ESTIMATION OF COUNTRY-SPECIFIC MESOTHELIOMA DEATHS: A MULTIVARIATE PREDICTIVE MODEL BASED ON ASBESTOS USE

[1]David Vizcaya*, [2]Kathryn Rough, [3]Leslie Stayner, [1]Jihong Zong, [1]Montse Soriano-Gabarró. [1]Epidemiology, Bayer Pharma Ag, Berlin, Germany; [2]Harvard T.H. Chan School of Public Health, Boston, USA; [3]Division of Epidemiology and Biostatistics University of Illinois at Chicago School of Public Health, Chicago, USA

Introduction Mesothelioma is a malignant deadly disease primarily caused by exposure to asbestos. Previous studies have used simple modelling strategies to evaluate the burden of unreported mesothelioma. We built on previous work by creating a predictive multivariate regression model that incorporates novel data sources to improve the accuracy of estimates.

Methods As dependent variable, we used country-specific annual number of mesothelioma deaths from the WHO Mortality Database. As independent variables we initially used the following: 10-year average asbestos consumption, an indicator variable for asbestos-producer countries (data from the US Geological Survey), the proportion of the population aged 40 years or older, and the GDP per capita (Data from United Nations Statistics). Countries with non-missing data on mesothelioma mortality were used to fit a negative binomial regression model weighted by population size. Due to the latency between exposure to asbestos and onset of mesothelioma, we considered different lag times for the asbestos variables that ranged from 20 to 40 years.

Results Forty-seven countries were used to fit the model and 37 were used to predict the number of mesothelioma deaths. The latency period that resulted in the more robust model was 1975–1985 which corresponds to between 28 and 38 years between exposure to asbestos and disease onset. The Spearman correlation coefficient between mesothelioma deaths and annual asbestos consumption in 1975–1985 was 0.72. After model performance evaluation, only asbestos consumption and the proportion of the population aged 40 years or older were used for predictions. Based on our model, we estimated 5404 annual deaths from mesothelioma (95% CI: 3228–9235) in addition to the 15229 mesotheliomas that were reported to WHO.

Conclusions Findings from our predictive model suggest that a substantial proportion of mesothelioma deaths may be unreported in official aggregated data.

CARCINOGENETIC EFFECTS OF PROCESSING NON-ASBESTIFORM TREMOLITE ASBESTOS MINERAL

[1,2,3]Hsiao-yu Yang*, [1]Sheng-Hsiu Huang, [4]Ruei-Hao Shie, [1,2,3,5]Pau-Chung Chen. [1]Institute of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public Health, Taipei, Taiwan; [2]Department of Public Health, Taipei, Taiwan; [3]Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Taipei, Taiwan; [4]Green Energy and Environmental Research Laboratories, Industrial Technology Research Institute, Hsinchu, Taiwan; [5]Department of Environmental and Occupational Medicine, National Taiwan University College of Medicine, Taipei, Taiwan

Objectives The cancer risk of elongated mineral particles (EMPs) generated from non-asbestiform asbestos minerals is unclear. Nephrite is regarded as a non-asbestiform asbestos mineral. The objective of this study was to determine the cancer risk of nephrite.

Methods We examined cancer mortality between 1979 and 2011 in Fengtian, where nephrite was mass-produced from 1970 to 1980 and calculated standardised mortality ratios (SMRs). Results: We observed a significantly elevated mortality risk of cancer of the hypopharynx (SMR 2.31; 95% CI: 1.37, 3.65), larynx (SMR 2.51; 95% CI: 1.55, 3.83), oesophagus (SMR 2.04; 95% CI: 1.62, 2.54), and stomach (SMR 1.38; 95% CI: 1.17, 1.63). This study analysed the lengths, widths, structures, chemical compositions, aerodynamic diameters, and distributions of EMPs in airways. The majority of the EMPs (68%) were short (< 5 μm) and thin (< 0.5 μm) and had asbestiform structures. The median aerodynamic diameter of the EMPs was 1.2 μm. The total deposition proportion in airways was 51.3%. The major deposition sites were the head airway (37.5%), followed by the alveolar region (10.6%) and the tracheobronchial region (3.2%).

Conclusion This study provides evidence that short EMPs generated from processing nephrite are carcinogenic, and the fraction deposition of EMPs is associated with the mortality risk of cancer.

Burden of Disease

DIFFERENCE IN MORTALITY AMONG SWEDISH SEAFARERS

[1]Eva Andersson*, [1]Helena Eriksson, [2]Karl Forsell, [3]IngLiss Bryngelsson, [1]Ralph Nilsson. [1]Occupational and Environmental Medicine Sahlgrenska University Hospital, Gothenburg, Sweden; [2]Occupational and Environmental Medicine Umea Universiy Hospital, Umea, Sweden; [3]Occupational and Environmental Medicine Orebro University Hospital, Orebro, Sweden

Introduction Several studies have shown higher mortality and morbidity ratios in seafarers when compared to land-based occupations. Hence, we conducted a cohort study in more recent time.

Methods All persons included in the Swedish Registry of Seafarers 1985–2013 with registered work periods were included in the cohort. They (n = 85 862) were followed up for death from 1985 or first work period to emigration, dead or 2013. Standardised mortality ratio (SMR) were analysed with 95% confidence intervals (CI) stratified for ship types, gender and age (<65 or ≥65 years) in relation to the Swedish population. Mean follow up time was 17 years.

Results There overall mortality was normal. For seafarers working only at passenger ships there was no excess mortality. Both male and female seafarers less than 65 years and working at other kind of ships had an increased mortality. This was most pronounced among those being seafarers for 10–20 years.

Passenger ships only:

- male <65 (n = 22,382, deaths = 698) SMR 97.0 (95% CI: 90–104)
- male ≥65 (n = 3,025, deaths = 533) SMR 75.3 (69–82)
- female <65 (n = 24,549, deaths = 325) SMR 86.9 (78–97)
- female ≥65 (n = 1,739, deaths = 200) SMR 68.5 (59–79)
- Other kind of ships:
- male <65 (n = 32,350, deaths = 1,988) SMR 127.7 (122–133)
- male ≥65 (n = 7,040, deaths = 1,450) SMR 86.7 (82–91)

P012 Carcinogenetic effects of processing non-asbestiform tremolite asbestos mineral

Hsiao-yu Yang, Sheng-Hsiu Huang, Ruei-Hao Shie and Pau-Chung Chen

Updated information and services can be found at:

http://oem.bmj.com/content/73/Suppl_1/A123.2

These include:

Email alerting service	Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:

http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:

http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:

http://group.bmj.com/subscribe/