Occupational Lung Diseases

- Occupational lung diseases occur as a direct result of workplace exposure to metals, dust, fumes, smoke, or biologic agents. These disorders include bronchitis, bronchiolitis, asthma, interstitial lung disease, and tumors
- Occupational lung diseases are usually diagnosed by a positive exposure history and suggestive radiographic presentation
- An understanding of the pathology and radiographic appearance facilitates the evaluation, diagnosis, and management of these workers

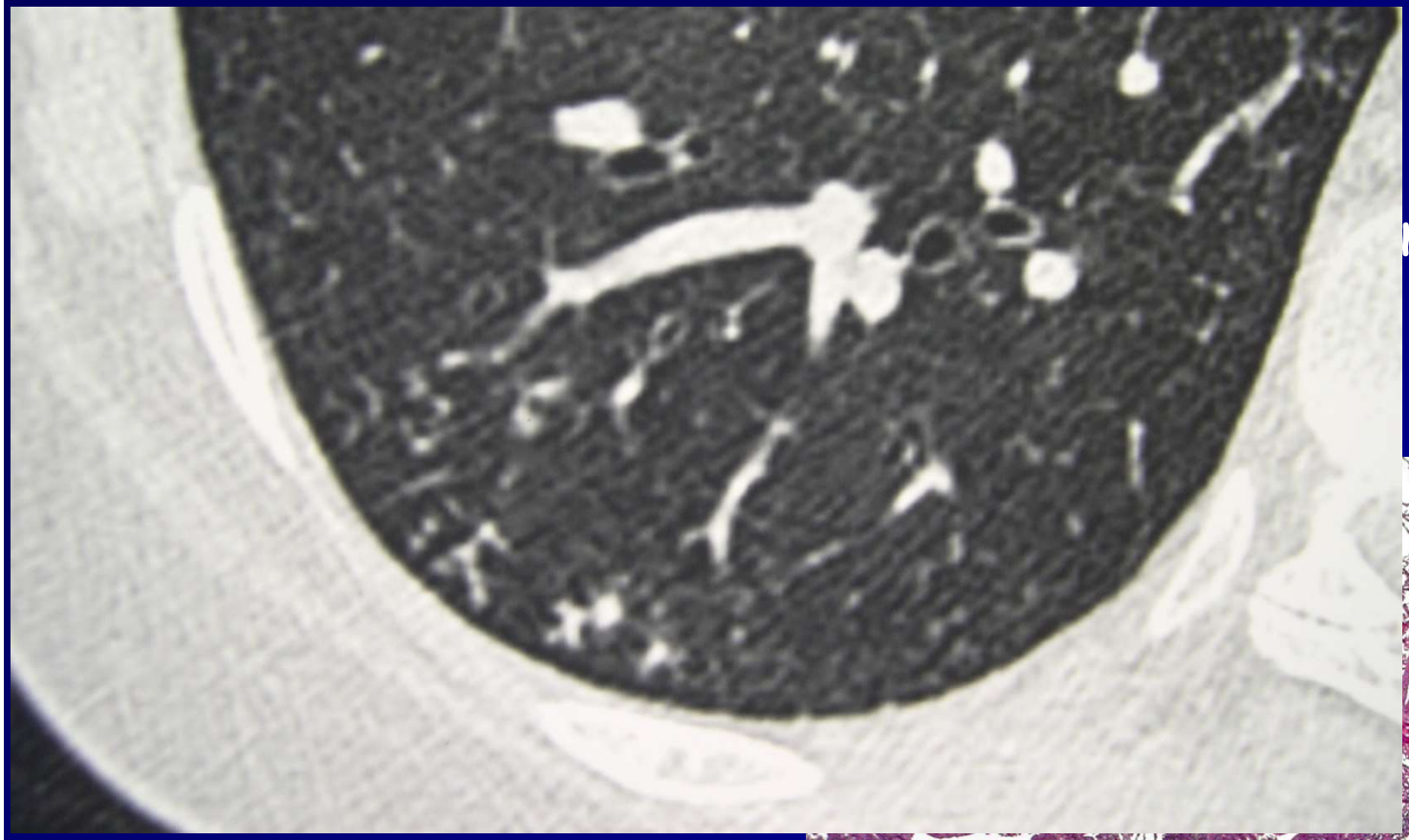
Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
- ✓ Organizing Pneumonia (OP)
- ✓ Non-Specific Interstitial Pneumonia (NSIP)
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

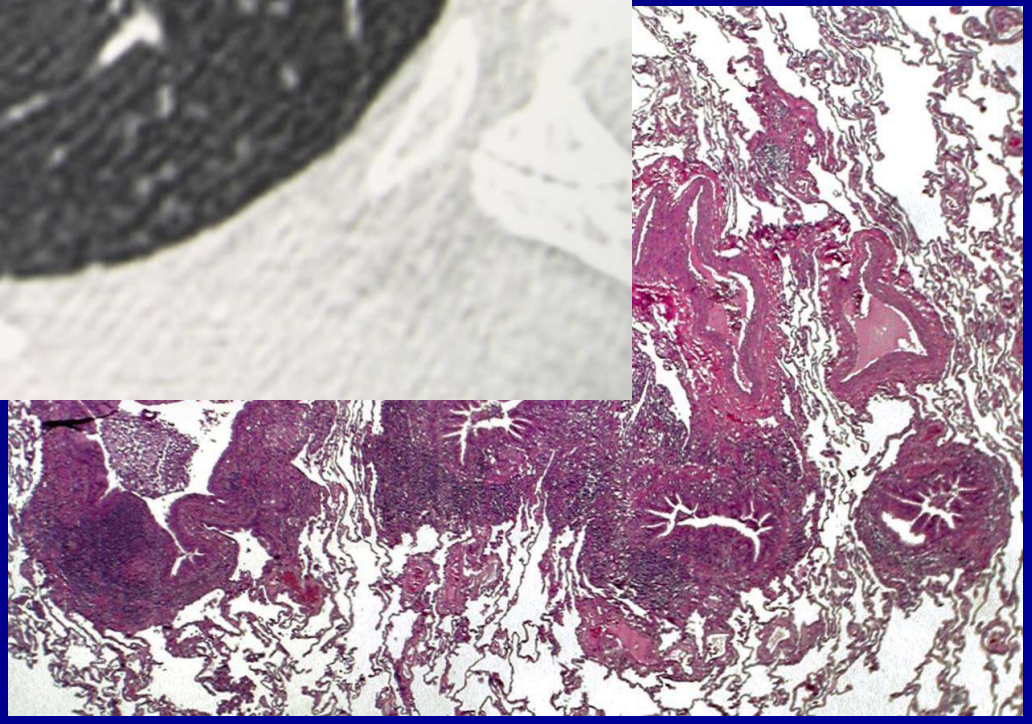
Malattie o Condizioni Cliniche Associate a Bronchiolite

- ✓ Esposizione a Fumi Tossici
- ✓ Infettive o post infettive
- ✓ Reazione a Farmaci
- ✓ Polmoniti da Ipersensibilità
- ✓ Asma
- ✓ Bronchiettasie
- ✓ COPD
- ✓ Bronchiolite Respiratoria
- ✓ RB-ILD
- ✓ Connettiviti
- ✓ Associate a trapianti
- ✓ BOOP
- ✓ Panbronchiolite Diffusa
- ✓ Inalazione
- ✓ Malattia Infiamm. Intestinale
- ✓ Cirrosi Biliare Primitiva
- ✓ Esposizione a Polveri
- ✓ Vasculiti (G. di Wegener)
- ✓ Iperplasia C. Neuroendocrine
- ✓ Tiroiditi
- ✓ Radioterapia
- ✓ Bronchiolite Idiopatica

Bronchiolitis



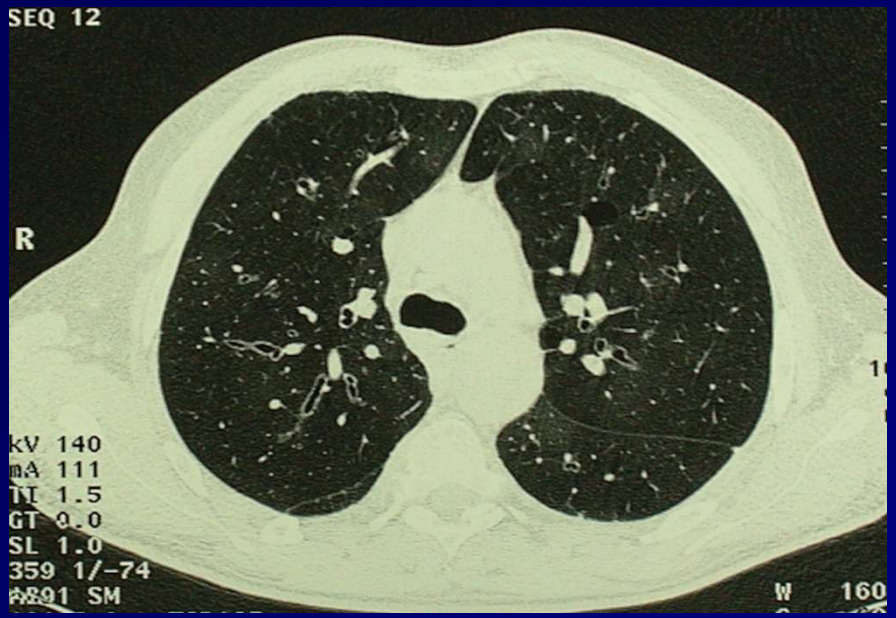
nchiolitis



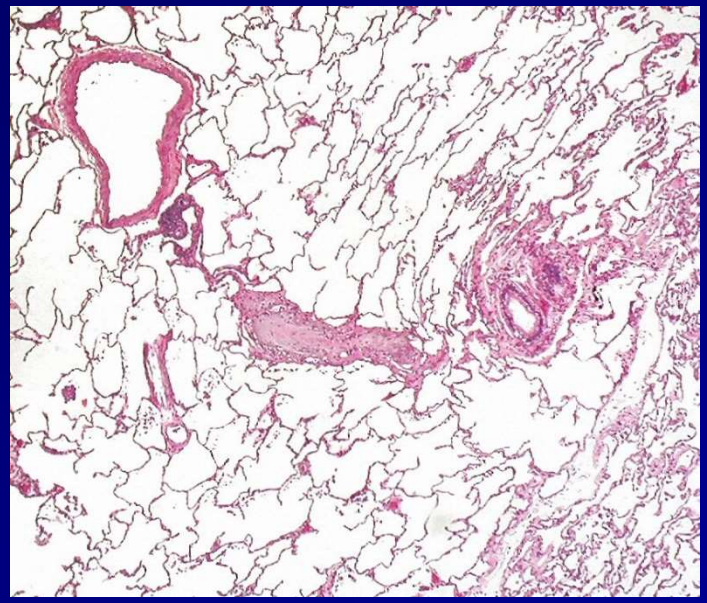
Cellular Bronchiolitis
in Occupational Lung Diseases

- **Occupational Infections** (TB, Virus, Legionella, etc.), frequently
- **Occupational Asthma**, rarely
- **Flock worker's lung** (respirable flock, an ultra-fine nylon fiber used in the production of certain fabrics)

Bronchiolitis



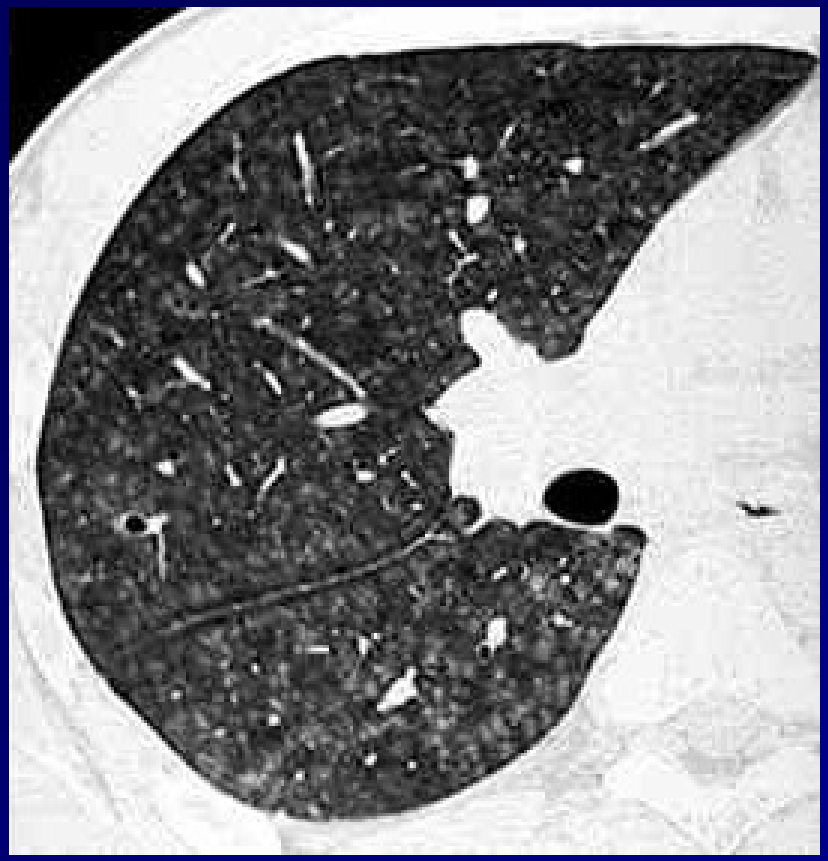
Obliterative Bronchiolitis



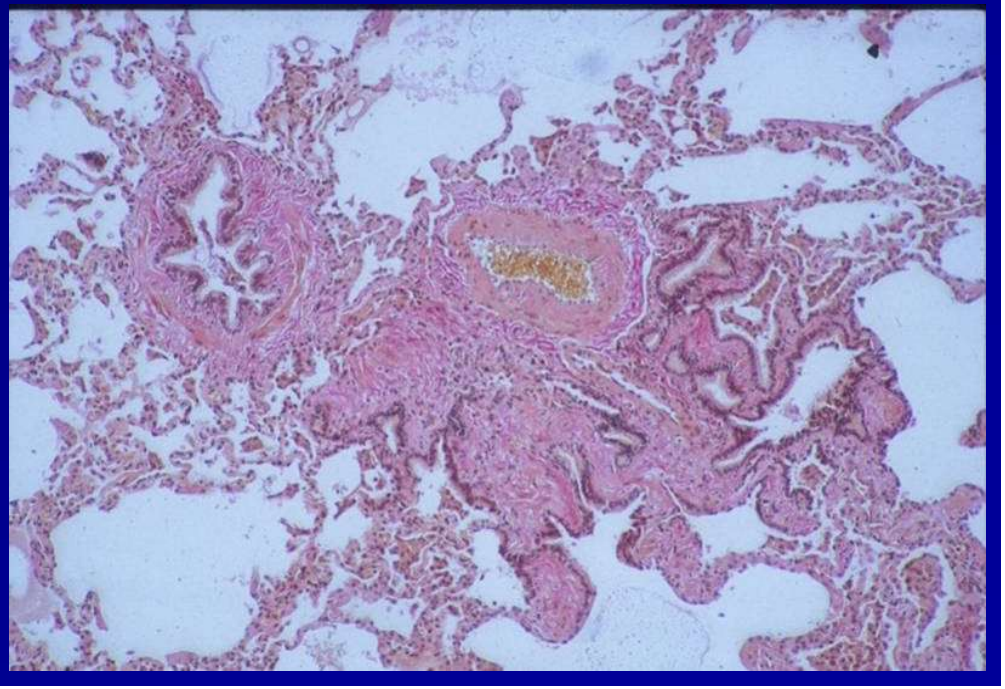
Obliterative Bronchiolitis
in Occupational Lung Diseases

- **Inhalation of noxious gases and fumes** [nitric acid (solution of NO_2 in water), sulfur dioxide (SO_2), chlorine gas (Cl), and ammonia (NH_3)]
- **Flavor worker's lung** [patients exposed to the artificial butter flavoring chemical, diacetyl (2,3-butanedione)]
- **Lung disease in deployed military personnel** (in returning service members exposed to combustion products from industrial sulfur fires and other noxious gases and fumes in Iraq or Afghanistan)
- **Nanoparticles**
- **World Trade Center Dust Exposure**

Bronchiolitis



Respiratory Bronchiolitis



Respiratory Bronchiolitis
in Occupational Lung Diseases

- Heavy Smokers
- Acute and Subacute Hypersensitivity Pneumonitis
- Siderosis

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ORIGINAL ARTICLE

Liver INTERNATIONAL WILEY

Prolonged exposure to welding fumes as a novel cause of systemic iron overload

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LAY SUMMARY

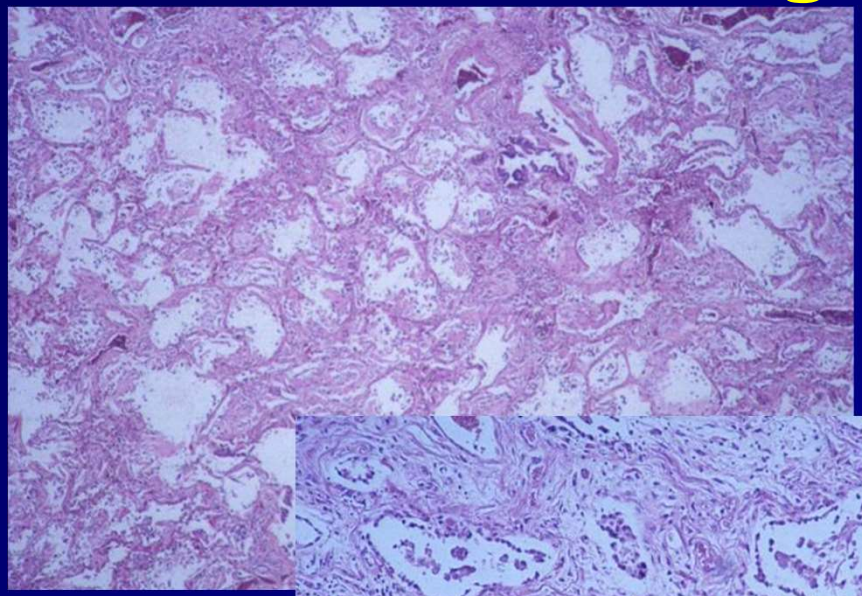
- The present study firstly demonstrates that a subgroup of welders with prolonged exposure to welding fume, and particularly those with less use of protective devices, can develop severe liver iron overload and liver damage.
- We recommend that measurement of serum iron indices should be part of the routine test in welders to identify subjects requiring more in-depth evaluation of iron overload and liver function, and to provide adequate measures for preventing and controlling occupational exposure to iron.

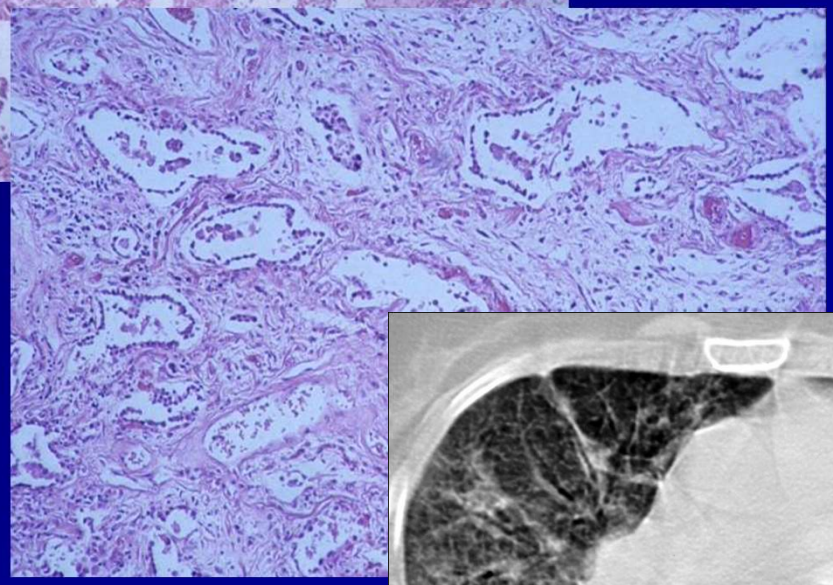
Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
- ✓ Organizing Pneumonia (OP)
- ✓ Non-Specific Interstitial Pneumonia (NSIP)
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

Diffuse Alveolar Damage (DAD)

- ✓ Infezioni
- ✓ Inalanti Tossici
- ✓ Farmaci
- ✓ Shock
- ✓ Connettiviti
- ✓ Radiazioni
- ✓ HP
- ✓ DAH
- ✓ Idiopatica (AIP)





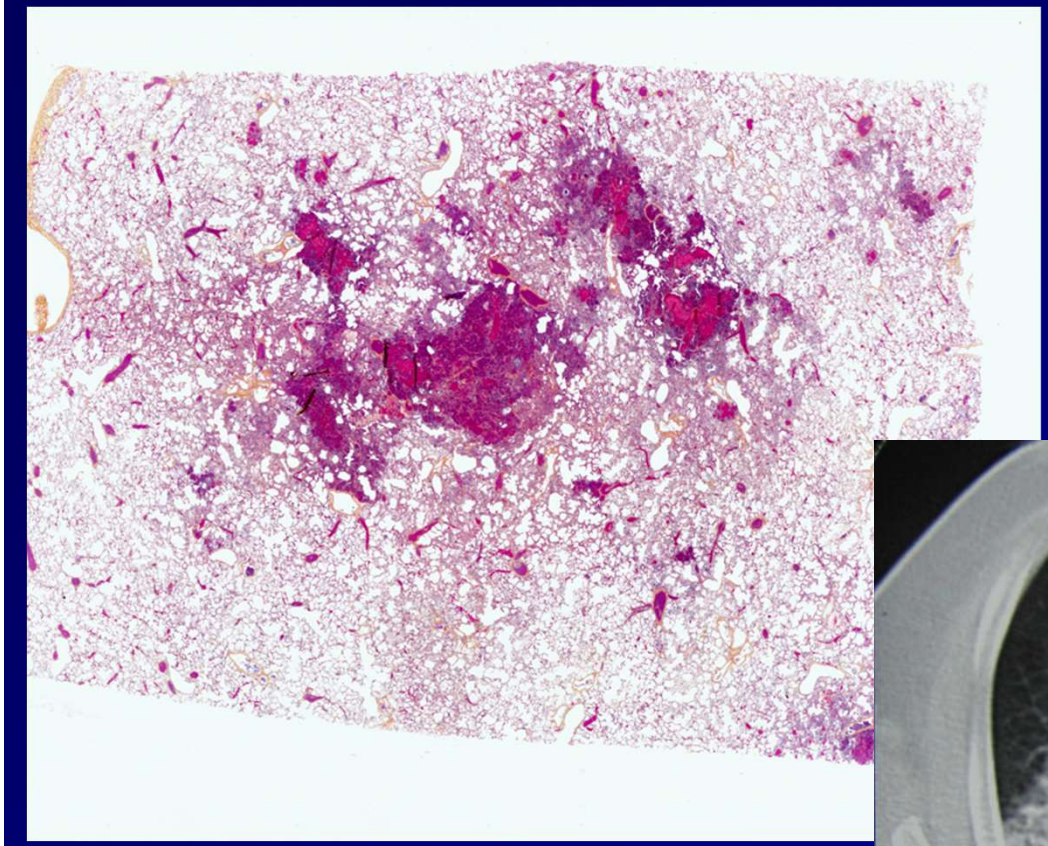
Adult Respiratory Distress Syndrome
ARDS

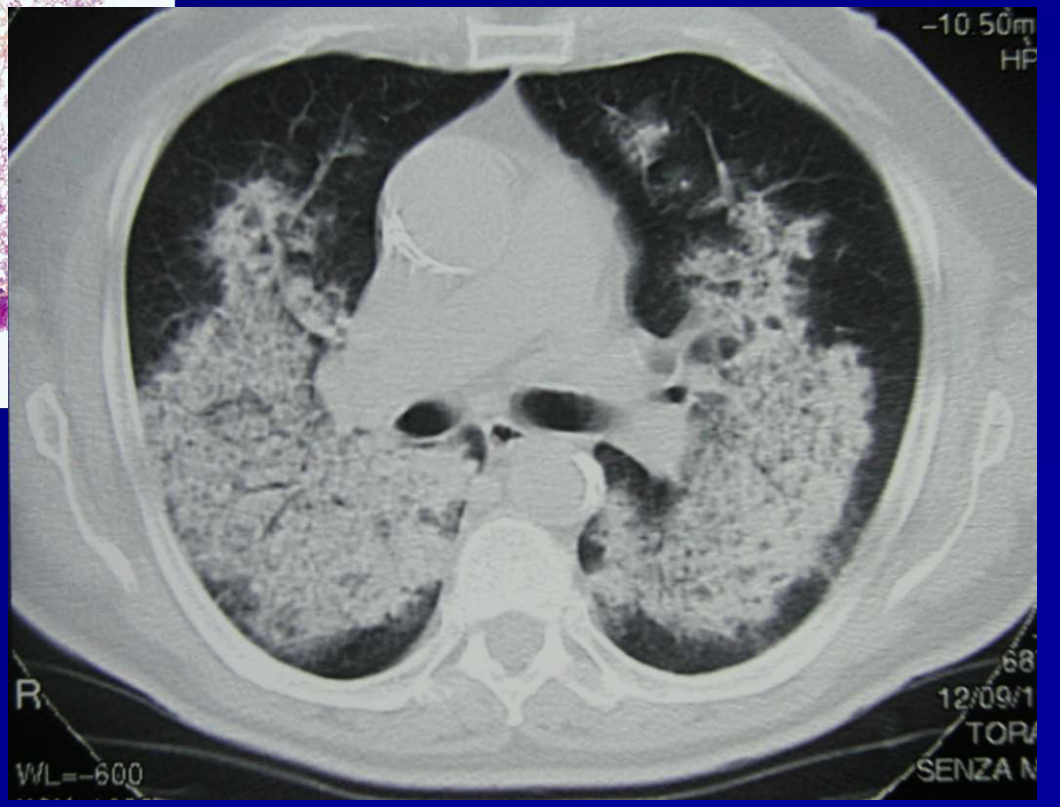
Diffuse Alveolar Damage (DAD)
in Occupational Lung Diseases

- **Noxious gases and fumes**, including nitric acid (solution of NO_2 in water), sulfur dioxide (SO_2), chlorine gas (Cl), and ammonia (NH_3) can lead to acute injury, such as noncardiogenic, increased permeability, pulmonary edema (eg, nitric acid, chlorine, phosgene)

- **Hydrochlorofluorocarbon pulmonary edema** – Hydrochlorofluorocarbon (HCFC)-141b (1,1-dichloro-1-fluoroethane) exposure in electronic factories producing circuit boards can induce acute pulmonary toxicity with increased permeability pulmonary edema

Diffuse Alveolar Haemorrhage (DAH)





Diffuse Alveolar Haemorrhage (DAH)
in Occupational Lung Diseases

- **Isocyanates –** rigid or flexible foams, surface coatings, paints, electrical wire insulation
- **Trimellitic anhydride** – production of resins, powder coatings

Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
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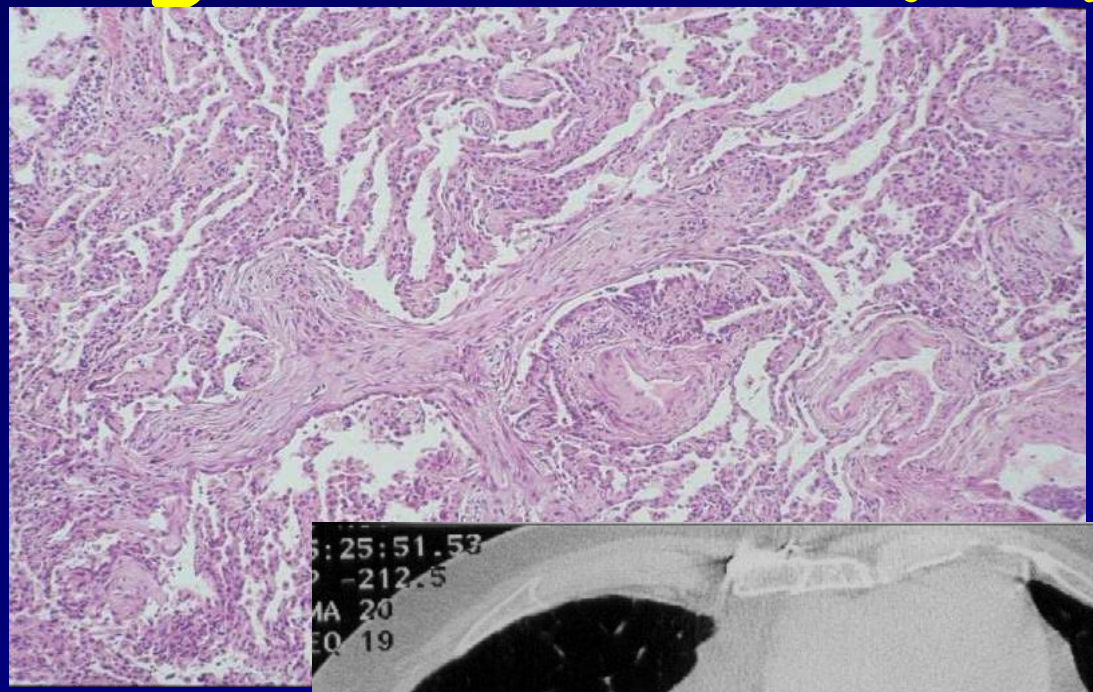
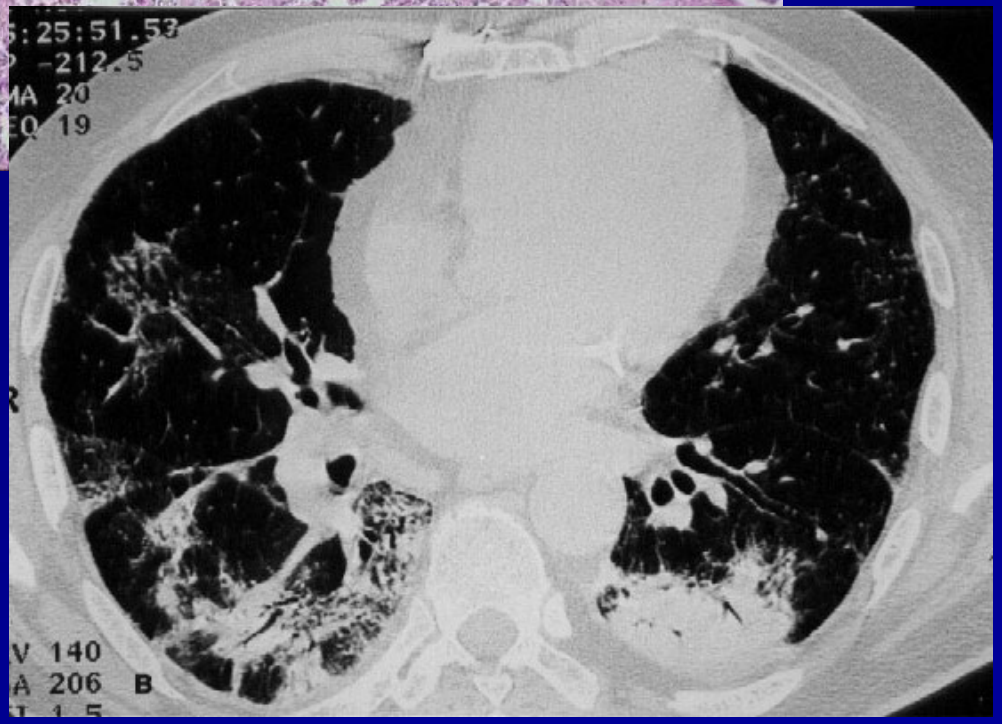
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

Organizing Pneumonia (OP)



- ✓ Infezioni
- ✓ Riparazione DAD
- ✓ Farmaci e Tossici
- ✓ Connettiviti
- ✓ HP
- ✓ CEP
- ✓ Ostruzione Bronchiale
- ✓ Idiopatica (COP)



Cryptogenic Organizing Pneumonia
COP

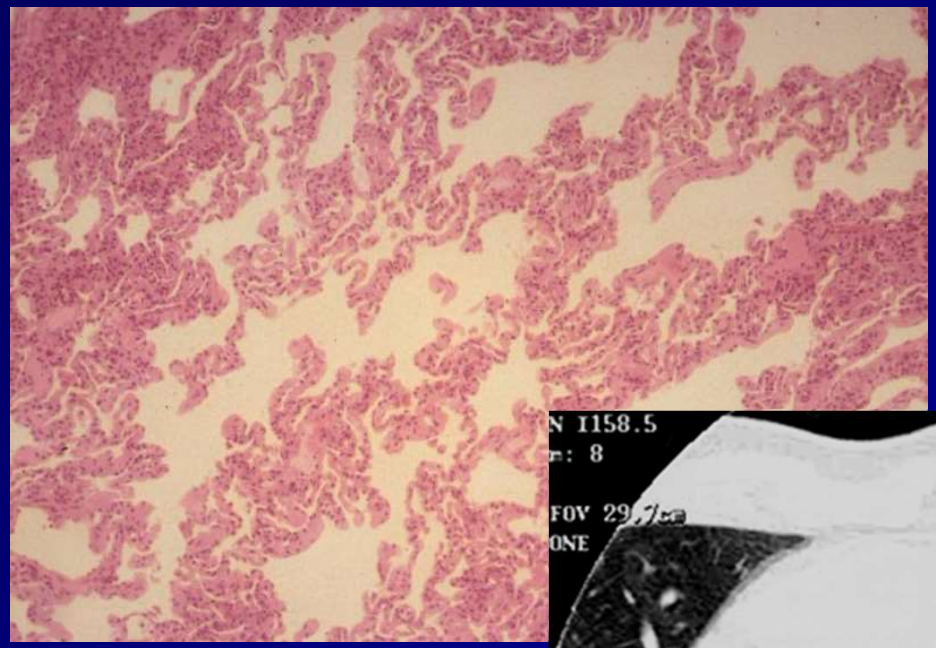
Organizing Pneumonia (OP)
in Occupational Lung Diseases

- **Flock worker's lung** (respirable flock, an ultra-fine nylon fiber used in the production of certain fabrics)
- Lung repair after **Occupational Infections** or **DAD**
- **Ardystil syndrome** after inhalation of aerosolized Acramin FWN used in textile printing
- **Vineyard sprayer's lung disease** — inhalation of Bordeaux mixture [copper sulfate with limewater (calcium hydroxide in solution)]

Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
- ✓ Organizing Pneumonia (OP)
- ✓ Non-Specific Interstitial Pneumonia (NSIP)
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

Non-Specific Interstitial Pneumonia (NSIP)



- ✓ Infezioni
- ✓ Farmaci
- ✓ HP
- ✓ Connettiviti
- ✓ Pneumoconiosi
- ✓ Idiopatica (NSIP)

NonSpecific Interstitial Pneumonia
NSIP

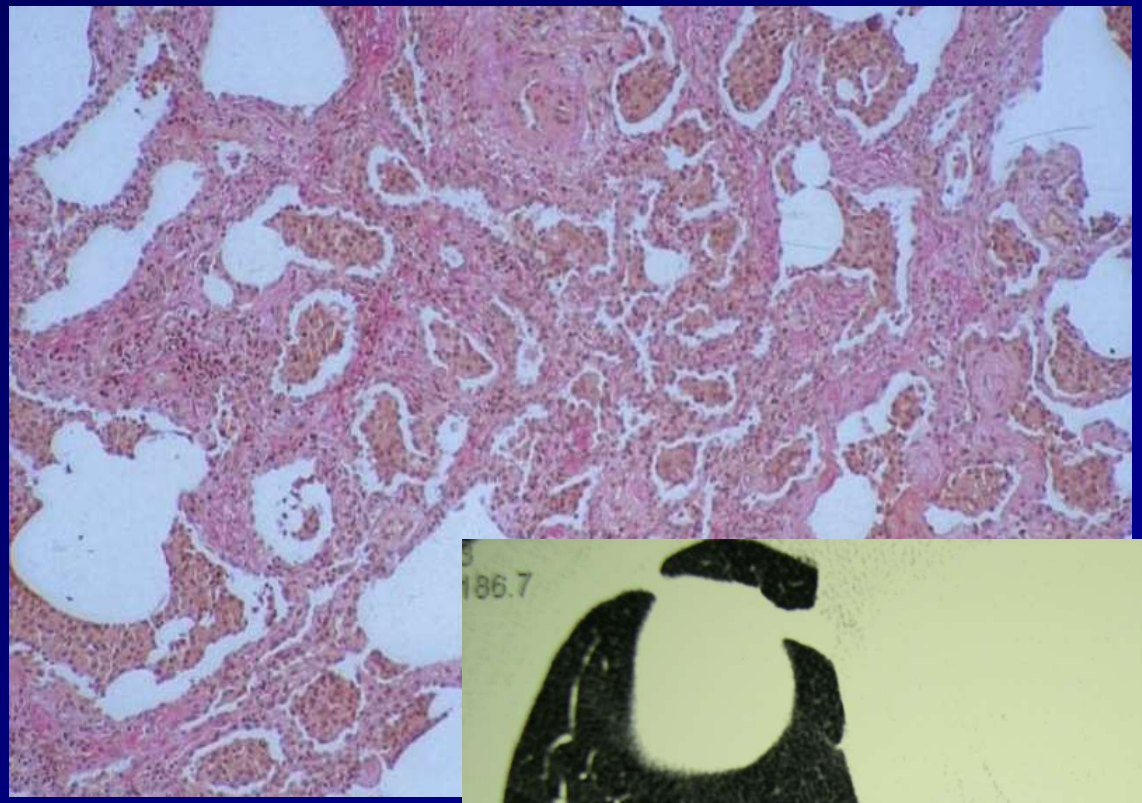
Non-Specific Interstitial Pneumonia (NSIP) in Occupational Lung Diseases

- **Flock worker's lung** (respirable flock, an ultra-fine nylon fiber used in the production of certain fabrics)
- **Asbestosis** (early disease)

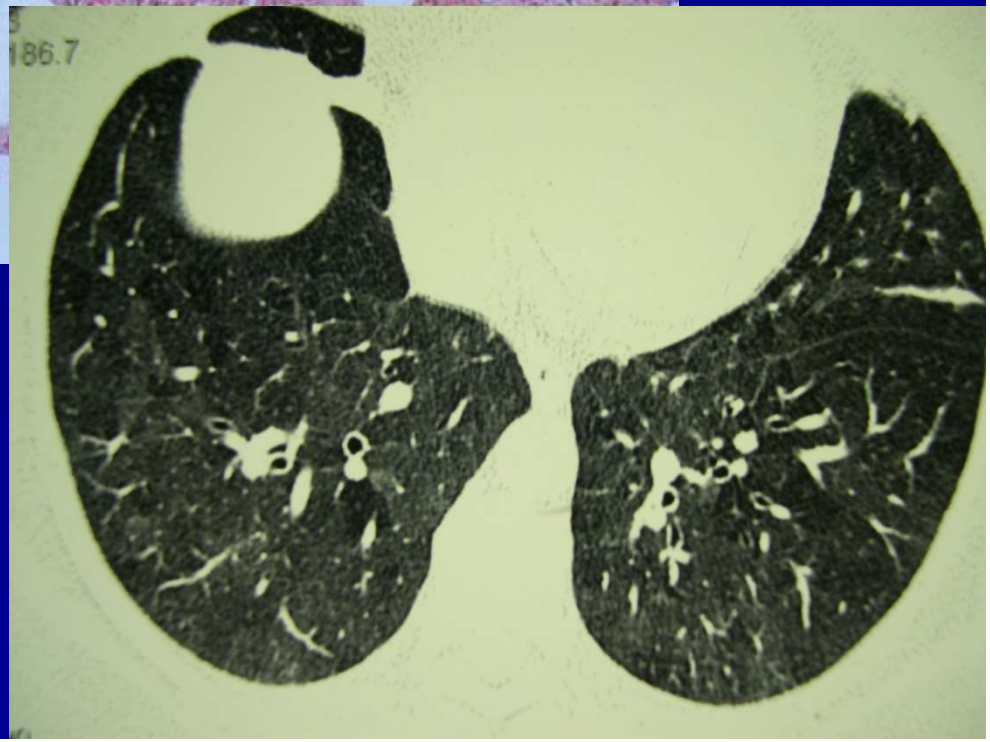
Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
- ✓ Organizing Pneumonia (OP)
- ✓ Non-Specific Interstitial Pneumonia (NSIP)
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

Desquamative Interstitial Pneumonia (DIP)



- ✓ Istiocitosi X
- ✓ Farmaci
- ✓ CAH
- ✓ CEP
- ✓ Pneumoconiosi
- ✓ P. lipidica
- ✓ Idiopatica (DIP)



Desquamative Interstitial Pneumonia

DIP

Desquamative Interstitial Pneumonia (DIP) in Occupational Lung Diseases

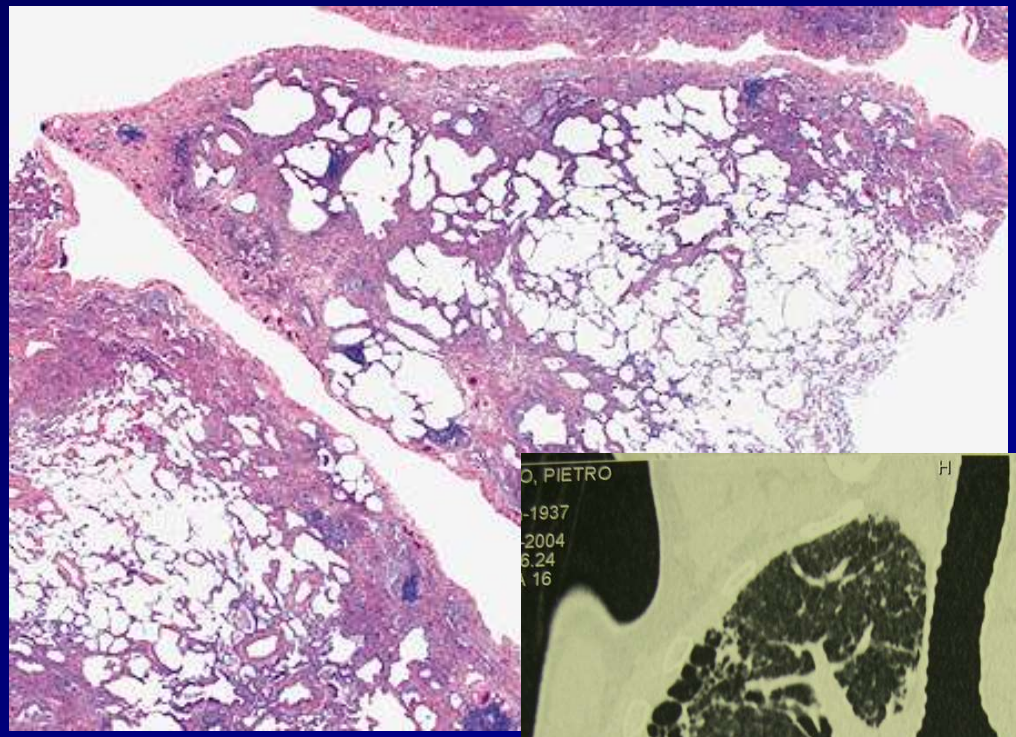
- **Hypersensitivity Pneumonitis** (acute and subacute)
- **Acute Silicosis** (silico proteinosis)
- **Coal Worker's Pneumoconiosis** (early stage)
- **Hard Metal Pneumoconiosis** (early stage)
- **Siderosis**
- **Indium-tin oxide lung disease**, utilized in the production of transparent conductive films utilized in flat-panel screens (early stage)

Lung Damage Patterns

- ✓ Bronchiolitis
- ✓ Diffuse Alveolar Damage (DAD)
- ✓ Organizing Pneumonia (OP)
- ✓ Non-Specific Interstitial Pneumonia (NSIP)
- ✓ Desquamative Interstitial Pneumonia (DIP)
- ✓ Usual Interstitial Pneumonia (UIP)
- ✓ Granulomatosis

Usual Interstitial Pneumonia (UIP)

- ✓ Farmaci
- ✓ Connettiviti
- ✓ HP
- ✓ Pneumoconiosi
- ✓ Sarcoidosi
- ✓ Istiocitosi X
- ✓ Sequela DAD
- ✓ Radiazione
- ✓ Infezioni
- ✓ Idiopatica (IPF/UIP)

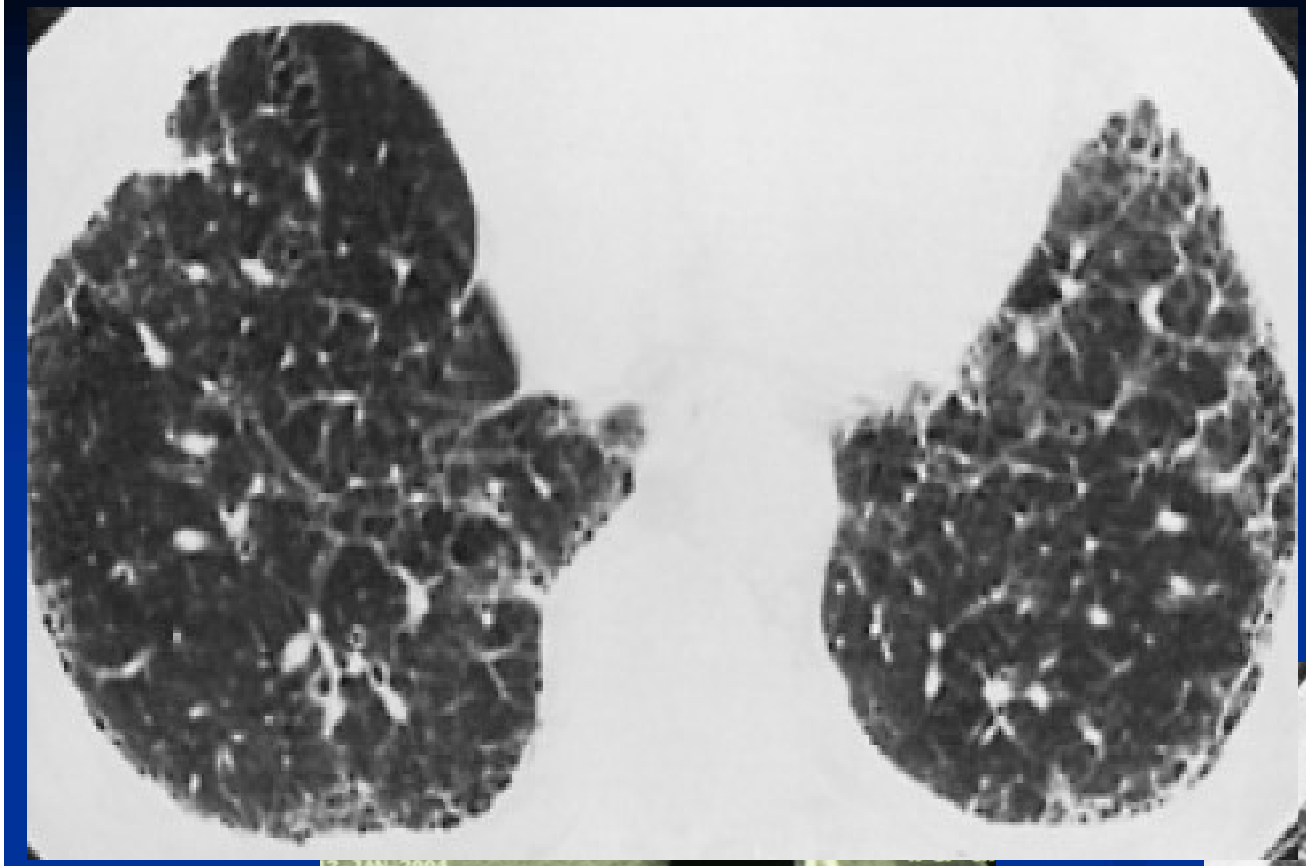


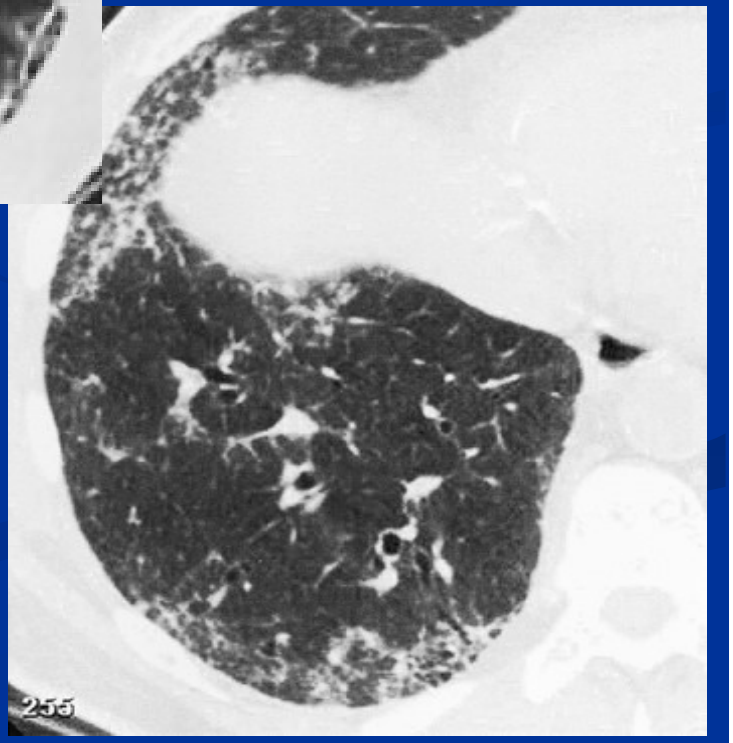
Fibrosi Polmonare Idiopatica
IPF/UIP

Usual Interstitial Pneumonia (UIP)
in Occupational Lung Diseases

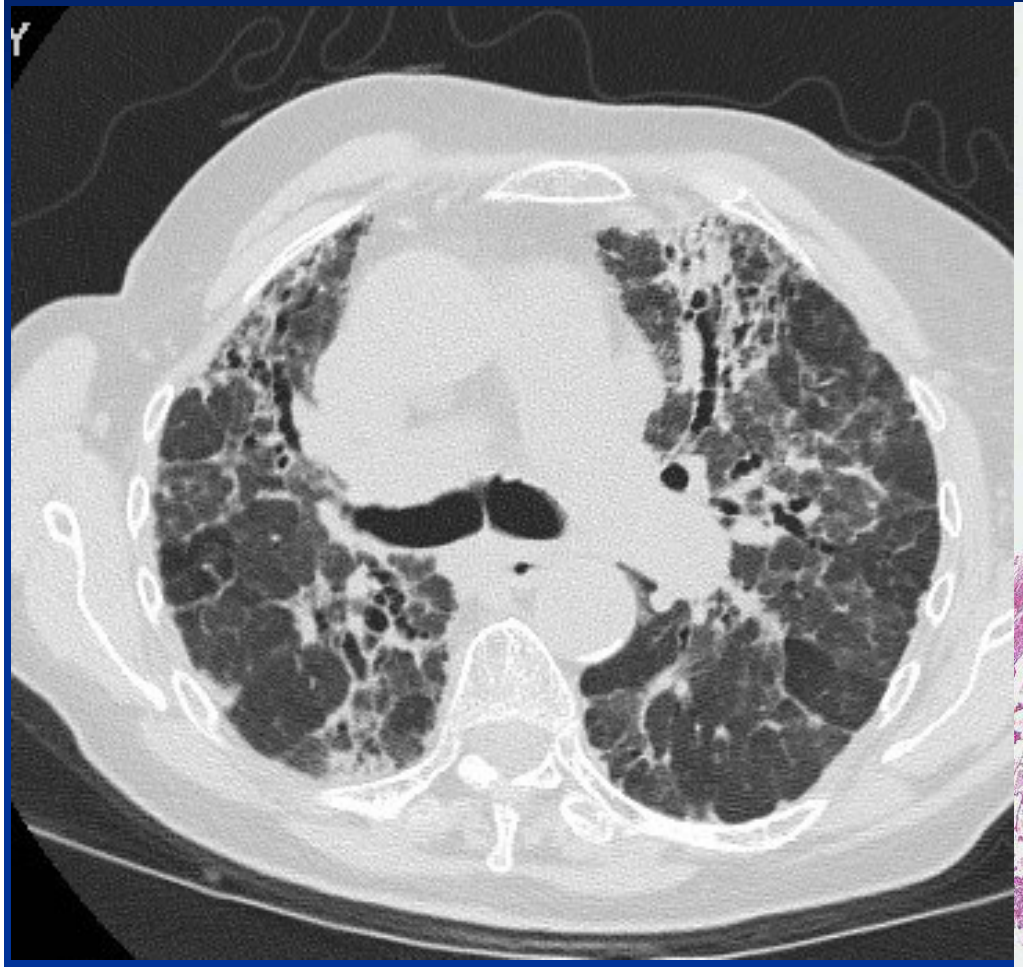
- **Hypersensitivity Pneumonitis** (chronic)
- **Coal Worker's Pneumoconiosis** (advanced stage)
- **Hard Metal Pneumoconiosis** (advanced stage)
- **Asbestosis**
- **Indium-tin oxide lung disease**, utilized in the production of transparent conductive films utilized in flat-panel screens (advanced stage)
- **World Trade Center Dust Exposure**

Advanced Asbestosis





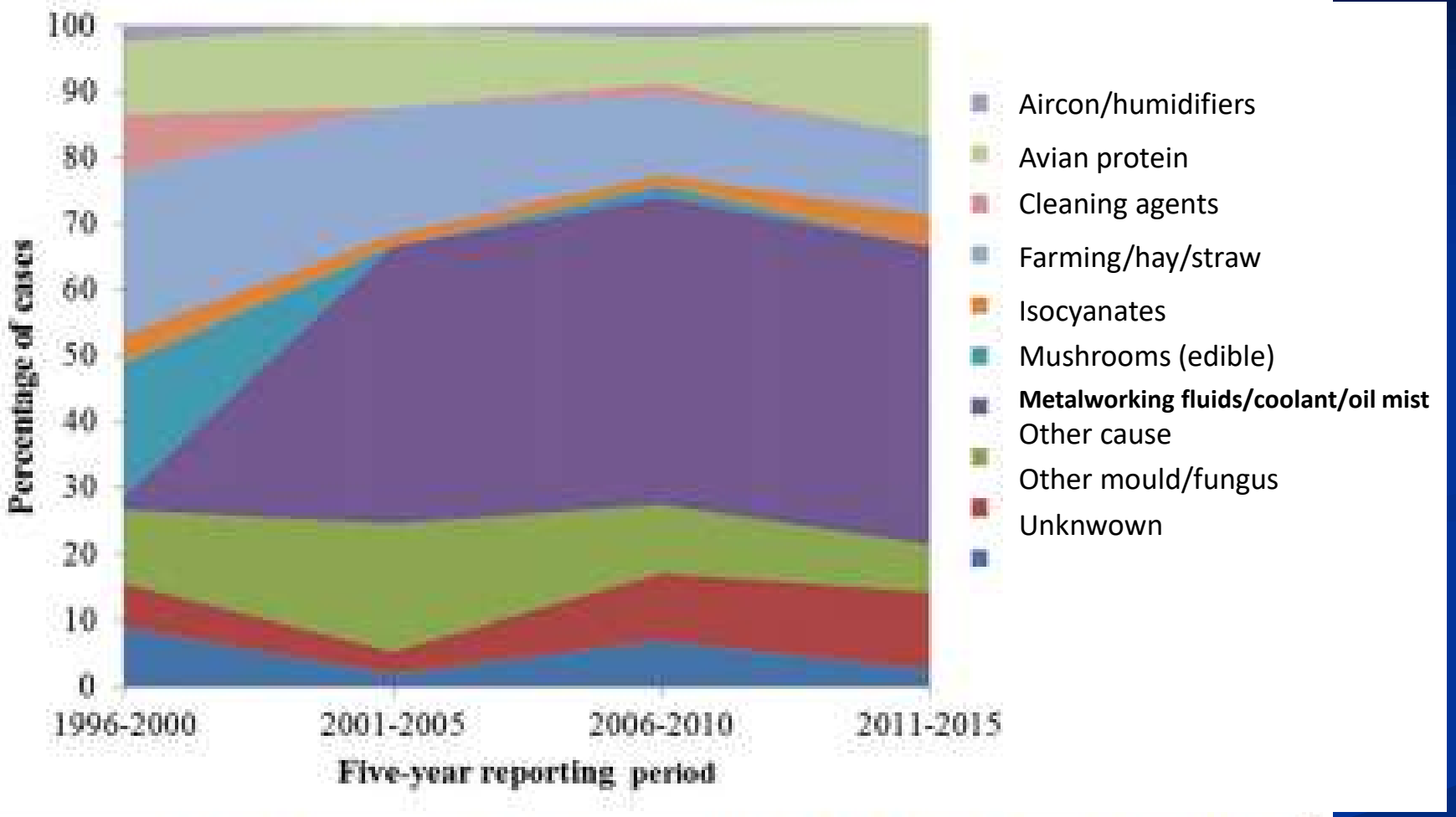
Chronic Hypersensitivity Pneumonitis



HP Etiologic agents

- Farming, vegetable, or dairy cattle workers
- Ventilation and water-related contamination
- Bird and poultry handling
- Veterinary work and animal handling
- Grain and flour processing and loading
- Lumber milling, construction, wood stripping, paper and wallboard manufacture
- Plastic manufacture, painting, electronics industry, other chemicals
- Textile workers

Occupational HP in England



Barber CM, *et al. Occup Environ Med* 2016;0:1–3. doi:10.1136/oemed-2016-103838

Lung Damage Patterns

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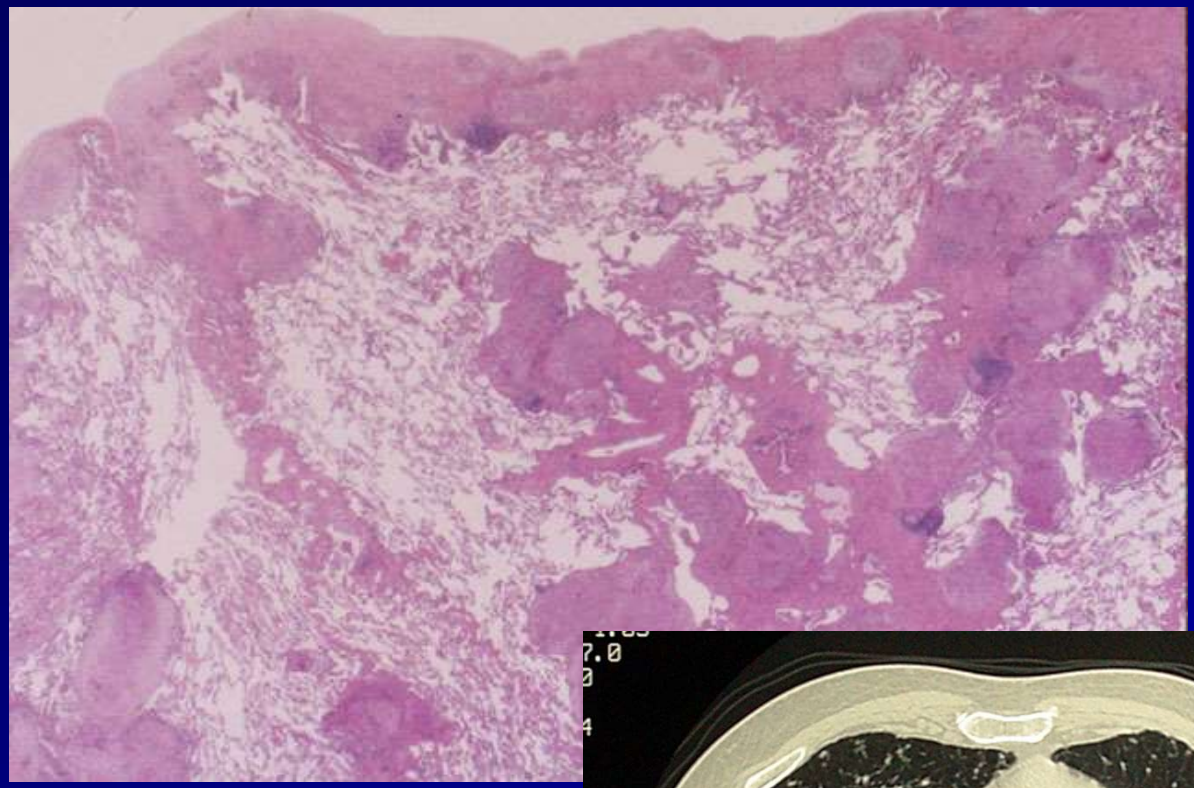
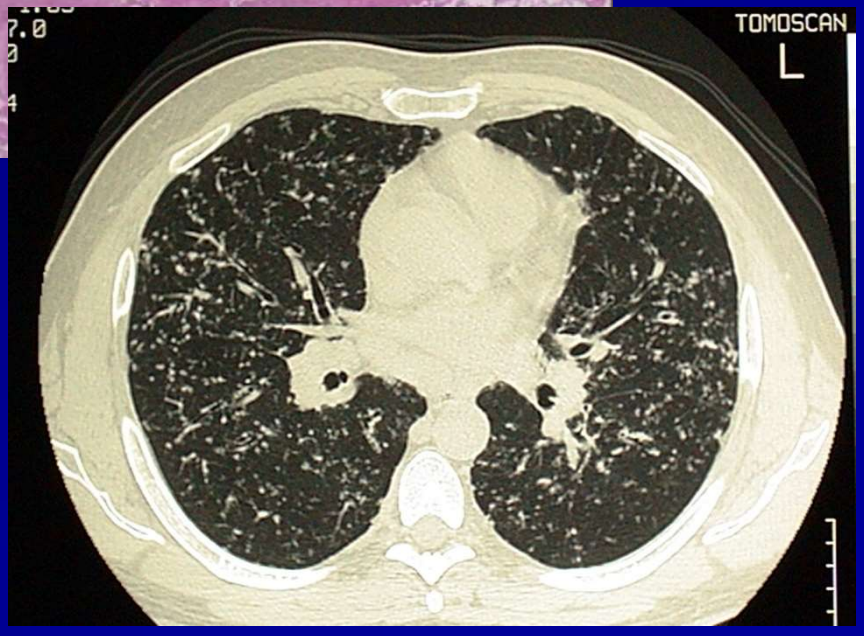
Granulomatosis

- ✓ Sarcoidosi
- ✓ HP
- ✓ Farmaci
- ✓ Pneumoconiosi
- ✓ Talcosi
- ✓ P. Inalazione
- ✓ Vasculiti
- ✓ Infezioni

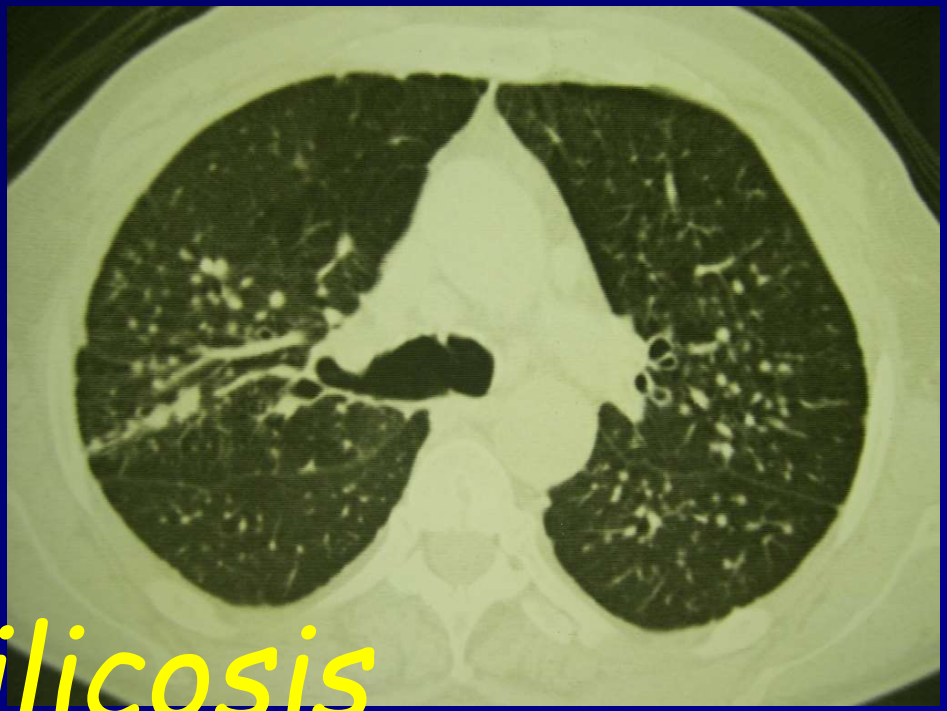




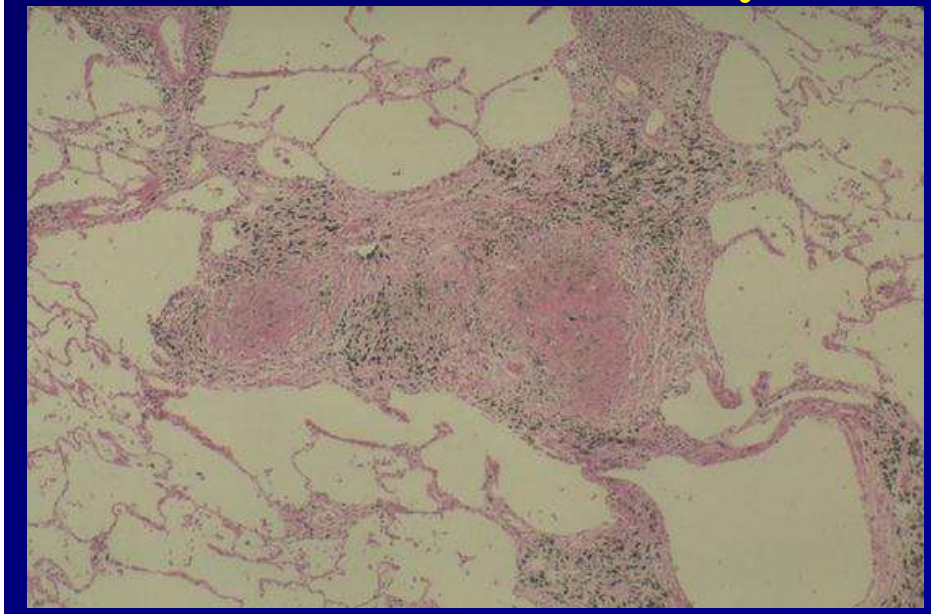
Sarcoidosi

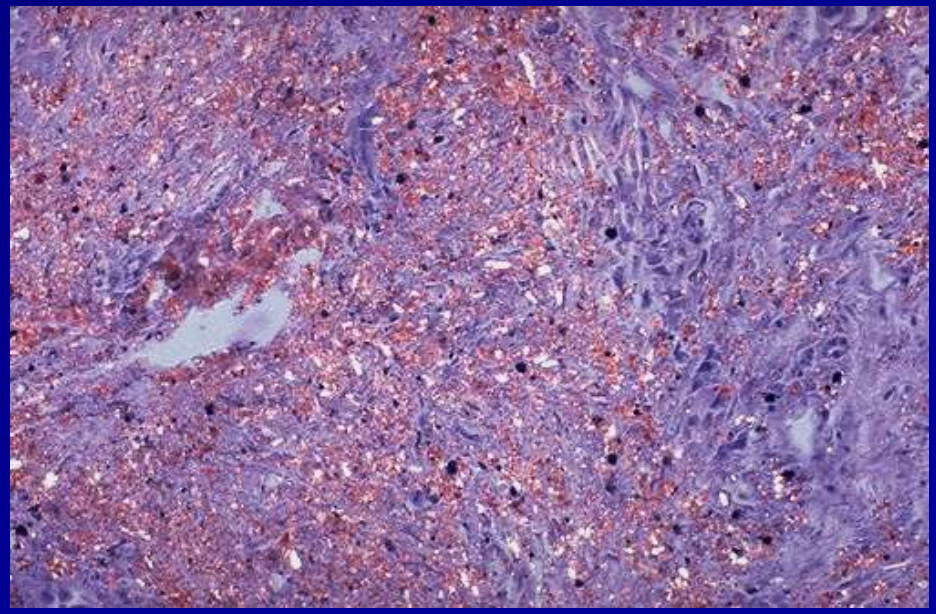
Granulomatosis
in Occupational Lung Diseases

- **Coal Worker's Pneumoconiosis** (early stage)
- **Silicosis**
- **Talcosis**
- **Berilliosis**

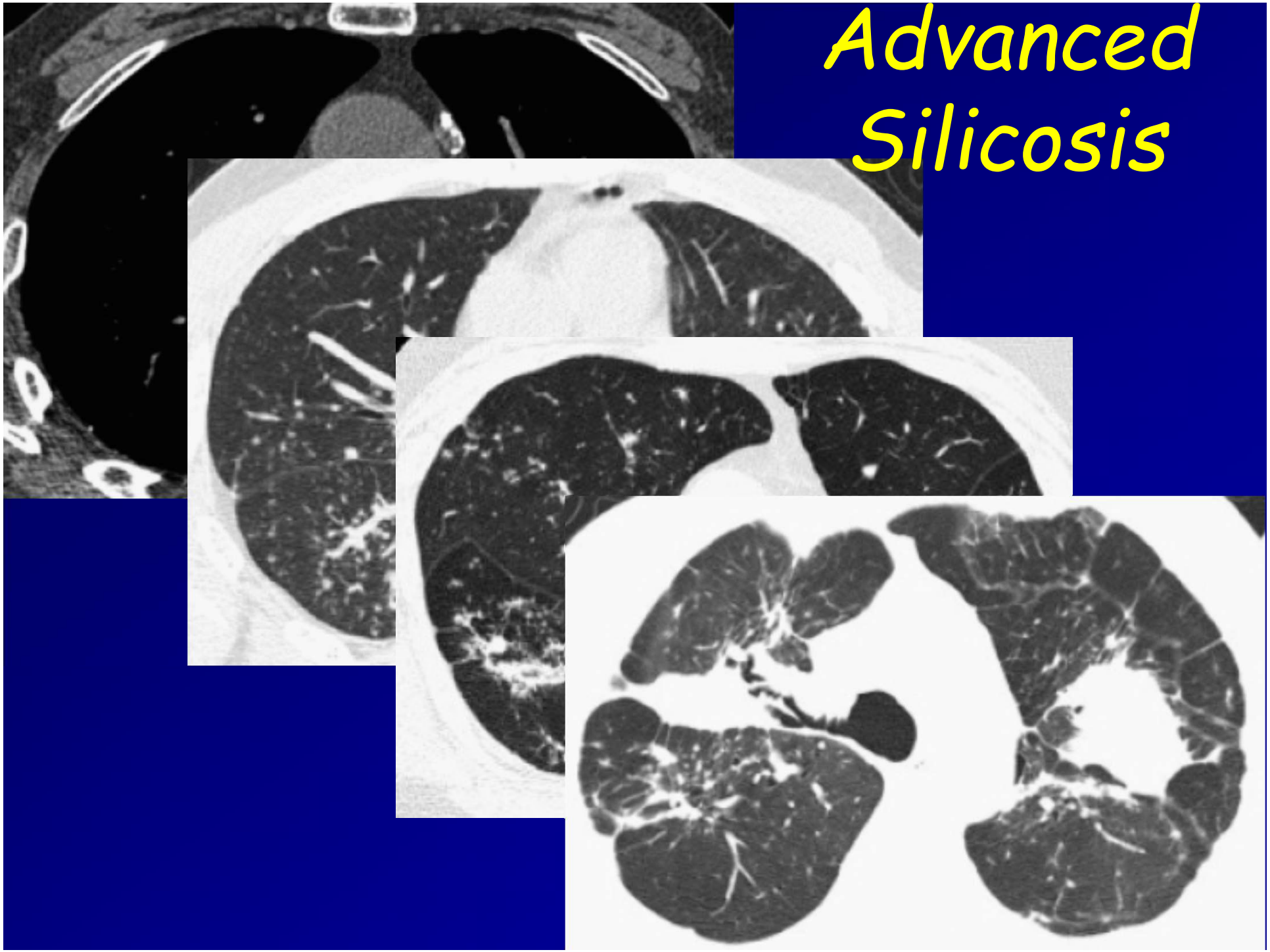


Early Silicosis

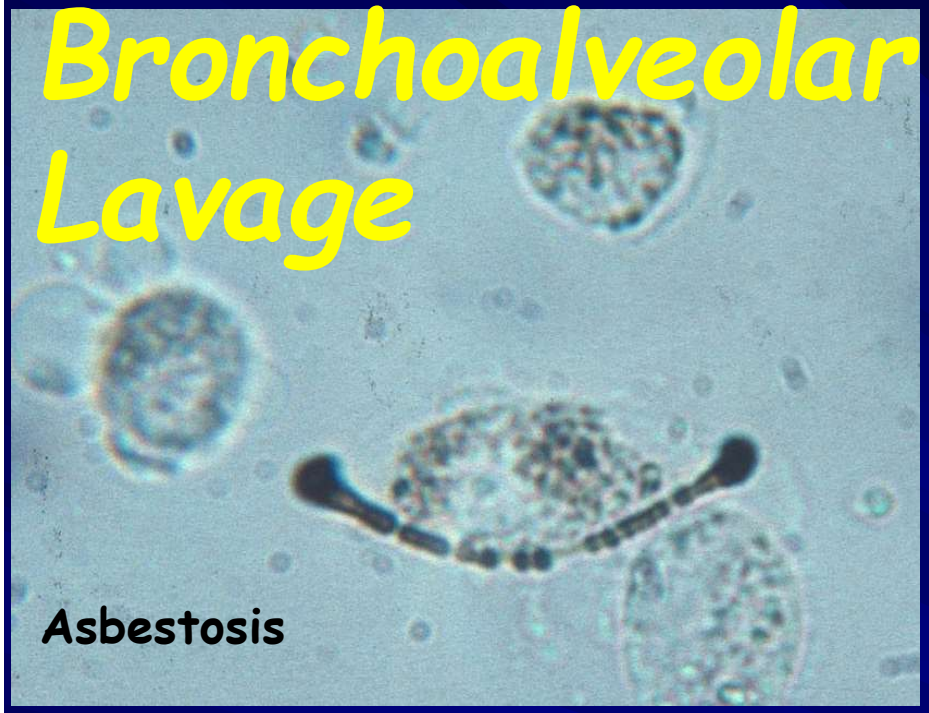




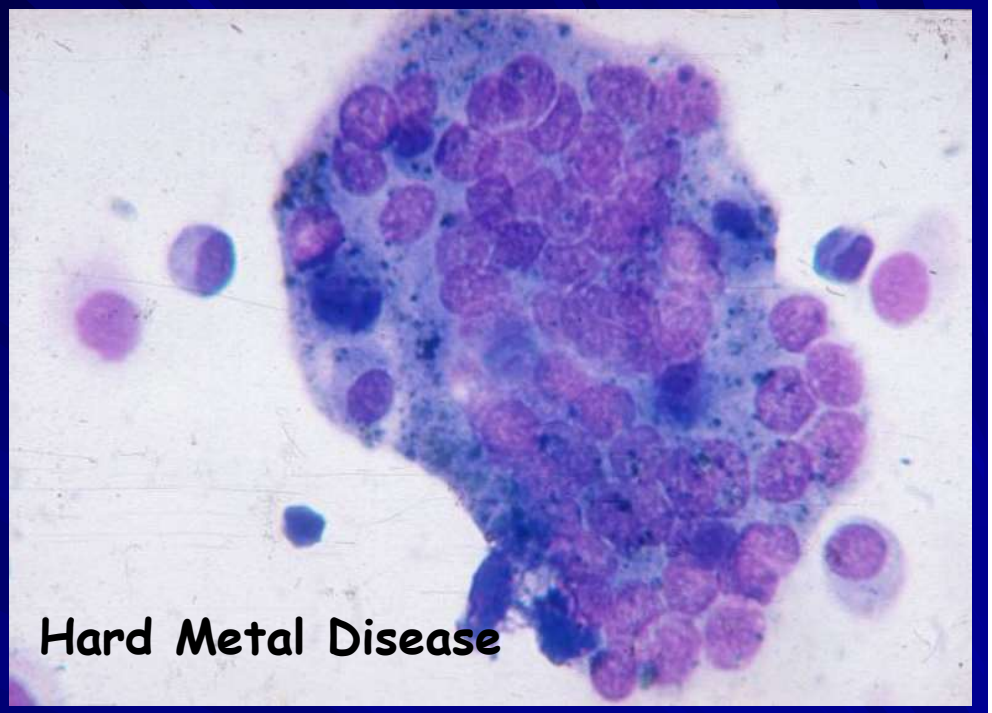
Advanced Silicosis



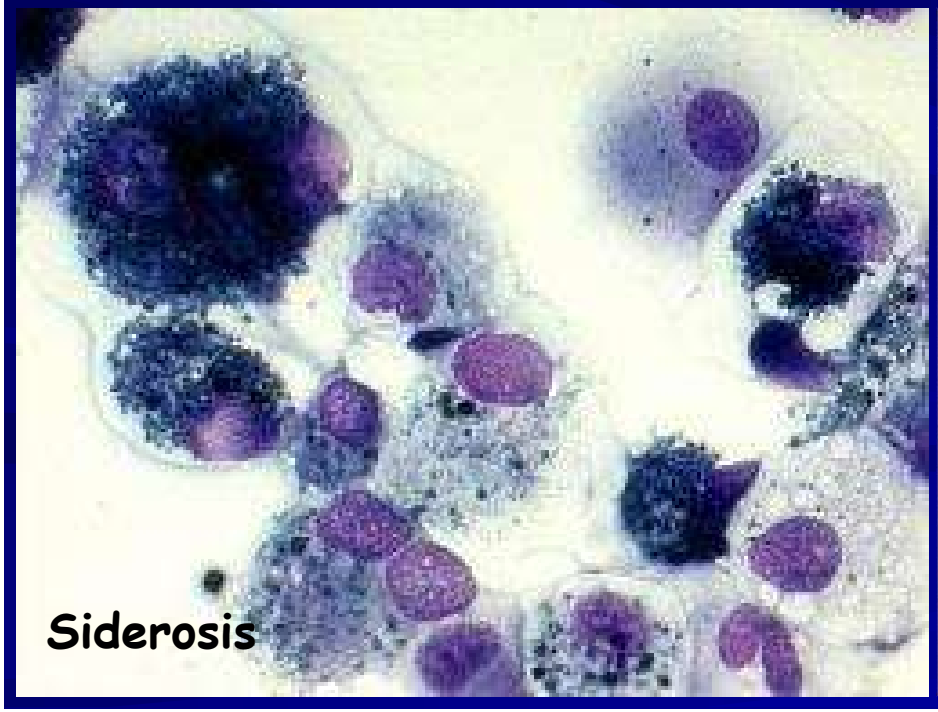
Bronchoalveolar Lavage



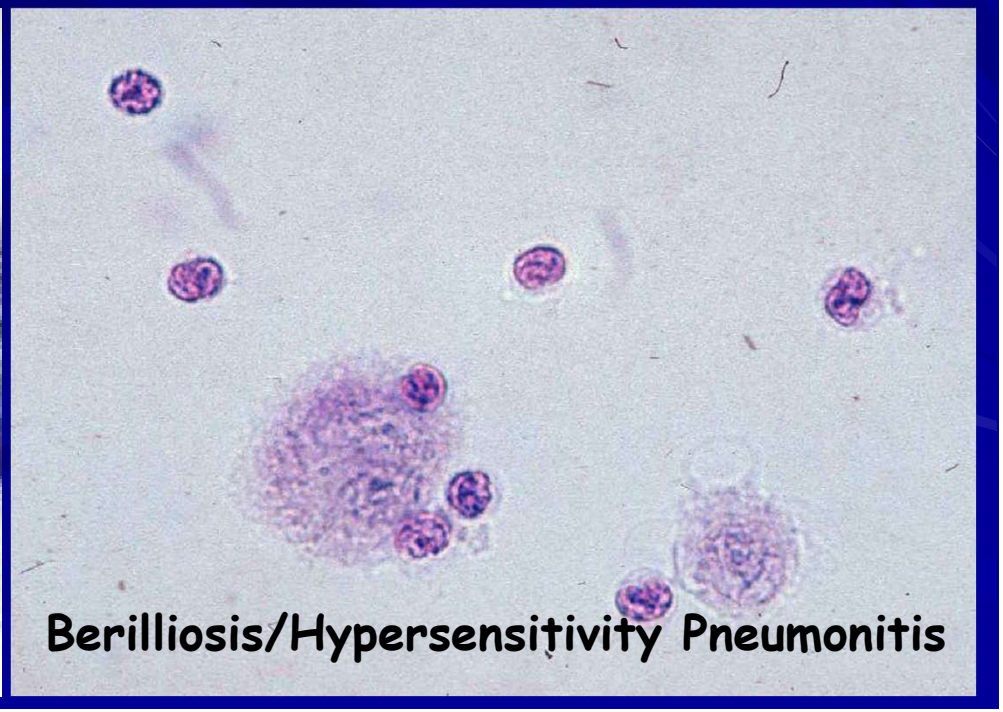
Asbestosis



Hard Metal Disease



Siderosis



Berilliosis/Hypersensitivity Pneumonitis

Conclusions

- Systematic under-reporting and difficulties in attributing causation both contribute to underdiagnosis of the occupational respiratory diseases
- The emergence of novel occupational causes of respiratory disease in recent years emphasises the need for continuing vigilance
- Multidisciplinary discussion is the key for the right diagnosis

Grazie a tutti i presenti della cortese attenzione

Alberto Pesci