

Sumas Mountain / Swift Creek Asbestos Cluster Investigation

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Sumas Mountain / Swift Creek Asbestos Investigation Update 2021

Background

The purpose of this report is to update the data for the Sumas Mountain – Swift Creek area of Whatcom County. This area has been the on-going subject of an investigation into possible health effects due to naturally occurring asbestos in the Swift Creek drainage area.¹ Possible human exposure to naturally occurring asbestos may occur when material from the stream bed are moved off-site for use as fill, or even from undisturbed stream bed materials that contain asbestos. The Environmental Health Division of the Whatcom County Health Department has requested this update.

Like the previous investigations, 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 are more common and are 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.

Methodology

The current cluster investigation includes cases occurring between 1999-2018, inclusive, for lung and bronchus cancer and for mesothelioma. Cancer incidence cases for lung and bronchus, and especially mesothelioma, are small so years of data were combined. Even using a combined dataset of 20 years results in small numbers, particularly for the small geographic area(s) of interest. The hospitalization data (asbestosis) presents additional challenges. Due to changes in hospital diagnosis coding in mid-year 2015, the asbestosis data included in the analysis are inpatient hospital cases from 2003-2014 and 2016-2018. The 2015 data have been excluded because these data were coded using one system for the first three quarters and a new system for the final quarter, without a comparability crosswalk for the two systems, leading to a break in the data. The lung and bronchus cancer and mesothelioma cancer data were acquired through the [Washington State Cancer Registry](#) database (WSCR). The asbestosis hospitalization data were obtained through the in-patient [Comprehensive Hospital Abstract Reporting System](#) (CHARS), using the nine diagnosis fields available in the hospital data file.

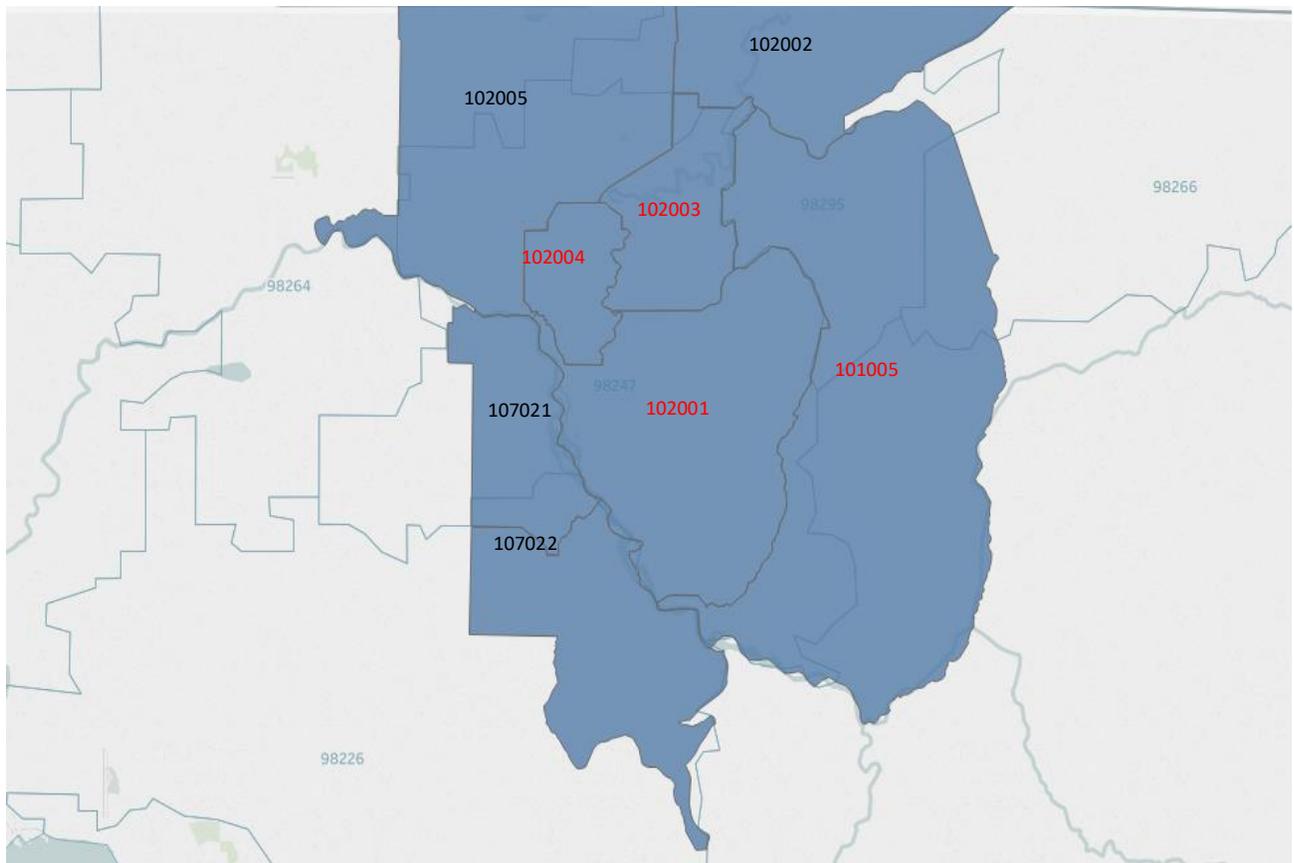
The data were analyzed using age-adjusted rates. Age-adjusted rates are employed when comparing rates across different geographies to account for a potential difference in the distribution of the population by age. In addition, because these cancers tend to present in middle to older age adults, the lung and bronchus cancer data were analyzed using age-specific rates for those 40 years old and older. Using a more focused age group removes the potential of diluting the rate from a large subset of the population that does not experience the condition. There were no lung and bronchus cancers in those under 40 years of age during this time period for Whatcom county. For mesothelioma and asbestosis, the counts in Whatcom county, the Swift Creek ZIP codes*, and the Swift Creek Area**, due to very small numbers, only age-adjusted rates were used. In addition to the rates, 95% confidence intervals were calculated. The confidence interval shows a range of certainty around the rate and allows for

comparison with other rates. Census tract data were not available for asbestosis because this level of geography is not available in the CHARS dataset.

The rates for this analysis differ from those in the previous analysis due to a difference in calculation methods. In the previous analyses, the sum of the case counts was divided by a single year of population. This method did not account for the total person-years represented in the count of cases.² In the current analysis, the sum of the case counts was divided by the total population across all of the years in the analysis, which accounts for the total person-years in the rate calculation. This method calculates a rate that more accurately represents the rate for this population.

In addition to the above-mentioned differences, the geographic area has changed since the initial 2008 report (Block Groups in red). These geographic area changes are expected due to population growth. When each census is completed (occurring every ten years) there are changes in census tracts, block groups and blocks.^{1,2} The census block groups used for this update reflect those used in the 2013 update and are based on the 2010 census.

Figure 1. Census block groups with surrounding ZIP codes analyzed for the 1999-2018 update



For asbestosis, hospitalizations were identified using the primary diagnosis field, which is the main reason the individual was admitted to the hospital, and by using nine diagnosis fields. Unlike the cancer incidence data, these data represent patient visits (admissions) not individual patients.

Results

Lung and Bronchial Cancer

The results for lung and bronchus cancer show a similar pattern that was identified in the 2008 and 2013 studies. Between 1999 and 2018, there were 84,623 lung and bronchial cancer cases in Washington State, with an age-adjusted rate of 61.7 per 100,000 (Table 1). The state rate was similar to that in Whatcom county (2492 cases with an age-adjusted rate of 59 per 100,000). Within the Swift Creek Area (census tract block groups), the lung and bronchial cancer age-adjusted rate was 71.5 per 100,000, higher than the state and county rates however, it is based on small numbers (average number of cases per year =8.5) and confidence intervals that overlap those for the state. This finding is not statistically significantly different and may be higher due to chance alone.

For those 40 years old and older, the age-specific rates for lung and bronchus cancers between 1999 and 2018 were: 140.0 per 100,000 in Washington state, 140.3 per 100,000 in Whatcom county, and 136.4 per 100,000 in the Swift Creek Area rate (Table 2). The Swift Creek Area age-specific rate was slightly higher compared to the other geographic areas; however, the confidence intervals indicate this difference is also not statistically significant.⁴

Table 1: Lung and Bronchus Cancer Incidence* (1999-2018)

Geographic Area	Average Annual Population	Age-Adjusted Rate per 100,000	95% Confidence Interval	
			Age-Adjusted Lower Bound	Age-Adjusted Upper Bound
Washington State	6,587,917	61.7	61.3	62.2
Whatcom County	193,972	58.5	56.2	60.9
Swift Creek Area**	13,014	70.7	31.8	140.7

Table 2: Lung and Bronchus Cancer Incidence* (age-specific rates: 40 years and older) 1999-2018

Geographic Area	Average Annual Population	Age-Specific Rate per 100,000	95% Confidence Interval	
			Age-Specific Lower Bound	Age-Specific Upper Bound
Washington State	3005715	140.0	139.0	140.9
Whatcom County	88235	140.3	134.9	145.9
Swift Creek Area**	5722	136.4	62.1	286.2

**Census Tract Block Groups: Matching the original study block groups area (102003, 102004, 101005, 102001), including additional Census block groups from the last update 102002, 102005, 107021, 107022)

Mesothelioma

Between 1999 and 2018, the age-adjusted rate for mesothelioma (Table 3) was 1.3 per 100,000 for the state and 1.2 per 100,000 for Whatcom county, and 0.8 per 100,000 in the Swift Creek area. The confidence intervals suggest that these rates were not statistically different, and the difference may be

due to chance. These rates were also not reliable due to the small numbers (average annual count: Washington State = 90; Whatcom county = 3; Swift Creek area = <1).

Table 3: Mesothelioma Cancer Incidence* (1999-2018)

Geographic Area	Average Annual Population	Age-Adjusted Rate per 100,000	95% Confidence Interval	
			Age-Adjusted Lower Bound	Age-Adjusted Upper Bound
Washington State	6,587,917	1.3	1.3	1.4
Whatcom County	193,972	1.2	0.9	1.6
Swift Creek area**	13,014	0.8	0.2	3.1

**Census Tract Block Groups: Matching the original study block groups area (102003, 102004, 101005, 102001), including additional Census block groups from the last update 102002, 102005, 107021, 107022)

*Cancer Incidence data from the Washington State Cancer Registry (WSCR), accessed through the Community Health Assessment Tool (CHAT), August 2021

Asbestosis

For 2003-2019, there were no in-patient asbestosis hospitalizations in Whatcom County or the Swift Creek ZIP codes when using only the primary diagnosis field. When using all nine diagnosis fields, the average annual number of asbestosis hospitalizations was: 377 (WA State); 10 (Whatcom County); and 5 (Swift Creek Zip codes). Table 4 shows the age-adjusted rates for asbestosis in-patient hospitalizations during the years 2003-2019 using nine diagnosis fields. The confidence intervals suggest that these rates were not statistically different, and the difference may be due to chance.

Table 4: Asbestosis Hospitalizations^ (2003-2019) ****

Geographic Area	Average Annual Population	Age-Adjusted Rate per 100,000	95% Confidence Interval	
			Age-Adjusted Lower Bound	Age-Adjusted Upper Bound
Washington State	6797067	5.4	4.9	6.0
Whatcom County	201671	3.9	1.8	7.8
Swift Creek ZIP codes***	77964	6.0	2.1	14.6

***ZIP codes: 98226, 98244, 98247, 98264, 98266, 98295

****ICD-9: 501; ICD-10: J61. The change in ICD coding (ICD9 - ICD10) for hospitalizations in October 2015. These data include this year by users are cautioned that there were no recordings of J61 in the 2015 hospital discharge file (CHARS).

^Hospitalizations for Asbestosis from the Comprehensive Hospital (CHARS), using nine diagnosis fields accessed through the Community Health Assessment Tool (CHAT), August 2021

Conclusion

The analysis of the risk from naturally occurring asbestos within the Swift Creek area indicates no increase in the risk of lung and bronchial cancer, mesothelioma or asbestosis hospitalizations. These findings are consistent with previous studies of this area.

There are several limitations to this study. The small numbers of events over the combined twenty-year period, particularly for mesothelioma and asbestosis, in the area(s) of interest limits our ability to reliably distinguish small increases or decreases in the rates from random fluctuations. Furthermore, the long latency of these diseases (time elapsed between exposure and disease onset) and population migration presents issues in determining the exposure location.³ Finally, the ZIP code level data cover an area that is considerably larger than the immediate Swift Creek /Sumas River drainage area, making it difficult to determine which cases actually occurred within this study area. These limitations may lead to an over or under estimation of the risk from the naturally occurring asbestosis. Given these limitations, the Department of Health recommends that people continue to reduce or eliminate their exposure to the Swift Creek area and the Sumas River.

¹ https://www.atsdr.cdc.gov/hac/pha/SwiftCreekAsbestos/SwiftCreekAsbestos_2-22-2008.pdf

² <https://www.whatcomcounty.us/DocumentCenter/View/40419/62--DOH-Cluster-Investigation?bidId=>

³ Medline Plus, Mesothelioma. <http://vsearch.nlm.nih.gov/vivisimo/cgi-bin/querymeta?v%3Aproject=medlineplus&query=mesothelioma>
Accessed September 10, 2021.

⁴ <https://www.doh.wa.gov/Portals/1/Documents/1500/ConfIntGuide.pdf>