

Asbestos

Technical Information Sheet

ATSDR Evaluation of Community-Wide Exposure to Naturally Occurring Asbestos

This fact sheet was written by the Agency for Toxic Substances and Disease Registry (ATSDR), a federal public health agency. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposure and disease related to toxic substances.

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INTRODUCTION

El Dorado Hills is one of many areas throughout the United States that has naturally occurring asbestos (NOA) in local soil and rock formations. Research on people who worked with commercial asbestos in the past has proven that breathing in asbestos increases the risk of cancer and respiratory disease. Some researchers believe the type of asbestos found in El Dorado Hills—amphibole asbestos—is more potent in causing disease than other types of asbestos.

ATSDR was involved in evaluating NOA exposures at Oak Ridge High School in El Dorado Hills in 2004-2006. Local residents, academic researchers, and environmental and public health agencies have expressed concern about potential community exposures to NOA in the wider community around El Dorado Hills. Activity-based sampling conducted by the U.S. Environmental Protection Agency (EPA) in 2004 showed that people performing typical outdoor recreational activities could breathe in high levels of NOA, compared to reference samples. Community members asked ATSDR what this finding meant to their health and what they should do to protect their health.

ATSDR's Health Consultation on Community NOA Exposure in El Dorado Hills

ATSDR has completed its evaluation of community exposures in El Dorado Hills. The report is available on ATSDR's web site and a CD or paper copy can be requested from ATSDR. The report was peer reviewed by independent experts, and a draft was available for public comment from March 29 to June 30, 2010. ATSDR visited the community in May 2010 to discuss the health consultation findings. The final health consultation responds to public comments received and clarifies ATSDR's conclusions and recommendations.



How Did ATSDR Evaluate the EPA Activity-based Sampling Data?

ATSDR worked with people from the area to develop reasonable assumptions about how often, throughout life, people would take part in the various activities represented by the EPA data. Using these assumptions, we developed asbestos exposure estimates for a range of outdoor activities. We considered both mid-range and high-end estimates of the amount of asbestos breathed in during each activity. In developing exposure estimates, ATSDR assumed all people were exposed to a background level of asbestos in the air. We used the EPA reference samples to represent this background level.

We used these exposure estimates with several different risk assessment methods to get a general idea of the additional risk of cancer this exposure might cause in the community at large. We used 5 risk assessment methods:

- The EPA "IRIS" method accepted for use in Superfund analyses.
- An EPA 1986 method which was the basis for the IRIS method and which specifically accounts for early life exposures. ATSDR applied updated mortality statistics in using this method.
- The Cal-EPA method typically enforced by the California Air Resources Board.
- ATSDR also examined a non-standard modification of the Cal-EPA method which uses a different method to obtain fiber concentration.
- The Berman Crump method, a proposed method not used for regulatory purposes. El Dorado Hills community members and stakeholders asked ATSDR to include this method because it assigns greater disease potency to amphibole asbestos – the type present in El Dorado Hills.

ATSDR compared the risk estimates to ranges used by EPA for determining acceptable risk at Superfund sites.

ATSDR also compared the EPA sampling data to other asbestos sampling data available from El Dorado Hills as part of its evaluation. The other data, while informative, was not detailed enough to use for risk assessment.

CONCLUSIONS

ATSDR reached two important conclusions:

Conclusion 1

Breathing in naturally occurring asbestos (NOA) in the El Dorado Hills area, over a lifetime, has the potential to harm people's health.

Basis for conclusion

- The general level of NOA in El Dorado Hills is somewhat higher than asbestos levels reported for other urban and rural areas in the U.S. and is similar to levels reported near local sources such as quarries. Activities that disturb NOA could result in brief exposures to higher levels of asbestos. (See Figure 1).
- Each of the four risk assessment methods used has considerable uncertainty, but they all gave similar results: the predicted increased risk of cancer ranged from too low to be of concern to a level high enough that action to prevent exposures would be warranted. (See Figure 2).
- Any one person could have markedly higher (or lower) exposures than the general estimates made in this report, depending on how and how often they encounter NOA in their daily activities.

Next steps

The following actions will reduce the likelihood for people to breathe NOA:

Increase Awareness

- El Dorado County should continue to review the community's knowledge about the presence and associated risk of NOA and to provide information about ways to manage the risk. ATSDR can provide technical assistance, if requested.
- El Dorado County should implement, to the extent possible, effective ways to:
 - » Maintain current records of locations known to contain NOA and
 - » Notify current and prospective landowners of the possibility for NOA to exist in soil or bedrock on their property.



Limit Exposure

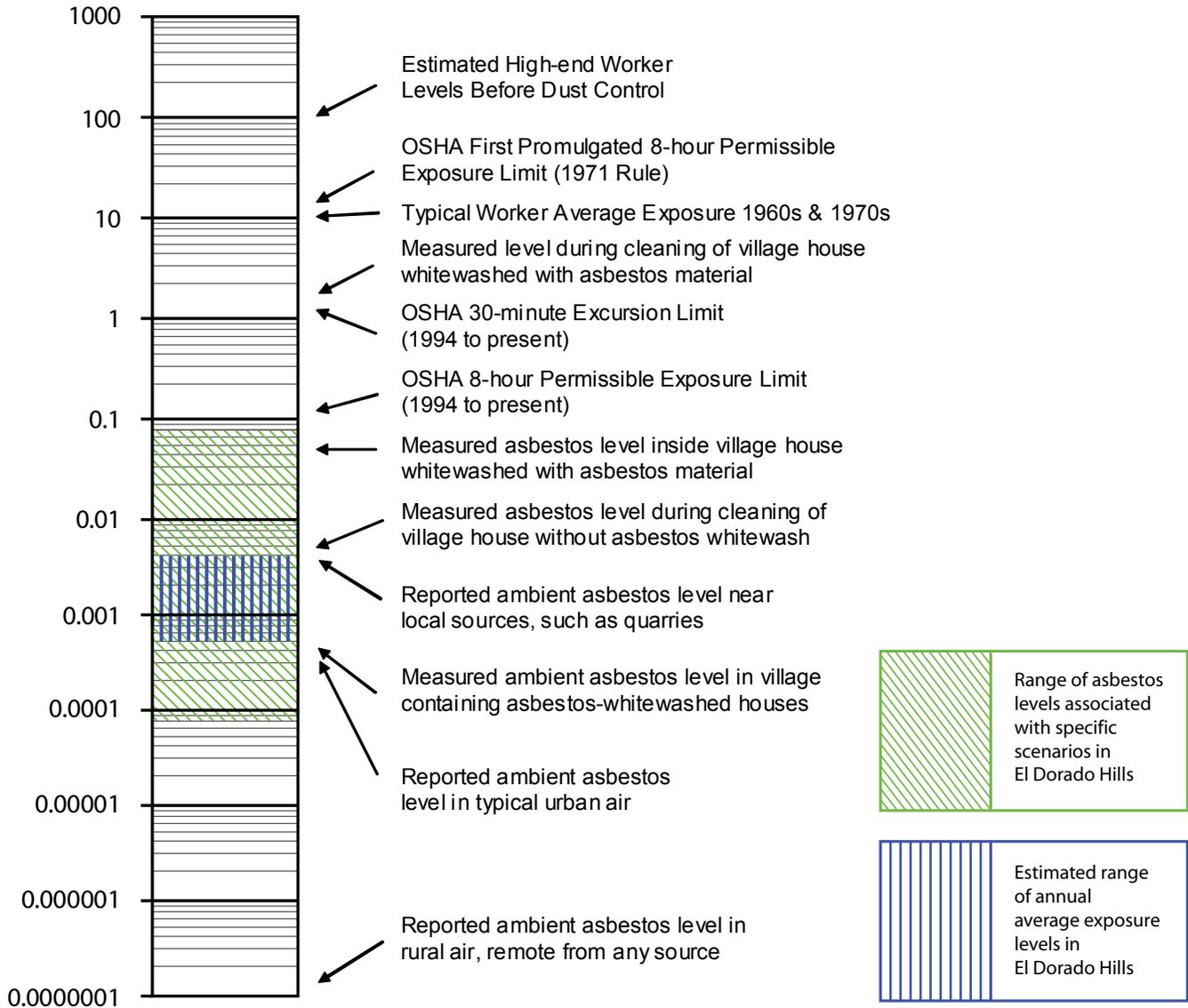
- State and local entities should continue to enforce applicable dust regulations throughout the community, which will reduce releases of NOA. For sites subject to asbestos hazard mitigation requirements, these regulations involve:
 - » Prohibition of visible dust emissions outside the property line or more than 25 feet from the point of dust-disturbing activities,
 - » Implementation of procedures to prevent vehicles and equipment from releasing dust or tracking soil off-site, and
 - » Requirements for asbestos dust mitigation plans, notification of authorities prior to work, and record-keeping.
- Community members and groups should learn how to reduce their exposure to NOA while conducting their normal activities. For example, exposure can be reduced by:
 - » Cleaning homes with a wet rag instead of a dry duster,
 - » Wetting down gardens before digging, or
 - » Staying on paved paths and roads during outdoor activities.

ATSDR has more recommendations online at: www.atsdr.cdc.gov/noa.

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Figure 1.

How Do the Levels of El Dorado Hills NOA Compare with Other Asbestos Levels?



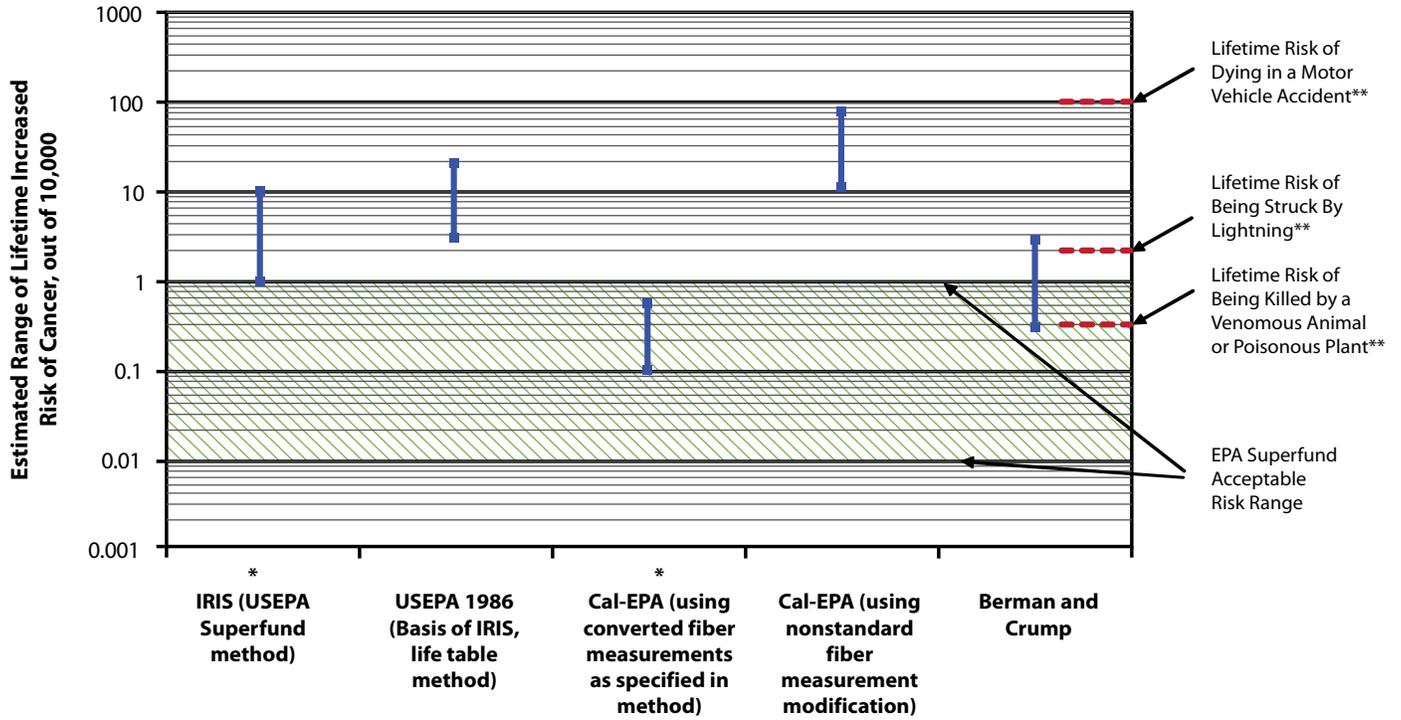
This schematic compares the range of asbestos levels measured for specific activities and estimated annual averages for El Dorado Hills with: general estimates of past worker exposure levels during a typical work day; “environmental” exposure levels for different situations in towns where local asbestos deposits were used for whitewashing houses (and people had increased rates of asbestos related disease); ambient asbestos levels reported for various locations in the United States; and past and present occupational 8-hour and 30-minute exposure limits. The estimates are placed on a “log” scale, which allows widely different values to be seen on the same graph—each heavy line is a value ten times the next lower heavy line. The overall exposure any person receives is a function both of the level and the length of time for which the exposure continues. The concentrations shown are approximate and are for comparison and context only.

SOURCES

- OSHA (Occupational Safety and Health Administration). Introduction to 29 CFR Parts 1910, 1915, 1926, occupational exposure to asbestos. 1994.
- Luce et al. Assessment of environmental and domestic exposure to tremolite in New Caledonia. Arch Env Health 2004;59(2):91-100.
- Agency for Toxic Substances and Disease Registry. Toxicological profile for asbestos (update). September 2001.
- Other assumptions described in ATSDR Health Consultation for El Dorado Hills, March 2010.

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Figure 2.
Ranges of Estimated Lifetime Increased Risk of Cancer from
NOA Exposure for Various Risk Assessment Methods



* Regulatory Methods

** General Risks estimated from Mortality Data and included at the request of community stakeholders for comparative purposes only.

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Conclusion 2

Reducing exposures to NOA will protect people's health and is warranted in El Dorado County based on estimates of past exposures. State cancer registry information indicates that the community's health has not been impacted at this time. However, health impacts to individuals from past exposures are highly variable and may take years before the cancer registry detects them.

Basis for conclusion

- The association between asbestos exposure and disease is well established. Preventing inhalation of asbestos will reduce risk of disease.
- Mesothelioma incidence, tracked by the California Cancer Registry, is not higher than expected in western El Dorado County at this time. However, mesothelioma may take decades after exposure to appear.
- Although the community in general is estimated to have an increased risk of exposure and disease, individuals' risk may vary widely due to the

sporadic nature of NOA occurrences and individual behaviors leading to exposure. Individual assessment by personal health care providers for those who are concerned about past exposures will be more efficient than general community screening in treating any health effects that may appear.

Next Steps

- State authorities should continue to monitor asbestos-related cancer incidence rates in the area.
- Community members should consult with their personal medical provider about their individual health concerns arising from NOA exposure.
- ATSDR encourages further research on NOA exposures and community health by governmental, academic, and other organizations. ATSDR may refine the conclusions and recommendations of this health consultation as results of ongoing asbestos research become available.



Photo of asbestiform tremolite, El Dorado County, California seen in hand sample (above) and scanning electron micrograph (left), courtesy of US Geological Survey, Denver Microbeam Laboratory.

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EVALUATION TIMELINE

Since the 2006 final release of our evaluation of exposures at Oak Ridge High School in El Dorado Hills, ATSDR has been actively working on issues related to this evaluation:

- ATSDR held an expert panel on biomarkers of exposure in 2006 to discuss the state of the science for assessing community exposure to asbestos. Although research continues, reliable methods for measuring asbestos exposures in individuals or communities are not currently available. Using activity-based sampling data and applying risk assessment methods remain the best way to assess community exposures and risk.
- ATSDR responded to the “cleavage fragment” issue raised by the National Stone Sand and Gravel Association (NSSGA) in December 2005. This group questioned whether the asbestos reported in the EPA sampling was truly asbestos or chemically identical but possibly less harmful “cleavage fragments”. Because discussions initiated after the release of the NSSGA report cast doubt on the findings of the EPA sampling, EPA requested a geologic analysis of the El Dorado Hills area by the U.S. Geologic Survey (completed in December 2006), and ATSDR requested toxicity studies on which particles contribute to asbestos-related health effects by the National Toxicology Program (studies will take several years to complete).
- ATSDR identified additional analysis that needed to be done on the air sampling filters to allow us to use the risk assessment method that accounts for differing toxicity of amphibole asbestos. Obtaining funding and completing the lab analyses were time consuming; results were not available until late 2007.
- ATSDR also developed and tested a “life table analysis” spreadsheet to account for early life exposures. Although this work was based on that of other researchers, ATSDR updated mortality data, developed an in-house spreadsheet to perform calculations, and developed a written explanation of the theory behind the analysis. We completed these tasks in 2008.
- A draft of the report was sent to external peer review in 2009. The document includes peer review comments and responses/changes made in responses to the comments received.

- ATSDR released a draft health consultation for public comment in 2010. The final health consultation includes changes and responses to public comments received, as detailed in an Appendix.

LEARNING MORE

To learn more, please call ATSDR at 1-800-CDC-INFO and ask for information about the “El Dorado Hills Naturally Occurring Asbestos” site. If you have concerns about your health, you should contact your health care provider.



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**U.S. Department of
Health and Human Services**
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and Disease Registry