# Sumas Mountain / Swift Creek Asbestos Cluster Investigation

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Patrick Vander Kelen, MPH
Glen Patrick, MPH

Environmental Epidemiology
Division of Environmental Public Health
Washington State Department of Health


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## Sumas Mountain / Swift Creek Asbestos Cluster Investigation

This report is a follow-up to the Washington State Department of Health epidemiologic cluster investigations conducted in 2008 and 2010 of health effects resulting from possible exposure to naturally occurring asbestos in the Swift Creek drainage located in Whatcom County, Washington.[1] Human exposure to naturally occurring asbestos is possible from both undisturbed asbestos-containing streambed materials as well as from materials moved off-site for use as fill. The Site Assessment Section within the Office of Environmental Health, Safety, and Toxicology requested this update.

The goal of this investigation was to assess the rate of lung and bronchial cancer, mesothelioma, and asbestosis among people living in the study area compared to rates for Whatcom County and the state overall using additional years of data. While mesothelioma and asbestosis are relatively rare and specifically linked to asbestos exposure, lung and bronchial cancer is more common and is associated with numerous factors, especially smoking. We hypothesized that the population living in the study area is more likely to be exposed to asbestos than other Washington residents and therefore, might experience a higher rate of asbestosis or asbestos related cancer (such as cancer of the lung and bronchus, and mesothelioma) than the county or the state.

## Methods

To address these goals, the Washington State Cancer Registry (WSCR) provided data on cases of mesothelioma and lung and bronchial cancer from 1992 through 2011 for the state. The Comprehensive Hospital Abstract Reporting System (CHARS) provided records for patients hospitalized with asbestosis from 2003 through 2011. Population data were obtained from the 2010 U.S. Census.

Rate calculations for mesothelioma and lung and bronchial cancer included five additional years of data compared to the 2010 investigation. The geographic region included in this investigation remained identical to the 2010 investigation which included census block groups that encompass the Swift Creek drainage and the Sumas River area to the Canadian border (Figure 1). Cancer data for the twenty-year period were combined because of the small number of both cancers among the population of Whatcom County as a whole, and especially among the population living within the selected census blocks comprising the study area.

The smallest geographic designation in CHARS is Zip code. The asbestosis study area encompassed six zip codes in Whatcom County (Figure 1) and expanded the geographic region of the analysis resulting in a larger area than the area studied for lung and bronchial cancers and mesothelioma. We limited asbestosis data to the years 2003-2011 because one of the zip codes in the study area split in 2002. This split made analyzing data from 1992-2002 unreliable since it was unknown which cases of asbestosis fell within the current zip code of interest.

Because the likelihood of these diseases increases with age, rates were age-adjusted to account for differences in the population age structure between Whatcom County, the study area, and the state overall.[2] We calculated age-adjusted rates per 100,000 population along with 95 percent confidence

[1] Washington State Department of Health. Health Consultation: Swift Creek Sediment Asbestos Site, Everson, Whatcom County, Washington. February 22, 2008. Available at URL: http://www.atsdr.cdc.gov/HAC/pha/SwiftCreekAsbestos/SwiftCreekAsbestos_2-22-2008.pdf

[2] In order to compare rates across the three population groups an age-adjustment was employed using the State of Washington's population as the standard. Age-adjustment practices are used to help minimize the influence of age when comparing rates or counts between populations.

intervals (CI) for asbestosis, mesothelioma and lung and bronchial cancer for residents of Whatcom County, the study area, and the state. Confidence intervals provide a measure of the variability of an estimate, such as the rate calculations for this investigation. Confidence intervals can also be used to assess whether two values are significantly different or whether the values are simply different due to chance alone.[3]

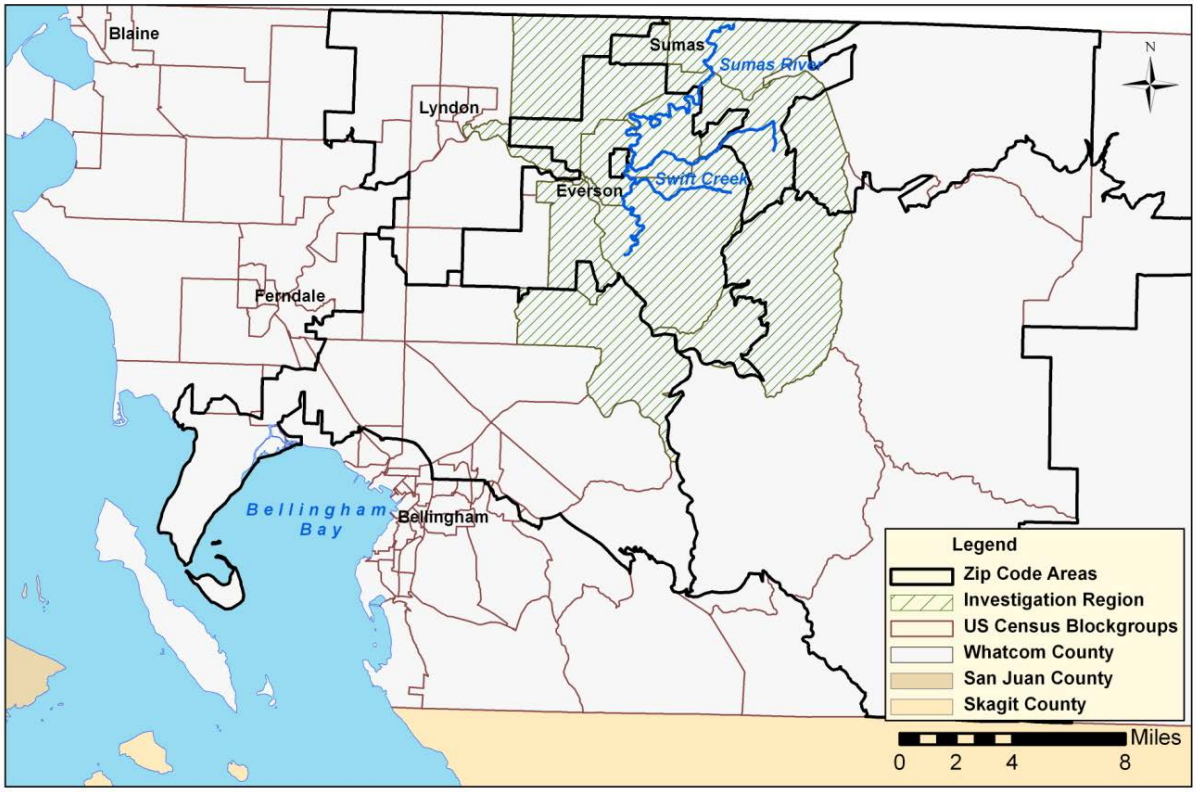


Figure 1. Swift Creek-Sumas River Study Area.

## Results

### Lung and Bronchial Cancer

Between 1992 and 2011, WSCR recorded 2,080 cases of lung and bronchial cancer in Whatcom County, resulting in an age-adjusted rate of 980 cases per 100,000 population.[4] This rate was less than the overall rate for Washington State (1206 cases per 100,000) and was lower than would be expected by chance alone. Within the study area, the rate for lung and bronchial cancer was 1044 per 100,000 and while lower than the state rate and higher than the county rate, the confidence intervals suggest that these finding are not statistically significantly different and may be higher or lower due to chance alone (Table 1).

[3] For more information on the use of confidence intervals for public health see: http://www.doh.wa.gov/Documents/5500/ConfIntGuide.pdf

[4] Since the last report, the inclusion of 2007-2011 data resulted in an additional 631 cases of lung and bronchial cancer for the analysis.

**Table 1. Lung and Bronchial Cancer Data (1992 – 2011)**

| Geographic Area | 2010 Census Population | Age-adjusted Rate per 100,000 | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| **Washington State** | 6,724,540 | 1206 | 1197 | 1214 |
| **Whatcom County** | 201,140 | 980 | 938 | 1023 |
| **Swift Creek/Sumas River Study Area** | 15,874 | 1044 | 886 | 1223 |

**Mesothelioma**

Between 1992 and 2011 the age-adjusted rate for mesothelioma in Washington State was 27 cases per 100,000 population, the rate for Whatcom County was 25 per 100,000, and the rate for the study area was 21 per 100,000 (Table 2). These differences are relatively small and are not significantly different – they might have occurred by chance alone.

**Table 2. Mesothelioma Cancer Data (1992 – 2011)**

| Geographic Area | 2010 Census Population | Age-adjusted Rate per 100,000 | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| **Washington State** | 6,724,540 | 27 | 26 | 28 |
| **Whatcom County** | 201,140 | 25 | 19 | 32 |
| **Swift Creek/Sumas River Study Area** | 15,874 | 21 | 4 | 61 |

**Asbestosis**

Between 2003 and 2011 the age-adjusted rate for asbestosis in Washington State was 69 cases per 100,000 population and the rate for Whatcom County was lower at 61 cases per 100,000 population, however, this difference was not found to be statistically significant. Within the study area, the rate for asbestosis was 64 per 100,000 population. The age-adjusted rate for the Swift Creek/ Sumas River Study area was not significantly different from the rates for the state or for Whatcom County (Table 3).

**Table 3. Asbestosis Data (2003– 2011)**

| Geographic Area | 2010 Census Population | Age-adjusted Rate per 100,000 | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| **Washington State** | 6,724,540 | 69 | 67 | 71 |
| **Whatcom County** | 122,888+ | 61 | 49 | 77 |
| **Swift Creek/Sumas River Study Area** | 78,252* | 64 | 48 | 83 |

+ The population of Whatcom County minus the population of Swift Creek/ Sumas River study area.

*The aggregated population comprising the six zip codes in which Swift Creek/Sumas River drainage area intersects.

## Conclusions

The results of this analysis are consistent with study results provided previously and provide no indication that naturally occurring asbestos in the study area consisting of the Swift Creek/Sumas River drainage area has contributed to an increase in the occurrence of lung and bronchial cancer, mesothelioma, or asbestosis among the potentially exposed population.

The age-adjusted rate for lung and bronchial cancer among the population in Whatcom County was found to be lower than the state rate by more than would be expected by chance alone. The age-adjusted rate for the study area consisting of the Swift Creek/Sumas River drainage area, while being lower than the state rate and higher than the county rate, was not significantly different and may have occurred by chance alone.

For mesothelioma, the age-adjusted rate for the population in both Whatcom County and the Swift Creek/Sumas River drainage area, while lower than the rate for the state overall, was not significantly different and may have occurred by chance alone.

The age-adjusted rate for asbestosis in Whatcom County was lower than the state rate; however, this was not statistically significant and may have occurred by chance alone. The Swift Creek/Sumas River zip code study area age-adjusted rate was lower than the state and higher than Whatcom County rates; however, this was not statistically significant and may have occurred by chance alone.

These conclusions, however, are based on available data and analytic methods at our disposal, both of which have limitations. With regard to mesothelioma, we have limited ability to identify with certainty small increases or decreases due to the relatively small number of cases among the Whatcom County and study area populations. Thus, we cannot distinguish minor increases or decreases from random fluctuations. Additionally, the number of cases reported for Whatcom County and the study area may under or over represent the true number of cases resulting from local asbestos exposure. This is due to the long disease latency period[5] (time between exposure and disease occurrence) and population migration. The use of zip code level data also poses limitations on the investigation in that it is not possible to distinguish which cases are located in the Swift Creek/Sumas River drainage area and which cases are outside the study. This limitation could lead to either an overestimation or underestimation of asbestosis cases within the study area. Because of these limitations, the Department of Health continues to recommend that people reduce or eliminate their exposure to naturally occurring asbestos associated with Swift Creek and the Sumas River.

[5] Medline Plus, Mesothelioma. http://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v%3Aproject=medlineplus&query=mesothelioma Accessed Oct. 7, 2009.