

Occupational Lung Disease

Situation, Prevention, Rehabilitation

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Prevention

- **Primary**
 - Prevent exposure at the source
 - Occupational (Industrial) Hygiene & Safety
 - Hierarchy of Controls, including Management
 - Tobacco-Free Workplace
- **Secondary**
 - Medical Fitness & Surveillance
 - Respiratory Protection
 - Biological Monitoring
 - Tobacco Cessation and Wellness Programs
- **Tertiary**
 - Correct Diagnosis
 - Removal from Exposures, including Tobacco
 - Correct Treatment
 - Prevent Complications
 - Physical and Occupational Rehabilitation

Primary Prevention

- Hierarchy of Controls
 - Management SOPs (procedures, regulatory compliance)
 - Bipartite OSH Committees (labor + management)
 - Union bargaining
 - Engineering and Design
 - Substitution, Elimination
 - Hazard Communication + Training
 - Emergency Preparedness & Response
 - Ventilation
 - Personal Protective Equipment
 - Inspections
 - Industrial Hygiene consultation
 - Medical clearance, case management, and safe return to work

OEM Tools and Toxic Torts

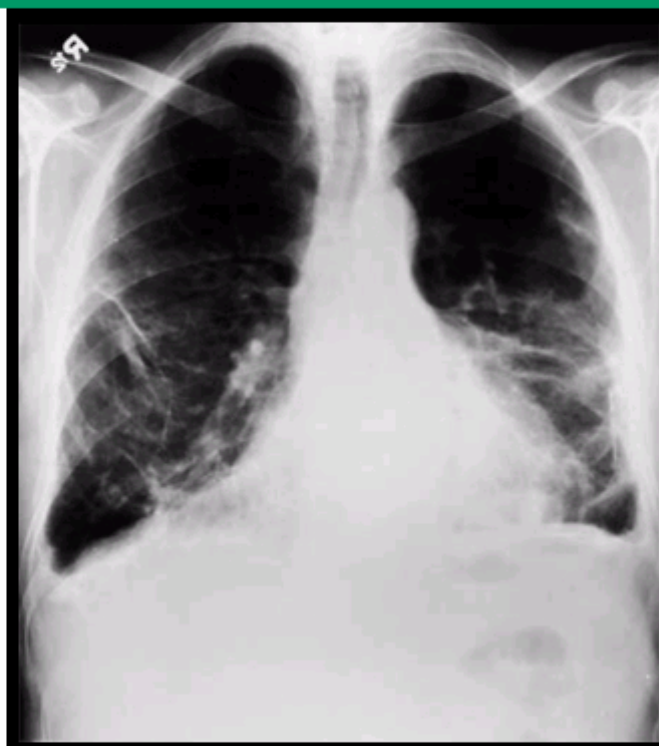
- Cases (injuries, illnesses, deaths)
- Epidemiology (population studies)
- Toxicology (human, animal, cell experiments)
- Regulatory aspects (OSHA, case law)
- In USA – Daubert Rules of Evidence

Scope

- Surveillance and lung testing
- Asthma
- Hypersensitivity pneumonitis
- Byssinosis(cotton dust)
- Pneumoconioses:
 - Asbestos, silica, coal worker, nanoparticle lung diseases

Asbestosis and ARPD

Advanced asbestosis



Note characteristic features: fibrotic bands superimposed on a background of widespread irregular opacities, shaggy heart border and septal thickening, extensive pleural changes, and blunted costophrenic angles.

Am J Respir Crit Care Med 2004; 170:692; www.atsjournals.org



Asbestosis and ARPD



ARPD = Asbestos Related Pleural Disease

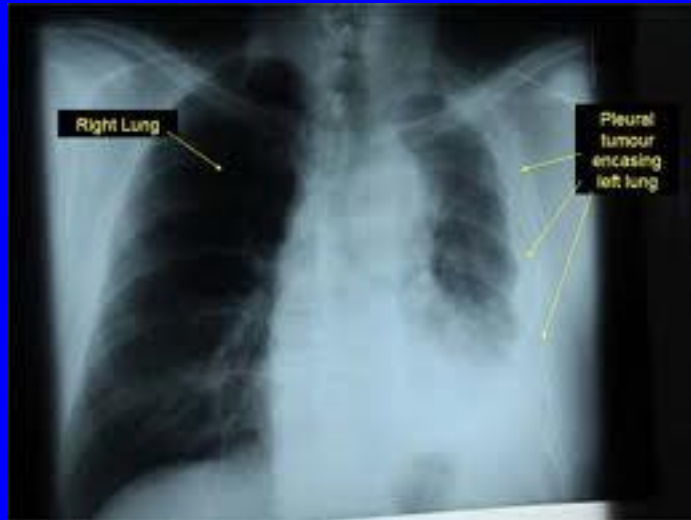
Asbestos Related Pleural Disease



- Fibrous, tan-white, pleural plaques on the pleural side of the diaphragm
- Latency > 10 yr
- +/- restriction, symptoms

(courtesy of
Dr. Edward Klatt)

Mesothelioma



Coal Worker's Pneumoconiosis

- CWP risk is higher for exposure to higher carbon rank coal: anthracite coal compared to bituminous coal
- Silica content increases risk of CWP



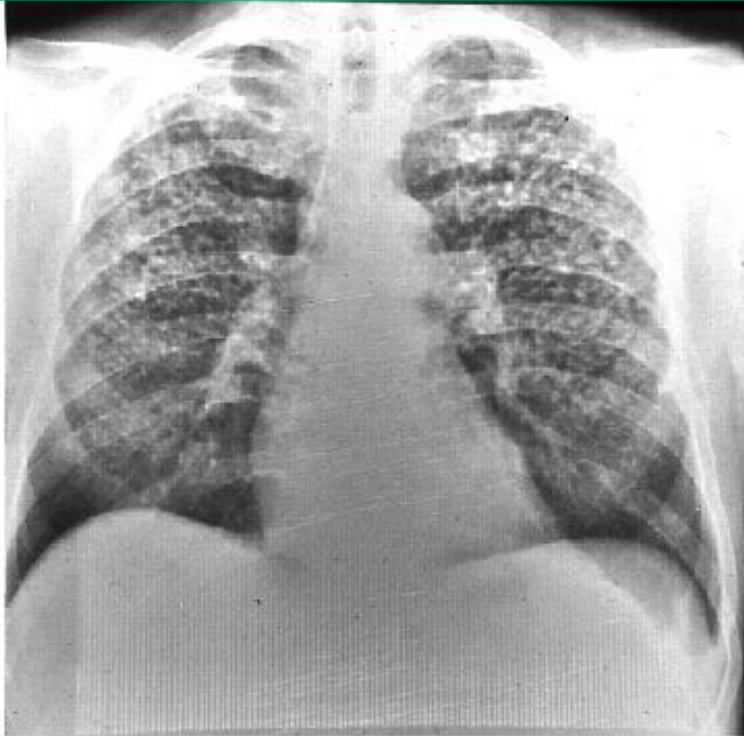
Progressive Massive Fibrosis (PMF) in CWP

- PMF lesions > 10 mm diameter
- Calcified (eggshell)
hilar lymphadenopathy
- Symmetric or unilateral
- Irregular non-calcified opacities
- Posterior upper and middle lobes
- Hilar retraction
- PMF lesions migrate toward
mediastinum causes peripheral
traction emphysema
- Cavitation predisposes to
Tuberculosis and necrosis

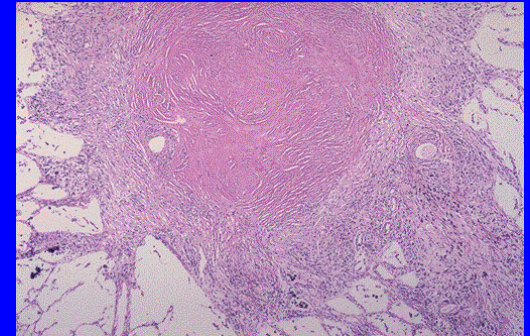


Chronic Silicosis

Silicosis

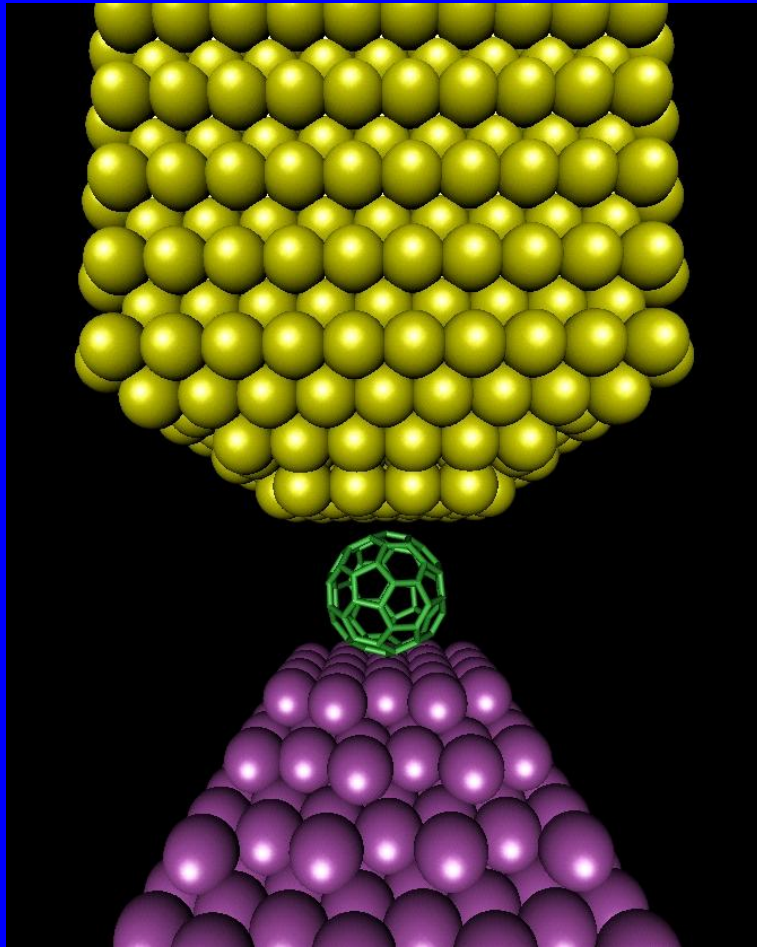


Chest radiograph shows multiple larger nodules, 3-5 mm in diameter, with a bias for the upper lobes. Note calcification in some of the pulmonary nodules and the hilar lymph nodes.
Courtesy of Paul Stark, MD.

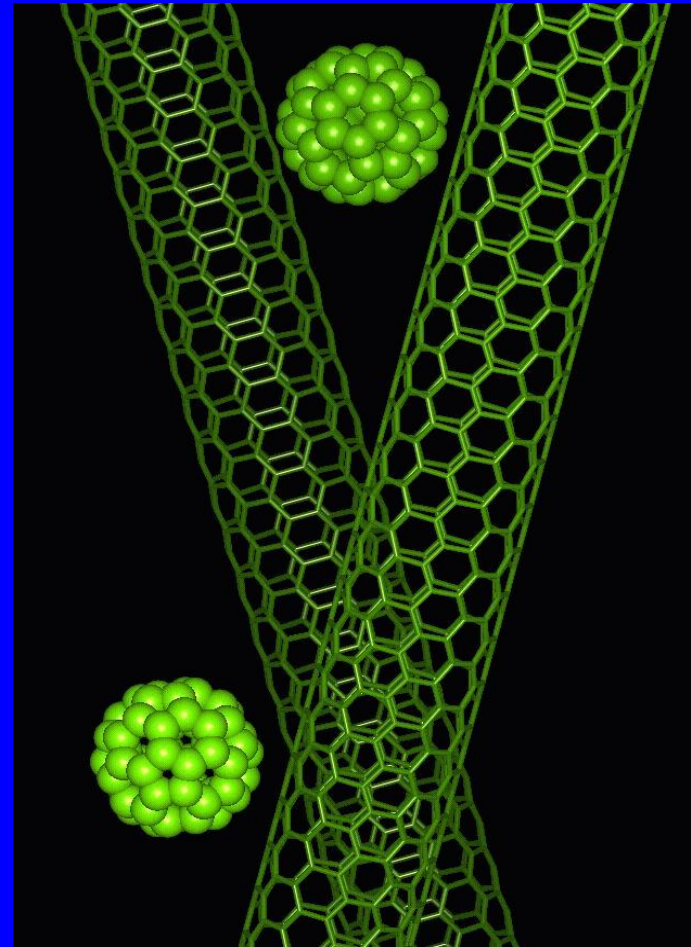


Nodules contain collagen bundles





C60 transistor © Nano@PolyMTL



C nano-structures © Nano@PolyMTL

Source: EcolePolytechnique de Montréal, Département de génie physique; <http://nanostructures.phys.polymtl.ca/galerie.html>