

TAR CREEK TASK FORCE
HEALTH EFFECT SUBCOMMITTEE REPORT
June 15, 2000

There remain many unanswered questions about health effects from exposure to mine wastes and how these effects are being addressed in N.E. Oklahoma. This report describes those areas of potential concern that the committee feels most warrant further consideration. Because of the wide diversity of these issues, the committee is concerned that research projects may be proposed or conducted both without a full understanding of the breadth of local issues and community concerns. In the absence of an understanding of community concerns and the status of completed and on-going projects, researchers may miss opportunities to optimize their efforts and elicit support from the community. To address these issues, we strongly recommend the formation of a community coordinating board that can review potential projects to minimize redundancy and maximize results.

This report attempts to detail some of the many health effects for which adequate information is lacking. As stated in the report, some of these issues are currently being addressed while some projects which will address certain issues are in the planning stage. Although addressing all of these issues will take a considerable effort by local, state, and federal agencies, the technology and knowledge base is available within the state to address all concerns. A considerable level of funding will be required to adequately understand the issues contained in this report.

1. Effects of long-term exposure to lead and cadmium

A number of potentially important health issues related to metals exposure in N.E. Oklahoma have been identified. These potential health effects have been identified based on similar exposures in other areas and anecdotal information from Ottawa County. There are currently no data to demonstrate that these health effects are occurring in Ottawa County; however, the potential appears to be high, considering the magnitude and duration of exposure. In order to address these concerns, a number of epidemiological studies would have to be initiated to collect adequate data. Funding for these type studies is traditionally supplied through the National Institutes of Health or its daughter agencies such as the National Institute of Environmental Health Sciences. The following table lists and prioritizes some of the studies that warrant consideration, current status of knowledge, and estimated funding costs.

| Potential Studies of Long-Term Metals Exposure in Ottawa County | | | |
|--|-----------------|---|-----------------------|
| Health Effect | Priority | Current status of knowledge/progress | Estimated Cost |
| Kidney Disease | 1 | Proposal submitted by OUHSC to ATSDR; approved but not funded | 750K* |
| Hypertension | 2 | Anecdotal information; several dialysis clinics in tri-state area | 750K* |
| Hearing Loss | 3 | Preliminary data being collected by Ottawa County Health Dept. | 500K |
| Cancers | 4 | Anecdotal information | 1-1.2 million |
| Alzheimer's Disease | 5 | Suggested by other studies | 250K |
| Parkinson's Disease | 6 | Suggested by other studies | 150K |

*hypertension and kidney disease could be conducted simultaneously for a combined cost of 750K

2. Health Effects on Children

The high prevalence of children with elevated blood lead levels as well as the general levels of blood lead that have been measured in the community suggest that a number of health effects are likely to be seen in children. Several efforts are underway to measure whether these health effects are occurring, although these efforts will need a continuation of funding at an increased level to be successful in identifying at risk children. Many of the effects of blood lead are subtle; therefore, long-term and widespread screening efforts are needed to identify effects.

The only fully funded project to address these issues will be conducted by Dr. Howard Hu from Harvard beginning in 2001. Dr. Hu's study will examine the relationship between scholastic performance and lead exposure by measuring the amount of lead stored in bones. Bone lead is the best measure of long term lead exposure and this study should provide an excellent determination of whether the identified exposures have had a negative effect on children's development. In addition to its strong efforts to increase testing for blood lead, the Ottawa County Health Department is currently gathering information on the following:

- behavioral issues
 - attention deficit
 - aggressive behavior
- physical anomalies
 - reduced stature
- vision deficits
- learning abilities
- scholastic achievement

These efforts should help to provide a clearer picture of the many potential effects of exposure to metals and will also help develop an information foundation that can be used to leverage additional research funding.

3. Exposure via the Food Chain

The widespread nature of soil and water contamination in Ottawa County assures that wildlife as well as people are being exposed to metals. Although this creates the potential for general deleterious effects for many biological communities, a more specific concern relates to the effects of these communities on the health of people. An increased reliance on consumption of fish, game, and plants in rural areas and by some cultural groups particularly raises the concern of metal exposure through ingestion of wild foods.

Exposure of this type could come from any of the following sources:

- fishing
- hunting
- wild plants
- home gardening

The only known attempt to address a segment of these concerns is a planned sampling of fish communities by the Oklahoma Department of Environmental Quality. ODEQ staff will be sampling several areas during Summer, 2000 to collect fish for laboratory analysis to determine whether metals are entering consumable species through the food chain and if these metals are being stored in edible portions of the fish. Based upon these data, it will be possible to determine whether fish consumption represents an exposure risk to the community. Additional efforts to address contamination of terrestrial organisms such as game edible plants should be explored.

4. Continued Exposure from Chat/Mine Tailings

The issue of the remaining chat piles and their potential for re-contamination of remediated soils has drawn considerable attention. Studies done by OUHSC have shown that dust in homes is the most important exposure source of lead for children; therefore, the potential for dust entering homes from chat or un-remediated soils remains an important health concern. Data show that ambient dust levels downwind from the chat piles could contribute significantly to the amount of lead in household dust; therefore, this factor should be stressed during the consideration of alternatives for the fate of chat. OUHSC has recently received notice that additional funding will be made available as part of the continuation of the TEAL project. In addition to continued intervention efforts in the community, the project will specifically focus on better characterizing the nature of household dust. Air samples will be taken in and outside of homes to determine lead levels and to evaluate the size of dust particles. Data will also be gathered on dust infiltration rates into homes and dust settling rates.

Occupational uses of chat and their role in adult and child exposures remain an area of considerable uncertainty. Data already collected shows that occupational exposure of a parent to chat significantly increases the risk of elevated blood lead levels in children. The effect of long-term exposure to workers is unknown and with the potential for increased use of chat, the number of workers exposed is likely to increase. Exposure monitoring is a relatively straightforward process; however, this type of monitoring requires cooperation by employers. The National Institute of Occupational Safety and Health is a potential funding source for such a project.

The number of homes in which chat was used as foundation backfill is a subject of considerable interest. The very limited assessment which has been conducted shows that this type of construction results in corrosion of ductwork with subsequent entry of lead-contaminate dust into homes; however, the number of homes with this type of construction is not known. Since many of these homes are outside of the Superfund area, testing and assessment are problematic. An additional concern is that homeowners may not want to have their homes tested. Because of legislation passed in the past few years, homeowners are now required to disclose if they have had their home tested for lead and the results of that testing. This bears obvious implications for potential real estate transactions.

5. Educational Activities

A strong educational effort is essential for reducing exposure to metals in Ottawa County. Although many exposure issues can be addressed through engineering controls and remediation, these efforts will take time; therefore, educational interventions, which have been shown to be effective in addressing many of the behaviors that contribute to exposure, should be implemented. Three goals have been established for addressing educational issues:

Goal #1 – Develop community-relevant health education and outreach strategies which will update and inform Ottawa County residents regarding the lead poisoning issues in the Tar Creek Superfund site and adjacent areas.

Objectives:

Development of:

- school curriculum
- mascot
- posters
- billboards
- community awareness projects

Goal #2 – Continued monitoring of blood lead levels in Ottawa County children with creation of a multipurpose database that facilitates tracking, sharing of information, and assisted measurement of community impact.

Objectives:

- screening of all Ottawa County children ages 6 months through 6 years
 - Head Start programs
 - Kindergartens
 - Day Care centers
 - WIC
 - Immunization clinics
- Creation of database

Goal #3 – Determine the incidence of Ottawa County children with learning disabilities from visual and/or cognitive deficits that represent barriers to education.

Objectives:

- Pilot project at NSU
 - 40 children with blood lead history
 - 20 high
 - 20 low
- School placement recommendation
- Teacher aid assistance for schools