Clinical Features:
- Fever
- Productive Cough
- Raised CRP/ESR
- New CXR infiltrate
- Deterioration in gas exchange
- Usually clinical diagnosis

Investigations:
- CXR: Non-specific infiltrate
- Cultures: Blood, sputum, pleural fluid if present
- ABG: determines severity
- RFT/ LFT

Microbiology:
- 50% mixed infections
- 30% aerobic bacteria- Gram neg. enteric bacilli and pseudomonas
- Pseudomonas and Staph. A are common

Management:
- If after 48h post admission, follow CAP protocols
- Generally need prolonged IV abx, usually empirical so:
  - Tazocin, meropenem or ceftriaxone
  - If severe sepsis, add on a STAT dose of gentamicin 5-7mg/kg
- Supportive therapy: Oxygen, fluids, ventilation, nutrition

Complications:
- Lung abscess
- Empyema
- PE
- Multiorgan failure

Prognosis: Mortality 20-50%

Prevention: Hygiene
Aspiration Pneumonia - 3 pulmonary syndromes result from aspiration

**Chemical Pneumonitis - Mendelson Syndrome**
Aspiration of toxic substances, no bacterial infection
Chemical burn to bronchial tree = intense parenchymal inflammatory response, pH<2.5 will cause inflammation
Changes occur within 3 min = atelectasis, pulmonary haemorrhage, pulmonary oedema
**Clinical Features:** Rapid Onset, SOB, low fever, severe hypoxaemia, CXR changes within 2 h
**TX:** Suction/bronchoscopy
  Fluids/O2
  Abx: Cefuroxime + metronidazole

**Bacterial Infection**
Aspiration of bacteria from upper airways/stomach
**Clinical features:** Cough, fever, purulent foul smelling sputum, SOB
May take weeks/months, can be chronic with weight loss and anaemia
**Pathogens:** peptostreptococcus, Fusobacterium nucleatum, Prevotella, Bacteroides
**Tx:** Co-Amoxiclav, clindamycin or carbapenem

**Mechanical Obstruction**
Aspiration of mater not directly toxic to the lung, may lead to airway obstruction or reflex airway closure
**Causative agents:** Saline, barium, fluids, gastric contents pH>2.5, foreign bodies
**Tx:** Tracheal suction, no further Tx if CXR clear
<table>
<thead>
<tr>
<th>URTI</th>
<th>Cause</th>
<th>Features</th>
<th>Investigation</th>
<th>Management</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Cold (coryza)</td>
<td>Viral</td>
<td>Sneezing, blocked nose, rhinorrhea</td>
<td>None</td>
<td>Symptomatic</td>
<td>Remits in days</td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>Viral, Occasionally Strep</td>
<td>Fever, sore throat</td>
<td>Throat swab, ASO titres</td>
<td>Abx if bacterial, surgery is abscess</td>
<td>Remits in 1 week</td>
</tr>
<tr>
<td>Laryngitis</td>
<td>Viral or Strep or H.influenza</td>
<td>Fever, hoarse voice</td>
<td>Throat swab</td>
<td>Abx, humidifiers</td>
<td>Remits in 1 week</td>
</tr>
<tr>
<td>Epiglottitis</td>
<td>h. Influenza</td>
<td>Fever, sore throat, stridor, Obstruction</td>
<td>Throat swab, cultures, lateral neck xray</td>
<td>IV abx, humidifiers, HiB vaccine</td>
<td>Slow improvement with tx, risk of death</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>Viral, Strep or H. Influenza</td>
<td>Dry cough, retrosternal pain, wheeze, sputum if bacterial</td>
<td>Sputum culture</td>
<td>Abx</td>
<td>Improves after a week</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>Various bacteria, 15% viral</td>
<td>Headache, facial pain, nasal congestion</td>
<td>None, xray if severe</td>
<td>Abx, decongestants, sinus washout or surgery</td>
<td>Remits is acute</td>
</tr>
</tbody>
</table>

Influenza
Type A: Pandemic, epidemic
Type B: Local outbreak
COPD

Definition:
Fixed airflow obstruction
Minimal/no reversibility with bronchodilators
Minimal variability in day-day sx
Slowly progressive and irreversible deterioration in lung function

Pathology:
Mucus gland hyperplasia- mainly large airways, mucus hyper secretion=productive cough
Squamous metaplasia- replacement of normal columnar epithelium
Loss of cilial function

Chronic inflammation and fibrosis of small airways
Infiltration: CD8 lymphocyte, macrophage and neutrophil, release of pro-inflammatory cytokines

Emphysema due to alveolar wall destruction- irreversible enlargement of airspaces
Panacinar emphysema: dilated airspaces evenly across acini
Centriacinar- dilated air spaces associated with resp. bronchioles
Periacinar- dilated air spaces at the edge of acinar unit

Thickened pulmonary arteriolar wall and remodelling occur with hypoxia- increased pulmonary vascular resistance, PHT, impaired gas exchange

Inv:
Pulmonary function tests
Obstructive spirometry and flow-volume loops
Reduced FEV1 to <80% predicted
FEV1/FVC<0.7
Raised TLV, FRC and RV due to emphysema, air trapping, loss elastic recoil
Decreased TLCO and KCO, emphysema <surface area available for gas exchange
2nd leading infectious cause of death worldwide.
125 cases per 100000 worldwide, highest incidence: Sub-Saharan Africa

**Pathophysiology:** Disease airborne spread, via droplets containing Mycobacterium TB. Droplets are inhaled and lodged in the distal airways. MB is taken up by the alveolar macrophages, triggers the innate immune system and spreads via lymphatics to hilar lymph nodes. Later, a cell mediated immune process leads to granuloma formation by activated T lymphocytes and macrophages which limits further bacterial replication and disease spread. Most will contain the disease and it won’t progress further.

Active disease: when host unable to contain MTB replication with absent or poorly formed granulomas. Active disease occurs most often in the lung parenchyma due to O2 content in which the baccilus grows well and hilar lymph nodes.

- Smear +ve TB: AFB on sputum Ziehl Neilsen Stain= infectious and need hospital isolation
- Culture +ve TB= AFB not seen on stain. TB grown on culture. Less infectious, but transmission can still occur.

**Inv:**
- CXR: Upper lobe infiltrates with cavitation
- Hilar/paratracheal lymphadenopathy
- Fibrous scar tissue & calcification
- Sputum ZN stain and culture- ZN only 50-80% sensitive
- Mantoux test
- Bronchoscopy
- Bloods: LFT, FBC, U&E
- HIV test
- CT

**Management:**

**Phase 1:** Initial intensive phase- lasts 2 months, kills actively growing bacteria
- RIPE

**Phase 2:** Continuous phase: 2 drugs usually Isoniazid and rifampicin for 4 months
- May need to use DOT
First-line anti TB drugs

**Isoniazid:** Bactericidal. Major SE: age-dependent hepatitis-increased toxicity with alcohol. Increased peripheral neuropathy with DM and pregnancy-reduce incidence with 10mg pyridoxine. Dose: 300mg OD

**Rimapicin:** Bactericidal. Increases hepatic microsomal enzymes so increases clearance of hepatic metabolized drugs-prednisolone, OCP. SE: Red urine, tears. GI upset. Dose: 450mg OD

**Pyrazinamide:** Bactericidal. GI upset common. Major SE: hepatic toxicity. Renal excretion leads to hyperuricaemia. Dose: 1.5g OD

**Ethambutamol:** Mainly bacteriostatic. SE: optic neuritis. Document visual acuity before starting, warn pt re visual disturbances. 15mg/kg

**Streptomycin:** Bactericidal. Given parenterally. Increased ototoxicity in foetus and elderly.

**HIV pts:** Rifampicin and isoniazid lead to reduced serum conc. Of antifungals. Ketoconazole can inhibit Rifampicin.

**F/UP:** CXR at end of meds, relapse uncommon if compliant. F/up after 12 months. Prolonged fup if HIV.
Rare group of pulmonary diseases. Mainly unknown origin. **Acute and chronic:** More common in women, 40-50 ys. 50% have concurrent asthma. **Hypereosinophilic syndrome:** Very rare. Can be complicated with cardiac failure. Poor prognosis. **Churg-Strauss Syndrome:** Rare pulmonary vasculitis. 1 per million. Affects small and medium vessel.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Features</th>
<th>Inv</th>
<th>Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute eosinophilic pneumonia</td>
<td>Fever, dry cough, dyspnoea, maligia, chest pain. Crackles/wheeze</td>
<td>Eosinophilia, segmental infiltrates. Peripheral ground glass on CT Restrictive lung function</td>
<td>Prednisolone 30-40mg/day- reduce rapidly following improvement</td>
</tr>
<tr>
<td>Chronic eosinophilic pneumonia</td>
<td>Cough, fever, dyspnoea, weight loss</td>
<td>Eosinophilia, bilateral peripheral infiltrates, restrictive lung function</td>
<td>Prednisolone 30-40mg/day. Reduce slowly over 6 months</td>
</tr>
<tr>
<td>Hypereosinophilic syndrome</td>
<td>Cough, malaise, Cardiac Failure- myocardial infiltrate</td>
<td>Eosinophilia &lt;20x10^9/L CXR: Pulmonary infiltrates and effusions</td>
<td>Prednisolone 30-60mg/day ? Long term tx Anticoagulant</td>
</tr>
<tr>
<td>Churg-Strauss Syndrome</td>
<td>Asthma, sinusitis, multisystem involvement</td>
<td>Eosinophilia, IgE raised, raised pANCA in 50%. Pleural effusion in up to 30%. Vasculitis on biopsy</td>
<td>Prednisolone 40-60mg/day reduce over a year. If severe-immunosuppression</td>
</tr>
</tbody>
</table>
Pneumothorax
Cavitation