ASBESTOS

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Outline

• What is Asbestos?
• Properties of Asbestos
• Where is Asbestos found?
• When is Asbestos dangerous?
• Health effects of Asbestos
• Determining factors for disease
• How to avoid Asbestos exposure?
• Asbestos Abatement at AUB
What is Asbestos?

• Asbestos is a group of naturally occurring fibrous mineral silicates.

• Asbestos is a hazardous material.

• Its fibers are extremely fine and can remain suspended in the air for hours.

• All types of asbestos tend to break into very tiny fibers.

• These individual fibers are so small they must be identified using a microscope.

• Some fibers may be up to 700 times smaller than a human hair.
Properties of Asbestos

Asbestos ore

Asbestos fibers

- Asbestos fibers are virtually indestructible.
- They are resistant to chemicals and heat.
- They are very stable in the environment.
- They do not evaporate into air or dissolve in water, and they are not broken down over time.
- Asbestos is probably the best insulator known to man.

Because asbestos has so many useful properties, it has been used in over 3,000 different products.
Types of Asbestos

Three main types of asbestos have been used commercially:

- **Chrysotile (white asbestos)** is the most commonly used form of asbestos. It is found in over 95% of asbestos-containing products.

- **Amosite (brown asbestos)** has been used in sprayed coatings, in heat insulation products, and in asbestos cement products where greater structural strength is required.

- **Crocidolite (blue asbestos)** is now rarely found. Before 1973 it was commonly used in sprayed coatings on structural steelwork for fire protection and for heat or noise insulation. It was also used in gasket materials and asbestos cement pipe.
Types of Asbestos

Other types of asbestos have been rarely used:

- Actinolite
- Anthophyllite
- Tremolite

- Actinolite and tremolite may be found as natural contaminants within vermiculite insulation.
Some Terms: “ACM” and “PACM”

**Asbestos Containing Material**
Any material containing more than 1% asbestos by weight.

**Presumed Asbestos Containing Material**
- Surfacing materials
- Thermal System Insulation
- Flooring

*Must be handled as ACM unless proved otherwise*

Many uses of asbestos have been banned under EPA. However, some materials where asbestos fibers are generally well bound in the materials were not banned.

Previously installed products still pose a hazard to workers. Asbestos fibers can be released during repair work, demolition, and renovation of older buildings and structures containing ACM.
Where is Asbestos found?

Asbestos has been used for centuries, but greatly increased during and after World War II in ship insulation and the following:

- Pipe insulation
- Surfacing insulating materials
- Reinforcement of materials
- Fireproofing
- Acoustic and decorative plaster
- Textiles

Use has greatly declined since the late 1970’s
Where is Asbestos found?

- Cement Pipes
- Cement Wallboard
- Cement Siding
- Asphalt Floor Tile
- Vinyl Floor Tile
- Vinyl Sheet Flooring
- Flooring Backing
- Construction Mastics (floor tile, carpet, ceiling tile, etc.)
- Acoustical Plaster
- Decorative Plaster
- Textured Paints/Coatings
- Ceiling Tiles and Lay-in Panels
- Spray-Applied Insulation
- Blown-in Insulation
- Fireproofing Materials
- Taping Compounds (thermal)
- Packing Materials (for wall/floor penetrations)
- High Temperature Gaskets
- Laboratory Hoods/Table Tops
- Laboratory Gloves
- Fire Blankets
- Fire Curtains

(This list does not include every product/material that may contain asbestos. It is intended as a general guide to show which types of materials may contain asbestos.)

* Source: EPA
Where is Asbestos found?

(Continued)

- Elevator Equipment Panels
- Elevator Brake Shoes
- HVAC Duct Insulation
- Boiler Insulation
- Breaching Insulation
- Ductwork Flexible Fabric Connections
- Cooling Towers
- **Pipe Insulation (corrugated air-cell, block, etc.)**
- Heating and Electrical Ducts
- Electrical Panel Partitions
- Electrical Cloth
- Electric Wiring Insulation
- Chalkboards
- Roofing Shingles
- Roofing Felt
- Base Flashing
- Thermal Paper Products
- Fire Doors
- Caulking/Putties
- Adhesives
- Wallboard
- **Joint Compounds**
- Vinyl Wall Coverings
- Spackling Compounds
Where is Asbestos found?

Sprayed-on fireproofing material

Sheet vinyl containing asbestos

These products may be found in homes and buildings constructed before 1981.

Vinyl asbestos flooring
Where is Asbestos found?

This damaged pipe insulation is a health hazard to persons working around it, handling it or removing it. Asbestos fibers are visible on the torn edges.
Where is Asbestos found?

Asbestos millboard was used in the construction of walls and ceilings, especially around furnaces and wood-burning stoves, where insulation and fire protection was required. Most varieties of asbestos millboard typically contained between 80% and 85% asbestos.
Where is Asbestos found?

Asbestos in gaskets and fabric

Asbestos fabric in HVAC system

Asbestos gaskets—may be round, flat or impregnated with waterproof sealant

Damaged asbestos gasket
Asbestos Roofing Material (used from 1920’s to 1970’s)
Cement-asbestos pipe, sometimes called Transite, was used underground and above ground in years past and may show up in pipe replacement jobs, building demolition jobs or excavations.
Asbestos Ceiling Tile - used until about 1980

Usually white and in 1’ by 1’ or 2’ by 4’ sizes
Asbestos Shingles and Siding

Found in older houses – not to be confused with newer asbestos-free cement siding. There is little hazard unless disturbed. The top right hand picture shows a siding replacement job with broken green asbestos shingles which would have released dust and fibers into the air if done incorrectly.

Removal done correctly
Asbestos “Popcorn” Ceiling Material

Popcorn ceilings (also known as acoustic ceilings) were popular in many homes built from the late 1950s through the early 80s. Not all popcorn ceiling material contained asbestos, but some did. Many types were more easily dislodged than others.

Uncontrolled popcorn ceiling removal job
Asbestos in Joint Compound and Plaster

Some joint compound contained up to 5% asbestos

Joint compound

Plaster with asbestos
When is Asbestos Dangerous?

- Asbestos is most hazardous when it is **friable**.
- The term "**friable**" means that the asbestos is easily crumbled by hand, releasing fibers into the air.
- Asbestos-containing ceiling tiles, floor tiles, undamaged laboratory cabinet tops, shingles, fire doors, siding shingles, etc. will not release asbestos fibers **unless they are disturbed or damaged in some way**.
- Water damage, continual vibration, aging, and physical impact such as drilling, grinding, buffing, cutting, sawing, or striking can break the materials down making fiber release more likely.
When is Asbestos Dangerous?

• The most common way for asbestos fibers to enter the body is through breathing.
• Asbestos containing material is not generally considered to be harmful unless it is releasing dust or fibers into the air where they can be inhaled or ingested.
• Many of the fibers will become trapped in the mucous membranes of the nose and throat where they can then be removed, but some may pass deep into the lungs, or, if swallowed, into the digestive tract.
• Once they are trapped in the body, the fibers can cause health problems.
Health Effects of Asbestos

Airborne asbestos fibers inhaled deep into the lung can cause damage.

- Tiny breathable asbestos fibers are deposited in the alveoli, the ending small air sacs in the lungs.
- The body’s defense mechanisms cannot break down the fibers.
- Asbestos fibers cause damage to the lungs.
- The fibers may also travel to the pleura, the membrane lining the outside of the lungs.
Health Effects of Asbestos

- Asbestosis
- Mesothelioma
- Lung Cancer
- Other cancers

- Usually symptoms take 15 to 30 years or more to develop.
- Health effects from asbestos exposure may continue to progress even after exposure is stopped.
Health Effects of Asbestos- Asbestosis

• Asbestosis is a **serious, chronic, non-cancerous respiratory disease**.
• Inhaled asbestos fibers aggravate lung tissues, which cause them to scar.
• Symptoms of asbestosis include **shortness of breath and a dry crackling sound in the lungs** while inhaling. In its advanced stages, the disease may cause **cardiac failure**.
• There is **no effective treatment** for asbestosis; the disease is usually **disabling or fatal**.
• The risk of asbestosis is minimal for those who do not work with asbestos; the disease is rarely caused by neighborhood or family exposure.
Health Effects of Asbestos- Mesothelioma

- Mesothelioma is a rare form of cancer that most often occurs in the thin membrane lining of the lungs, chest, abdomen, and (rarely) heart.

- People who work in asbestos mines, asbestos mills and factories, and shipyards that use asbestos, as well as people who manufacture and install asbestos insulation, have an increased risk of mesothelioma.

- So do people who live with asbestos workers, near asbestos mining areas, near asbestos product factories or near shipyards where use of asbestos has produced large quantities of airborne asbestos fibers.
Health Effects of Asbestos - Lung Cancer

- Lung cancer causes the **largest number of deaths related to asbestos exposure.**
- The incidence of lung cancer in people who are directly involved in the mining, milling, manufacturing and use of asbestos and its products is much higher than in the general population.
- People who have been exposed to asbestos and are also exposed to some other carcinogen -- such as **cigarette smoke** -- have a significantly greater risk of developing lung cancer than people who have only been exposed to asbestos.
- One study found that asbestos **workers who smoke are about 90 times more likely to develop lung cancer** than people who neither smoke nor have been exposed to asbestos.
Health Effects of Asbestos Lung Cancer

Lung cancer causes the largest number of deaths from asbestos exposure. The risk greatly increases in workers who smoke.

**Lung Cancer Risks**

- **No Exposure**: (70 per 100,000 lung cancer deaths in general population)
- **Asbestos**: 5x higher risk than general population
- **Smoking**: 10x higher risk
- **Asbestos + Smoking**: 50x to 90x higher risk
Health Effects of Asbestos - Other Cancers

Evidence suggests that ingesting asbestos can also cause cancers in the:

- Esophagus
- Larynx
- Oral cavity
- Stomach
- Colon
- Kidney

Fibers can enter the mouth and be swallowed. Poor hygiene, leaving food/drinks out in contaminated areas, and carelessness can result in the ingestion of asbestos.
The potential for asbestos related disease depends on:

- Concentration of exposure
- Duration of exposure
- Smoking
- Age – because of delayed effects
Asbestos Limits in the Air

Asbestos in the air at these levels would be invisible to the naked eye.

Asbestos Permissible Exposure Limits (PEL)

- 0.1 fibers per cubic centimeter of air (0.1 f/cc) 8-hour time weighted average
- 1.0 f/cc 30-minute short-term exposure limit
How to Avoid Exposure?

• In order to avoid being exposed to asbestos, you must be aware of the locations it is likely to be found.

• If you do not know whether something is asbestos or not, assume that it is until it is verified otherwise.

• Remember that you cannot tell if floor or ceiling tiles contain asbestos just by looking at them.

• If you need to have materials analyzed or tested for asbestos, please contact EHSRM department.

• Never try to take a sample yourself unless you are licensed to do so.
How to Avoid Exposure?

If you have reason to suspect that something contains asbestos, either because it is labeled as such, or because it something that is likely to contain asbestos (9" floor tile, for example)...

DO NOT DISTURB IT

If you need to do work that might involve asbestos (lifting ceiling tiles, repairing insulated pipelines, etc.), check with EHSRM to find out what can be done safely.
How to Avoid Exposure?

NEVER....

- Drill
- Hammer
- Cut
- Saw
- Break
- Damage
- Move
- Disturb

...any asbestos containing materials or suspected materials.
How to Avoid Exposure?

• Housekeepers and custodians should never sand or dry buff asbestos containing floor tiles, and only wet stripping methods may be used during stripping operations.

• Broken and damaged asbestos floor tiles must also be removed by qualified workers. Report any suspect broken tiles to EHSRM department.
How to Avoid Exposure?

Asbestos exposure must be controlled by one or more of the following engineering and work practices:

- Local exhaust ventilation with HEPA filter system
- HEPA-filtered vacuums
- Enclosure or isolation
- Wet methods of handling
- Prompt disposal
- Regular housekeeping

HEPA filter = high efficiency particulate air filter
How to Avoid Exposure?

Worker training
- Provide initially and annually
- Cover hazards, work practices, & safety procedures
- Program elements of Rule

Worker protection
- PPE: respirator, gloves, head and foot protection, coveralls
- Hygiene facilities: decontamination, changing room, etc...

Decontamination shower
Asbestos Abatement at AUB
Asbestos Abatement at AUB
Questions
Thank you!