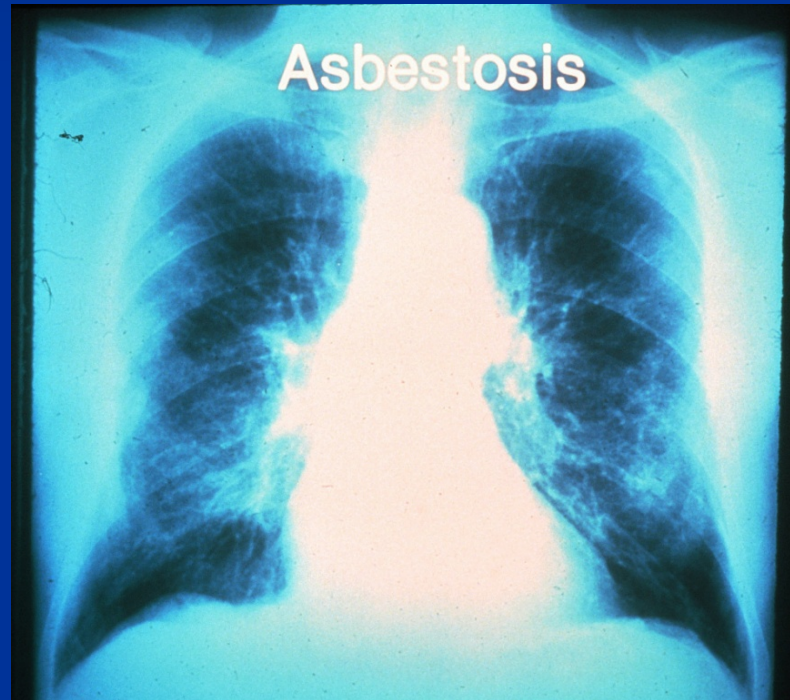


Asbestos-Related Disorders



Pneumoconiosis

- Pulmonary Diseases
- Pneumoconioses (dusty lung)
- Non-neoplastic reaction of the lungs to inhaled mineral or organic dust ...

Fibers



Asbestos Spray on Beams



Spraying Asbestos on Ceilings



Occupational Title Can be Uninformative

- Pipe Coverer, Insulation worker
- Millwright, boiler maker
- Fireman (may be furnace worker)
- Mixer, front end loader, welder
- Laborer – construction trades
- Bystanders
- Carry-home

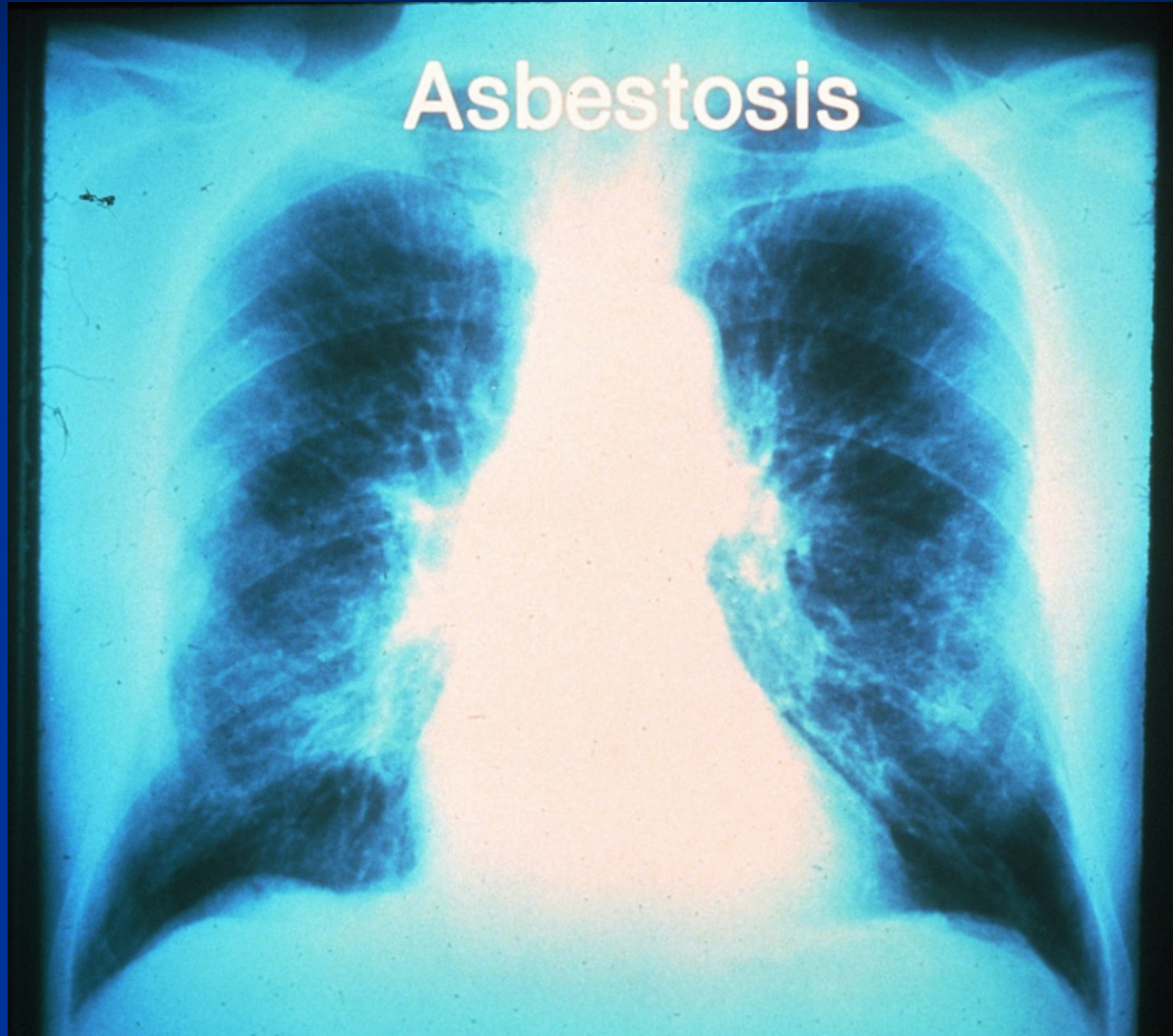
Asbestosis

- One of group of “asbestos-related disorders”
- ↓ FVC; ↓ DLCO
- Can see mixed restrictive/obstructive
- Interstitial fibrosis
- Pleural scarring
- Pleural plaques
- Calcifications
- Progressive

American Thoracic Society (ATS)– Guideline of 2003

- Asbestosis refers to interstitial fibrosis, not to pleural fibrosis with or w/o pleural thickening
- Diagnosis
 - Evidence of structural pathology consistent with asbestos-related disease (either imaging or histology)
 - Evidence of causation – history, plaques
 - Exclusion of alternative plausible causes
 - See PM E-500 §§ 17 & 18 – if not asbestosis, may still be considered an “asbestos-related disorder” p. 6, “lung fibrosis” p. 7 or “pneumoconiosis” p. 8

Chest X-ray: Asbestosis



X-rays showing Severity of Asbestosis

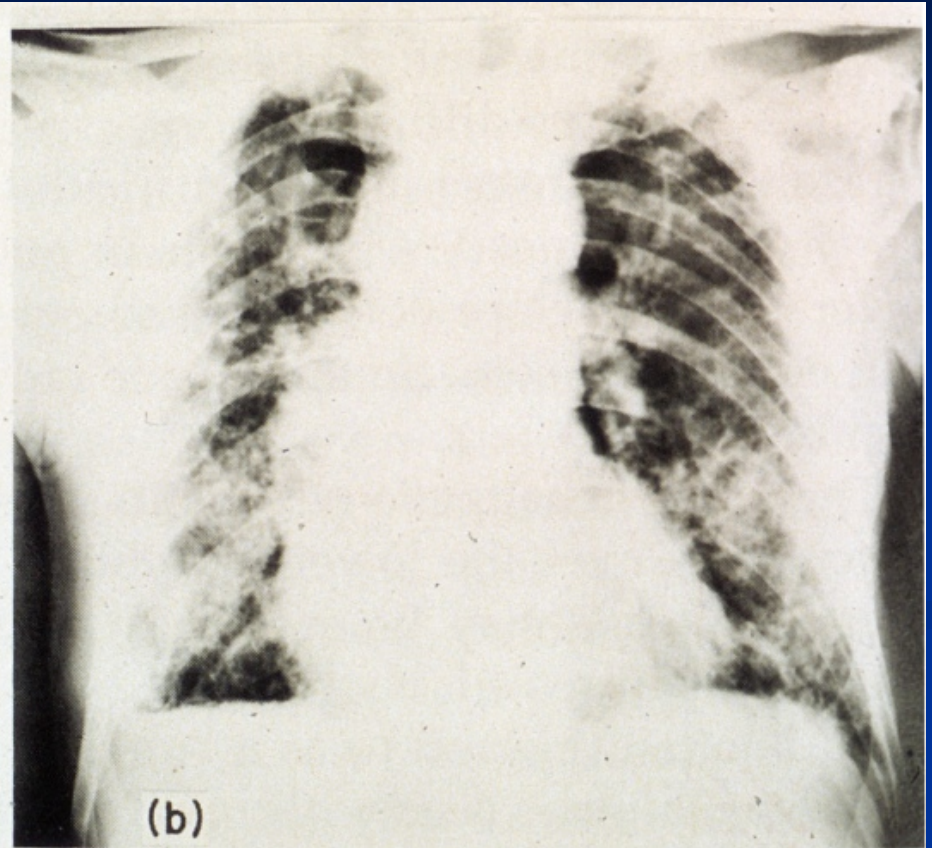
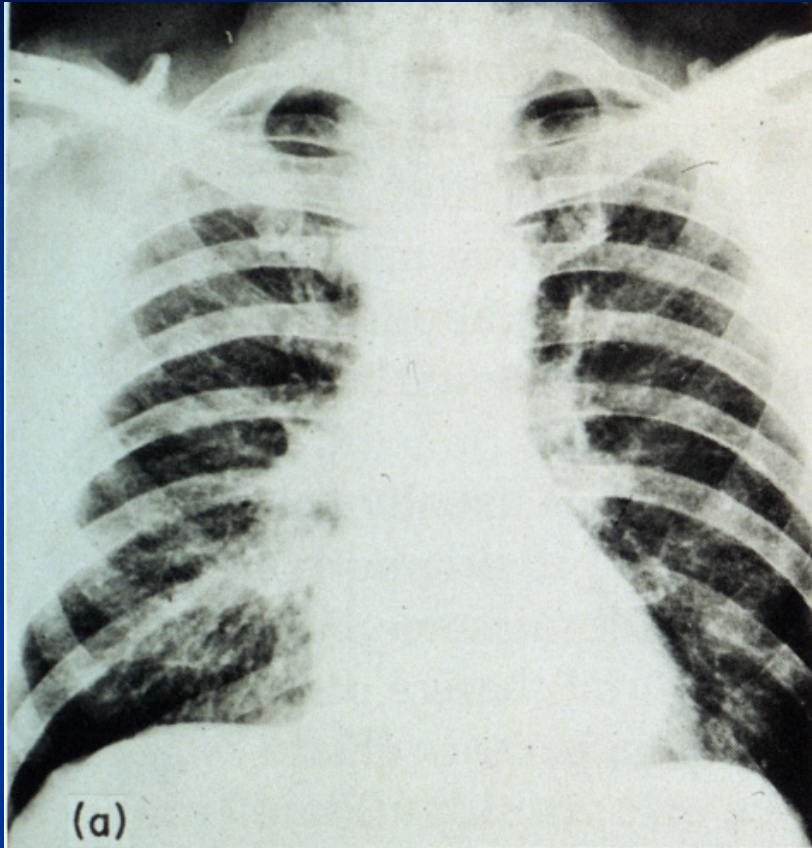


Plate 7-2a. Parenchymal asbestosis (grade 2) fairly evenly distributed.

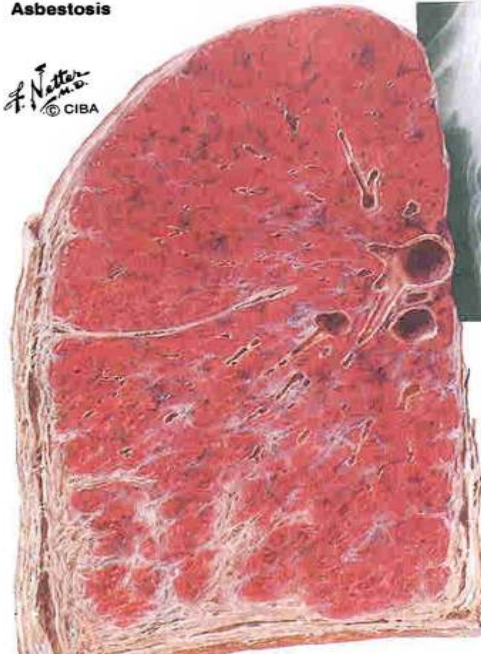
Plate 7-2b. Parenchymal asbestosis (grade 3), extensive distribution, shaggy heart, thickened interlobar fissure, no calcification seen with Bucky, obliteration of the R costophrenic angle.

Asbestosis

Page 17 of
Handouts

Asbestosis

F. Netter
© CIBA



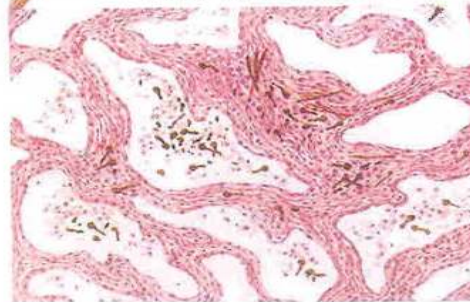
Extensive fibrosis with emphysematous changes predominantly in lower lobe; great thickening of visceral, parietal, and diaphragmatic pleurae



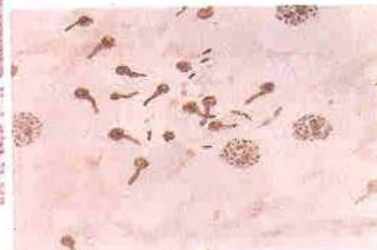
Calcified pleural plaques and irregular densities, chiefly in lower lobes, shown on oblique roentgenogram



Pleural plaques in pulmonary asbestosis

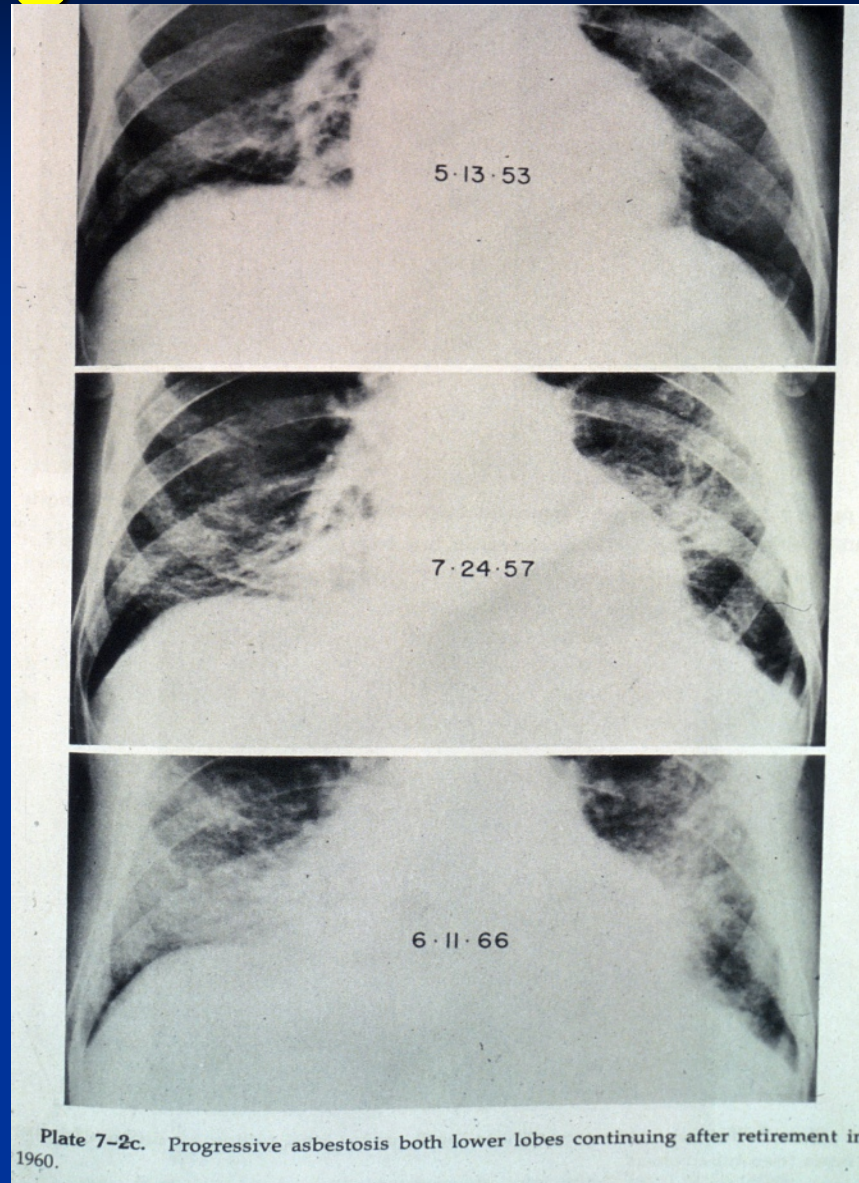


Moderately advanced asbestosis with extensive fibrosis and distorted alveoli. Asbestos bodies (some fragmented) and a few asbestos fibers in airspaces and interstitium

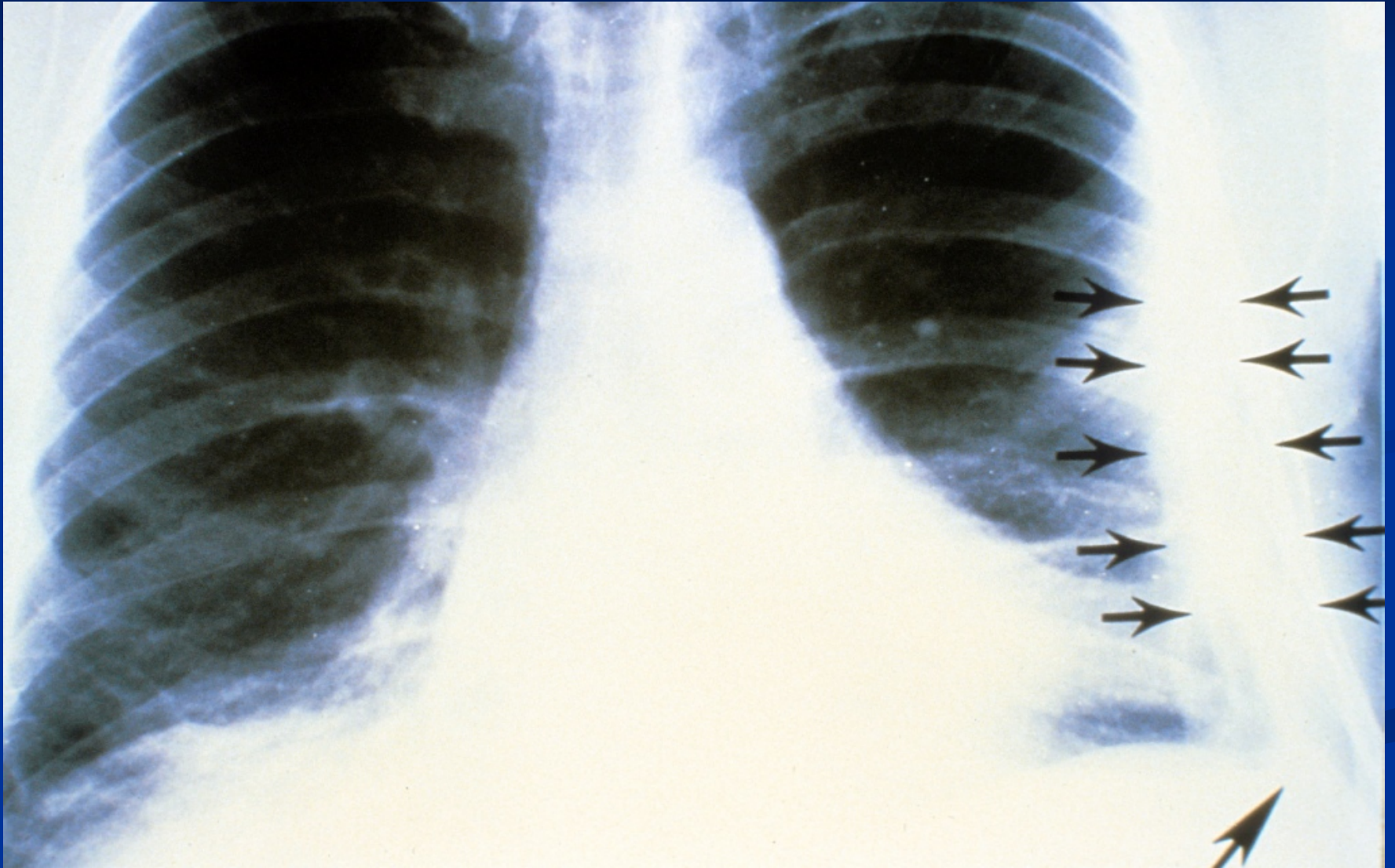


Asbestos bodies in sputum

Progressive asbestosis



Pleura



Pleural Plaque

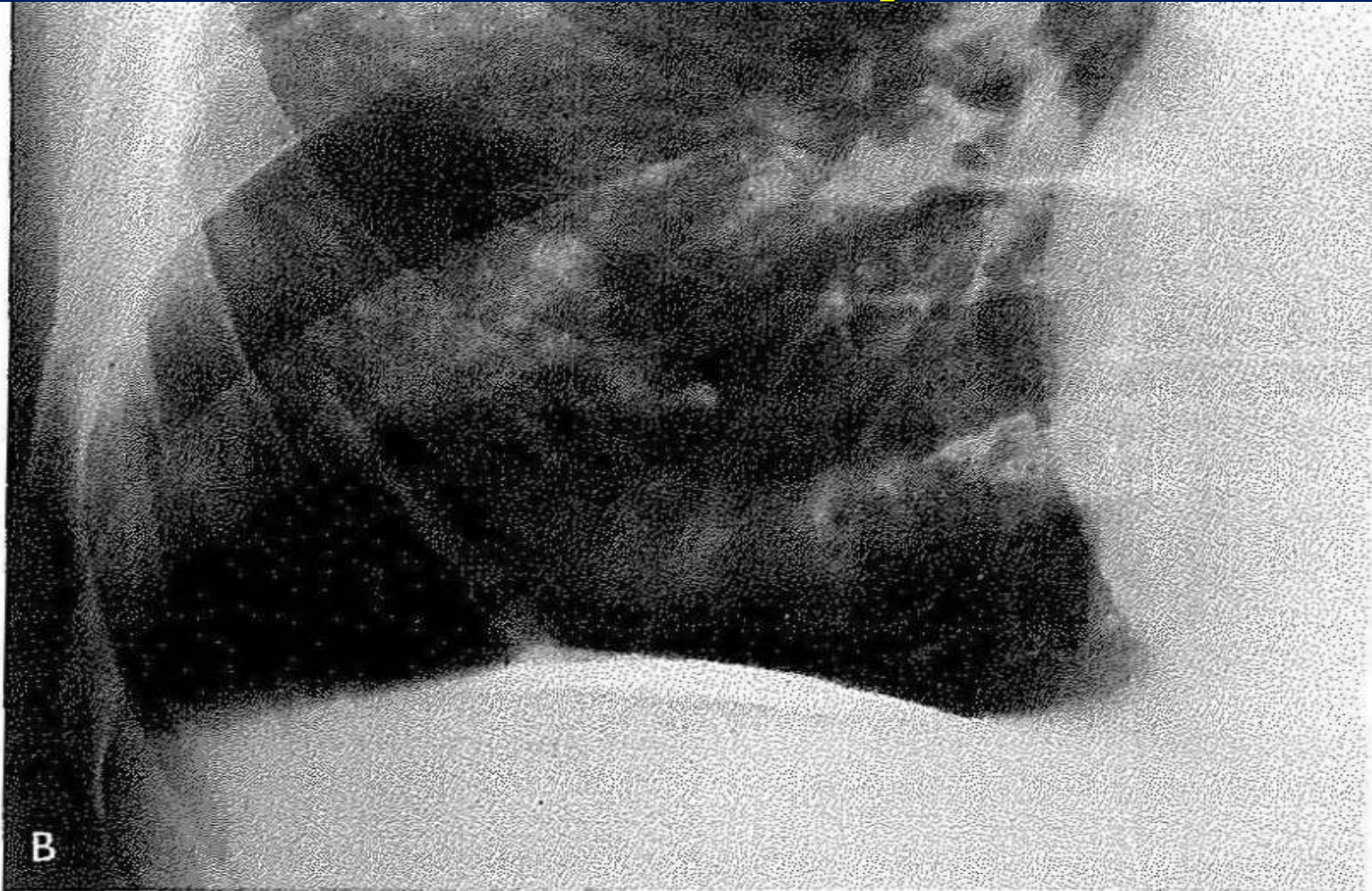


Figure 9-4 A, Large, noncalcified plaques (arrowed) in a shipyard worker exposed to asbestos. In addition, scant parenchymal asbestotic lesions are present. (Courtesy of Dr. J. Lyons.) B, Close-up view of the right lower zone of chest film of another subject. A well delineated calcified pleural plaque is present on the right diaphragm.

Pleural Plaques

- Marker of Asbestos Exposure
- Marker of risk – cancer and mesothelioma
- May be associated with ↓ in PFT

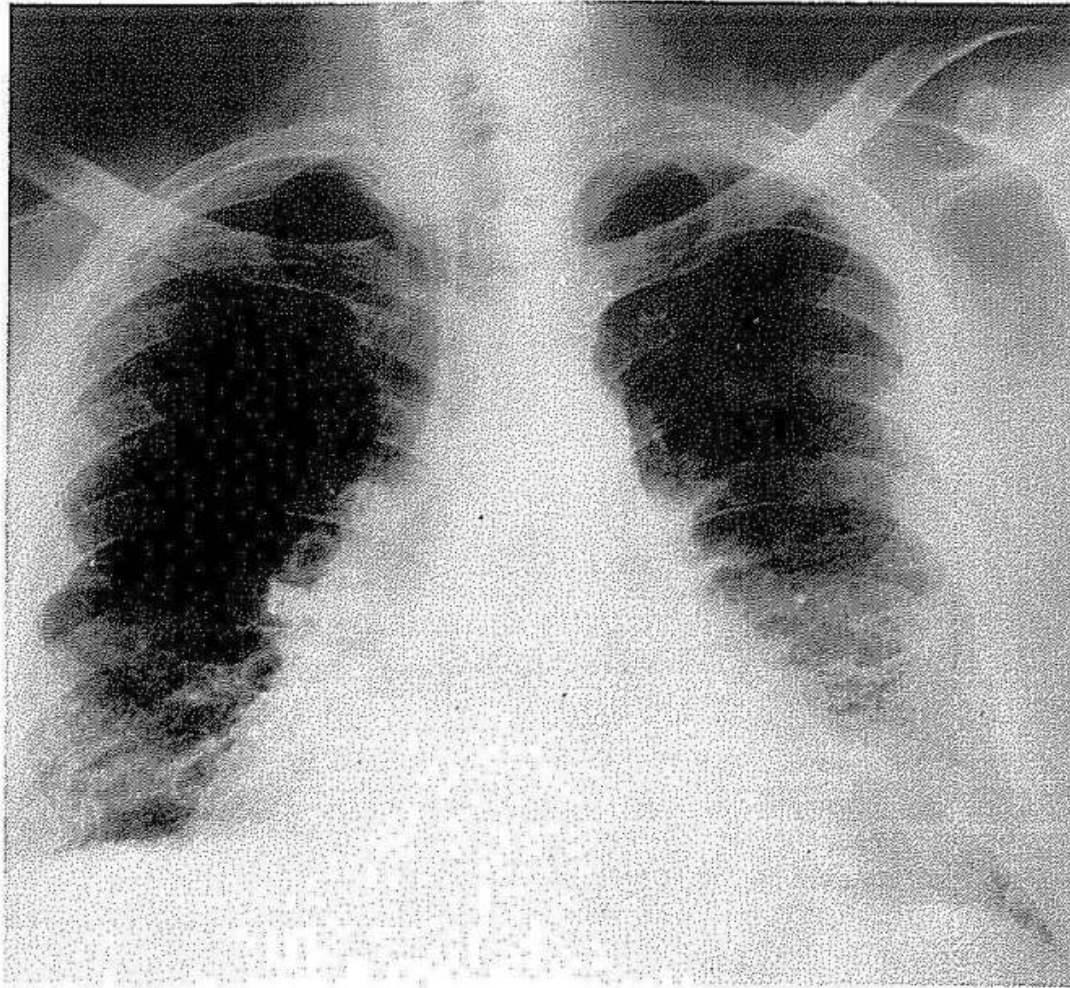


Figure 9-3 The final stages of asbestosis in a shipyard worker. Both lungs show diffuse fibrotic change, obscuring the cardiac border. The heart is dilated, and clinically this patient was in cardiac failure. (Courtesy of Dr. J. Lyons.)

American Thoracic Society (ATS) on Smoking

- Smokers w/o dust exposure can have irregular opacities, but rarely as high as 1/0
- Latency – usually 20 or more years
- Duration – as little as 1 month of high level
- High intensity exposure can decrease latency
- PM E-500, Exhibit 2

Clinical Picture

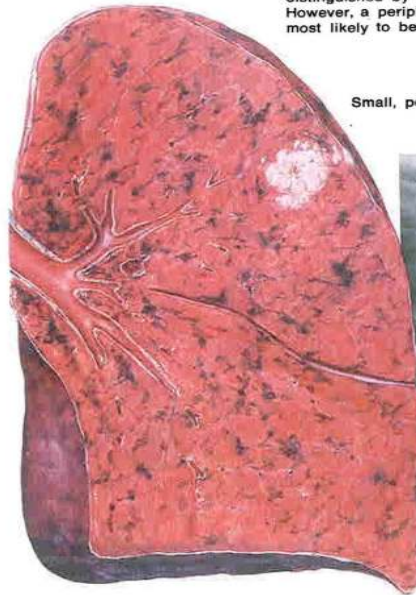
- Dyspnea
- Bi-basilar rales
- Restrictive or mixed PFT
- Decreased DLCO
- Abnormal Chest x-ray

Lung Cancer

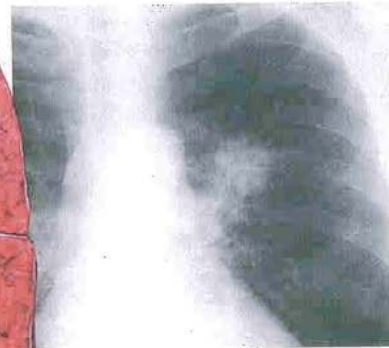
Page 25
of
Handouts

Bronchogenic Carcinoma: Adenocarcinoma

Different histologic types of bronchogenic carcinoma cannot be distinguished by gross specimens or roentgenogram alone. However, a peripherally located tumor < 4 cm in diameter is most likely to be adenocarcinoma

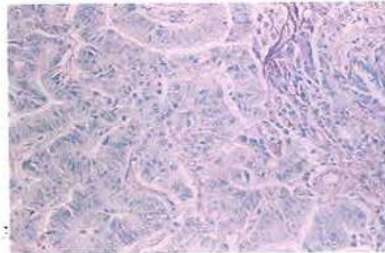


Small, peripherally placed tumor

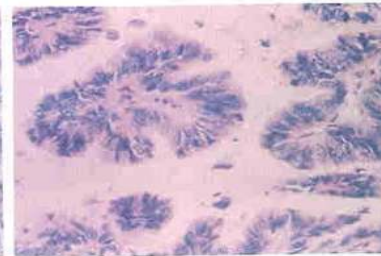


F. Netter M.D.
© CIBA

Varied histology of adenocarcinoma



Tumor cells form glandlike structures with or without mucin secretion



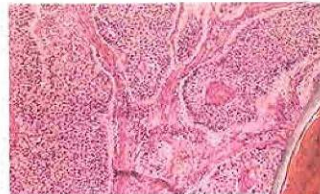
Tumor cells may also form papillary structures

Lung Cancer

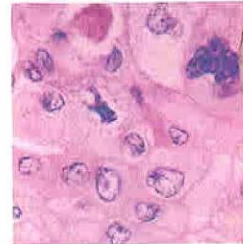
Page 26 of
Handouts

Plate 13

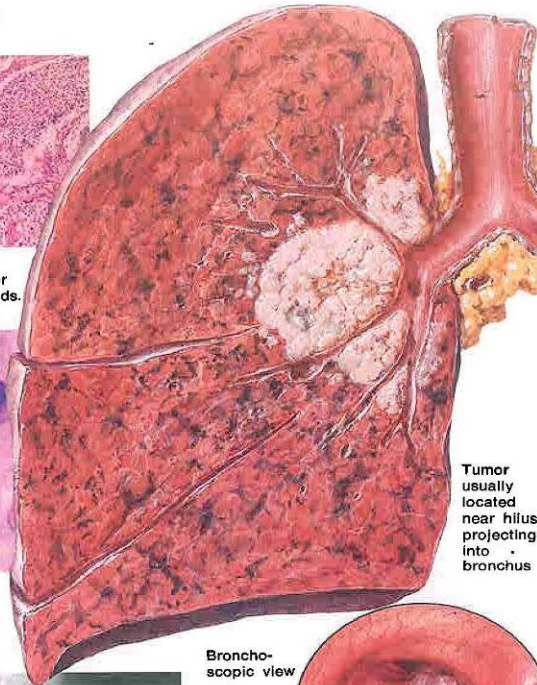
Bronchogenic Carcinoma: Squamous Cell Type



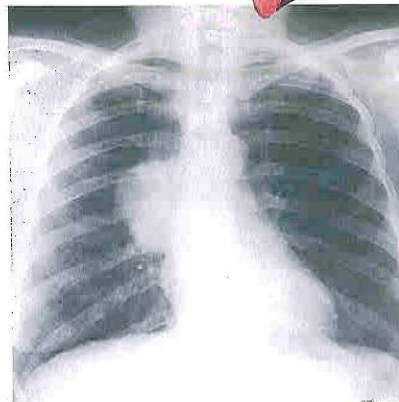
Low-power section (H and E stain) showing nests of tumor cells separated by fibrous bands. Keratin (horn) pearls present



High-power section showing nuclear pleomorphism and individual cell keratinization (pink)



Tumor usually located near hilum, projecting into bronchus



Bronchoscopic view



Cytologic smear from sputum or bronchoscopic scraping showing cells with dark nuclei and cytoplasm strongly pink because of keratin

X-ray w/possible lung cancer



Serosal Membranes

- Pleura
 - single layer of mesothelial cells
 - resting on connective tissue
- Visceral Pleura – covers lung
- Parietal Pleura – lines chest wall

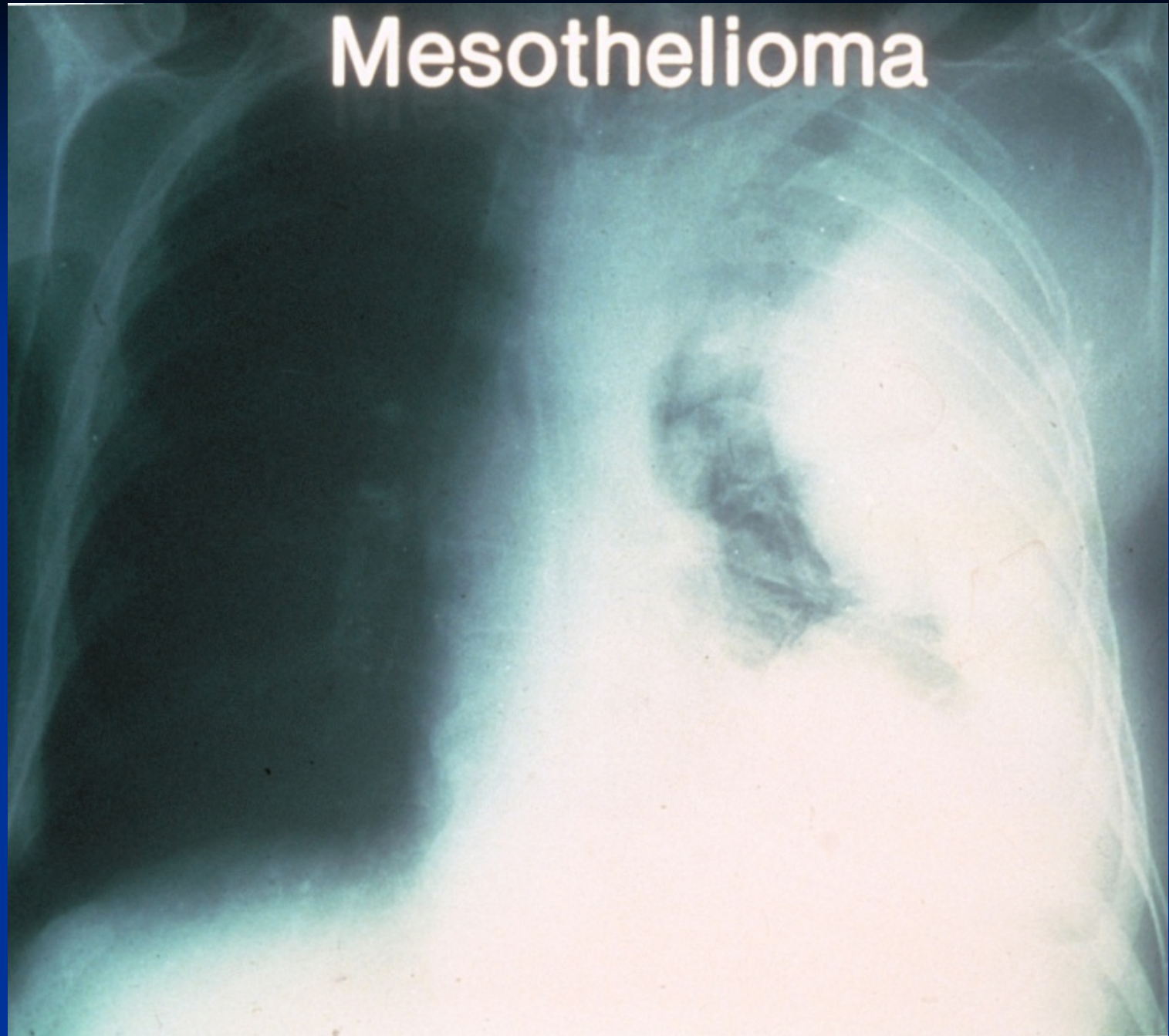
Tumors of Serosa

- Diffuse Malignant Mesothelioma
 - Pleura
 - Also peritoneum, pericardium & Tunica vaginalis testis
 - Usually aggressive, multifocal
 - Survival from Dx 8-18 months

Mesothelioma – Pleural

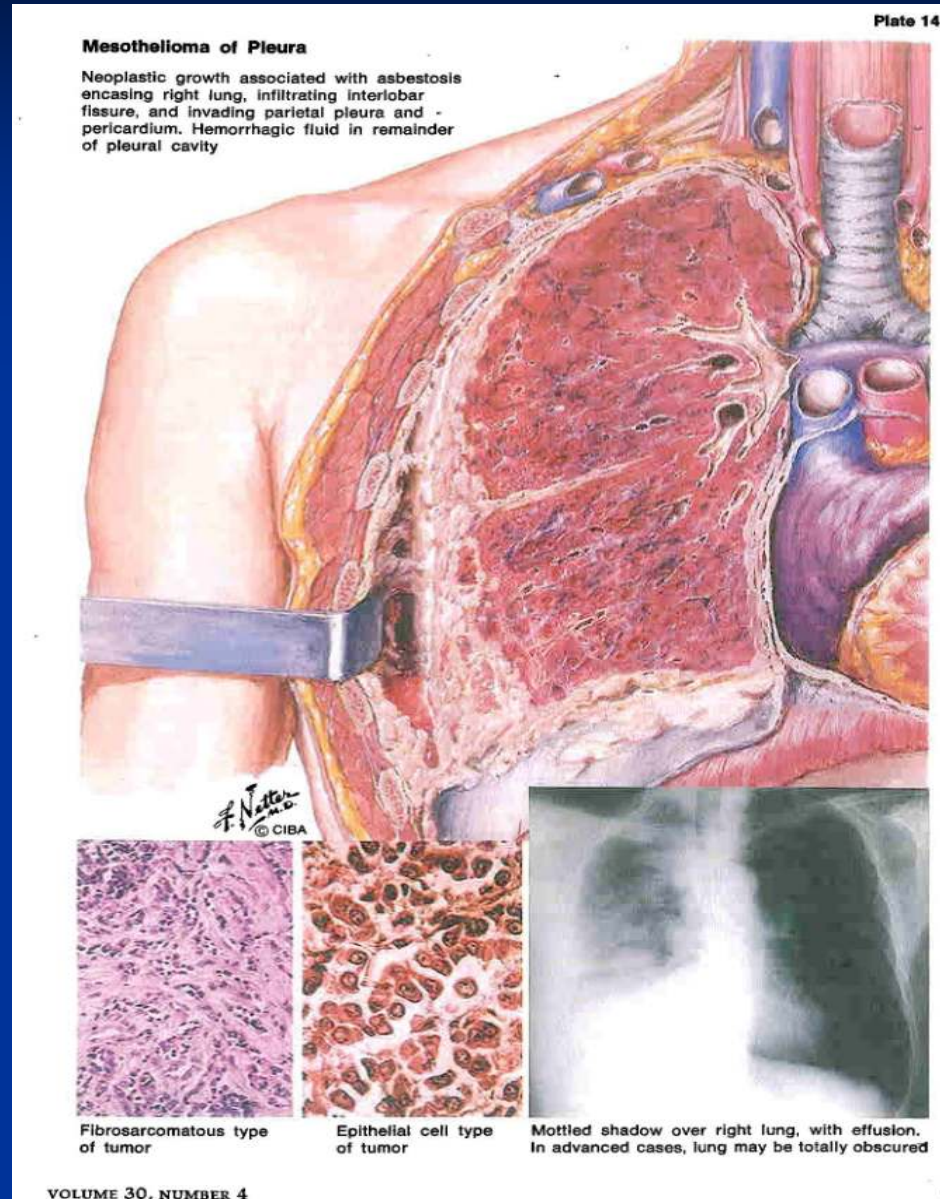
- Pain, SOB, Cough, Insidious
- 4-6 mo later – pleural effusion, weight loss, increasing pain,
- Misdiagnosed as
 - Cardiac, GB
 - Shoulder pain
 - Meso can be confused with metastatic lung, prostate, pancreatic, breast ca.
- Pleural tumors can be metastatic from lung, prostate, kidney, pancreas, breast (females)

Mesothelioma



Mesothelioma in the Pleura

Page 29
of Handouts



Asbestosis to Mesothelioma

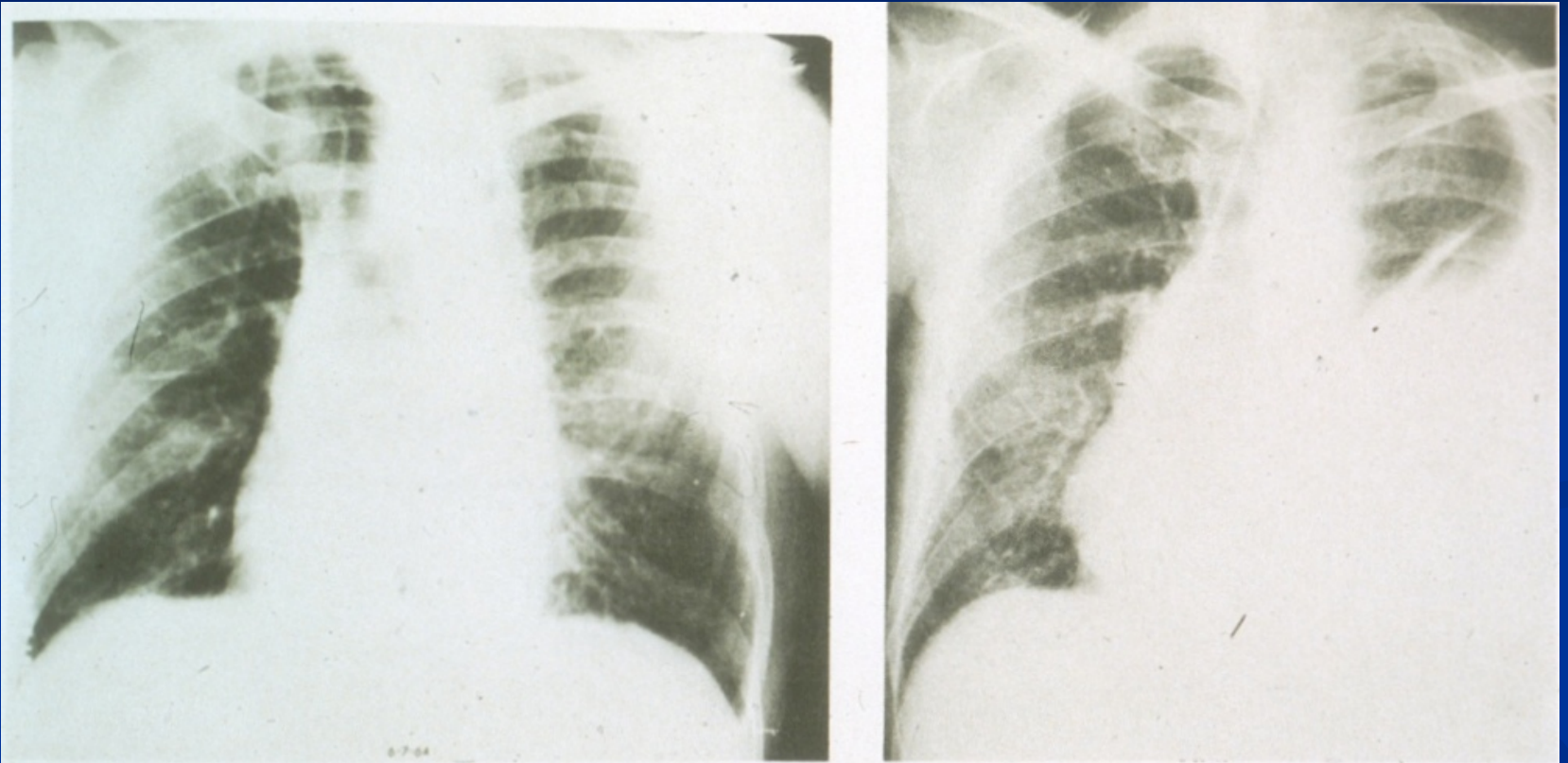
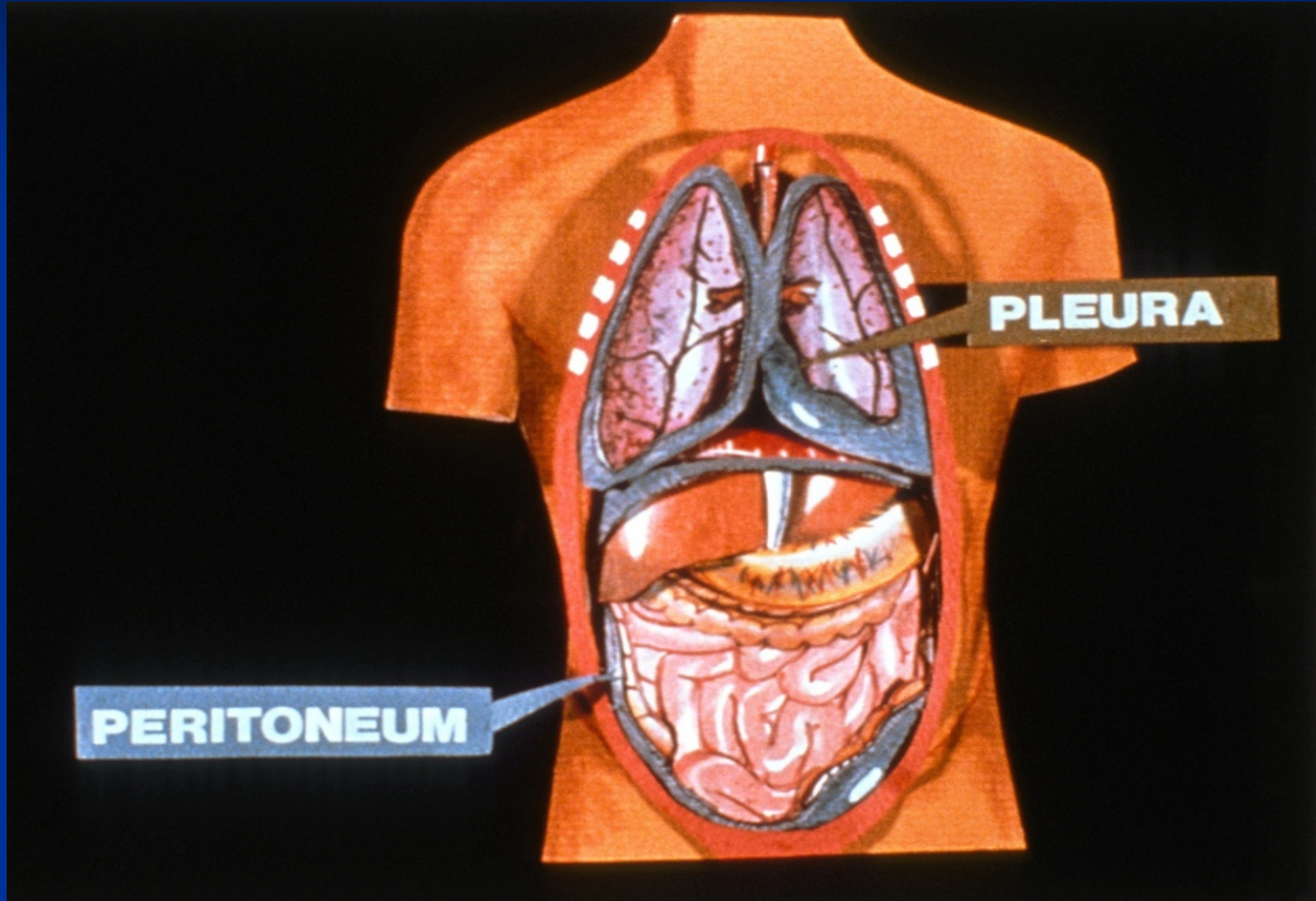


Plate 10-1d. Asbestosis alone, June 1964; mesothelioma, August 1965; died 1966.
Asbestos worker for 31 years, started work 38 years before death.

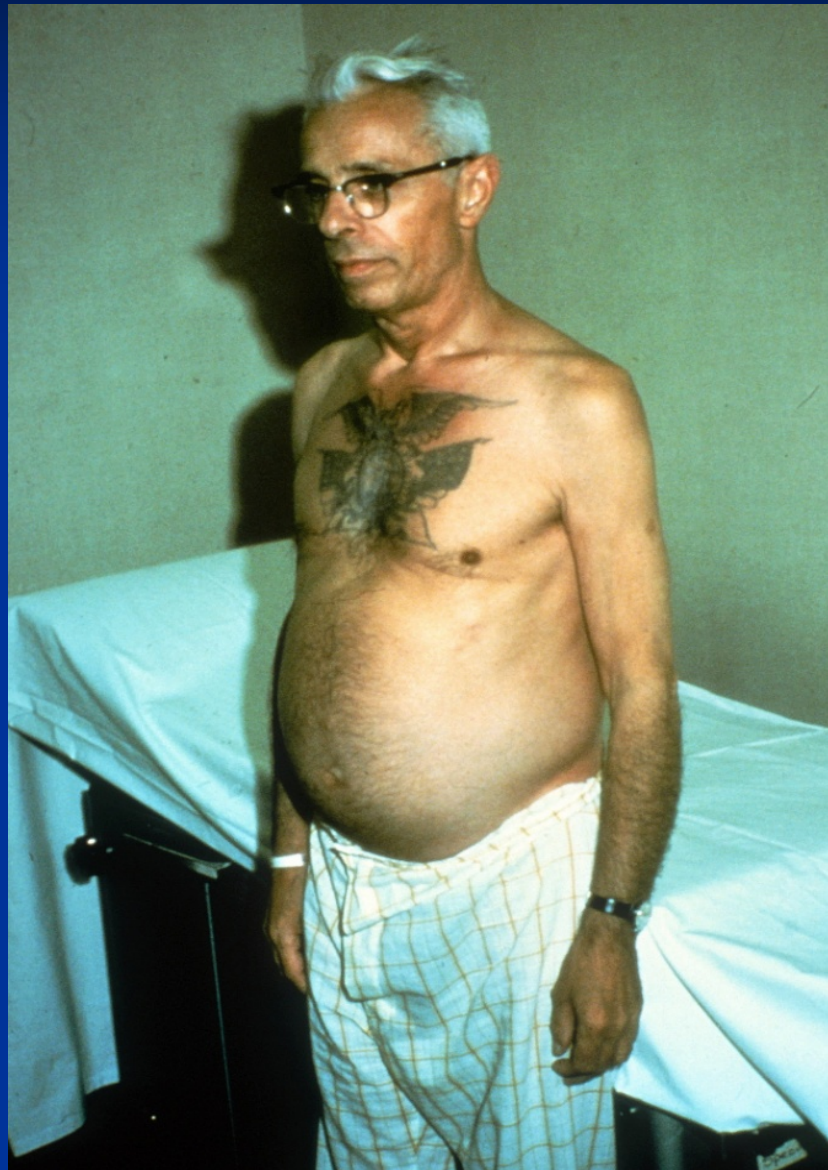
The Lining of pleura/perit



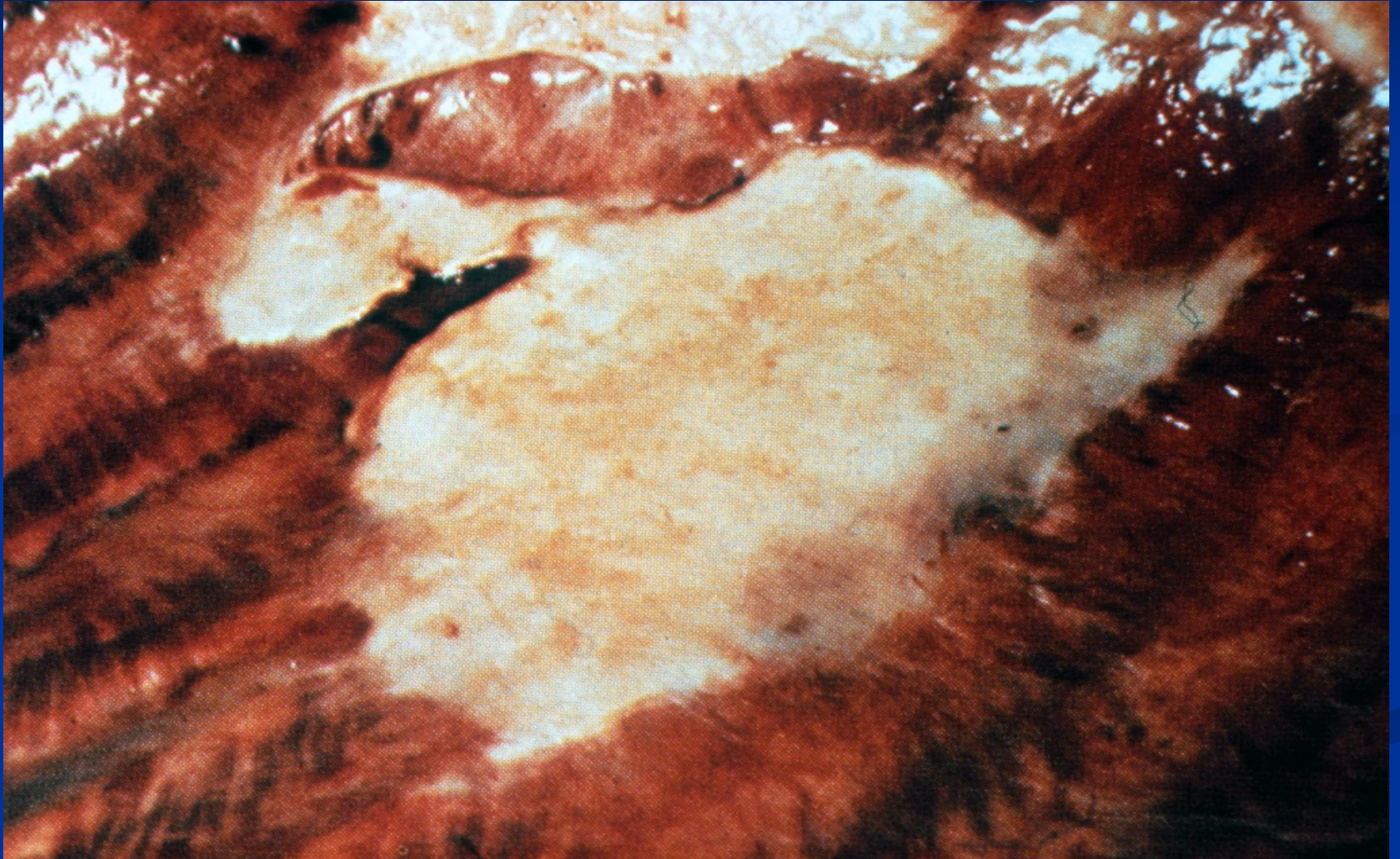
Peritoneal Meso

- Ascites
- Localized Masses – outside bowel
- Often does not obstruction bowel
- Diagnosed late stage
- Survival usually shorter than pleural

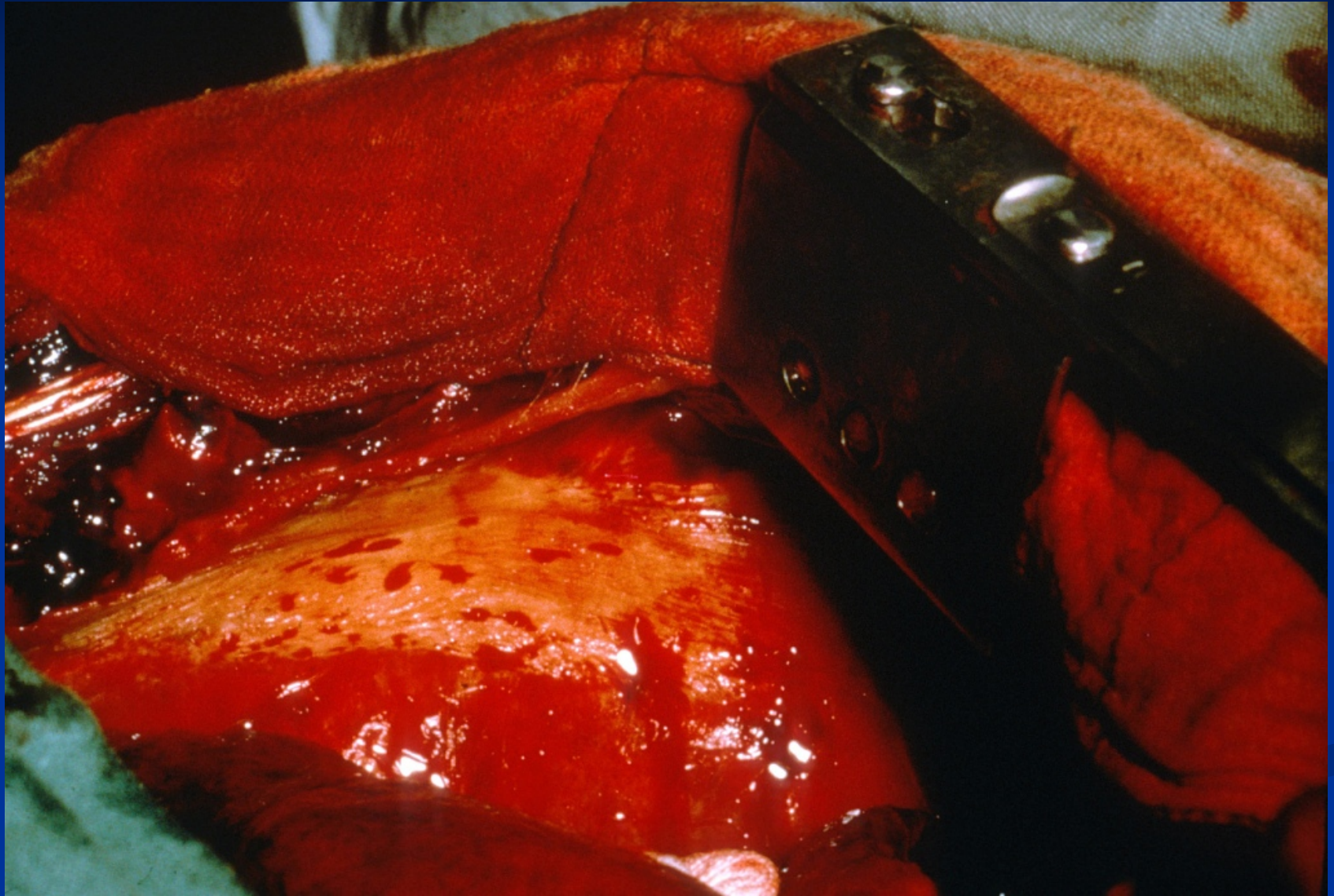
Navy Pilot w/abd Meso



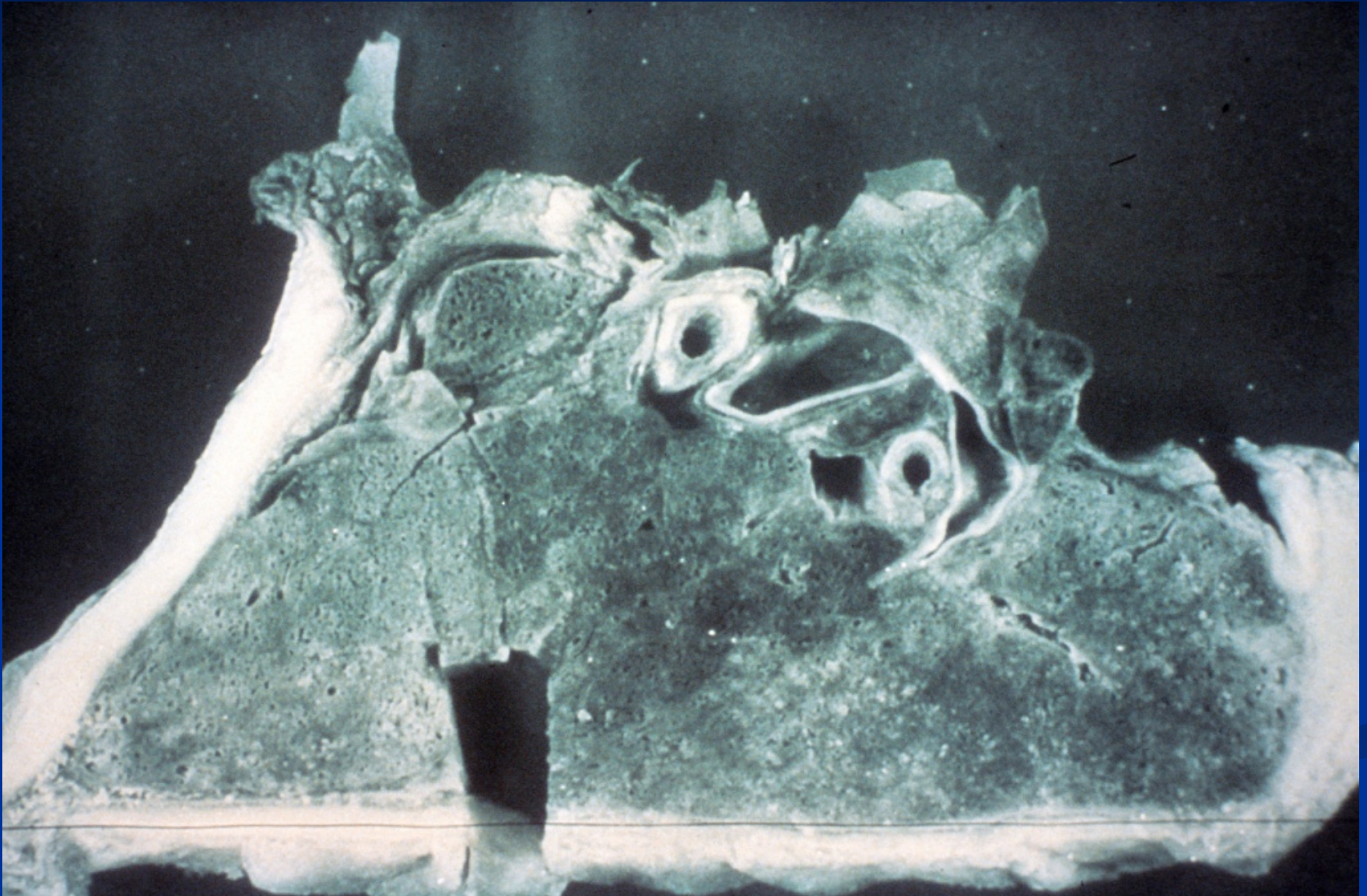
Pleural Plaque



Gross Specimen of Pleural Thickening



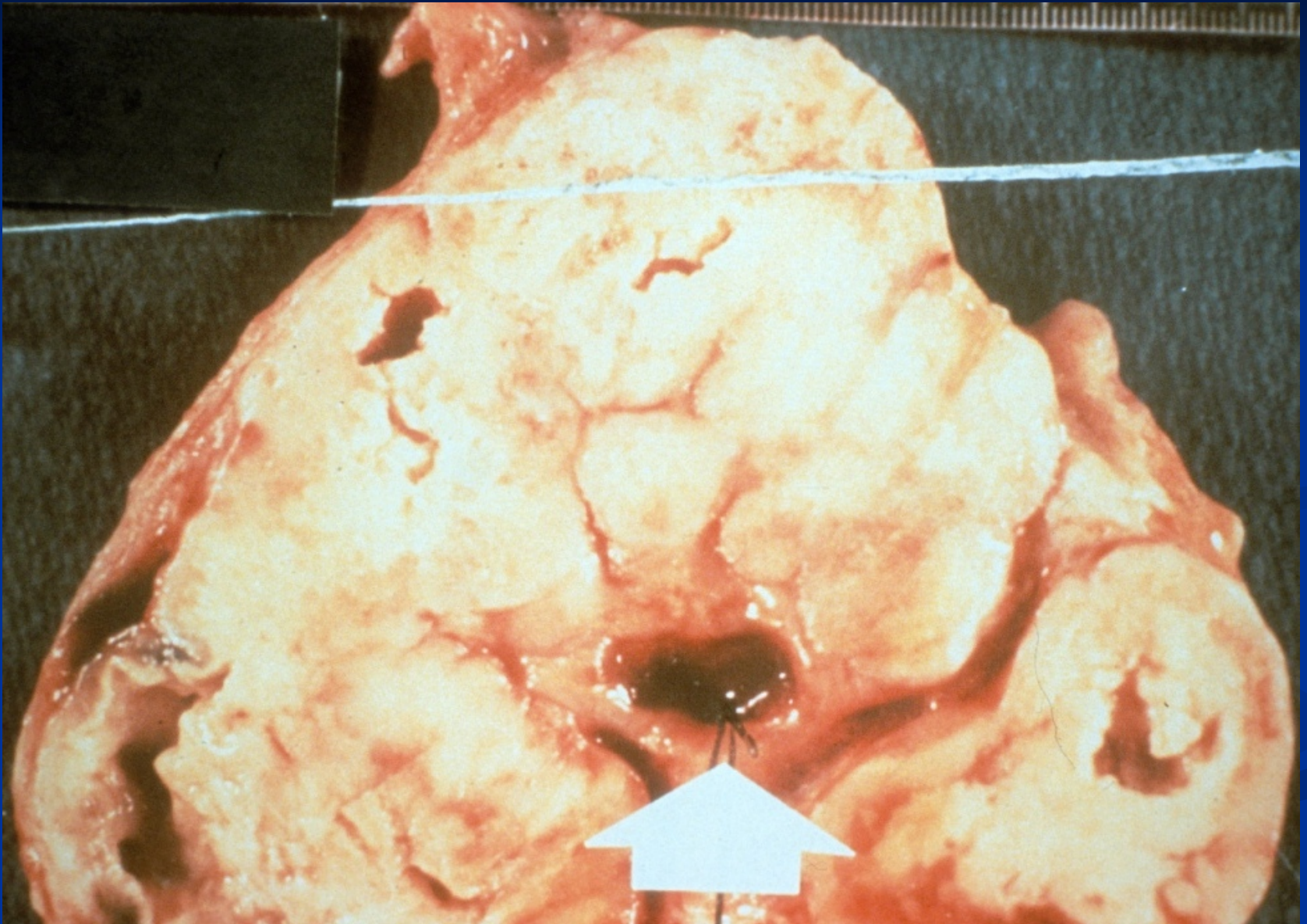
Gross Specimen



Wide Spectrum

- Localized plaques
- Limited pleural thickening
- Extensive pleural thickening
- Case example:
 - Question to DMC – Asbestosis?
 - Opinion: No, only pleural disease.
 - Disposition? Hint – PM E-500 § 17 b. (3) (a)

Lung Cancer

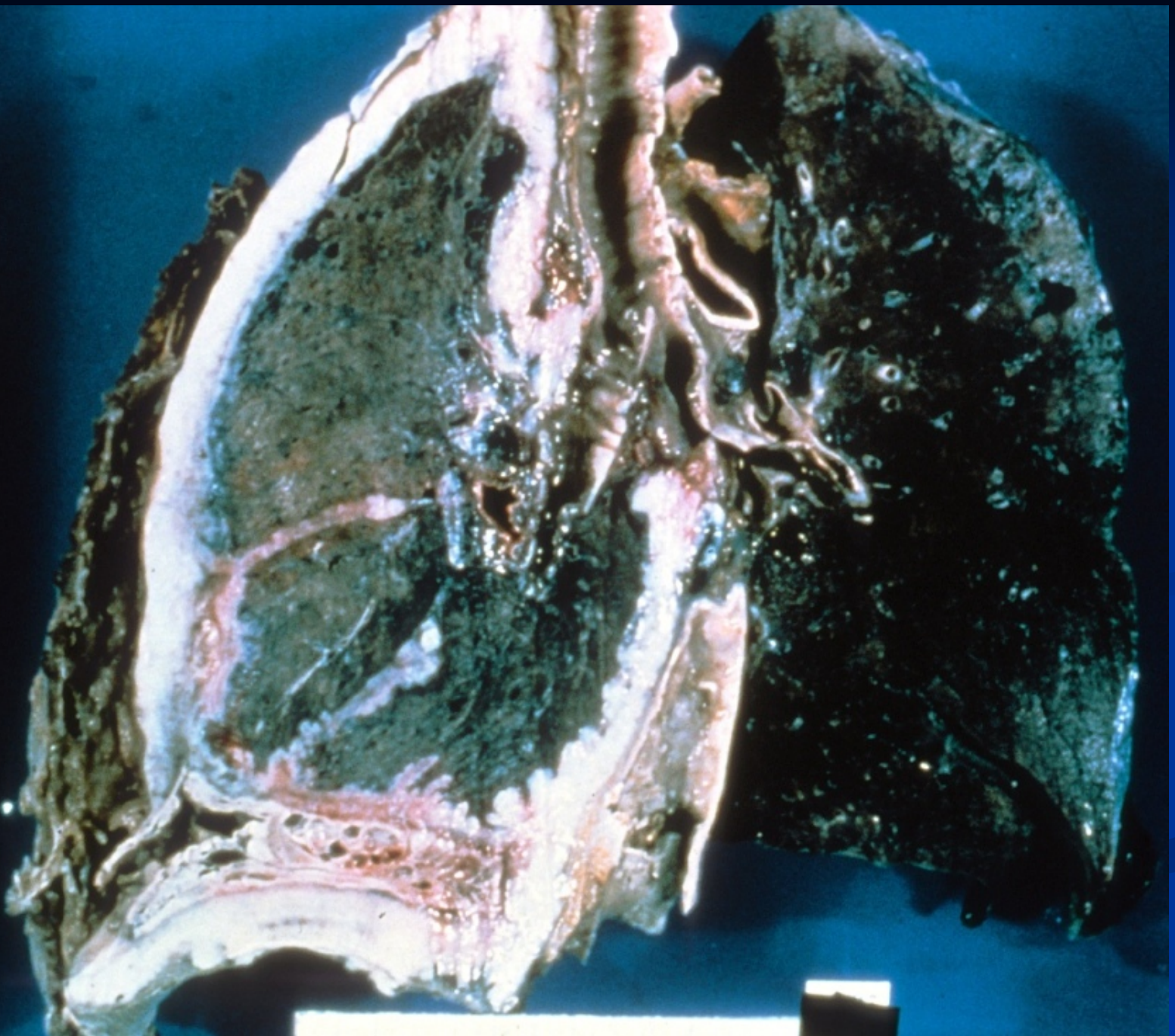


Multifocal Spread



537

R



Multiple Factor Interaction - Synergy

Table 8

Comparison of Age-Standardized Death Rates* for Lung Cancer in Asbestos Workers and in Males not Occupationally Exposed, Tabulated according to smoking habits.

<u>Smoking Habits</u>	<u>Asbestos Workers</u>	<u>Unexposed Males</u>
Never smoked regularly	58.4	11.3
Regular cigarette smokers	601.6	122.6

*Per 100,000 man-years

What we covered

- What key conditions are called pneumoconioses
- The benign and malignant asbestos related disorders
- The significance of pleural plaques and pleural thickening
- That mesotheliomas can occur in the chest or abdomen
- The concepts of latency and synergy

Questions

