

Health Consultation

BLOOD LEAD LEVELS IN CHILDREN IN THE
LINCOLN PARK NEIGHBORHOOD

CANON CITY, FREMONT COUNTY, COLORADO

EPA FACILITY ID: COD042167585

NOVEMBER 16, 2006

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

BLOOD LEAD LEVELS IN CHILDREN IN THE
LINCOLN PARK NEIGHBORHOOD

CANON CITY, FREMONT COUNTY, COLORADO

EPA FACILITY ID: COD042167585

Prepared by:

The U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation

Statement of Issue

The Canon City area has been the historical site of at least six milling and smelting facilities. Based on environmental contamination from those operations, numerous questions and concerns have been voiced by residents of the Lincoln Park neighborhood. Among the various issues are specific concerns that lead contaminated dust from current and historical operations may have migrated into the residential neighborhood. In response to those concerns, the US Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) review the data related to lead contamination in the Canon City area, and assess the health risk associated with the lead contamination. After an initial review of the available data, a site visit to the Lincoln Park area in July of 2004, and conversations with concerned community members, ATSDR focused assessments on two primary issues. The first issue was the blood lead levels in children living in the area, and the second was the lead contaminated dust in homes in the Lincoln Park area.

This health consultation specifically addresses concerns related to blood lead levels in children living in the Lincoln Park area. (A second health consultation will address the concerns related to lead in dust of homes in the Lincoln Park area, and will be released as a second document.)

Background

Canon City was first settled in the mid 1800s and later was development as a center for mineral industries. Historical milling and smelting operations in the Canon City area are potential sources of various environmental contaminants. The larger of those industrial facilities have been the subject of previous investigations and a variety of clean-up activities have been conducted to remediate environmental contaminants [1]. The six larger of the potential sources of lead are located generally south and southwest, and within approximately 4 miles, of central Canon City. The Lincoln Park neighborhood is located generally east-southeast of the facilities and the general wind direction is west to east. Short summary descriptions of the prominent industrial facilities, developed from the "Canyon City Lead Data Compilation Report" [1], is provided in the text that follows.

Empire Zinc Smelter (aka New Jersey Zinc; also commonly known as the property of the College of the Canons) (~60 acres) operated from 1902 until its closure 1968. The Canon City Chemical Company purchased the site and used the tailings as a soil additive and operated until 1991. In 1996 a survey of 136 soil samples from nearby residential area showed that 4 samples exceeded 500 ppm lead in the soil and subsequent sampling (composite samples all below 600 ppm) and evaluation by EPA determined that no further work was needed. On-site lead contaminated soil (soil exceeding 1450 ppm) was consolidated and capped.

The Cotter Corporation owns approximately 2500 acres in the area, and since the mid 1950s, the *Cotter Mill* facility has been primarily concerned with uranium milling. In 1984 the site was placed on the National Priorities List, as was an adjacent residential neighborhood, the Lincoln Park Superfund site. Subsequent onsite investigations found lead contaminated areas that were the target of remediation activities. To date numerous clean-up activities have been conducted on-site with some areas having soil removed down to bedrock. Data collected for an EPA risk assessment (1994 through 1996) concluded that neither the soil nor the air at the Cotter Mill site posed a health risk to residents of the Lincoln Park neighborhood. Dust samples were not evaluated as part of that investigation.

The U.S. Smelter facility operated from the 1880s to 1912, and at one time was considered to be the largest lead and zinc smelter in the world. The primary products of the smelter were lead used as a paint pigment and metallic zinc. In 1922 a new owner used more modern techniques to re-work the tailings and slag at the site. The site is currently in the process of being sold and reclaimed.

The *Canon City Copper Smelter*, the *Ohio Zinc Company*, and the *Royal Gorge Smelter* were each in operation prior to 1920. However there is little or no information describing the ores and operations at each property. There is no known previous site work associated with these three properties.

Childhood Blood Lead levels

Decades of research on the health effects of lead have guided public health responses aimed at reducing lead exposures. Because early evidence indicated that children are particularly sensitive to the effects of lead, much of the research, awareness, and prevention efforts have been focused on children. The results of the collective public health efforts are clearly shown in the dramatic reductions in blood lead levels (BLL) over the past 20 years. Based on national data collected from 1976 through 1980, children one to five years of age had an average BLL of 15 micrograms per deciliter ($\mu\text{g}/\text{dL}$). By the mid 1990s, the average BLL of similarly aged children had decreased to 2.7 $\mu\text{g}/\text{dL}$, with 4.4% of children having a BLL of 10 $\mu\text{g}/\text{dL}$ or higher [2]. More recent data indicate a continuing decline in children's average blood lead levels to approximately 2 $\mu\text{g}/\text{dL}$; however, many areas of elevated BLLs continue to be reported [3].

The likelihood of lead exposure increases among children with multiple risk factors. The primary risk factors include: low income, non-Hispanic black race, and living in older housing [3,4]. The most frequent route by which children are exposed to lead is through ingestion of lead-contaminated paint and dust [3,5]. Lead contaminated paint is frequently found in older housing, however other potential sources of lead exist, and include: mining operations, battery recycling facilities, and foundries.

Health problems associated with elevated blood lead levels in young children include effects on neurodevelopment, growth, and behavior [3,6,7]. The Centers for Disease Control and Prevention (CDC) has established a BLL of 10 µg/dL as the level at which adverse health effects have been demonstrated [8]. There are also some recent reports that have suggested there are subtle adverse effects at lower blood lead levels [9,10].

Evaluation of Blood Lead Levels in the Canon City Area

Information guiding assessment of childhood blood lead levels in the Canon City area was derived from three sources: discussions with area residents and care givers, the annual report from State of Colorado Childhood Lead Poisoning Prevention Program [11], and data made available by the Saint Thomas More Hospital, located in Canon City.

Data from the State of Colorado Childhood Lead Poisoning Prevention Program.

The State of Colorado Childhood Lead Poisoning Prevention Program compiles records of lead testing data that are submitted by testing laboratories. Computerized data reported to the State of Colorado Childhood Lead Poisoning Prevention Program is available for the years 1996 through 2003 [11]. Those data indicate that, in Fremont County, 493 children were screened for BLL over that 8 year time period, and during that time period, 8 children, had BLLs that exceeded 10 ug/dl (1.6 %) [11]. For the entire state of Colorado, for the time period of 1996 through 2003, 51,878 children were tested and 2.4 % had lead levels at or above 10 ug/dL. For the year 2003 it was estimated that 1.1 % of the 2,834 children (6 to 72 months old) in Fremont County were tested for BLL [11].

Hospital Data from Blood Lead Testing. Preliminary discussions with community residents, local care givers, and clinicians indicated that the vast majority, if not all, of the BLL testing in Fremont County is conducted at the Saint Thomas More Hospital.

Generally, the BLL testing was conducted as a result of referrals by area physicians. In cooperation with ATSDR's investigation of BLLs in the local community, the hospital made their recent BLL testing records available for review. Those data showed that 211 BLL tests were conducted over the time period 2002 through June 24, 2004. From those test reports it was determined that 115 BLL tests were for children that were 6 months old to less than 7 years old that had a Canon City address. (The remainder of children had addresses in outlying parts of Fremont County and/or were more than 7 years old). Of the 115 Canon City children tested, one child had a BLL over 10 ug/dl (BLL at 13 ug/dl). Within the group of 115 children with BLL tests, there were 19 children with BLLs exceeding 5 ug/dl (16.5 %).

Discussion

The available data describing children from the Canon City area indicate that fewer than the state average have elevated BLLs. However, the information gained from ATSDR's initial site visit and investigations, and discussions with area residents and local care-givers have raised additional questions.

Those questions are focused on:

the rate of testing for BLL in the area;
the rate of BLL testing in particular neighborhoods; and
whether “at risk” children are being adequately tested for BLL.

Also a factor in this evaluation was the knowledge that a substantial number of older homes exist in the Lincoln Park neighborhood. Because living in an older home is a known risk factor for an elevated BLL, the percentage of older housing in the Lincoln Park area was determined through a review of the 2000 census data. Within the two census tracts that are included in the Lincoln Park neighborhood, it is estimated that approximately 70 % (tract 9788) and 40 % (tract 9791) of the homes were built prior to 1970 [12].

Without additional data and clarifying information, answering the questions presented above is not possible. Therefore, ASTDR has determined that **lead exposures to children in the Lincoln Park neighborhood represent an indeterminate health hazard**. Given the historical and current environmental issues, the questions related to BLL, and the potential for a number of “at risk children” living in older homes in the area, it is reasonable to address the questions with a BLL screening program in the Lincoln Park neighborhood.

Conclusion

Available data indicate that the rate of elevated BLL for Fremont County is below the state average. However, there are no available data that permit evaluation of whether area children, including “high risk” children, are being adequately screened for blood lead levels.

Recommendation:

Assess the blood lead levels in children in the Lincoln Park neighborhood. (*ATSDR completed this recommended blood lead screening and expects to release the report that describes the results in the Fall of 2006.*)

Public Health Action Plan:

ATSDR will conduct a BLL screening service for the children of the Lincoln Park neighborhood. This screening service will be planned and conducted with the input and assistance of persons living in the community, as well as local health officials.

The BLL Screening Service is expected to include up to 300 children from the area, and has been planned and will be conducted with the input and assistance of persons living in the community. A plan for the BLL screening service is in development at ATSDR, and

it will integrate suggestions made by local community members, as well as encourage operational support from members of the community. ATSDR expects to conduct the BLL Screening service in the late Summer /early Autumn of 2005.

The data gathered from the Exposure Investigation will be evaluated to determine if exposures to lead represent a public health hazard. The findings of the Exposure Investigations will be made available to the Lincoln Park community as well as the general public. The report will contain conclusions and recommendations and may include recommendations for further investigations to fill additional data gaps identified by the Exposure Investigation. *(ATSDR completed the blood lead screening project and expects to release the report that describes the results in the Fall of 2006.)*

Prepared by:

Clement J Welsh, PhD, MPH
Senior Environmental Health Scientist
Exposure Investigations and Consultation Branch
Division of Health Assessment and Consultation

Reviewed by:

Peter Kowalski
Senior Environmental Health Officer
Team Leader
Exposure Investigations and Consultation Branch
Division of Health Assessment and Consultation

Susan Moore
Branch Chief
Exposure Investigations and Consultation Branch
Division of Health Assessment and Consultation

References

1. US Environmental Protection Agency: Canon City Lead Data Compilation Report. Tetra Tech EM, Inc. (Contract No. 68-W-00-118). 2004.
2. Centers for Disease Control and Prevention. 1997. Update: Blood Lead Levels -- United States, 1991-1994. *MMWR*, 46:141-6.
3. Centers for Disease Control and Prevention. 2000. Blood Lead Levels in Young Children – United States and Selected States. *MMWR*, 49:1133-7.
4. Pirkle JL, Kaufman RB, Brody DJ, Hickman T, Gunter EW, and Paschal DC. 1998. Exposure of the U. S. Population to Lead, 1991-1994. *Environ Health Perspect*, 106:745-50.
5. Centers for Disease Control and Prevention. 1997. Screening Young Children for Lead Poisoning; Guidance for State and Local Health Officials. Atlanta: U. S. Department of Health and Human Services.
6. Agency for Toxic Substances and Disease Registry. 1999. Toxicological Profile for Lead (Update). Atlanta: US Department of Health and Human Services.
7. National Research Council. 1993. Measuring Lead Exposure in Infants, Children and Other Sensitive Populations. National Academy Press, Washington DC.
8. Centers for Disease Control and Prevention. 1991. Preventing Lead Poisoning in Young Children. Atlanta: US Department of Health and Human Services.
9. Schwartz J. 1994. Low-Level Lead Exposure and Children's IQ: A Meta-analysis and Search for a Threshold. *Environ. Res.* 65:42-55.
10. Lamphear BP, Deitrich K, Auinger P, Cox C. 2000. Cognitive Deficits Associated with Blood Lead Concentrations <10 ug/dL in US Children and Adolescents. *Public Health Rep* 115:521-9.
11. Colorado Department of Public Health and Environment, Lead Poisoning Prevention Program: A Review of Data from January 1996-December 2003. 2004.
12. U.S. Census Bureau. 2000. Census 2000 Summary File 3-Colorado. Washington, D.C.

Responses to Public Comments

This health consultation was released for “public comment” on September 7, 2005. Numerous comments were received from community members. Comments regarding the text and issues that are considered in the health consultation are listed below. Responses follow the specific comments. For the sake of brevity, most of the comments were paraphrased and similar comments were summarized to provide a single statement.

Comment: College of the Cannons should be recognized / listed as the property / location of the former Empire Zinc Co. (aka New Jersey Zinc)

Response: The text has been revised to reflect this information. (Note: the community member also included materials that support the revision.)

Comment: The Cotter Corporation owns about 2500 acres in the general Canon City / Lincoln Park area.

Response: The text has been revised to reflect this information. (Note: the community member also included materials that support the revision.)

Comment: The previous lead sampling was limited to the Lincoln Park area. Since there were other areas where there were smelters, there are concerns about contaminants in other areas. I recommend that the current studies be completed and the scope of future studies be expanded.

Response: The activities concerning lead contamination that are discussed in this health consultation were conducted as a measured response to community concerns. The two projects (blood lead screening and house dust and soil sampling) found no evidence indicating a concern for community wide lead exposures. Therefore the data do not indicate a need for additional studies of lead exposures.

Comment: ATSDR should inform the community of the health risks related to the lead contamination in the area.

Response: ATSDR is now releasing documents that describe our activities to address the community concerns related to lead contamination in the Lincoln Park area. In addition to the documents, ATSDR will be holding public availability meetings to allow members of the community to ask questions about the information contained in the documents.

ATSDR also expects to investigate concerns about other contaminants in the Lincoln Park area. Documents describing those activities and findings will be released as they are completed

Comment: I think it is vitally important to determine the source of the lead. This could be done by analyzing for lead 210, and since you already have samples it should not be overly expensive to perform those analyses.

Response: The data collected to date found no evidence indicating a concern for community wide lead exposures. Therefore, the data do not indicate a need to look for sources of lead.

Comment: Requests for a health risk evaluation were made in 1988. EPA required a health risk survey when the site went on the NPL (National Priority List). But the Lincoln Park site fell through the cracks.

Response: Recent activities have been initiated to address community concerns for environmental contaminants in the Lincoln Park area. ATSDR is now releasing four documents that describe our activities to address the community concerns related to lead contamination in the Lincoln Park area. In addition to the documents, ATSDR will be holding public availability meetings to allow members of the community to ask questions about the information contained in the documents.

ATSDR also expects to investigate concerns about other contaminants in the Lincoln Park. Documents describing those activities and findings will be released as they are finalized.

Comment: College of the Canons had nothing to do with milling or mining.

Response: Comment noted. Also see the revision in text describing the College of the Canons.

Comment: Cotter began construction in 1957 and began operations in 1959 (late 1950s, not mid 50s).

Response: The text has been revised to reflect this information.

Comment: Cannon City began as a place for persons recovering from TB to convalesce in hot springs.

Response: Comment noted. See the revision in the text.

Comment: Note that Lincoln Park is an unincorporated area, and is not part of the city of Canon City.

Response: Comment noted.