# 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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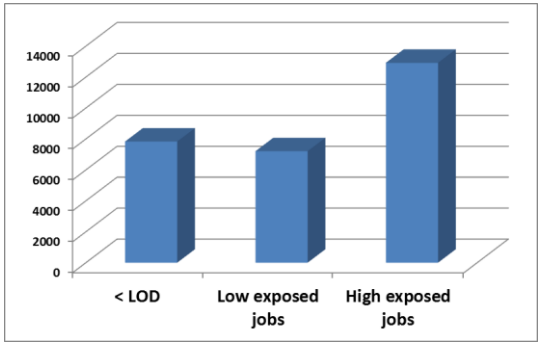
# Asbestos and the SYNERGY project

- 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




27,958 personal measurements 1971-2009

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

Prior rating
Non – Low- High

Statistical model: **Ln(Y) = Intercept + ßprior rating + Randomjob + Randomregion + ßyear + ßsampling duration x 480 minutes +ßasbestos ban)**

Study population's all jobs >1 year

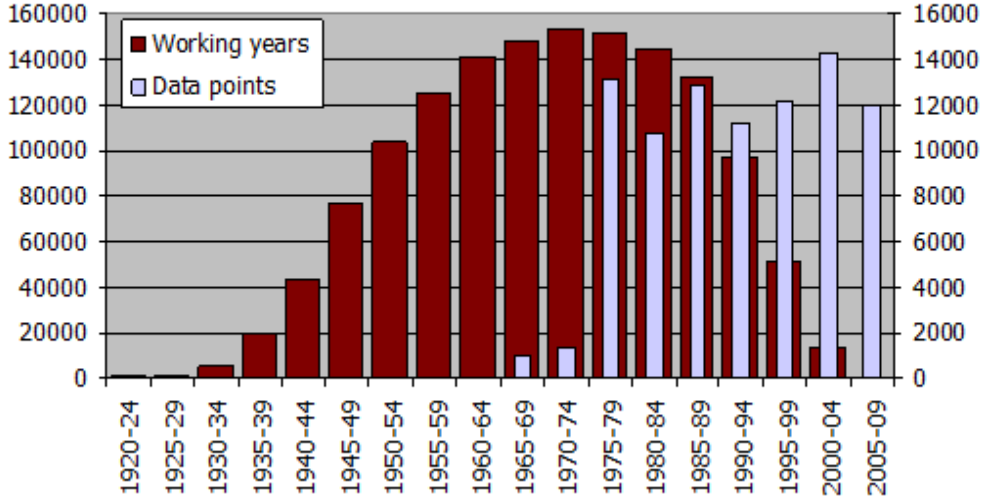
SYN-JEM

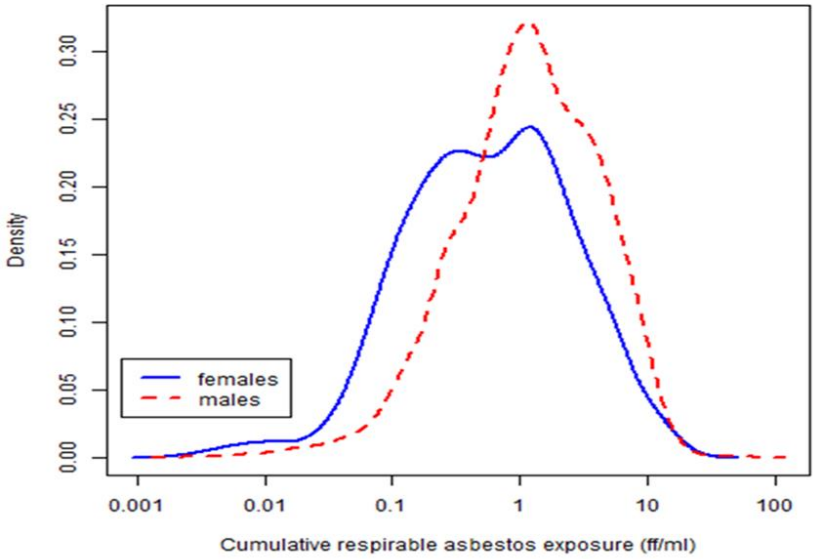
Individual exposure estimates

International Agency for Research on Cancer
World Health Organization

Peters et al. 2011

# Data points vs. distribution of working years and exposure levels




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

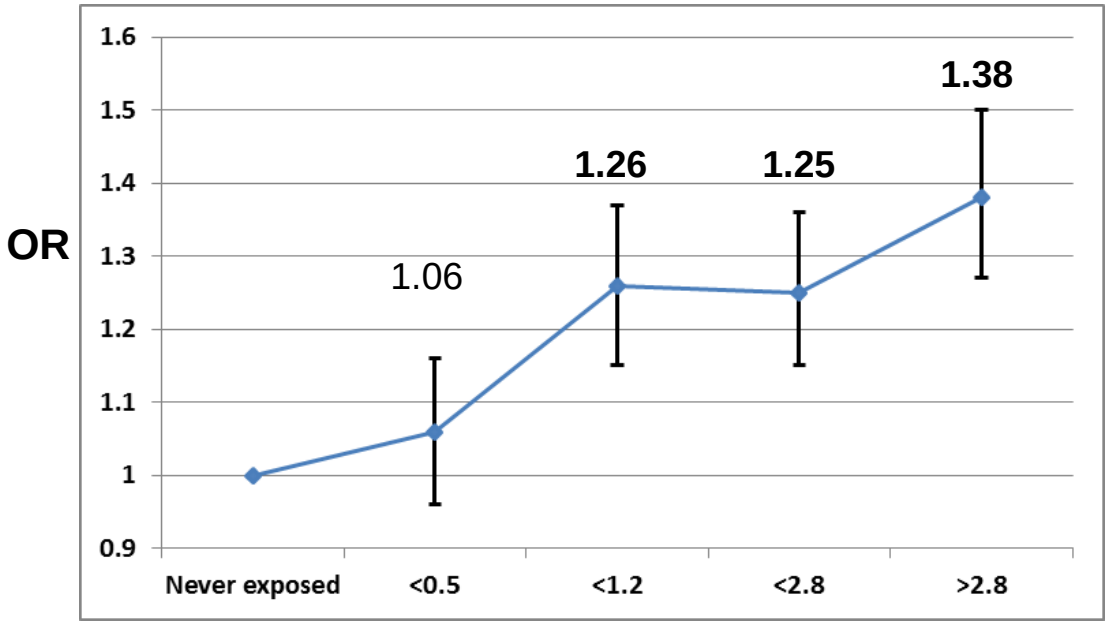
International Agency for Research on Cancer

World Health Organization

Peters et al. 2011; Olsson et al. in press

occupational

# Cumulative asbestos exposure among men

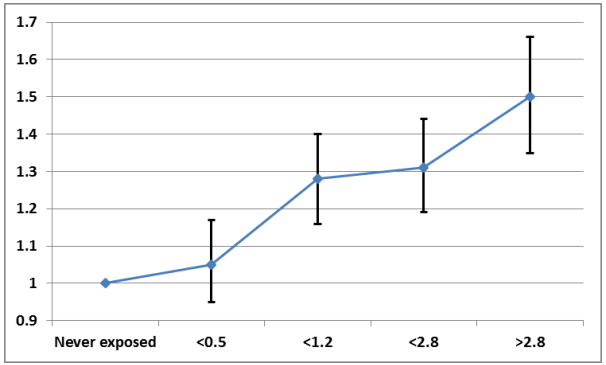



International Agency for Research on Cancer

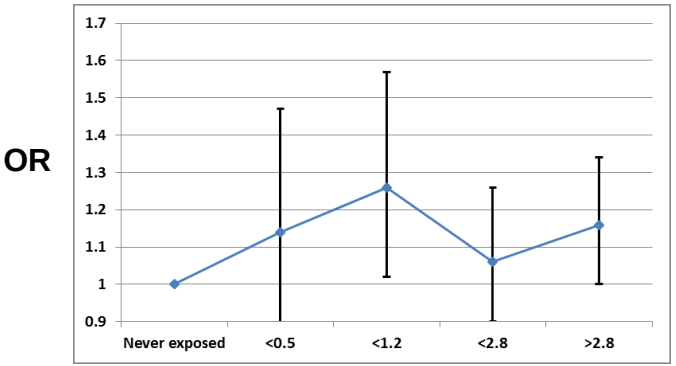
World Health Organization

OR adjusted for study, age, smoking pack-years, time since quitting smoking and List A jobs

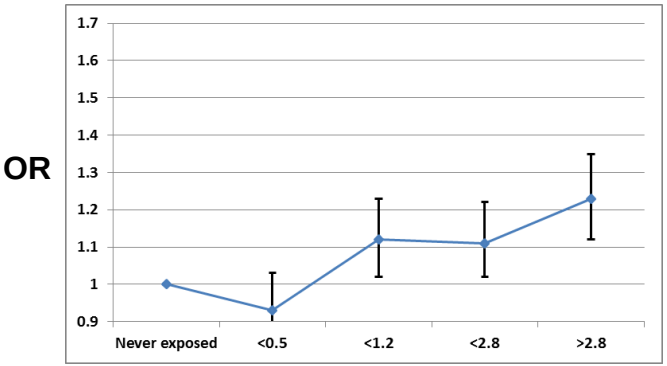
# Robustness of results in men



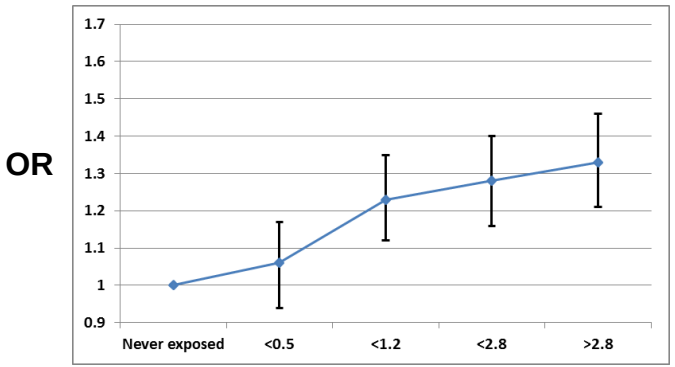

Studies with population controls




Studies with hospital controls

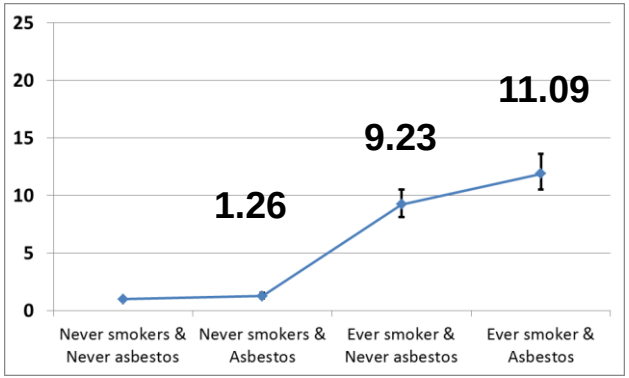



Restricted to blue collar workers




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

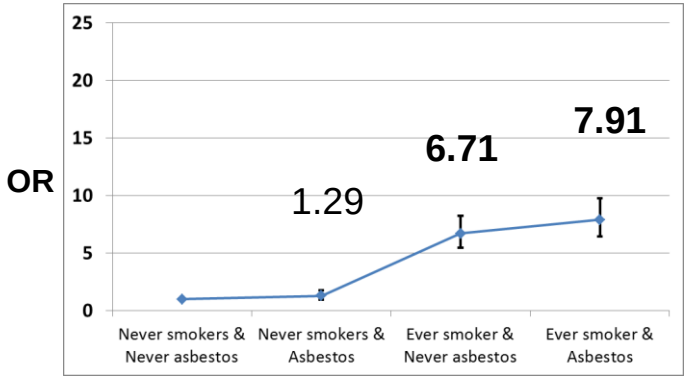
# Joint effects of asbestos & smoking




All lung cancer types

P-value multiplicative interaction: 0.82

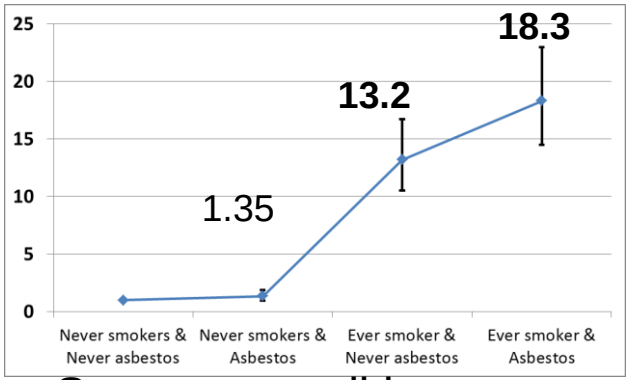
RERI: 2.44 (1.89-3.08)




Lung adenocarcinoma

P-value multiplicative interaction: 0.59

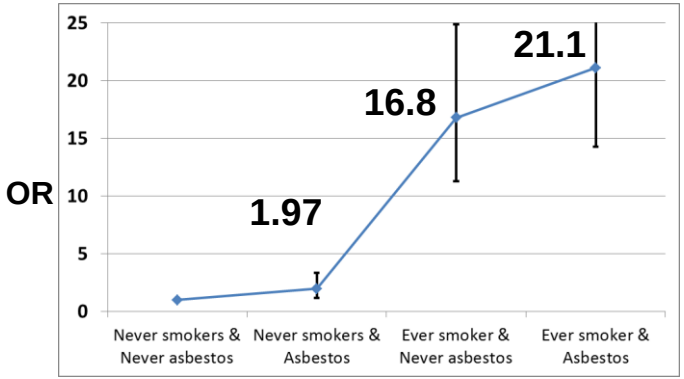
RERI: 0.92 (0.16-1.59)




Squamous cell lung cancer

P-value multiplicative interaction: 0.90

RERI: 4.75 (3.57-6.55)




Small cell lung cancer

P-value multiplicative interaction: 0.10

RERI: 3.18 (1.29-5.92)

# 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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All study group PI's




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