### Introduction

**Asian context**

Some developed Asian countries such as Japan, Korea and Israel were included in the ecological relationship between historical asbestos use and asbestos-related diseases (all, pleural and peritoneal mesothelioma and asbestosis, by gender).

**Critical appraisal**

Authored by UOEH researchers. Based on the experience of 33 countries, an international analysis determined an ecological relationship between historical asbestos use and mortality of ARDs.

**Unique keywords**

Asbestos use per capita, mortality predictor, age adjusted mortality rate by sex, ecological relationship

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### Abstract

**Background:** The potential for a global epidemic of asbestos-related diseases is a growing concern. Our aim was to assess the ecological association between national death rates from diseases associated with asbestos and historical consumption of asbestos.

**Methods:** We calculated, for all countries with data, yearly age-adjusted mortality rates by sex (deaths per million population per year) for each disease associated with asbestos (pleural, peritoneal, and all mesothelioma, and asbestosis) in 2000–04 and mean per head asbestos consumption (kg per person per year) in 1960–69. We regressed death rates for the specified diseases against historical asbestos consumption, weighted by the size of sex-specific national populations.

**Findings:** Historical asbestos consumption was a significant predictor of death for all mesothelioma in both sexes (adjusted R²=0.74, p<0.0001, 2.4-fold [95% CI 2.0–2.9] mortality increase was predicted per unit consumption increase for men; 0.58, p<0.0001, and 1.6-fold [1.4–1.9] mortality increase was predicted for women); for pleural mesothelioma in men (0.29, p=0.0015, 1.8-fold [1.3–2.5]); for peritoneal mesothelioma in both sexes (0.54, p<0.0001, 2.2-fold [1.6–2.9] for men, 0.35, p=0.0008, and 1.4-fold for women [1.2–1.6]); and for asbestosis in men (0.79, p<0.0001, 2.7-fold [2.2–3.4]). Linear regression lines consistently had intercepts near zero.

**Interpretation:** Within the constraints of an ecological study, clear and plausible associations were shown between deaths from the studied diseases and historical asbestos consumption, especially for all mesothelioma in both sexes and asbestosis in men. Our data strongly support the recommendation that all countries should move towards eliminating use of asbestos.
### Factsheet on Asbestos and Asbestos-Related Diseases

#### Annotation

| Fact 1 | Historical asbestos consumption (per capita use from 1960-1970) was a significant predictor of death for all mesothelioma (age-adjusted mortality rate from 2000-2004) with adjusted $R^2=0.74$, $p<0.0001$ in males. |
| Fact 2 | Death rate predicted for the mean consumption value (1.67 kg per head) was 3.18 (2.55 to 3.82) in men and 1.05 (0.56 to 1.54) (per million people per year) in women; thus the male-to-female death rate ratio was 3.0. |
| Fact 3 | In men, mesothelioma mortality increased 2.4-fold [95% CI 2.0–2.9] per unit increase in asbestos consumption ($\Delta=1$ kg/capita) with adjusted $R^2=0.74$, $p<0.0001$. |
| Fact 4 | In men, asbestosis mortality increased 2.7-fold [95% CI 2.2–3.4] per unit increase in asbestos consumption ($\Delta=1$ kg/capita) with adjusted $R^2=0.79$, $p<0.0001$. |
| Fact 5 | The regression lines had intercepts close to zero for all diseases associated with asbestos; small amounts of historical asbestos consumption are therefore predictive of few deaths from such diseases. |

#### References