Safe removal of asbestos and elimination of asbestos related diseases

Timo Tuomi
CV at a glance

- Industrial Hygienist, 1984
- PhD, 1994, Thesis "Asbestos exposure of mesothelioma patients in Finland"
- Associate Professor, 1998
- Head of Laboratory (Specialized in asbestos and other dusts analysis), 2007-2011
- Director of Center of Expertice, Work Environment Development, FIOH, 2011-
- recently: Expert member of a committee reforming the national legislation concerning asbestos, 2010-
Where we are with asbestos

- Today two million tonnes of asbestos per year is produced (Russia, China, Canada…)
- An estimated 125 million people are exposed to asbestos at work and 107 000 people die of asbestos-related diseases every year. These diseases will increase greatly in the coming years."(WHO)
- Asbestos is used the most in Asia, Russia and some other countries
- All types of asbestos (actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite) cause cancer in humans
- Asbestos causes about half of deaths from occupational cancer (e.g. in Finland even 90 %)
Asbestos is still mined
Asbestos minerals are fibrous
Current limit values for exposure

Workplace air:

0.1 fibers/cm³
for fibers longer than 5 µm, thinner than 3 µm and length/width-ratio > 3

"Asbestos free air":

0.01 fibers/cm³
Exposure to asbestos and its impact on health

- exposure takes place through inhalation of asbestos fibers from contaminated air
  - work environment
  - ambient air in the vicinity of point sources
  - indoor air in housing and buildings containing friable asbestos material still in place

- asbestos fiber settled in lungs stay and accumulate in time when exposure continues
  - asbestos disease may appear after 20-40 years after start of exposure
The adverse health effects of asbestos fibers

**Pleural plaques** are localized scars (fibrosis) consisting of collagen fiber deposits that form as a result of exposure to asbestos. They are the most common manifestation of exposure to asbestos. Normally, pleural plaque is found in the parietal pleura (on the inside of the diaphragm), but in very rare cases they also can be found near the ribcage.

**Pleural thickening** is a type of pleural fibrosis that extends continuously over the entire thoracic cavity and causes a significant restrictive impairment of lung function. It may be preceded by pleural effusion.

**Retroperitoneal fibrosis**, a thick fibrotic mass covering the retroperitoneal (i.e. the space in the abdominal cavity behind the peritoneum, see below) structures.

**Asbestosis** (pulmonary fibrosis), is a serious lung disease which develops when inflammation and scarring of the lung tissue take place and breathing becomes labored. Asbestosis develops when asbestos fibers are inhaled and become lodged in the inner layers of the lungs. Asbestosis can lead to disability and death.

**Mesothelioma** of pleura (two-layered membrane surrounding the lung) and peritoneum (two-layered membrane forming the lining of the abdominal cavity), is cancer with a mean survival time of less than 12 months.

**Lung cancer.** Asbestos, all types of it, can cause lung cancer. Smoking and asbestos act synergistically i.e. the risk of smokers to die of lung cancer is about ten (compared to non-smokers) when the risk for non-smokers with asbestos exposure is about five. Finally the risk of smokers with asbestos exposure to die of lung cancer is about fifty.
Asbestos and cancer

Mesothelioma
Malignant mesothelioma is a rare malignancy closely related to asbestos exposure. In the early 1950s, at the time when mesothelioma was recognised as a malignancy associated with asbestos, the disease was generally regarded as a pathological rarity. However, case reports in the medical literature had been published already in 1930s and 1940s. The findings of Dr C. Sleggs led to a report in which 33 cases of pleural mesothelioma and exposure to crocidolite in South Africa were described in 1960 by Wagner. This report is a landmark in associating asbestos with mesothelioma and it is now known that over 80% of mesothelioma patients have had some occupational exposure to asbestos and furthermore some of the exposures had been low. Mesothelioma is an invariably fatal disease with a median survival time of 9-12 months from diagnosis.

Lung cancer
After the first report (Doll, 1955) several studies have shown an elevated risk of lung cancer in association with asbestos exposure and today asbestos is a recognised carcinogen. There is sufficient evidence that not only the amphiboles but also chrysotile asbestos cause lung cancer. A health study which followed a group of asbestos exposed workers showed cigarette smoking alone caused an 11-fold, and smoking and asbestos together a 53-fold increase in lung cancer risk.

Other cancers
Asbestos has been suspected of causing cancers in the pharynx, esophagus, stomach and intestine. However, only slightly increased risks have been shown for stomach and colorectal cancer, but there is some evidence that also laryngeal cancer may be caused by asbestos exposure.
Exposure to asbestos

- Today, workplace exposure takes place in:
  - asbestos removal work (!)
  - electricity-, gas-, water and heating maintenance sector (asbestos in place in buildings/appliances)
  - maintenance/caretaker work (asbestos in place in buildings/appliances)
  - recycling/waste treatment/renewal of old dumping grounds (earlier/illegal asbestos waste dumped)
  - excavation work (asbestos waste in soil)
Exposure to asbestos.

• Today, ambient and indoor exposure takes place in:
  – friable asbestos containing materials are in place in many buildings and cause exposure to asbestos fibers (in Finland, 50% of the asbestos have been removed so far)
  – failed dust control and/or not taking asbestos in consideration in maintenance, alteration, removal or demolition cause exposure to asbestos fibers
To summarize

- the safe eventual removal of asbestos is possible
- there is enough knowledge, good practices and experience
- a lot of training and sharing of information has to be done
Suggestions

• the education and competence update of the licenced (asbestos removal) companies = managers, foremen, workers, to be continuous and supported by all stakeholders
• the competence of the persons conducting the mapping of asbestos (vocational qualification)
• the regular follow-up of asbestos removal workers by occupational health unit: health issues, other safety counseling (e.g. dangers of asbestos exposure, importance of respiratory protection)
Suggestions

• mapping the existing asbestos in all housing and buildings and documenting it to be easily available
Thank you !