loss of appetite, decreased activity level, and mood disorders. So how does China figure in all of this? There is no environmental protection in China, Southeast Asia, the former Soviet Union, Eastern Europe, Africa, and South America. All of the families who travel to China to adopt their children, know first hand about the serious pollution problems in China. I remember being short of breath in Hefei for about three days until I became accustomed to the coal burning pollution in the air. Rapid and sweeping industrialization of China has caused lead poisoning to be a pervasive problem. There is still leaded gasoline in China. Toys, paper, art objects, and paint have high lead content. Many parents work in factories where lead dust contaminates their clothing. Coal burning in China is also a major source of indoor lead pollution. Food can become contaminated with lead dust and even some Chinese herbal medicines have a high lead content. Suburban and rural lead levels can be just as high as urban levels.

There have been seventeen publications which have reported elevated blood lead levels in children from different areas of China. "Childhood lead poisoning in China" published in 1996 in The Science of the Total Environment is a comprehensive review of the lead problem in China and is written by Chinese physicians from the Shanghai Institute for Pediatric Research. Retrospective pilot studies conducted in Shanghai, Shenyang, Fuzhou, and Beijing evaluated the health effects of childhood lead poisoning and revealed deficits in IQ, neurobehavioral development and physical growth.

Children in orphanages who are swaddled and kept in cribs for most of their lives as infants may be somewhat protected from lead poisoning because they are not free to explore their environment where they might otherwise ingest lead contaminated dust. The coal burning exposure is still a problem as is the leaded gas which pollutes the air. Once a child walks, however, the ingestion of dust begins.

When children arrive from abroad, they should be initially screened for lead with other blood tests. If the lead level is less than 10, then it is in keeping with the standards in the U.S. to not re-evaluate this child unless there is a new exposure in the environment. If the lead level is between 10 and 44, there is currently no recommendation for treatment. The level should be followed periodically (3-6 months) to document a pattern of decline. There is much research currently addressing the use of medication to treat this group of children. All levels that are elevated should be repeated and be drawn from a vein for the most accurate level.

If the lead level is between 45-69, then Chemet, a new oral preparation for the treatment of lead poisoning can be administered at home over a three week period. Children with lead levels equal to or greater than 70 must be managed in the hospital with other medications. In reviewing the data of about 50 Chinese children in my practice, there were about 15-20 % with elevated lead levels. Only one child from Qidong/ Hengyang Institute had a level of 48 which required therapy with Chemet. After therapy her level was 20. She was a well, healthy 14 month old child when she arrived in the U.S. just 4 months ago and she will be followed over the next few months. I think that it would be worthwhile for us to gather lead level data on as many Chinese children as we can to look for a regional pattern.

For more information about lead poisoning, read [Lead Poisoning in Children Adopted from Abroad](#), or [Overview of Lead Poisoning in Chinese Children in the Medical Resources/Environmental Diseases section of this site](#).

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