

UBC CENTRE FOR
HEALTH SERVICES AND
POLICY RESEARCH



Estimation of the Number of Lung Cancer Cases Attributable to Asbestos Exposure



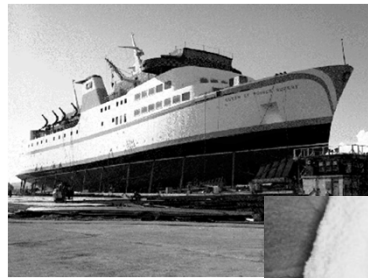
THE UNIVERSITY OF BRITISH COLUMBIA

WORK SAFE BC

WORKING TO MAKE A DIFFERENCE

BC Asbestos Statistics

- Approximately 55,000 BC men and women exposed in 1971 in high exposed industries
- Significant exposure in other industries – service, government
- The latency period for mesothelioma estimated to be up to 40 or more years from first exposure ¹
- From the following industries and occupations:
 - Shipyard Workers
 - Seamen
 - Mining and Milling
 - Asbestos Products Manufacture
 - Brake Repair
 - Boiler Shops
 - Craftsmen
 - Asbestos Cement Pipe Installers
 - Hot industries and maintenance



BC Lung Cancer and Mesothelioma Statistics

Number of Lung Cancer Cases Diagnosed in BC – 3 year average

Year	2005	2006	2007	Average
Male	1489	1454	1628	1524
Female	1323	1329	1462	1371
Total	2812	2783	3090	2895

Number of Mesothelioma Cases Diagnosed in BC – 3 year average

Year	2005	2006	2007	Average
Male	56	79	66	67
Female	13	13	9	12
Total	69	92	75	79

BC Cancer Agency, December 2009

Cohort Studies Methods: Ratio of Excess Lung Cancer to Mesotheliomas

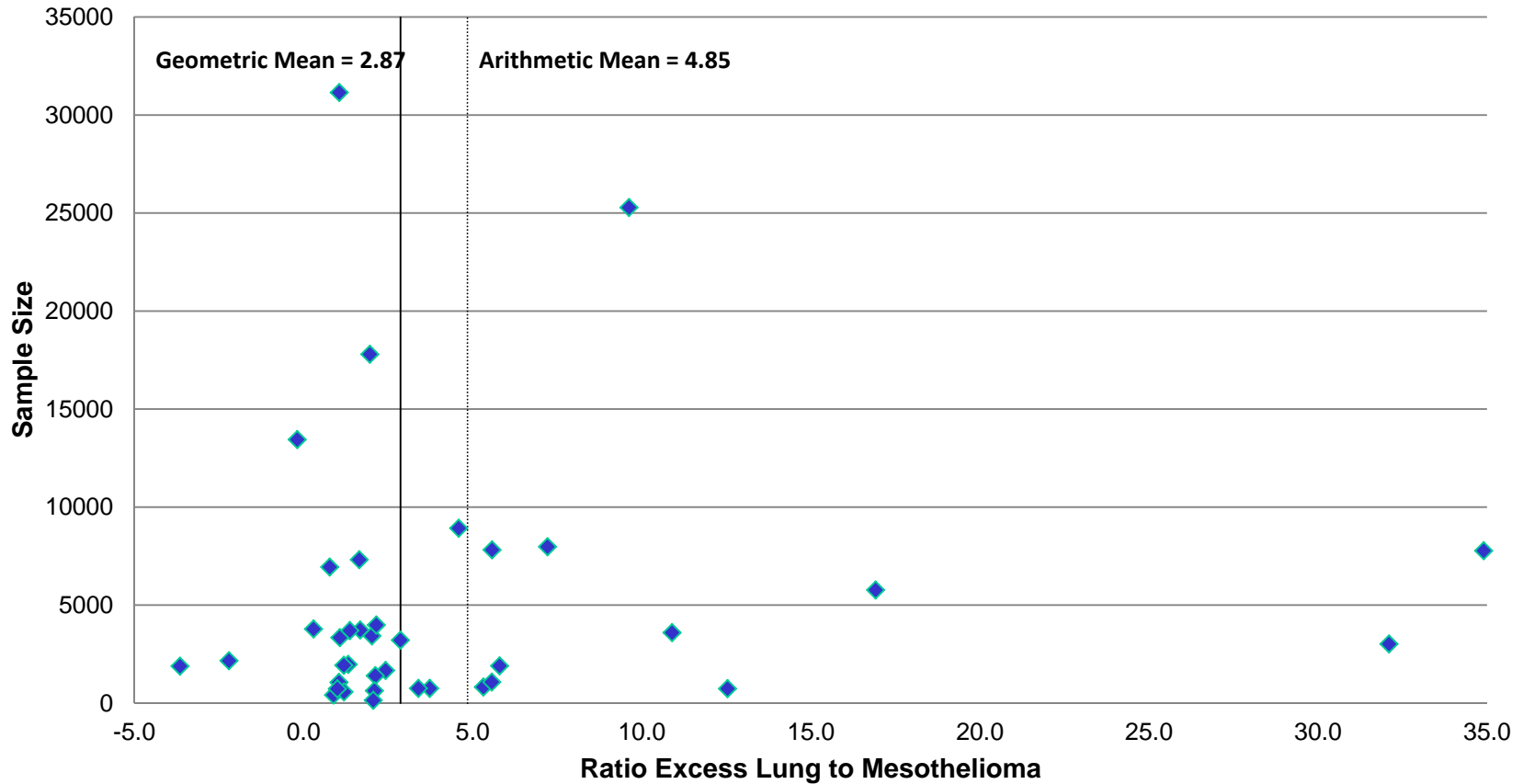
- Used the same cohort studies as those selected by the committee of the IOM that published the 2006 report *Asbestos: Selected Cancers* ²
- Some articles from the original IOM report were excluded :
 - No mesotheliomas were reported for the cohort (4 studies)
 - Lung cancer and mesothelioma numbers were combined when reported (1 study)
 - The cohort was patient-based rather than occupational (4 studies)

Cohort Studies Methods: Ratio of Excess Lung Cancer to Mesotheliomas

- A literature search was completed to update the list
 - One study was added from a new cohort
 - Five cohorts with studies in the IOM report were updated with more recent articles
- There 38 were studies used in total
- Funnel plots used to determine best measure of centre

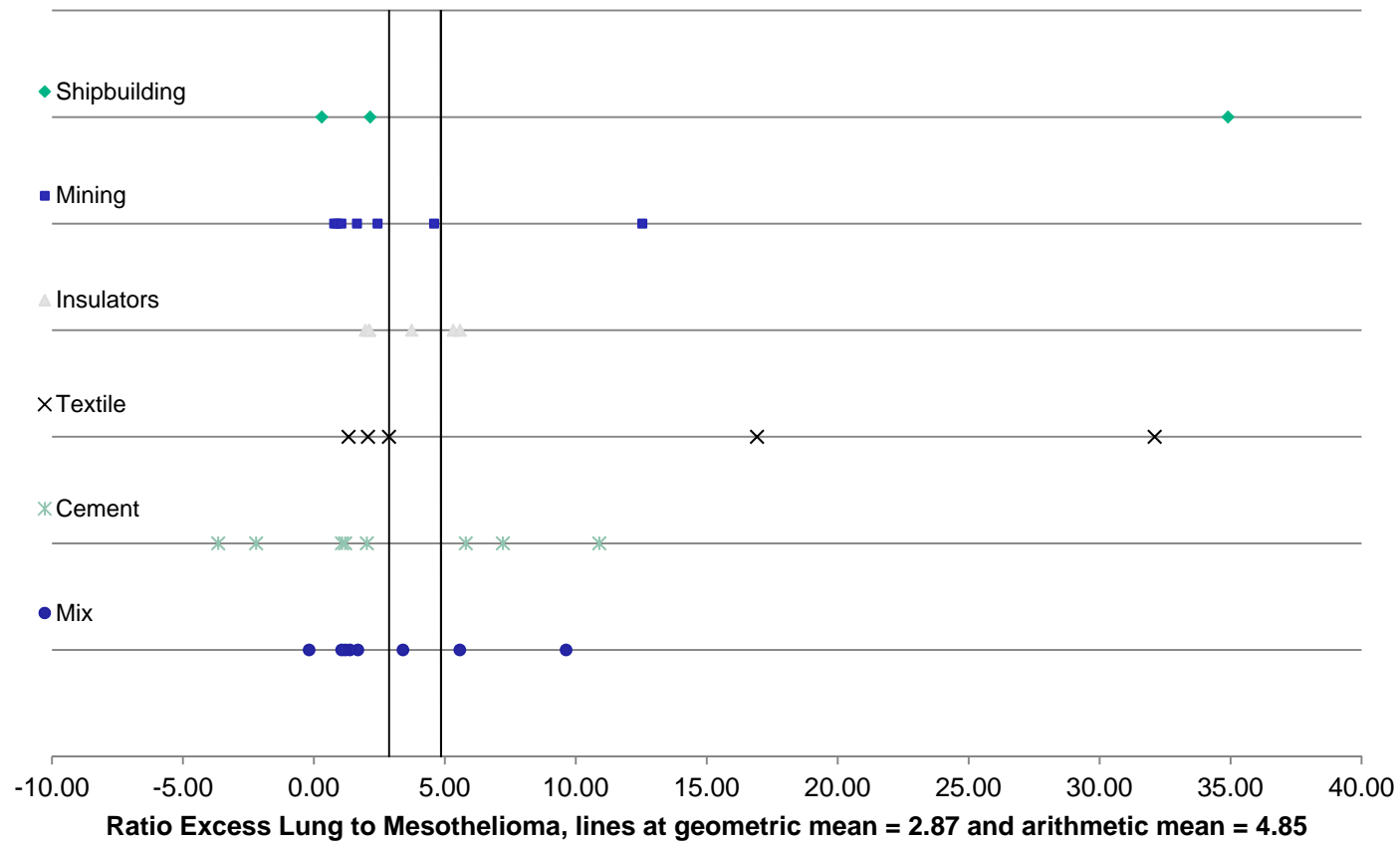
Cohort Studies Results: Ratio of Lung Cancers to Mesotheliomas

Funnel Plot: Sample Size



Cohort Studies Results: Ratio of Lung Cancers to Mesotheliomas

Industry and Occupation



Case Control Methods: Attributable Proportion of Lung Cancers due to Asbestos Exposure

- The method was based on that used in a 1991 article by Vineis and Simonato³
 - They estimated the proportion of lung and bladder cancers that were due to occupational exposures
- This analysis used the same articles as that study, plus a literature search was performed to obtain articles that were published after 1989.

Case Control Methods: Attributable Proportion of Lung Cancers due to Asbestos Exposure

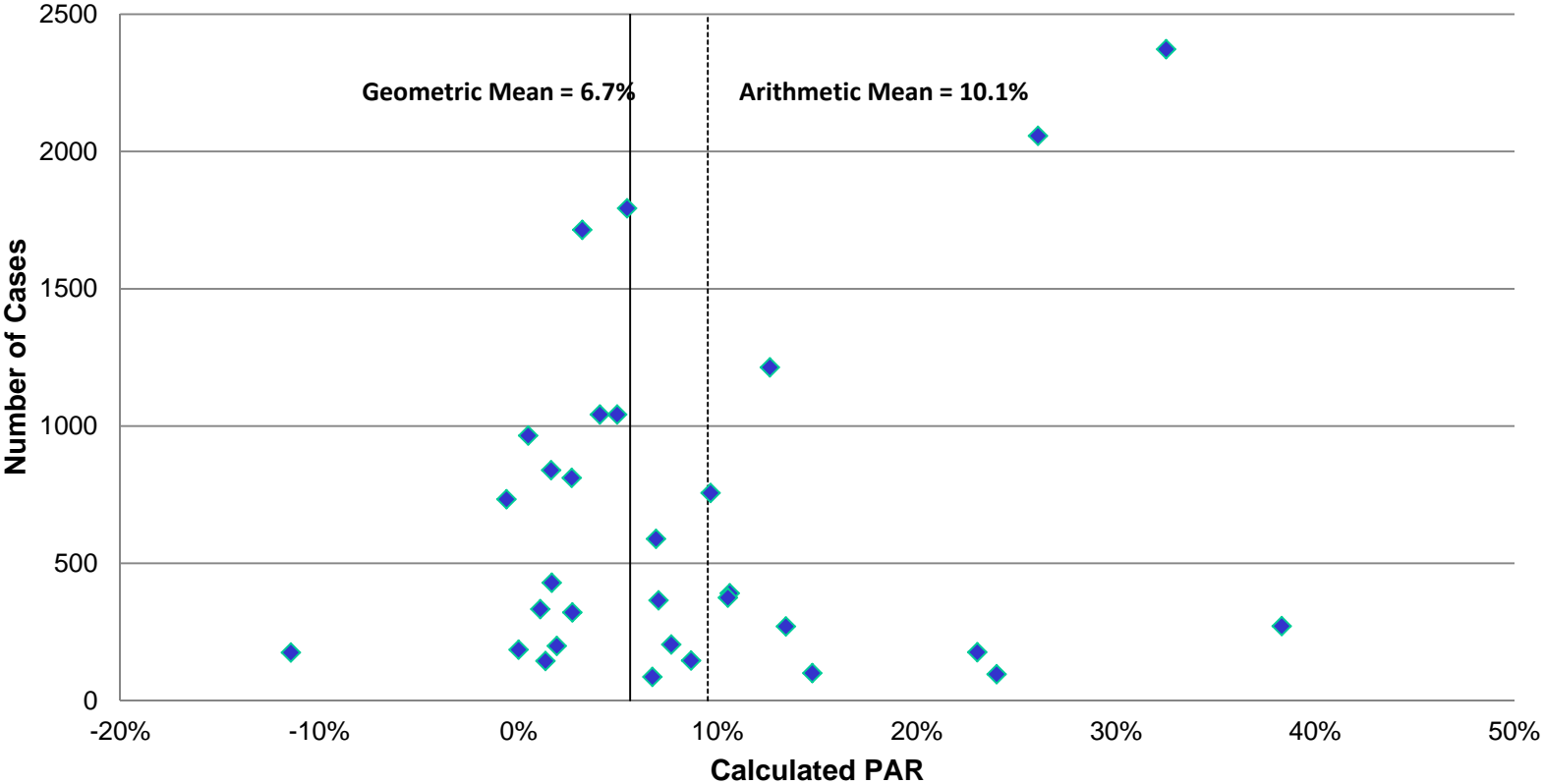
- The Attributable Proportion (AP) was calculated as follows:

$$PA = \frac{(RR - 1)}{RR} \times P_e$$

- Where RR refers to the relative risk from asbestos exposure, as estimated by the odds ratio, and P_e refers to the proportion of cases that had been exposed to asbestos

Case Control Results: Attributable Proportion of Lung Cancers due to Asbestos Exposure

Funnel Plot: Number of Cases



Summary of Results

Measure of Lung Cancer	Lower Limit (Geometric Mean)	Upper Limit (Arithmetic Mean)	Units
Cohort Study Method	2.87	4.85	Number of excess lung cancers due to occupational asbestos exposure for each case of mesothelioma
Case Control Method	6.4	9.2	Percentage of lung cancers due to occupational asbestos exposure

Results: Putting it all together

- Number of Lung Cancers in BC, 3 year average: **2895**
- Number of Mesotheliomas in BC, 3 year average: **79**
- Number of Lung Cancers due to asbestos exposure:
Cohort Method
 - **2.87 to 4.85 excess lung per mesothelioma = 227 to 383 lung cancers were due to asbestos exposure**
- Number of Lung Cancers due to asbestos exposure:
Method 2:
 - **AP(6.7% - 10.1%) X 2895 = 186 to 267 of the lung cancers in BC were due to asbestos exposure**

Conclusion

- Approximately 200 to 400 lung cancer cases, each year, are due to occupational asbestos exposure
- *Very few* lung cancers are compensated by WorkSafeBC

Lung cancers due to occupational asbestos are undercompensated in British Columbia