



Exposure Response Analyses of Asbestos and Lung Cancer Subtypes in a Pooled Analysis of Case-Control Studies in Europe and Canada

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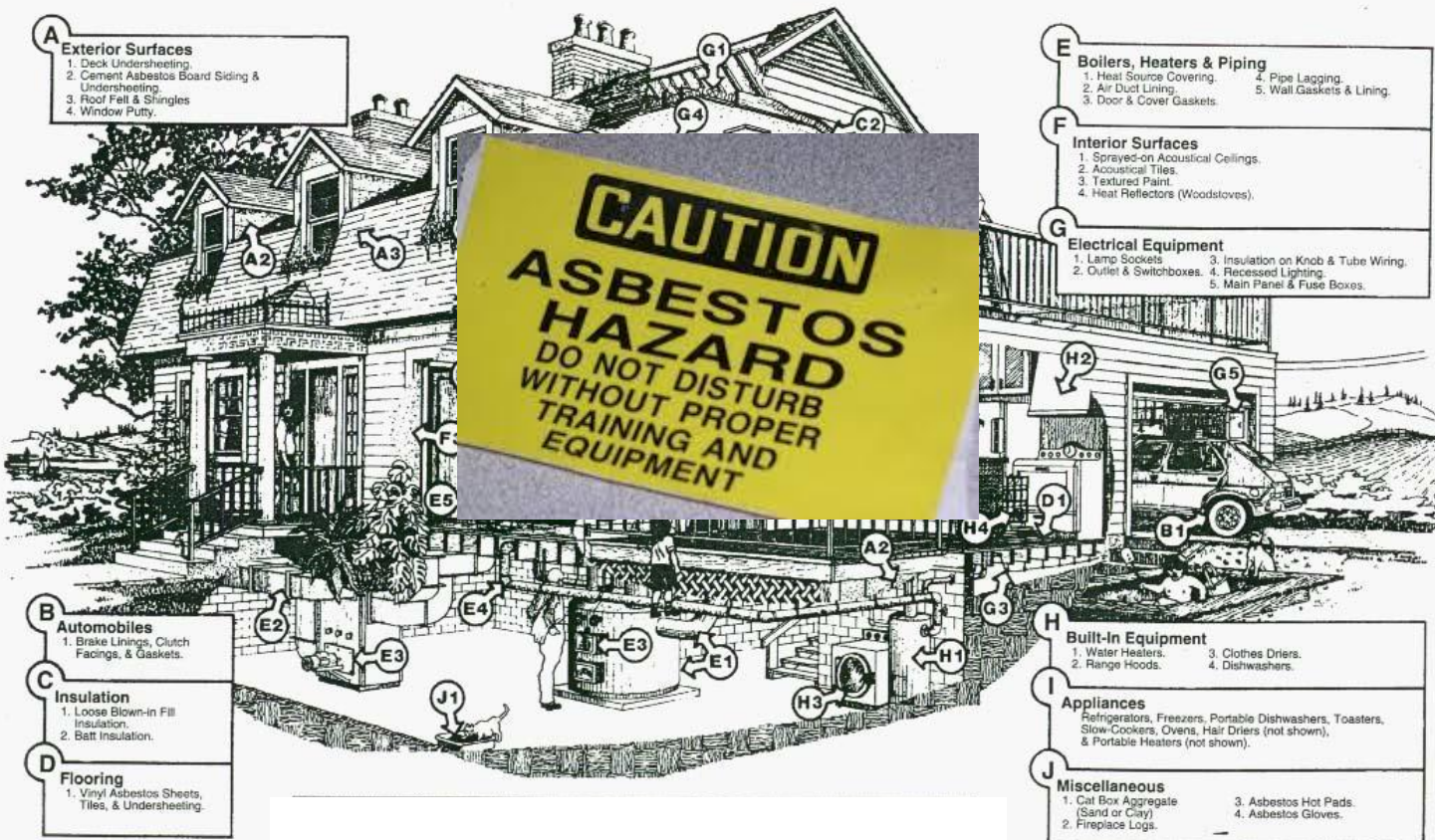
International Agency for Research on Cancer
Lyon, France



Asbestos and the SYNERGY project

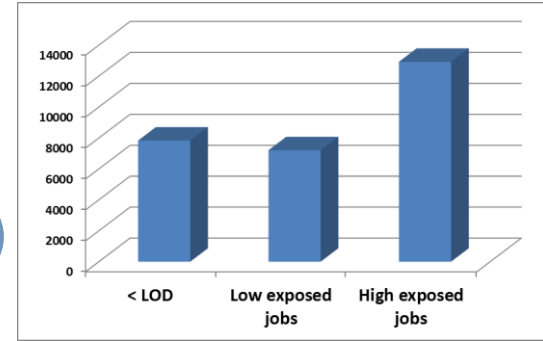
- Group of mineral silicate fibres (chrysotile, amphiboles), which are strong, flexible, stable, heat-resistant, and durable
- IARC evaluated asbestos in 1973, 1977, 1987, and concluded in Vol. 100C (2012) that all forms of asbestos cause mesothelioma and cancer of the lung, larynx, and ovary
- SYNERGY project: results from 14 pooled case-control studies, conducted in Europe and Canada between 1985 and 2010
- ~19,300 lung cancer cases, ~23,600 controls
- Complete occupational and smoking history, start and stop dates

Where asbestos might be





Exposure assessment



ExpoSYN
Exposure database:
Job, sampler, concentration,
duration, date

27,958 personal
measurements
1971-2009

Prior rating
Non – Low- High

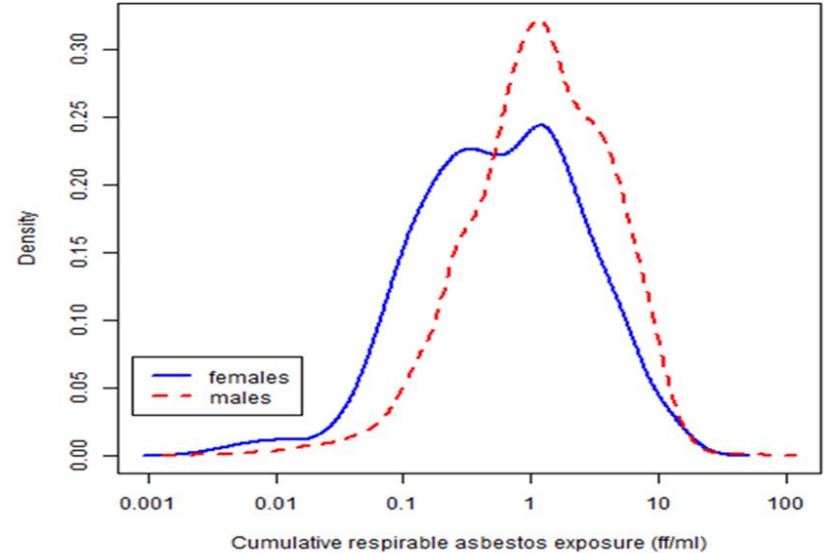
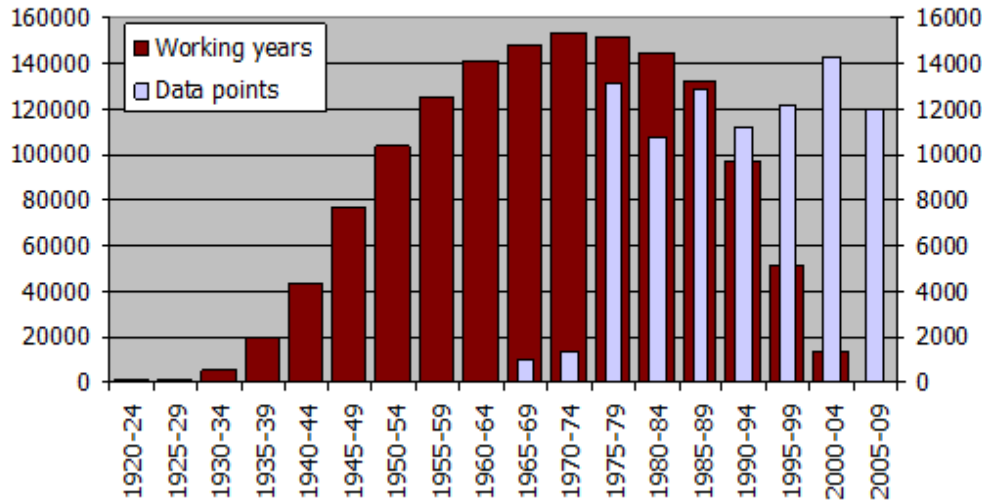
Statistical model: $\ln(Y) = \text{Intercept} + \beta_{\text{prior rating}} + \beta_{\text{Randomjob}} + \beta_{\text{Randomregion}} + \beta_{\text{year}} + \beta_{\text{sampling duration} \times 480 \text{ minutes}} + \beta_{\text{asbestos ban}}$

Study population's
all jobs >1 year

SYN-JEM

Individual exposure
estimates

Data points vs. distribution of working years and exposure levels

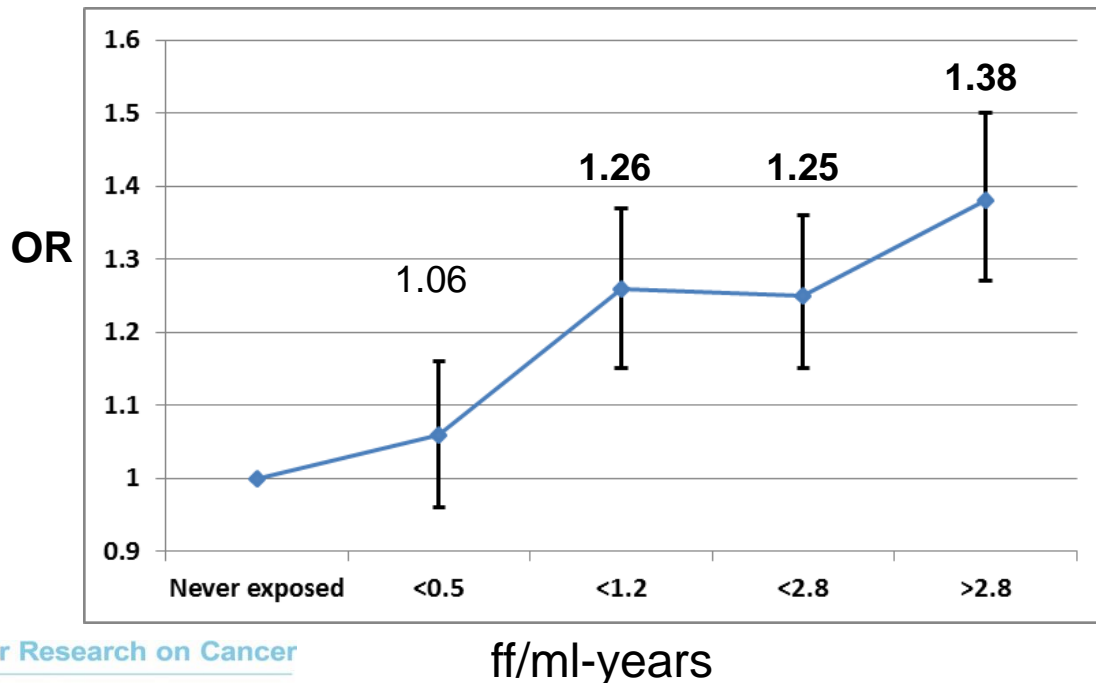


Max levels in 1975; -10.7% per year before asbestos ban

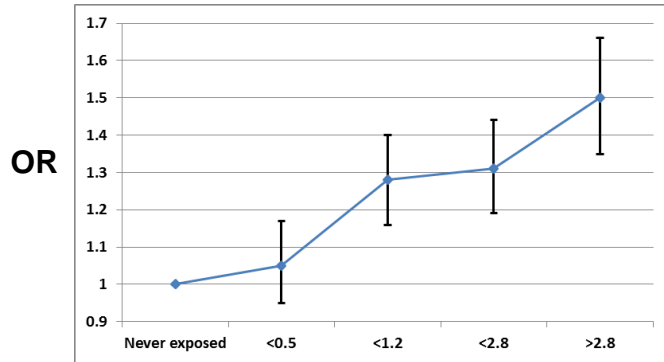
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occupational

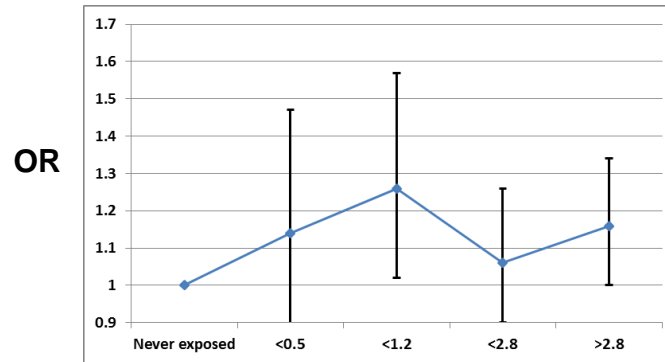
Cumulative asbestos exposure among men



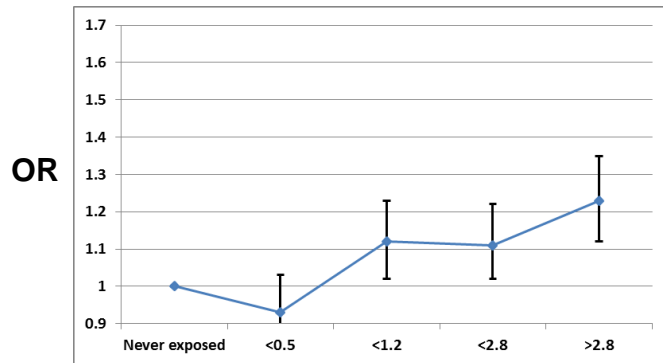
Robustness of results in men



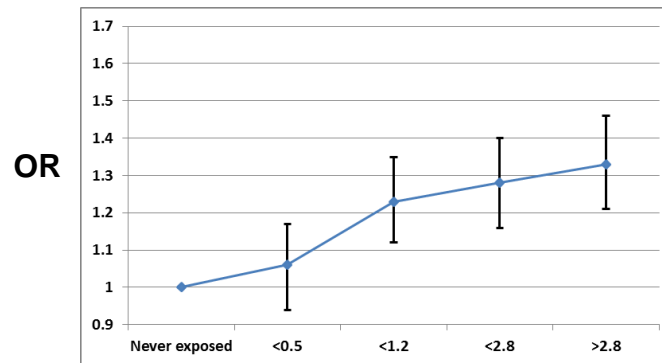
Studies with population controls



Studies with hospital controls

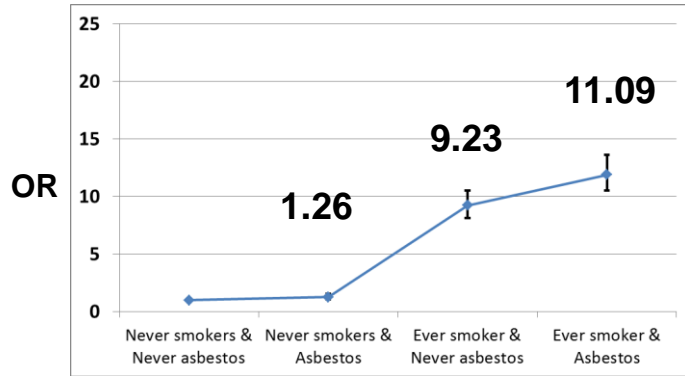


Restricted to blue collar workers



Excluding labourers n.e.c. (ISCO 9-99.10)

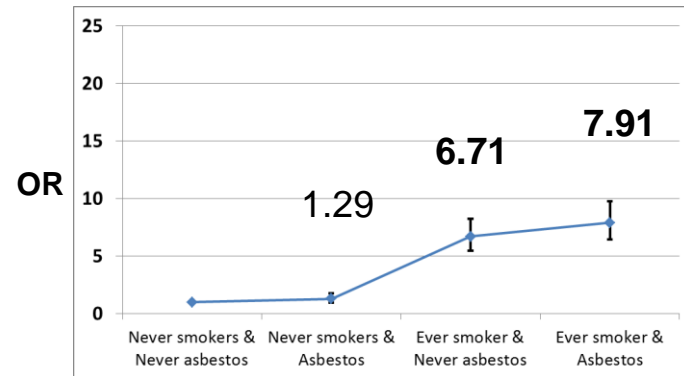
Joint effects of asbestos & smoking



P-value
multiplicative
interaction:
0.82

RERI: 2.44
(1.89-3.08)

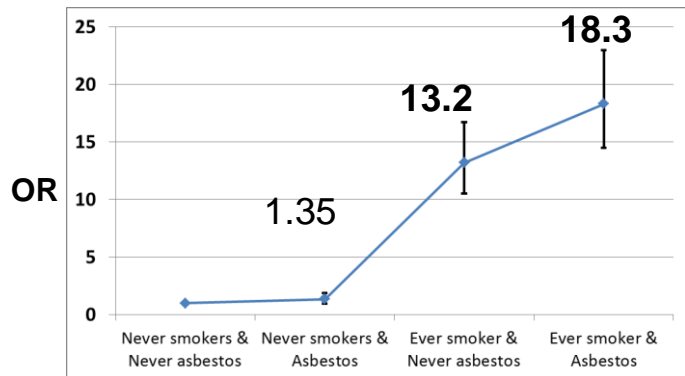
All lung cancer types



P-value
multiplicative
interaction:
0.59

RERI: 0.92
(0.16-1.59)

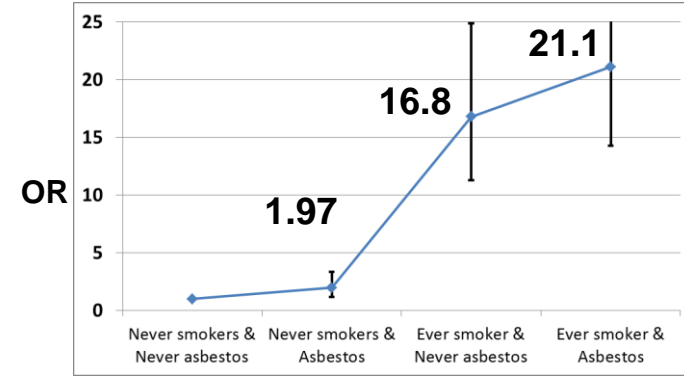
Lung adenocarcinoma



P-value
multiplicative
interaction:
0.90

RERI: 4.75
(3.57-6.55)

Squamous cell lung cancer



P-value
multiplicative
interaction:
0.10

RERI: 3.18
(1.29-5.92)

Small cell lung cancer

Key messages

- Exposure assessment new and innovative based on job specific quantitative measurements
- Increased lung cancer risk at relatively low levels (>0.5 fibres/ml-years) of cumulative exposures among men
- No significant deviation from a multiplicative interaction; more than additive effect of asbestos and smoking for all major lung cancer cell types



Acknowledgements

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Thank you
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