

Chapter

1. Asbestos Exposure Assessment, Risk Identification, and Substitutes

Section

C. Epidemiology of ARDs

No./Title

**20. Mapping the risk of mesothelioma due to neighborhood asbestos exposure**

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**Introduction**

Asian context

Neighborhood asbestos exposure is another source to cause asbestos-related diseases, and thus they are should be carefully monitored.

Critical appraisal

Unique keywords

Neighborhood exposure, mesothelioma, Japan, Amagasaki

Abstract



**Rationale:** Little is known about neighborhood exposure to asbestos and mesothelioma risk among residents around an industrial source of asbestos.

**Objectives:** To investigate the magnitude of the risk among residents by asbestos exposure levels and to determine the range of the area affected by asbestos.

**Methods:** We calculated standardized mortality ratios of mesothelioma from 1995 to 2006 among the estimated population at risk that lived around a former large asbestos cement pipe in Amagasaki City, Japan, between 1957 and 1975, the time when the plant had used crocidolite and chrysotile. The distance between the plant and homes and relative asbestos concentrations obtained by diffusion equations involving meteorological conditions were used to determine asbestos exposure levels among residents.

**Measurements and Main Results:** We identified 73 mesothelioma deaths of 35 men and 38 women who had no occupational exposure to asbestos. Among persons who had lived within a 300-m radius of the plant, the standardized mortality ratio of mesothelioma was 13.9 (95% confidence interval, 5.6-28.7) for men and 41.1 (95% confidence interval, 15.2-90.1) for women. When the study area was divided into five regions by relative asbestos concentration, standardized mortality ratios of mesothelioma declined, for both sexes, in a linear dose-dependent manner with concentration. The regions with a significantly elevated standardized mortality ratio reached 2,200 m from the plant in the same direction in which the wind predominantly blew.

**Conclusions:** Neighborhood exposure to asbestos can pose a serious risk to residents across a wide area.

## Annotation

### Fact 1

- The Standardized Mortality Ratio (SMR) of mesothelioma was 13.9 (95% CI; 5.6-28.7) for men and 41.1 (95% CI; 15.2-90.1) for women in a neighborhood population who had lived within a 300-m radius of a plant producing asbestos-cement pipes using crocidolite and chrysotile.

### Fact 2

- The SMR of mesothelioma within a 1,500-m radius of the center of the plant producing asbestos-cement pipes using crocidolite and chrysotile was 4.3 (95% CI; 3.4-5.4).

### Fact 3

- The relation between relative asbestos concentration used as dose of asbestos exposure (x) and SMR of the neighborhood population for mesothelioma (y) was linear.

### Fact 4

- The regions with a significantly elevated SMR for mesothelioma of women (SMR 47.7, 95% CI; 20.8-105.7) reached 2,200 m from the plant in the same direction in which the wind predominantly blew.

### Fact 5

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## References