The effectiveness of asbestos-related interventions in reducing cancer rates: a systematic review

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Background: Prevention

• A key reason to discuss the burden of occupational cancer is to encourage prevention

• Primary prevention:
  i. Avoiding the introduction of carcinogenic agents
  ii. Eliminating or drastically reducing exposure to carcinogenic agents

“Although primary prevention of occupational carcinogens must logically result in lowered cancer rates, such reductions are not easily documentable in quantitative terms because most of the published reports on the subject are limited to predicting declines in cancer risk.”

Source: Tomatis et al., 1997
Background: Asbestos

• Global asbestos production highest in the mid-20th century
  – ~181 million metric tonnes produced over the century
  – Peaked in 1975 at ~5 million tons
• Production declined in the 1960s and 1970s following the recognition of negative health consequences
  – Asbestos fibres have a specific shape and dimension that enables inhalation and deposition in the respiratory tract
• Despite the implementation of many dust-reduction techniques, the use of asbestos is now banned in most industrialized countries

Source: International Agency for Research on Cancer, 2009
**Background: Asbestos-Related Cancers**

- Rates of mesothelioma continue to rise in most industrialized countries; almost entirely attributed to past asbestos exposure.
- Rates of lung cancer stable or declining in many industrialized countries; largely due to ↓ smoking.

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**Ontario cases of pleural mesothelioma, 1980 - 2006**

- **Male**
- **Female**

**Ontario lung cancer incidence rates, 1981 - 2006**

- **Male**
- **Female**

*Source: Ontario Cancer Registry*
To quantify the effectiveness of asbestos-related interventions in reducing *incidence* of lung cancer, mesothelioma, overall malignancy.

**Project Objective**

- **Time/latency**
- **Intervention type**
- **Exposure level**
Search Methods

• Relevant information often buried within papers; not captured using traditional search methods

1. Review of all IARC Monograph 100 references on asbestos
2. Review of all articles on ‘asbestos and cancer’ indexed in PubMed since the monograph was completed

• Inclusion criteria:
  – Article evaluates an asbestos-related intervention on cancer risk, or
  – Article provides risk estimates stratified by time of exposure
Articles Reviewed

- IARC Monograph
  - 100 references
  - N=744

- PubMed articles
  - N=350

Reviewed articles
  - N=1094

- Included
  - N=9

- Excluded
  - N=1085
Geographic Location

- Canada and the United States, United Kingdom, Italy, Germany, Norway, Israel
Interventions

• Hygiene efforts (process)
  – Dust reduction
    • Improve crushing techniques
    • Use of dust-free bags
    • Use of closed-drum mixing
    • Use of wet processes
• Exposure-control policies
• Discontinuing use
  – Total halt of production
• Government bans
Conclusions

• Evidence in the literature that prevention efforts have been effective in decreasing incidence of lung cancer and mesothelioma

• Unsure of size of decrease in relationship to time
  – More pronounced effect observed for lung cancer than mesothelioma, probably due to disease latency

• Next steps - summarize findings examining:
  – Temporality
  – Exposure levels
  – Magnitude of decrease

• Final results may be informative for mesothelioma and lung cancer projections/future burden of cancer
Towards a cancer-free workplace