Respiratory Infection

2nd Year Revision

Phil Short

Clinical Research Fellow

Overview

Today

- History
- Examination
- Investigations
- Respiratory Infections
  - Pneumonia
  - Bronchiectasis
  - Cystic Fibrosis
  - TB

- Pleural Effusions

Overview

- Next Week
- Asthma
- COPD
- Restrictive Lung Disease

- End of Block
- Dr Fardon Revision

History

- Chest Pain
- Breathlessness
- Cough
- Wheeze
- Systematic Enquiry
- PMH
- DH
- FH
- Social

History

- Breathlessness
  - Acute
    - PE
    - Pneumothorax
    - Pulmonary Oedema
  - Subacute
    - Pneumonia
    - Pulmonary Oedema
    - Pleural effusion
    - Asthma/COPD
  - Chronic
    - COPD
    - Pulmonary fibrosis
    - PE

www.netterimages.com

History

- Chest Pain

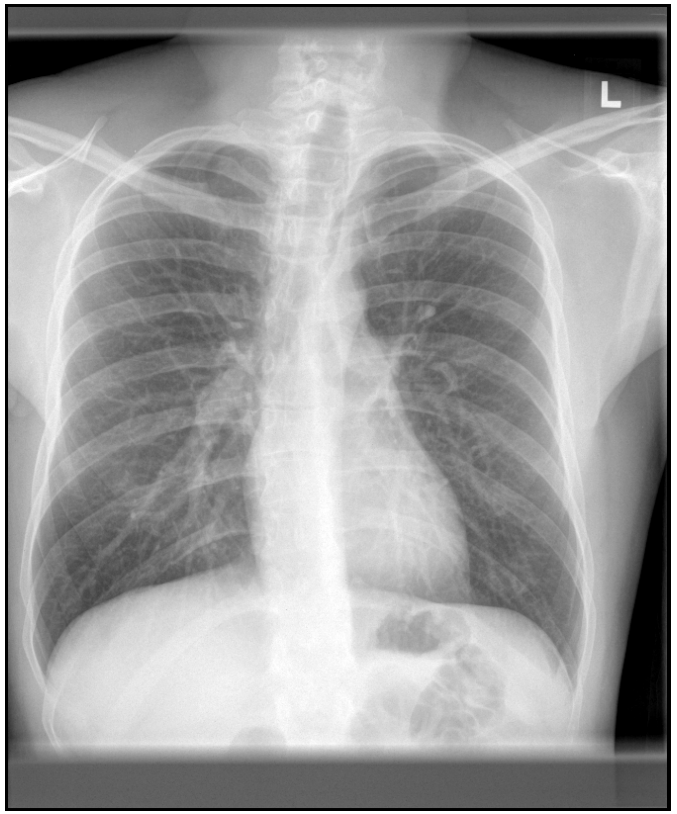
homeemergency.wordpress.com

History

- Cough
  - Dry
  - **<8 weeks**
    - Viral
  - >8 weeks
    - GORD
    - Asthma/Bronchial hyperresponsiveness
    - Post nasal drip

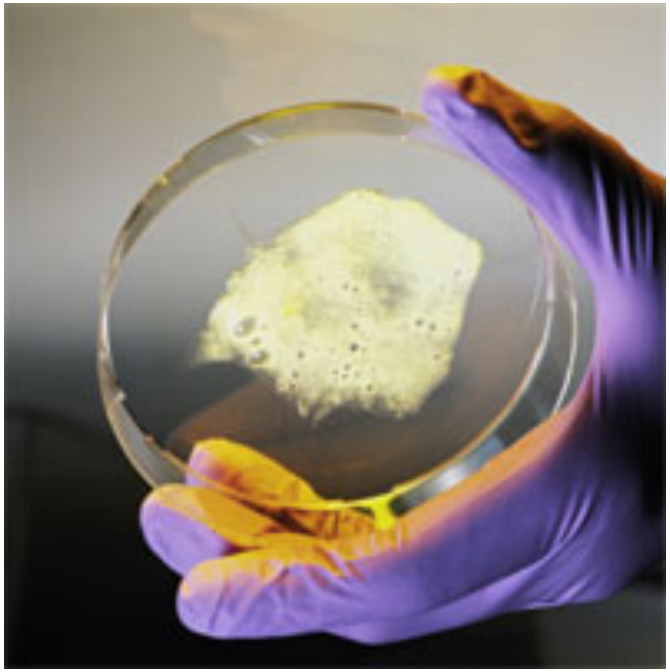
History

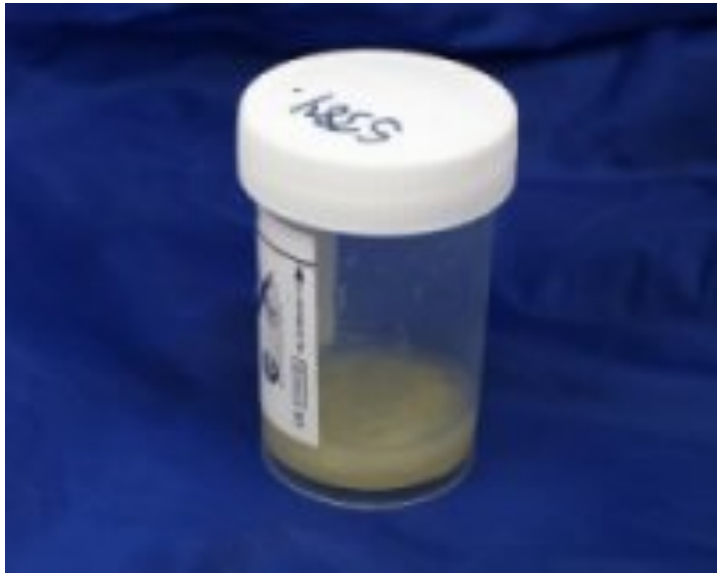
- Cough
  - Dry
  - **<8 weeks**
    - Viral
    - Airways disease
  - **>8 weeks**
    - GORD
    - Asthma/Bronchial hyper-responsiveness
    - Post nasal drip
    - ACEI



History

- Cough
  - Dry
  - **Productive**





www.helmholtz-muenchen.de
www.old.rlbuht.nhs.uk

History

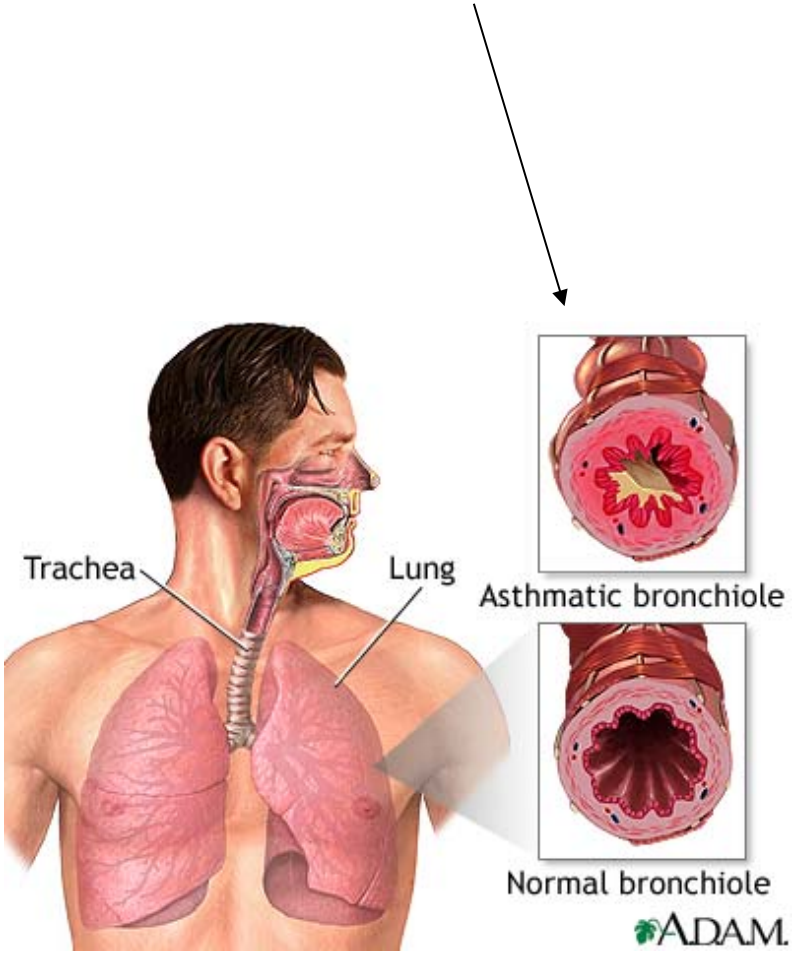
- Cough
  - Dry
  - Productive
  - Haemoptysis
    - Massive
    - Non massive

Haemoptysis

- Big Four!
  - Infection
  - Carcinoma
  - Pulmonary Embolism
  - Bronchiectasis
- The others
  - Cardiac
  - AVM
  - Anticoagulation

History

- Wheeze



www.lisleuth.com

History

- Systematic Enquiry
  - Weight Loss
  - Fevers and sweats
  - GORD
  - Cardiac
    - Orthopnoea
    - PND
    - Peripheral Oedema
  - ENT
    - Hoarseness
    - Snoring/daytime somnolence
    - URT symptoms
  - Rash
  - Joint pains
  - Dysphagia
    - Neuro
    - GI
  - Myopathy

History

- PMH
- FH
- RH
- SH

- Childhood infection
- PE
- TB

History

- PMH
- FH
- RH
- SH

- Atopy
- COPD

History

- PMH
- FH
- RH
- SH

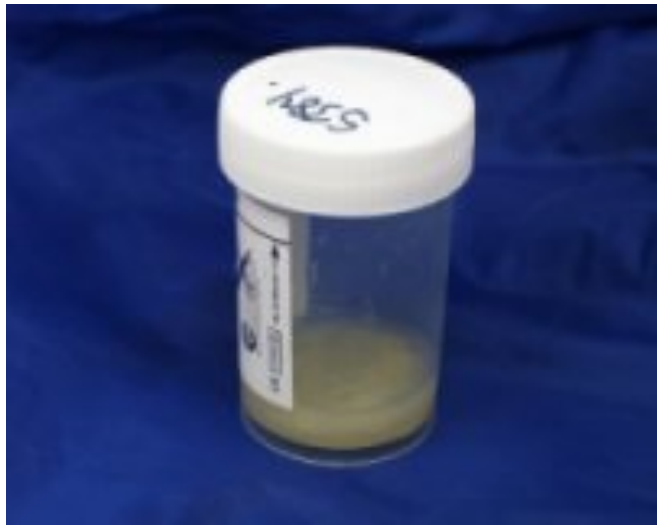
- ILD
  - Nitrofurantoin
  - Methotrexate
  - Amiodarone
  - ACEI
  - Bleomycin
  - Beta blockers
- Airways
  - Beta blockers
  - Contrast media
  - ACEI
  - Penicillamine (O.B.)
- Vascular
  - Phenytoin (PE)
  - Dexfenfluramine
- Mediastinal
  - Bleomycin
  - Phenytoin

History

- PMH
- FH
- RH
- SH
  - Occupation/Hobbies
    - Asbestos
    - Coal mining
    - Farming
    - Pigeons/birds
  - Tobacco
  - Cannabis

Examination

www.imaginis.com



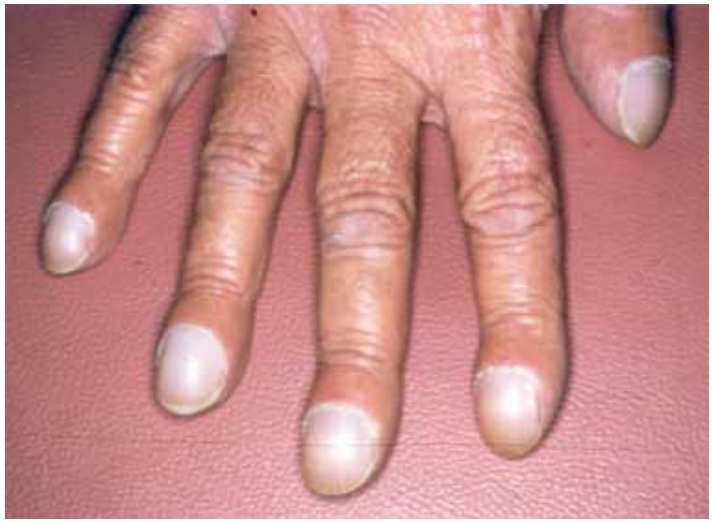
Bed side

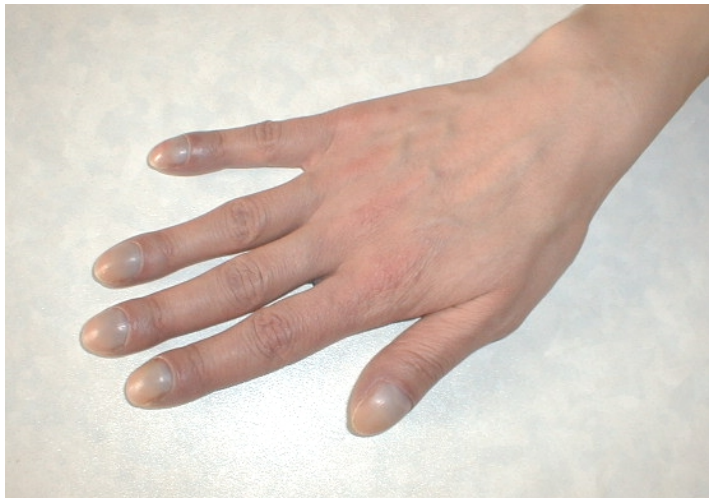
www.old.rlbuht.nhs.uk
www.kcfirstaid.com
www.allergyasthmatech.com

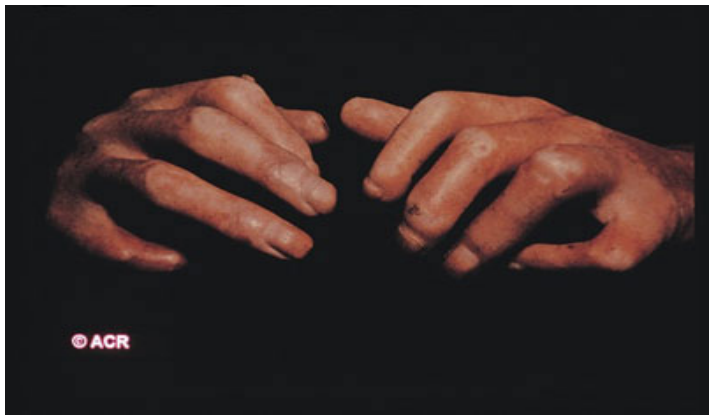
Examination

General

- Hands
- Head
- Weight







Clubbing

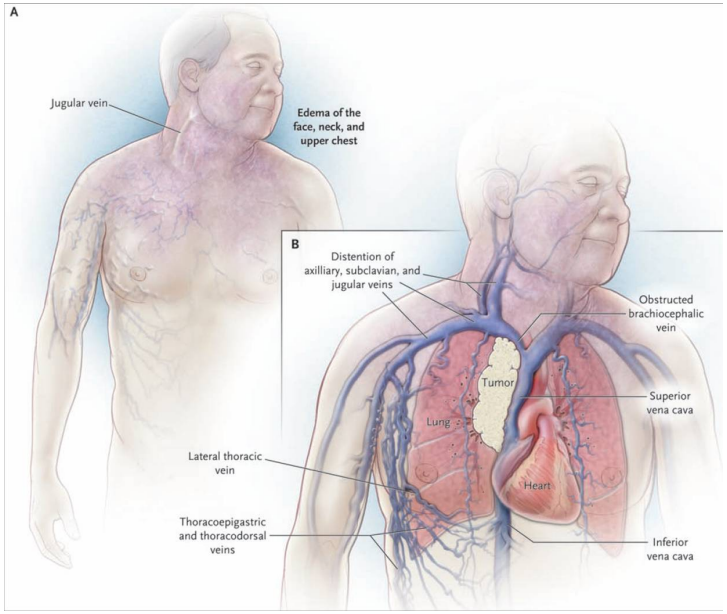
Cyanosis

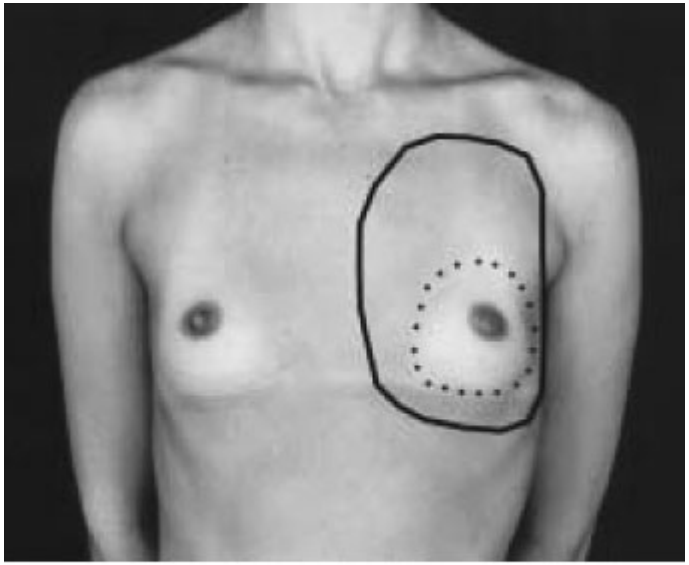
Connective tissue

CO2 flap

Tar stained nails

cancergrace.org
arthritis-symptom.com
www.scleroderma.org

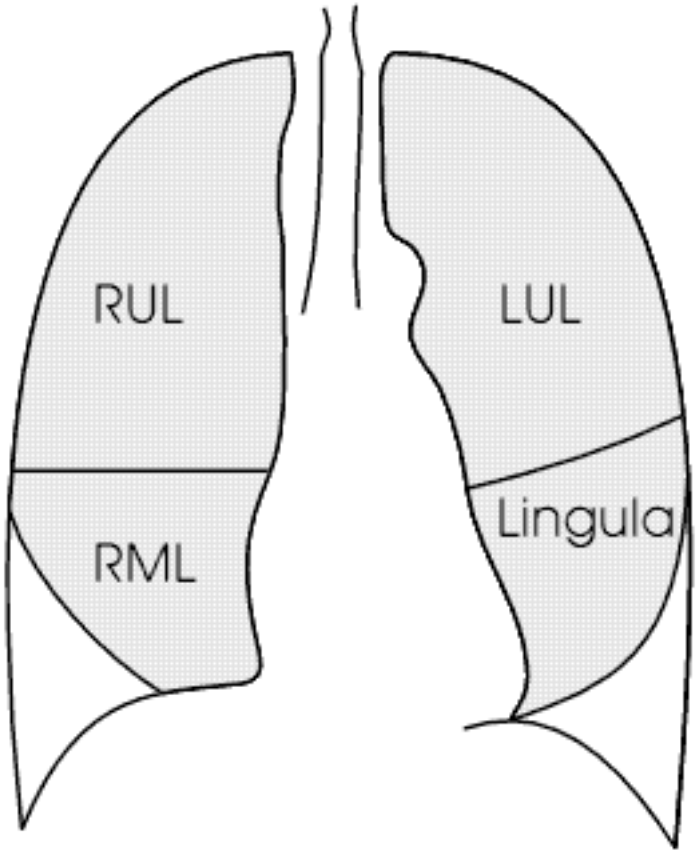




Cyanosis
JVP
Lymphadenopathy
SVCO
Gynaecomastia

cancergrace.org
www.scielo.br

Chest Examination



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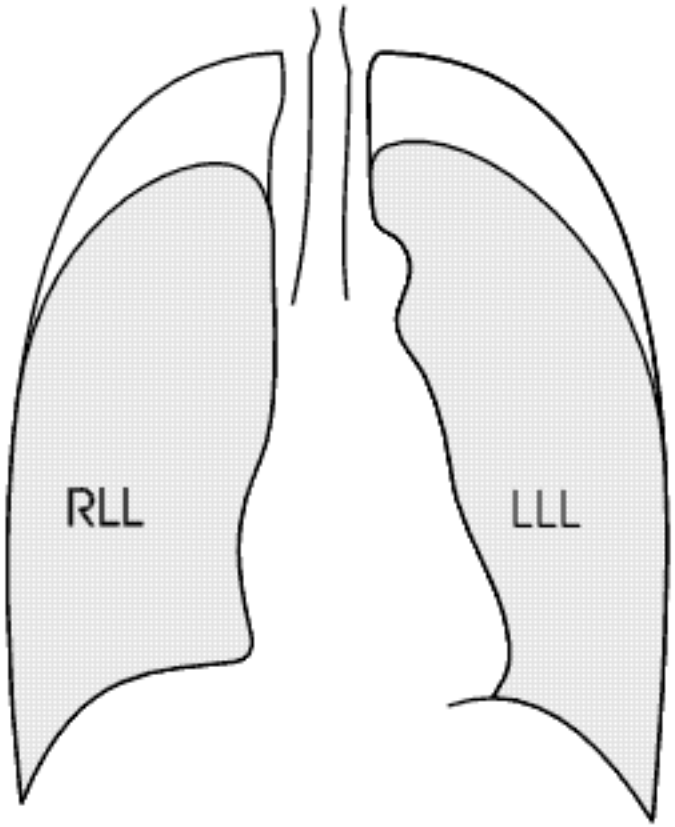

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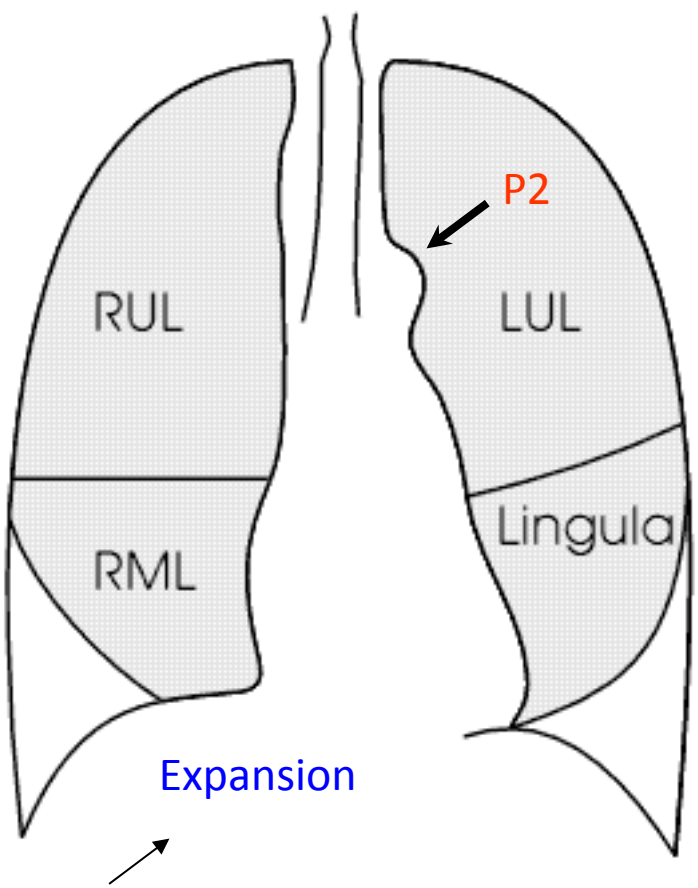
Chest Examination



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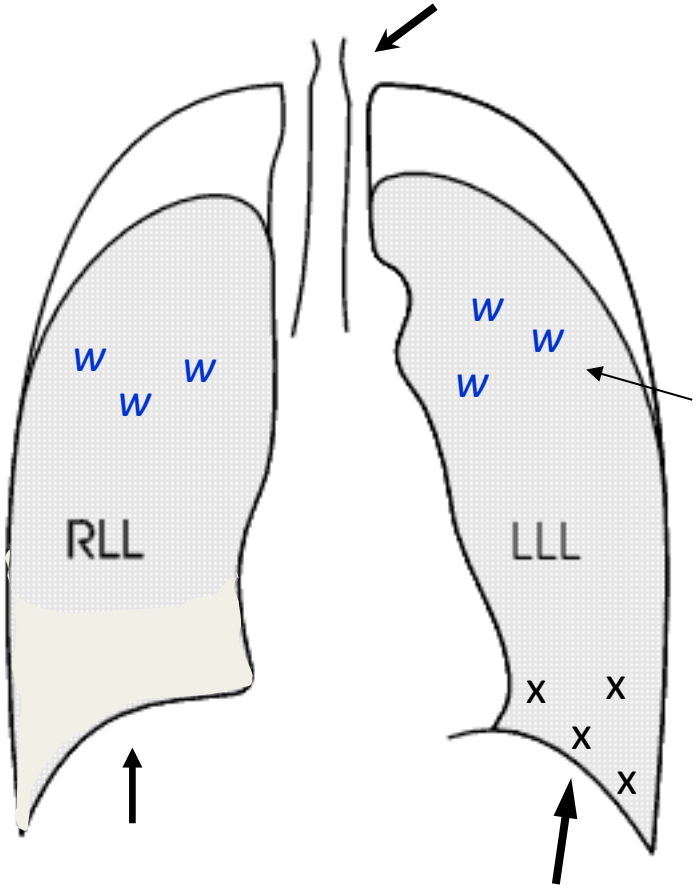

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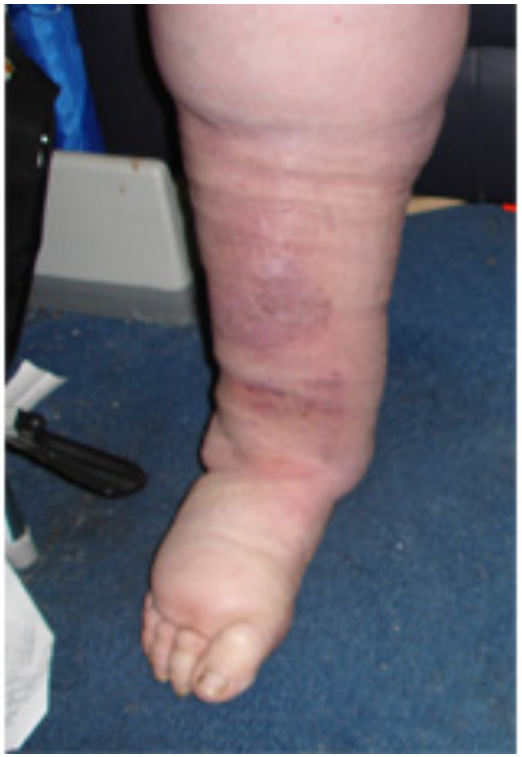
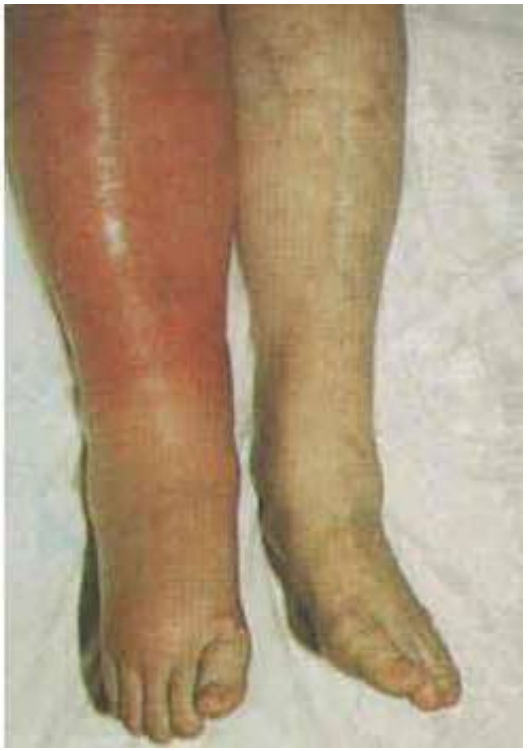
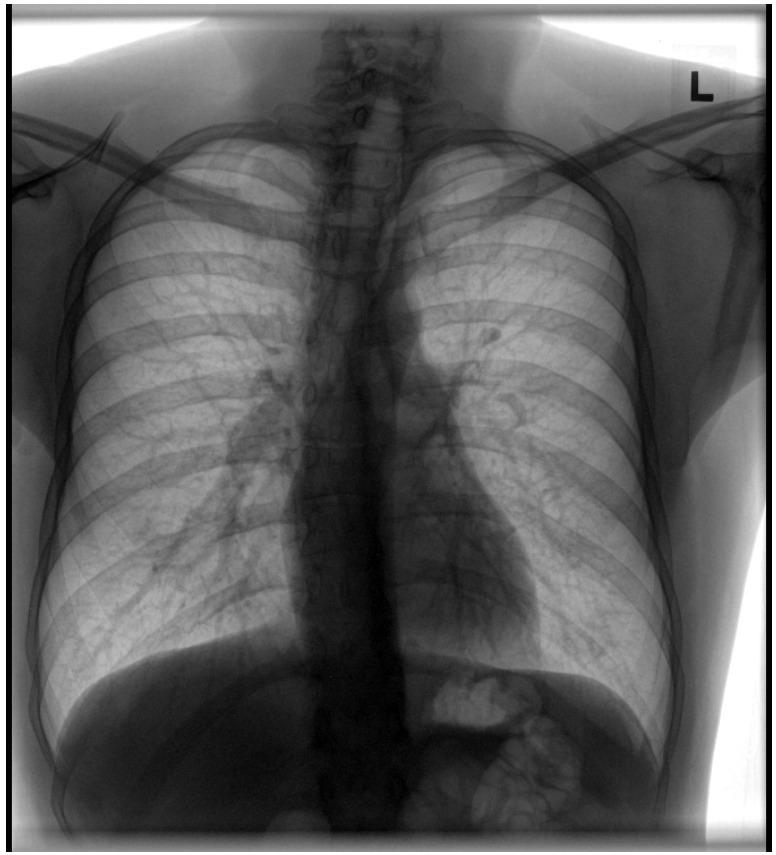




www.activahealthcare.co.uk
health-pictures.com

Investigations



Investigation

- Blood Tests
  - Sodium
  - Calcium
  - ACE
  - A1AT
  - Troponin T
  - CRP
  - Hb
  - WCC
    - Ne
    - Eo
- D Dimer
- Coagulation
- ANA
- ANCA
- Anti GBM
- Aspergillus ppt
- IgE and specific IgE

Investigation

- Sputum
  - Microbiology
  - Induced
  - Cytology

www.southend.nhs.uk

Investigation

- CXR
- CT
- Pulmonary function
  - Dynamic
  - Static
  - Diffusion capacity

Pneumonia

Definition of CAP in community

- Symptoms of an acute lower respiratory tract infection.
- New focal chest signs on examination
- At least one systemic feature (sweating, fever, aches, rigors)
- No other explanation for illness.
- Treated with antibiotics

Definition of CAP in hospital

- Symptoms and signs consistent of acute lower respiratory tract infection with NEW RADIOGRAPHIC SHADOWING for which there is no other explanation.

- Illness is primary reason for admission to hospital and is managed as pneumonia.

Severity Assessment

- **CURB65**
- Hospital Setting

- New onset mental confusion (MSQ <8)
- Urea > 7mmol/l
- Respiratory rate ≥ 30 breaths/min
- Systolic blood pressure <90mmHg or diastolic blood pressure ≤ 60mmHg
- Age ≥65

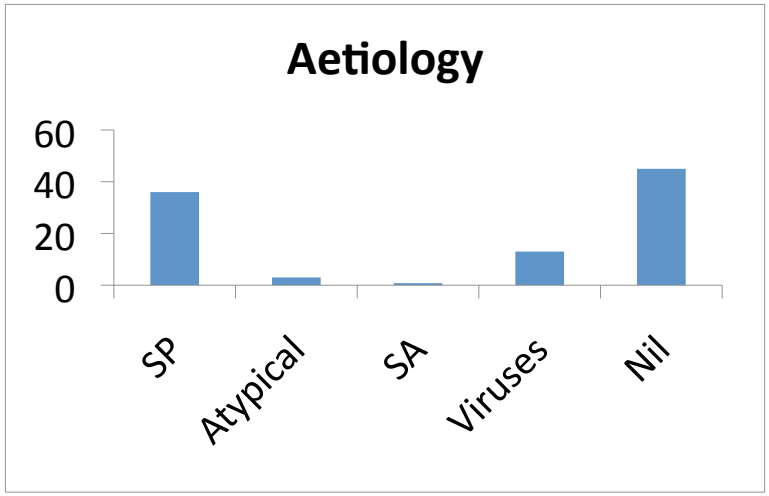
Investigations

- CXR
- Oxygen Saturations
- Urea and Electrolytes
- CRP
- FBC
- LFTs
- Microbiology Investigations

Microbiology

Blood	Sputum	Urine
CURB65 0-1 No blood cultures recommended. **CURB65 ≥ 2** Blood cultures recommended.	**CURB65 0-1** No samples routinely recommended. **CURB65 =2** Sputum Cultures (+/- gram stain) if NO prior antibiotics given. Recommended if Legionella suspected. **CURB65 ≥3** Routine Sputum cultures (+/- gram stain) Legionella cultures Atypical and Viral pathogens	CURB65 0-1 No samples routinely recommended. CURB65≥2 Pneumococcal Urine Antigen Legionella Urine Antigen

Low Severity CAP



- HOME

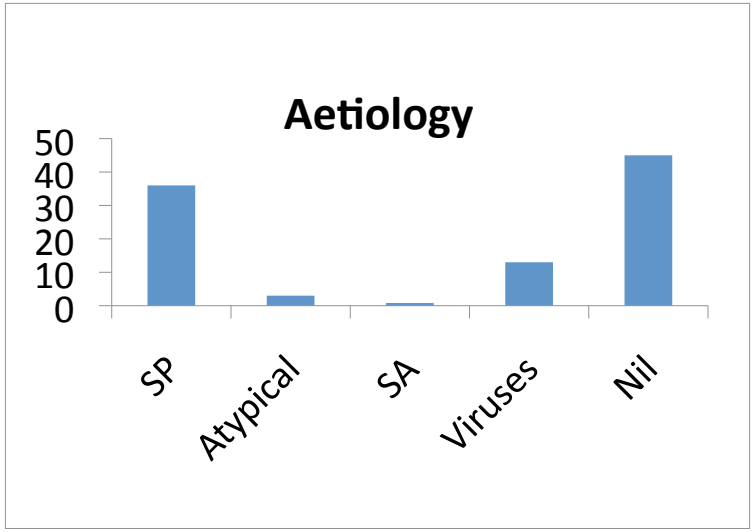
Preferred

- Oral Amoxicillin 500mg tds

Alternative

- Oral Doxycycline 200mg LD, 100mg od OR Clarithromycin 500mg BD

Low Severity CAP (comorbidities or elderly)



- HOSPITAL

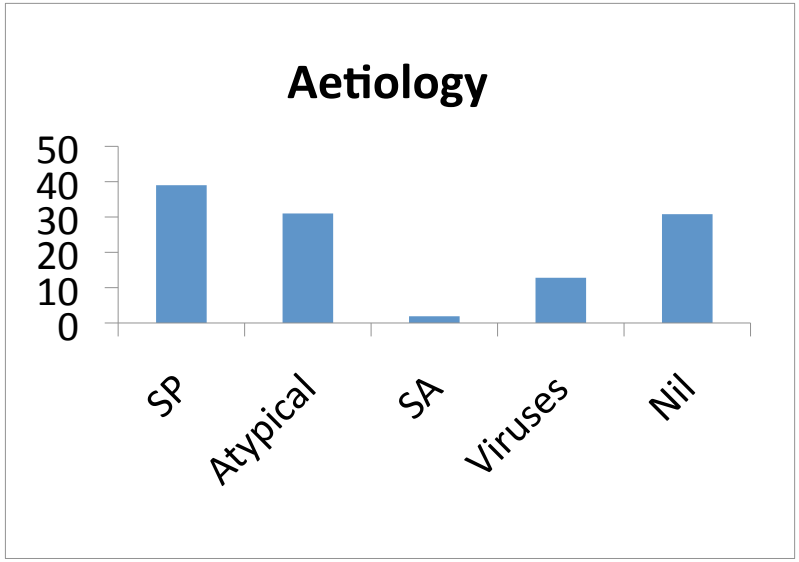
Preferred

- Oral Amoxicillin 500mg tds
- IV Amoxicillin 500mg tds **if oral not possible**

Alternative

- Oral Doxycycline 200mg LD, 100mg od OR Clarithromycin 500mg BD
- IV Clarithromycin 500mg bd **if oral not possible**

Moderate Severity CAP



- HOSPITAL- **<u>Antibiotics within 4 hours</u>**

Preferred

- Oral Amoxicillin 500mg-1G tds **+** Clarithromycin 500mg bd

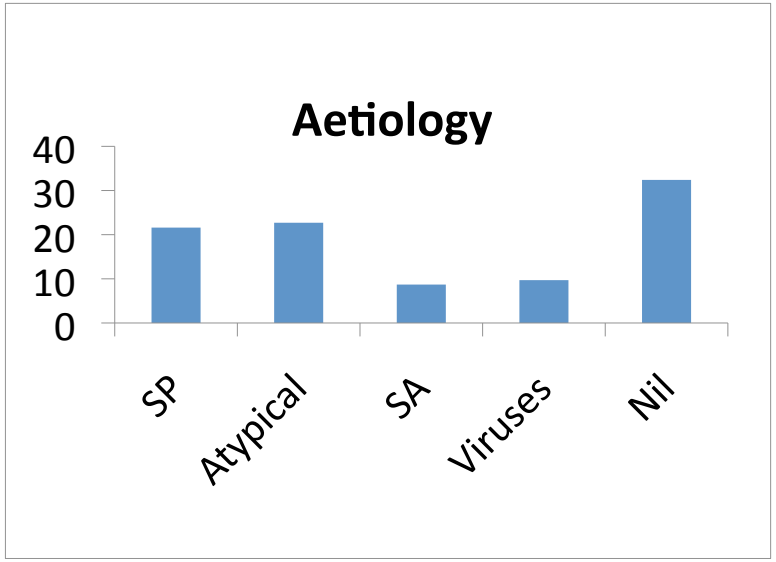
- IV Amoxicillin 500mg tds or
  IV Benzylpenicillin 1.2G qds **+**
  IV Clarithromycin 500mg bd
  if oral not possible

Alternative

- Oral Doxycycline 200mg LD, 100mg od OR Levofloxacin 500mg od or Moxifloxacin

- IV Levofloxacin 500mg od OR
  IV Cefuroxime 1.5G tds or IV Cefotaxime 1G tds or IV Ceftriaxone 2G od **+** IV Clarithromycin 500mg bd
  if oral not possible

High Severity CAP



- HOSPITAL- **<u>Antibiotics ASAP and consider critical care review</u>**

Preferred

- IV Co-amoxiclav 1.2G tds +
  IV Clarithromycin 500mg bd

- If Legionella suspected add in
  IV Levofloxacin

Alternative

- IV Benzylpenicillin 1.2G qds **+**
  IV Levofloxacin 500mg od OR
  IV Ciprofloxacin 400mg bd
- IV Cefuroxime 1.5G tds or IV Cefotaxime 1G tds or IV Ceftriaxone 2G od **+** IV Clarithromycin 500mg bd
- If Legionella suspected add in
  IV Levofloxacin

Hospital Acquired Pneumonia

- New CXR changes 72 hours after hospital admission.
- Aspiration most important cause
- Frailty/ ICU admission/ Immunosuppressed
- Strep/Staph/ MRSA Anaerobic/ Pseudomonas

- Antibiotics diffferent
- Need to target gram-ve anaerobic bacteria.
- Amoxicillin
- Metronidazole
- Gentamicin

THE MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA

SUSPECTED or PROVEN COMMUNITY ACQUIRED PNEUMONIA

TRANSFER OF PATIENTS AFTER INITIAL ASSESSMENT:

CURB65: 4 or 5
Medical HDU or ICU

CURB65: 3
Consider Medical HDU or admit to medical ward

CURB65: 2
Admit to medical ward or Acute Medical Outpatient Clinic

CURB65: 0 or 1
Home therapy or admit if clinical concern or co-morbidity

ALL PATIENTS SHOULD BE ASSESSED IMMEDIATELY FOR:

- **SEVERITY** - Use severity box below to guide management. Record clearly in notes.
- **SEVERE SEPSIS/SEPTIC SHOCK** – refer to SEPSIS BUNDLE (Early Goal Directed Therapy)
- **ANTIBIOTICS** – GIVE IMMEDIATELY – within 4 hours of arrival at hospital. Take blood culture first, but DO NOT AWAIT the results of a CXR. See appropriate antibiotic box below.
- **OXYGEN** – Aim to keep oxygen saturations in non-COPD patients 94-98% if <75y or 92-98% if >75y. In COPD patient aim for 88-92% initially and take ABG.
  In non-COPD patients: 60-100% FiO_2 is safe. COPD: 28% and adjust according to ABG
- **IV FLUIDS** – Aim to keep BP >90/60 with good urine output (>30mls/hour)

THE FOLLOWING SHOULD BE PERFORMED ON ALL PATIENTS: FBC, U&E, LFT, CRP, BLOOD CULTURE, BASELINE SEROLOGY, CXR, ECG, nursing observations 4-hourly (including RR and oximetry) until stable. **SPUTUM CULTURE** – only in severe CAP patients with productive cough. **IN SEVERE CAP PATIENTS:** throat swab or gargle for virology PCR, urine for legionella antigen

ASSESS SEVERITY OF PATIENT'S PNEUMONIA
CORE Adverse Prognostic Features (Score 1 for each)

- CONFUSION, NEW (MSQ ≤8/10)
- UREA >7mmol/l (if available)
- RESPIRATORY RATE ≥ 30/minute
- BP <90mmHg (systolic) or ≤60mmHg (diastolic)
- 65 AGE ≥ 65 years

PRE-EXISTING Adverse Prognostic Features

- Co-existing chronic illness

ADDITIONAL Adverse Prognostic Features

- Pulse oximetry <92% or PaO_2 <8.0kPa on any FiO_2 (if available)
- Bilateral or multi-lobar changes on CXR (if available)

ADVICE ONLY
Respiratory (9-5pm) *or* Medical Team on-call (5pm-9am) via switchboard

Note:
ASPIRATION PNEUMONIA should be treated with:

Non severe -
Amoxicillin + metronidazole

Severe –
IV amoxicillin + metronidazole + gentamicin (see gentamicin guideline)
(step down to oral co-amoxiclav)

CURB 65 SCORE 0 OR 1 (MILD)

CONSIDER HOME THERAPY IF:

- Oral route available
- Satisfactory social situation
- Consider the Early Supportive Discharge Service (9am-5pm) *OR* a Community Hospital bed

NO

YES

HOME THERAPY

- *1st CHOICE:* AMOXICILLIN 1g x3/day PO for 7 days
- *ALTERNATIVE:* DOXYCYCLINE 200mg on Day 1 then 100mg daily PO for 6 days
- Oral fluids, antipyretics, analgesia
- Smoking advice
- CAP PATIENT INFORMATION LEAFLET

FOLLOW-UP

- CXR at 6/52 if risk of lung cancer (e.g. smokers and/or age >50y)
- Consider further investigation for persistent symptoms/signs
- GP to ORGANISE FOLLOW-UP ARRANGEMENTS
- Influenza/pneumococcal vaccination for those at risk
- Smoking advice

CURB65 SCORE 0 OR 1 (WITH A CO-MORBIDITY OR CLINICAL CONCERN)

ANTIBIOTICS:

- *IF ORAL ROUTE AVAILABLE:* AMOXICILLIN 1g x3/day
- *IF IV REQUIRED:* AMOXICILLIN 1g x3/day

(PENICILLIN ALLERGY:
Doxycycline 200mg on day 1 then 100mg daily for 6 days.
If IV required use Clarithromycin 500mg x 2/day then step down to doxycycline)

- Treat for 7 days (IV/oral)

CURB65 SCORE 2 (MODERATE)

ANTIBIOTICS:

- *IF ORAL ROUTE AVAILABLE:* AMOXICILLIN 1g x3/day
- *IF IV REQUIRED:* AMOXICILLIN 1g x3/day

(PENICILLIN ALLERGY:
Doxycycline 200mg on day 1 then 100mg daily for 6 days.
If IV required use Clarithromycin 500mg x 2/day then step down to doxycycline)

- Treat for 7 days (IV/oral)

CURB65 SCORE 3 OR MORE (SEVERE)

ANTIBIOTICS: SEVERE

- *ALL SHOULD INITIALLY RECEIVE:*
  IV CO-AMOXICLAV 1.2g x3/day
  PLUS IV CLARITHROMYCIN 500mg x2/day or PO DOXYCYCLINE 100mg x2/day
  (PENICILLIN ALLERGY:
  IV Levofloxacin 500mg2/day)
- Step down to oral doxycycline 100mg x 2/day in all patients
- *ALL SHOULD HAVE:* Paired serology, throat swab/gargle for virology PCR, urinary legionella antigen tests
- Treat for at least 10 days (IV/oral)

PENICILLIN ALLERGY = RASH and/or ANAPHYLAXIS (see Penicillin Hypersensitivity Guideline)

ASSESS & RECORD PROGRESS EVERY 12 HOURS UNTIL STABLE

- *IF NOT IMPROVING:* RE-ASSESS SEVERITY, ANTIBIOTICS, OXYGENATION and IV FLUIDS. Repeat CXR (empyema), FBC & CRP, SPUTUM CULTURE and consider investigations for mycobacteria spp including TB. Discuss with Respiratory Team.
- *REFER TO ICU (Consultant/Senior SpR only) IF:* Persistent hypoxia (PaO_2<8.0kPa) despite high FiO_2 Progressive hypercapnia, pH <7.26, shock or depressed GCS (≤8)

CONSIDER IV to ORAL SWITCH IF:

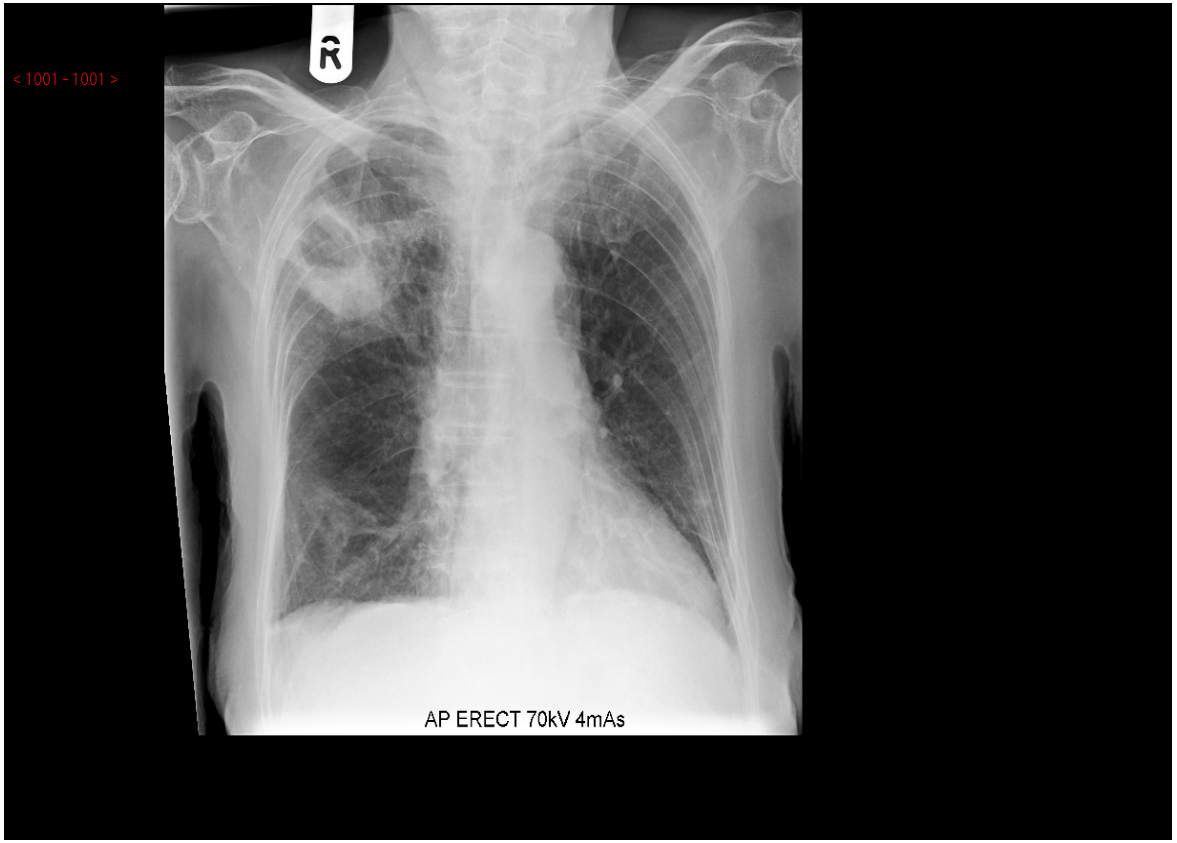
- Oral/GI route available
- Temperature <38°C for 24h
- SaO_2/PaO_2 ≥92%/8.0kPa (air)
- Pulse <100/minute
- RR < 30/minute
- BP ≥90/60 mmHg

➢ **CONSIDER DISCHARGE 24-HOURS AFTER SWITCH TO ORAL THERAPY**
➢ **GIVE ALL PATIENTS A CAP PATIENT INFORMATION LEAFLET**

Updated August 2008
Ref: BTS Guidelines 2004

Lung Abscess

- Common in immunosuppressed.
- Usually Staph Aureus or Klebsiella.

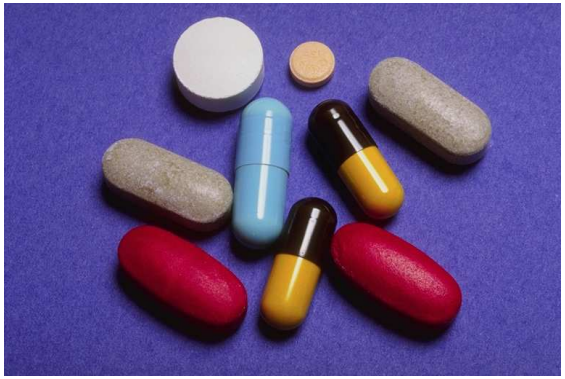


TB

Kills 3 million/yr
2 Billion people
UK:7000/Yr
UK:10% Drug Resistant

Tuberculosis

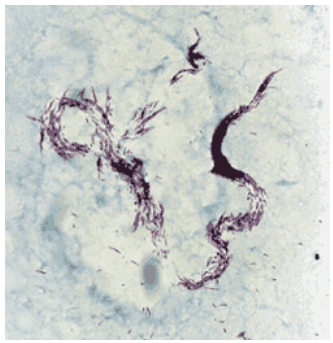
Primary
Post-Primary (Reactivation)



Remember:

HIV testing
Public Health
Prolonged Rx
Rx Side effects
Isolation
Rx compliance + Resistance

Commonest
Non pulmonary site



Diagnosis:
Relevant sample
AAFB
TB PCR
Immunological
CXR

computer.howstuffworks.com
www.irritable-bowel.net
www.santa.org.za
depts.washington.edu

Standard TB Management

- Rifater (rifampicin, isoniazid, pyrazinamide) and ethambutol for two months
- Rifinah (rifampicin, isoniazid) for four months
- Treatment periods can be prolonged or further medications added (streptomycin) if concerns about poor clinical improvement or drug resistance
- Productive cough and Smear positive – Need isolation.

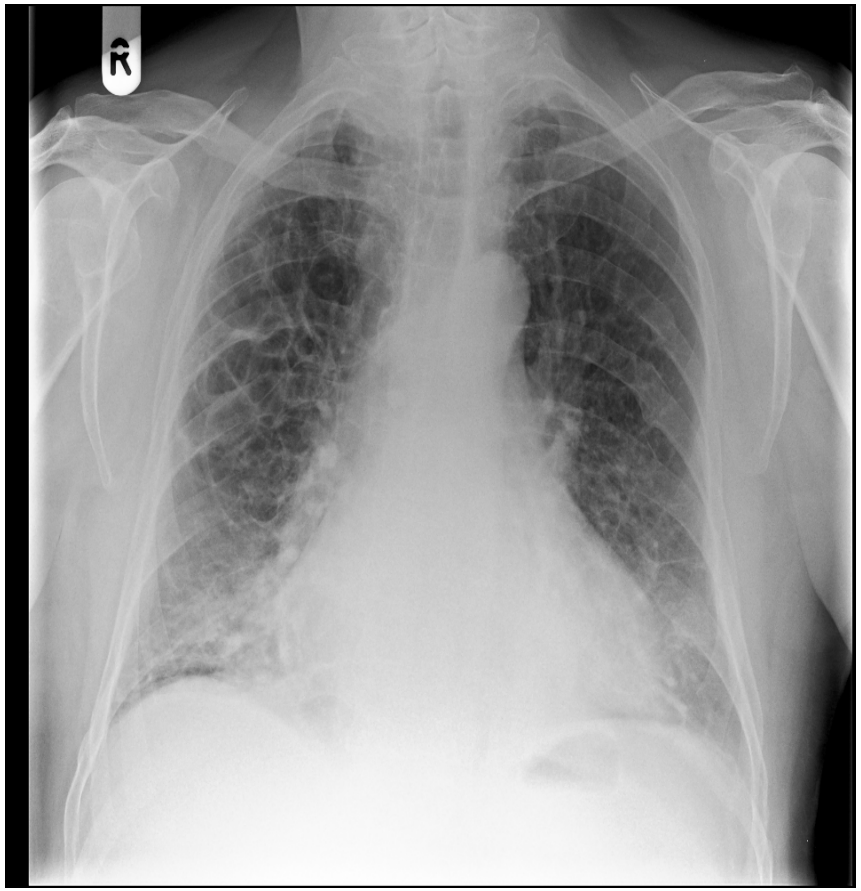
TB drugs side effects

- Rifampicin
  - Red Urine
  - Enzyme Inducer (increases clearance of hepatitic metabolise drugs)
- Isoniazid
  - Hepatitis
  - Peripheral Neuropathy (reduced incidence with pyridoxine)
- Pyrazinimide
  - Hepatic toxicity
  - GI upset
- Ethambutol
  - Optic Neuritis

Bronchiectasis

- Irreversible abnormal dilatation of one or more bronchi with chronic airway inflammation.
- Chronic sputum production
- Recurrent LRTIs and airflow obstruction.
- Causes are many
- Either one-off infectious insult or immune deficiency.
- Important to exclude cystic fibrosis.

Bronchiectasis



- CXR
- HRCT
- Sputum Micro
- Immunoglobulins

- Physio
- Broad spectrum abs
- Colonisation common
  - Staph
  - Pseudomonas

Cystic Fibrosis

- Autosomal Recessive
- Chromosome 7
- CFTR gene (essential for regulating salt and water movement)
- Thick viscous secretions
- ΔF508 (67%)
- Patients usually diagnosed in childhood. Genetic screening, failure to thrive

Main Issues

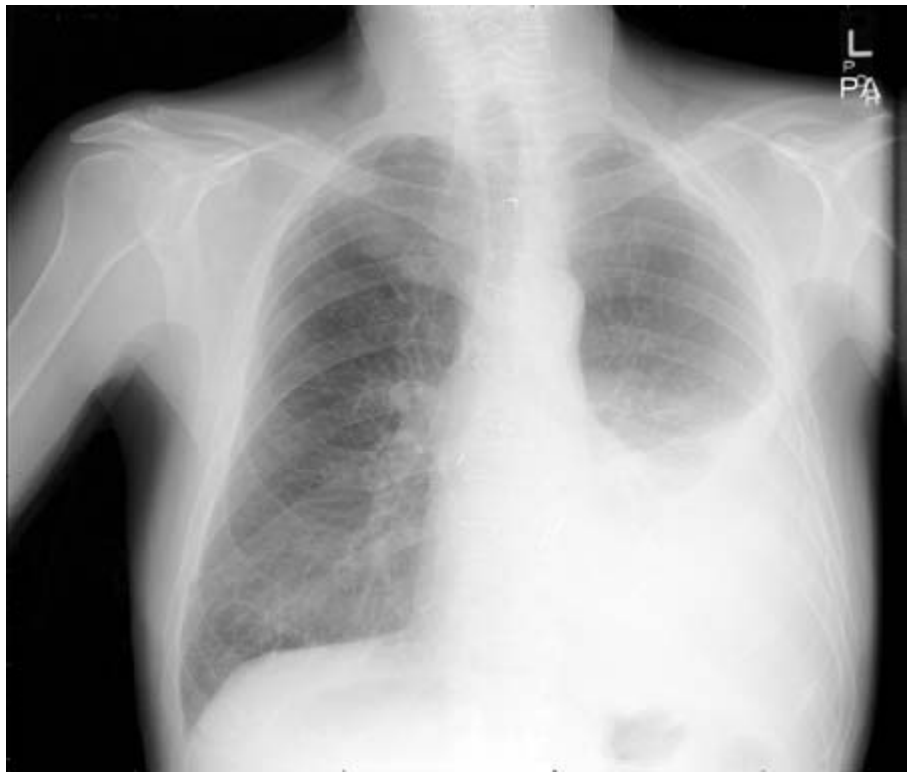
- Lung Disease
  - Maintain lung func, bacteria, transplant
- Nutrition
  - Pancreatic enzyme insufficiency
- GI
  - Screen for biliary cirrhosis, portal hypertension
- Endocrine
  - Diabetes
- Fertility Advice
- Psychological Advice

Treatment

- Lungs
  - Antibiotics at exacerbations and longterm
  - Recombinant Dnase (decreases sputum viscosity)
  - Immunisation
  - Physiotherapy
  - Steroids
  - Transplant
- GI
  - Pancreatic Enzyme Supplements (Creon)

Pleural Effusions

- Serous Fluid
- Blood
- Chyle
- Pus



Pleural Effusion

- **Transudate**
- Left Ventricular Failure
- Liver Cirrhosis
- **Exudate**
- Malignancy
- Parapneumonic
- Pulmonary Embolism

Investigations

- Cytology
- Bacteriology
- Biochemistry

- Pleural fluid protein >2.9 g/dL (29 g/L)

- Light's Criteria

- Any Questions?