

# THE HEALTH EFFECTS OF ASBESTOS EXPOSURE

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# WHAT IS ASBESTOS?

- ✓ A group of naturally occurring minerals whose characteristic feature is that they occur as fibres
- ✓ Masses of tiny fibres form dust if disturbed

# **MOST COMMON TYPES OF ASBESTOS USED IN CANADA**

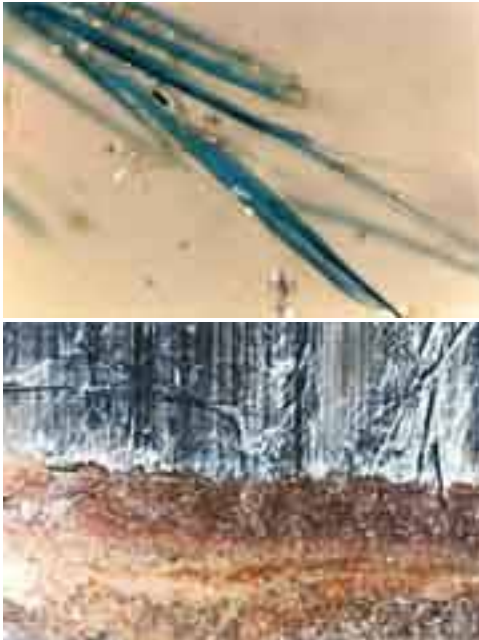
## **✓Serpentine**

- ✓Chrysotile (white asbestos)

## **✓Amphibole**

- ✓ Amosite (brown asbestos)
- ✓Crocidolite (blue asbestos)

## Blue asbestos



## White asbestos



## Brown asbestos



# WHY WAS IT USED?

Asbestos was commonly used in the 1940-1980s for

- ✓ Durability
- ✓ Fire resistance
- ✓ Excellent insulating properties

# WHERE DO YOU FIND IT?

- ✓ Over 3,000 uses of asbestos known
- ✓ In majority of homes built before mid 1980
- ✓ Asbestos-cement products
- ✓ Electrical, thermal & acoustic insulation
- ✓ Fire resistant insulation

# DIFFERENT FORMS OF ASBESTOS MATERIAL HAVE DIFFERENT LEVELS OF RISK

- ✓ Friable (nonbound) vs bound asbestos
- ✓ Where asbestos fibres are stable and bonded in good condition, little risk
- ✓ However, when broken, damaged or mishandled, fibres become loose and airborne, creating hazard

# FRIABLE ASBESTOS MATERIAL UNLIKELY TO BE FOUND IN HOMES IN CANADA



- ✓ A dry material which can be reduced to powder by hand pressure.
- ✓ A health risk as it becomes airborne and more likely to be inhaled.
- ✓ eg: insulation inside stoves & heaters  
industrial grade insulation in commercial buildings



# NON FRIABLE (BOUND) ASBESTOS

- ✓ AC sheeting (fibro)
- ✓ Flexible building boards
- ✓ Flue & water pipes
- ✓ Vinyl floor tiles
- ✓ Ceiling insulation



# WHAT ARE THE HEALTH EFFECTS OF EXPOSURE TO ASBESTOS?

- ✓ Asbestos becomes a health hazard when fibres become airborne and are inhaled.
- ✓ Effects depend on length, diameter and composition of fibre
- ✓ Disease is usually associated with long-term exposure in occupational or para-occupational setting (immediate family or live near asbestos mine or factory)
- ✓ Risk depends on how much and how long



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# ASBESTOS RELATED DISEASES

All forms of asbestos can potentially cause:

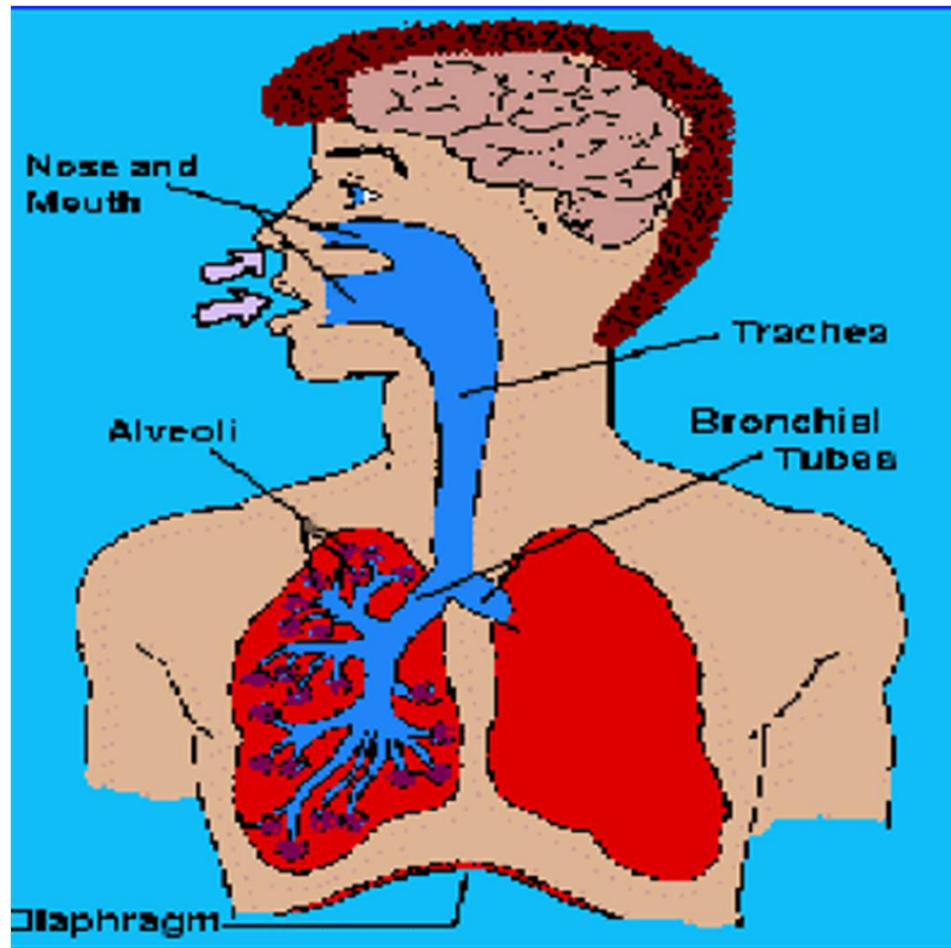
Non cancer

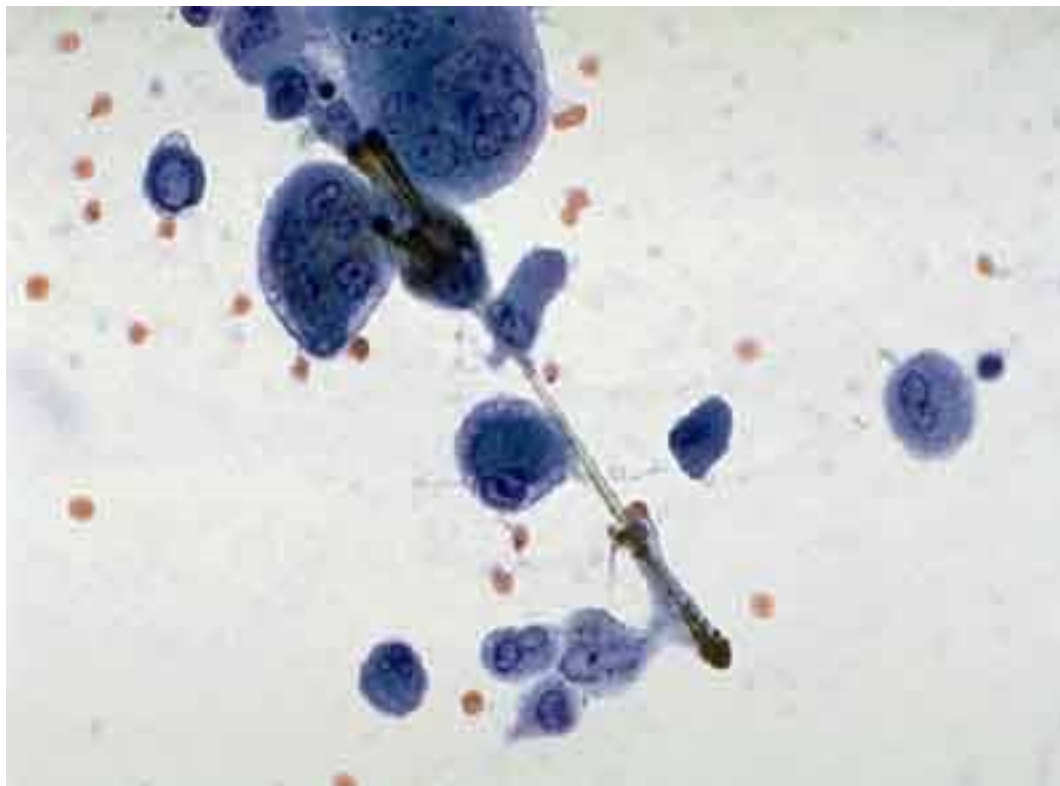
- ✓ Pleural plaques
- ✓ Asbestosis

Cancer

- ✓ Lung cancer
- ✓ Malignant mesothelioma





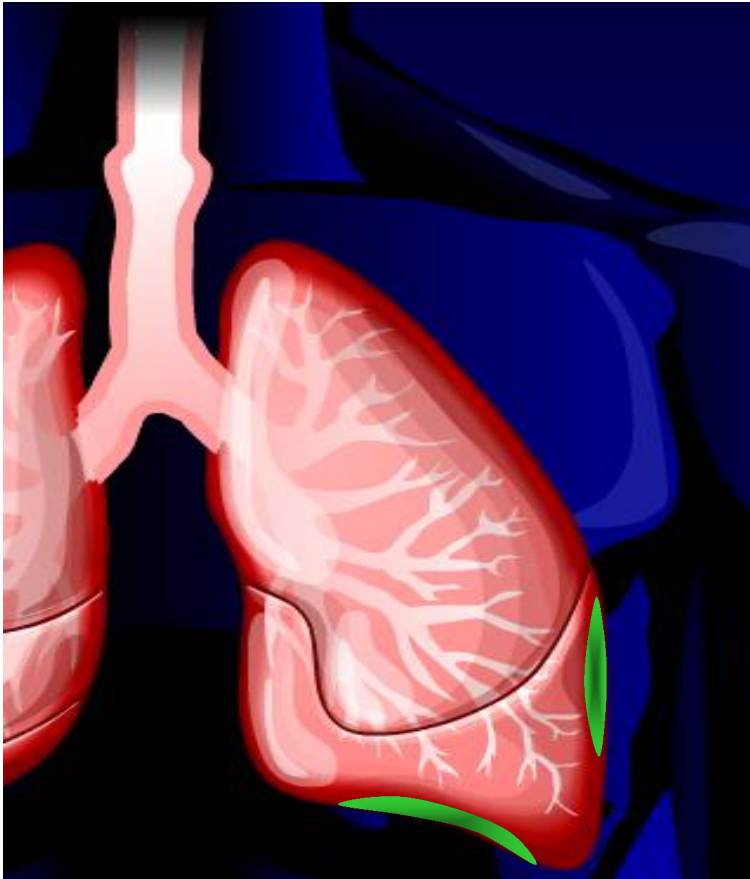




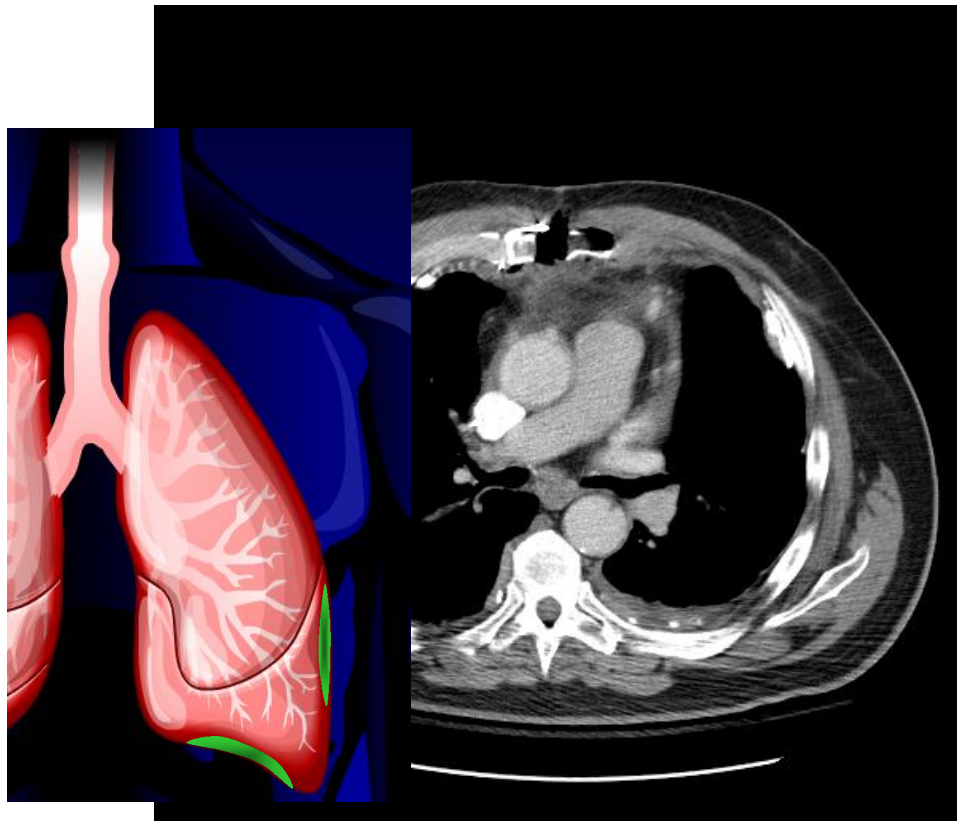
# PLEURAL PLAQUES

- ✓ Pleura: 2 layers of membrane line the chest wall & cover the lungs
- ✓ Asbestos may produce thickened patches
- ✓ Is not cancerous but can affect lung function
- ✓ Generally, no symptoms
- ✓ Indicates significant previous exposure
- ✓ Common in occupational exposure & sometimes high environmental levels

# Pleural Plaques



# Pleural Plaques on CT-SCAN



thickness

area

density

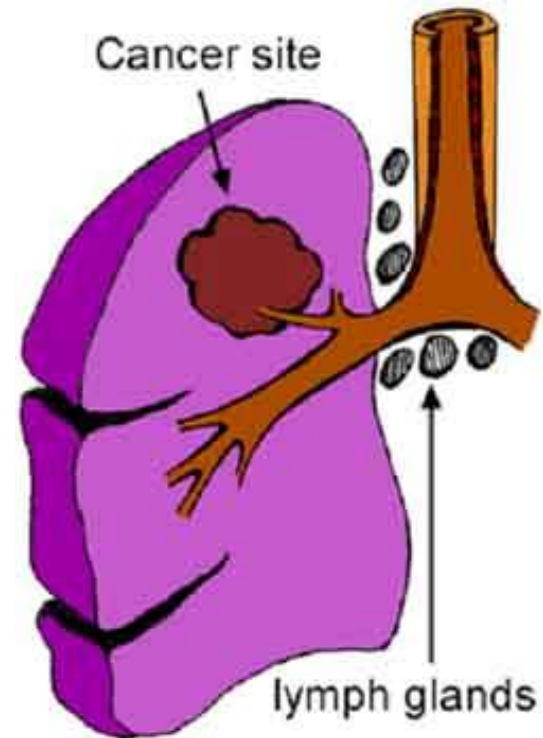
# ASBESTOSIS

- ✓ A chronic and progressive lung disease caused by inhaling asbestos fibres over a long period of time.
- ✓ 5- 20 years to develop
- ✓ Inflammation from fibres causes scarring (fibrosis) and stiffening of the lung. This causes less oxygen exchange
- ✓ Symptoms – short of breath, cough, chest, tightness

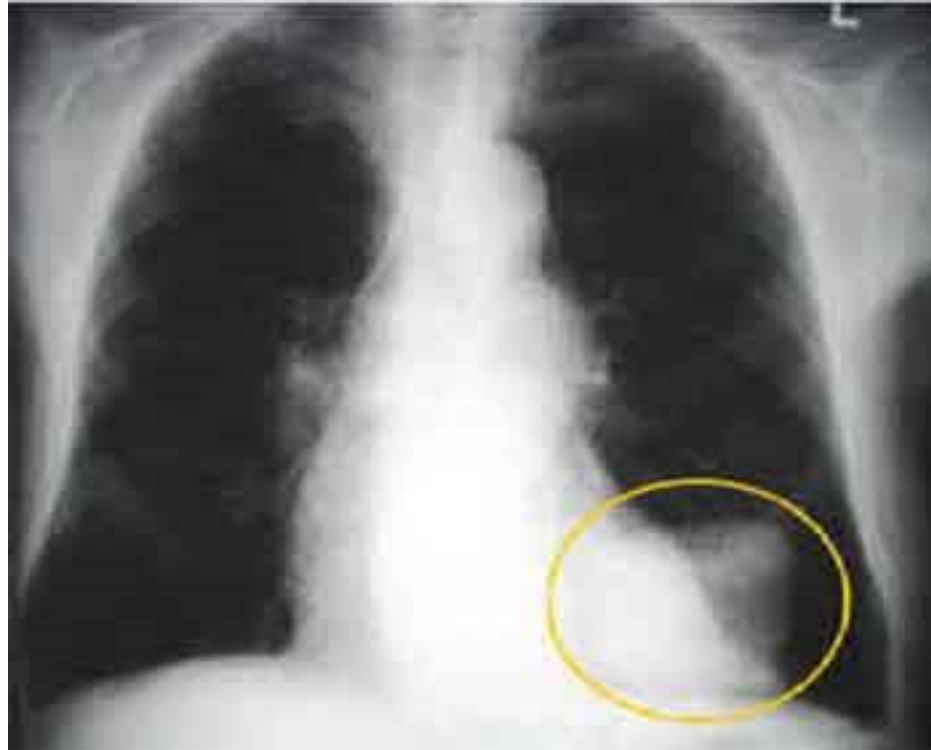


# LUNG CANCER

- ✓ Usually takes 10 to 20 years to develop after asbestos exposure.
- ✓ Asbestos in non-smokers: 5x background rate
- ✓ Asbestos in smokers: 50x background rate
- ✓ Symptoms: persistent cough, weight loss, cough up blood







# Lung Cancer



# MALIGNANT MESOTHELIOMA

- ✓ A cancer of the lining of the lung and chest cavity (pleural mesothelioma) (2/3)
- ✓ or the lining of abdominal cavity (peritoneal mesothelioma)
- ✓ Can take 20 to 40 years to develop
- ✓ Particularly associated with crocidolite
- ✓ Australia has the world's highest incidence

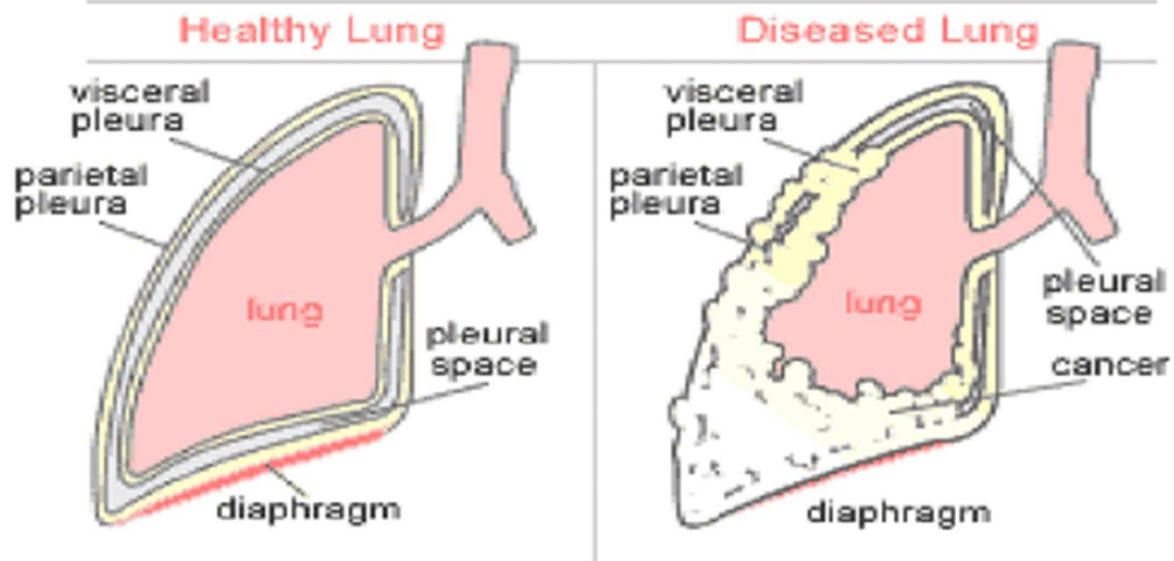
# MALIGNANT MESOTHELIOMA

- ✓ Rapidly fatal : 75% dead 1 year after diagnosis
- ✓ Smoking has no apparent effect on risk
- ✓ Symptoms: short of breath, chest pain, weight loss
- ✓ Has occurred in people without direct occupational exposure but exposed to large quantities of dust

# ASBESTOS INDUCED MESOTHELIOMA

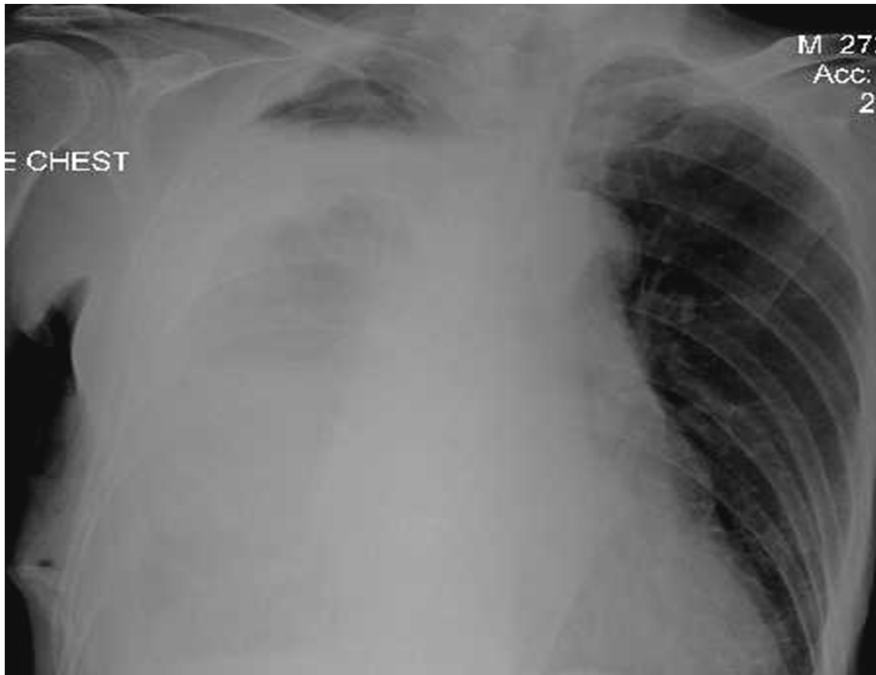
- ✓ 80% are related to asbestos
- ✓ Most from workplace exposure
  - More common in males than females
- ✓ 4000 – 4500 cases/year in North America
- ✓ Long latent period (20 - 40 years)
  - Average age 60 at diagnosis
- ✓ Incidence rising

## Pleural Mesothelioma

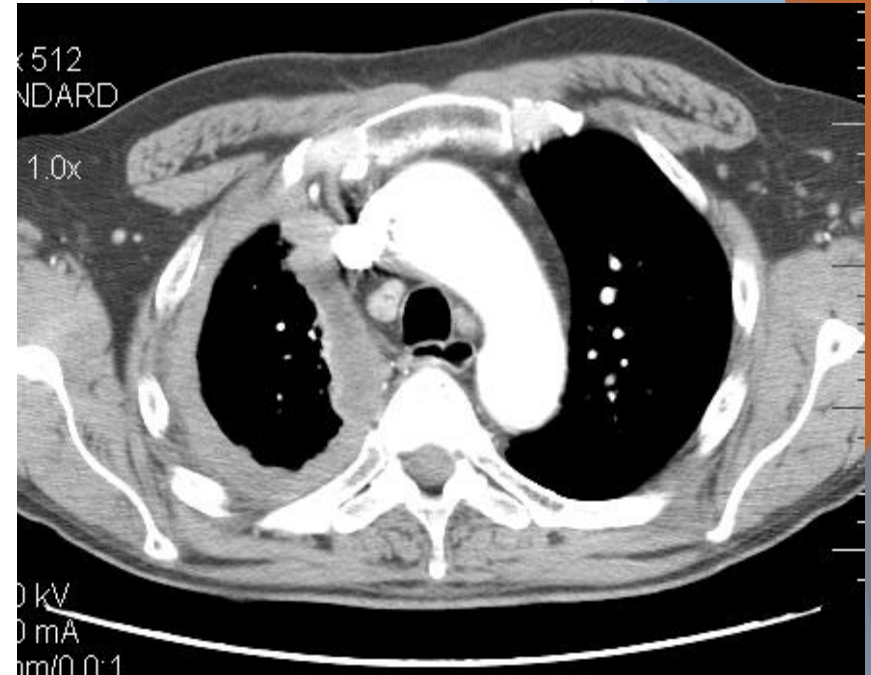


# MESOTHELIOMA

► Chest X-RAY



Chest CT-Scan

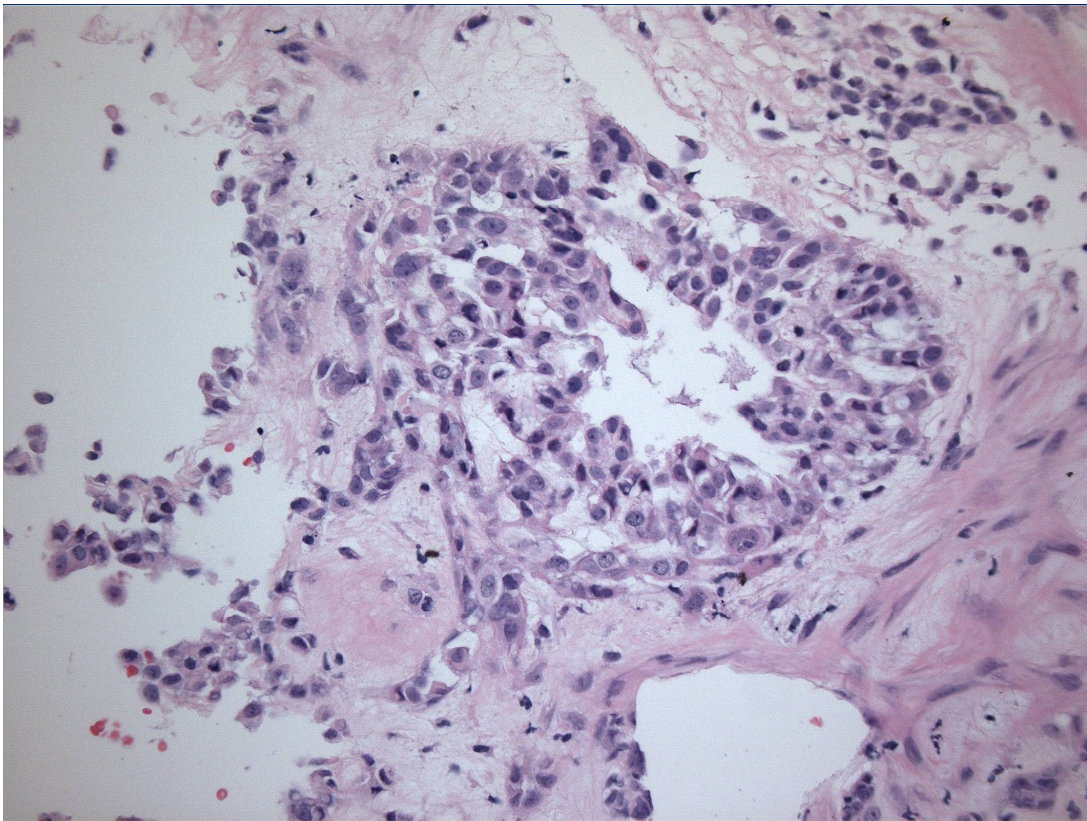


# TUMOUR ON PLEURA





# MESOTHELIOMA UNDER THE MICROSCOPE



# CURRENT TREATMENT PROTOCOL

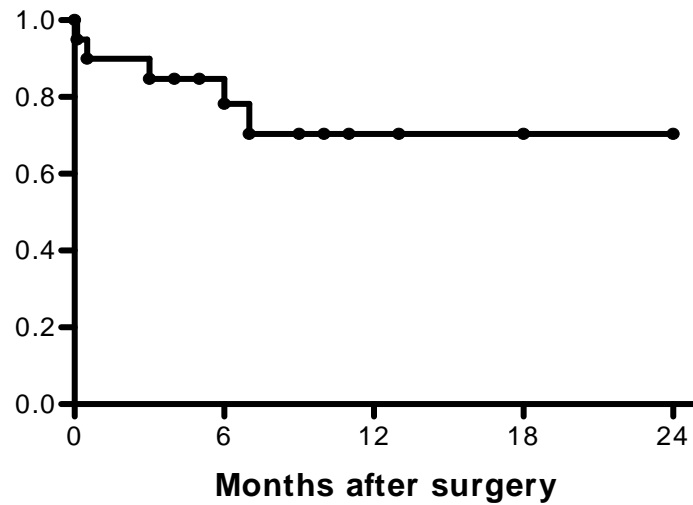
Chemotherapy  
(Cisplatin and ALIMTA)

Surgery  
(Extrapleural Pneumonectomy)

Radiation  
(54 Gy Hemithoracic)



# OVERALL SURVIVAL



# EXPOSURE TO ASBESTOS FIBRES IN AIR

- ✓ Small quantities are present in air breathed by most people without developing asbestos-related disease
- ✓ People who have developed disease from asbestos were exposed to workplace air levels around 5 fibres/ml

# WHAT IS THE RISK FROM A ONE-OFF EXPOSURE?

✓ The risk has not been quantified, but except for intense exposures, the risk caused by brief exposure is likely to be undetectably low.

# WHAT IS A SAFE LEVEL OF EXPOSURE TO ASBESTOS?

- ✓ The level of exposure that may cause health effects is not known.
- ✓ It is therefore important to keep exposure to asbestos fibres as low as possible and precautions must always be taken.

# CONCLUSION

- ✓ The major route of exposure to asbestos is inhalation
- ✓ There is no known “safe” level of exposure
- ✓ Tightly bound asbestos poses no immediate hazard
- ✓ Asbestos becomes a health hazard when fibres become airborne
- ✓ Exposure should be minimized by sensible precautions