

# Testing for Beryllium Sensitization

## A Community Service

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BRUSH WELLMAN ELMORE PLANT  
(a/k/a BRUSH WELLMAN INCORPORATED)

ELMORE, OTTAWA COUNTY, OHIO

EPA FACILITY ID: OHD004212999

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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

## **Introduction**

In 2001, Senator Mike DeWine wrote a letter to Dr. Jeffrey Koplan, former Director/Administrator, Centers for Disease Control and Prevention (CDC)/ Agency for Toxic Substances and Disease Registry (ATSDR), regarding possible beryllium (Be) exposures from the Brush Wellman Inc. facility in Elmore, OH. The letter stated that:

*Specifically, I would like you to determine whether beryllium particles carried off-site on workers clothes and shoes and emissions from the plant pose a risk to residents in the community.*

### *Initial Assessment*

In response, ATSDR reviewed what was known about beryllium (Be) releases at this facility. ATSDR concluded that current releases were not a public health hazard. The health risk from past releases could not be determined because of insufficient information. ATSDR concluded that testing for beryllium sensitization was warranted for persons who were concerned about past exposures. This testing was offered as a community service.

## **Background**

### *Beryllium Sensitization and Disease*

Some people who are exposed to beryllium develop an immune sensitivity (BeS). The beryllium lymphocyte proliferation test (BeLPT) can detect persons who are sensitized to beryllium. Among these sensitized persons, more than one-half develop chronic beryllium disease (CBD), a scarring lung disease that resembles sarcoidosis [Newman et al. 2004]. Additional medical testing is required to distinguish between BeS and CBD

### *Deaths Among Ohio Residents*

ATSDR reviewed a listing of CBD deaths among Ohio residents from 1990 to 2003. These data were made available to ATSDR from the Ohio Department of Health. The death certificates of 20 Ohio residents who died during this period listed beryllium disease as the underlying cause of death.

### *Deaths Among Area Residents*

The actual numbers were small, but during this period the cumulative mortality rate from CBD per 100,000 persons among the 88 Ohio counties was highest in the counties of Ottawa (7.32), Sandusky (3.24), and Wood (2.48). Limited occupational information was available from these death

certificates. Of the eight deaths in Ottawa, Sandusky, and Wood counties, the occupations of four individuals suggested exposure to beryllium at work. Death certificates for two additional deaths provided a *possible* link to workplace exposure. Occupational information on the two remaining death certificates did not suggest beryllium exposure at work.

*Additional information from Brush Wellman Inc.*

ATSDR asked Brush Wellman Inc. to determine whether the eight residents of Ottawa, Sandusky, and Wood counties who died from CBD from 1990 to 2003 had been employed at their facility. Brush Wellman Inc. responded that "Seven of the eight deaths listed had been Brush Wellman employees. " The years worked at the facility for these seven persons ranged from 4 to 38 years. The average number of years they worked was 22 years.

Brush Wellman Inc. also identified the remaining death from CBD as the spouse of a Brush Wellman Inc. employee. When this person became ill, the initial – though incorrect - diagnosis was sarcoidosis, a lung disease that resembles CBD. While this person may have had more than one exposure route, beryllium sensitization (BeS), and chronic beryllium disease (CBD) are known to occur among persons who share households with beryllium workers.

*Community Requests for Testing*

During the public comment period, ATSDR was contacted by over 20 members of the community who requested testing for beryllium sensitization. Those asking to be tested included individuals who reported living with a Brush Wellman Inc. worker, living near the facility, or having been diagnosed with sarcoidosis. Some people who reported a diagnosis of sarcoidosis had not been evaluated for CBD.

*Public Comment*

In April 2006 ATSDR released a draft of this community service plan for public comment. ATSDR also provided information to the community by direct mailings and advertisements placed in the local media.

On April 25, 2006, ATSDR traveled to Ottawa County, Ohio and held both a community availability session for interested people and conducted an expert panel meeting to discuss the proposal. People interested in testing contacted ATSDR by phone or in person at the community meeting.

The final plan, the Expert Panel Report, and ATSDR's responses to comments were released on June 16, 2006. They are available at the following internet site: <http://www.atsdr.cdc.gov/sites/brushwellman/index.html>.

## Methods

ATSDR offered to test up to 200 persons in the Elmore area who expressed interest in having the test and were current or former

- household contacts of Be workers,
- local machinists who worked with Be alloys,
- residents who lived within 1.25 miles of the facility, or
- area residents with a diagnosis of sarcoidosis.

Because Brush Wellman Inc. already tests employees with the BeLPT, their employees were not tested.

### *Criteria for Sensitization*

ATSDR used information from the panel of experts to select criteria for beryllium sensitization. For this testing plan (only), sensitization was defined as two abnormal BeLPT results – any initial borderline or abnormal test would require a second blood draw with testing at two different laboratories.

### *Validation*

Validation of each exposure category was done with the permission of participants. Also, for those participants who told us they had sarcoidosis, ATSDR contacted personal health care providers to verify the diagnosis.

The Ottawa County Health Department (OCHD) assisted ATSDR in verifying the distance of each home from the Brush Wellman Inc. facility and that certain persons were household contacts of facility employees. The OCHD agreed to maintain the privacy of participants who made available their personal information.

## Results

In July 2006, ATSDR staff went to Elmore, Ohio to test people for beryllium sensitivity.

### *Participants*

Twenty people requested testing. Sixteen of them allowed us to share their information with the OCHD for validation. After this process was complete, ATSDR grouped these 20 people as follows:

- 3 were household contacts of Be workers and nearby residents,
- 7 were household contacts of Be workers and not nearby residents,

- 8 were nearby residents (within 1.25 miles of the facility) who *were not* household contacts of Be workers, and
- 2 were *not eligible* for inclusion in this report

There were 18 eligible persons tested with the BeLPT.

- One person tested had an initial *borderline* test result that required collection of a second blood specimen. The second specimen was split and sent to two separate laboratories for testing. Both laboratories reported normal results.
- A second person required collection of a second specimen, because the original was considered inadequate for testing. The result of this second test was normal.
- Sixteen of the eligible 18 persons had a single blood specimen drawn and a single normal BeLPT test result.
- All individuals tested were considered normal.

## Discussion of Findings

ATSDR provided a community service by testing people who were concerned about beryllium exposure. ATSDR was prepared to test up to 200 people. In fact, 20 persons asked for and received testing; eighteen of them could be included in one or more of the possible exposure categories. All of the participants had normal test results; none met the case-definition for beryllium sensitization.

One person tested was taking prednisone for an underlying illness. Prednisone can make BeLPT test results unreliable and the results for this individual must be interpreted with caution. Participation and interest in the community survey was low. This may be related to ATSDR's earlier findings that current beryllium emissions from Brush Wellman Inc. did not represent a health hazard. Additionally, some people may not have been aware of this testing opportunity.

The community service had several limitations. First, it was not designed to determine the prevalence of BeS in the community. Secondly, the BeLPT has a fairly high rate of false negative results; that is approximately 30% of people who are sensitized will have normal results (Stange, et al. 2004).

## Summary

ATSDR conducted a community service by providing testing for beryllium sensitization to those community members who were concerned about historical exposures to beryllium from the Brush Wellman Inc. facility. Community interest in the testing was modest. Twenty people requested testing and 18 were designated as eligible.

At least one household contact of a Brush Wellman Inc. employee had a sarcoidosis diagnosis, but had not been previously tested for BeS. All participants had normal results. The results of one individual taking prednisone therapeutically should be interpreted cautiously.

It is reassuring that no one from the local community was identified as sensitized. The possibility remains, however, that other people living in the community who do not work with beryllium have been sensitized.

## Recommendations

- 1) No sensitized individuals were identified among the small group of persons who were tested. ATSDR is not recommending additional community-based testing at this time.
- 2) The Ottawa County Health Department will provide additional information to area physicians regarding BeS and CBD. This will include identifying Be exposure, testing for sensitization, and referral for evaluation by specialists.

## References

Newman LS, Mroz MM, Balkissoon R, Maier LA. Beryllium sensitization progresses to chronic beryllium disease: a longitudinal study of disease risk. Sept 16, 2004: doi:10.1164/rccm.200402-1900C.

Stange AW, Furman FJ, Hilmas DE. The beryllium lymphocyte proliferation test: relevant issues in beryllium health surveillance. *American Journal of Industrial Medicine* 2004; 46: 453-462.

Please contact Dan Middleton, MD, MPH, for questions about this report. You can reach him by phone at 1-404-498-0565, or by email at [dmiddleton@cdc.gov](mailto:dmiddleton@cdc.gov).

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