

## Lung Examination for the Health Practitioner

Presented By: Jennifer D. Illes, D.C., M.S.

Mosby's Guide to Physical Examination (Seidel, H. 2007) 1

1

---

---

---

---

---

---

---

---

## Anatomy and Physiology

- Locating Findings on the Chest
  - To locate findings around the circumference of the chest, imagine a series of vertical lines

Mosby's Guide to Physical Examination (Seidel, H. 2007) 2

2

---

---

---

---

---

---

---

---

## Anatomy and Physiology

Mosby's Guide to Physical Examination (Seidel, H. 2007) 3

3

---

---

---

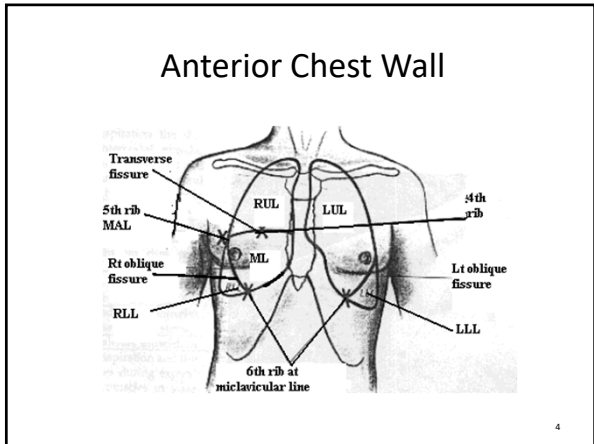
---

---

---

---

---



4

---

---

---

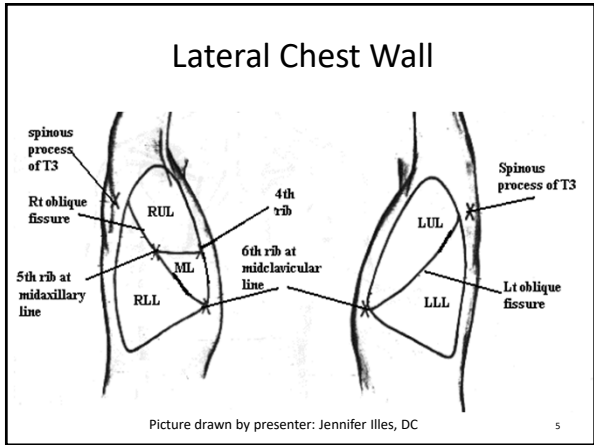
---

---

---

---

---



5

---

---

---

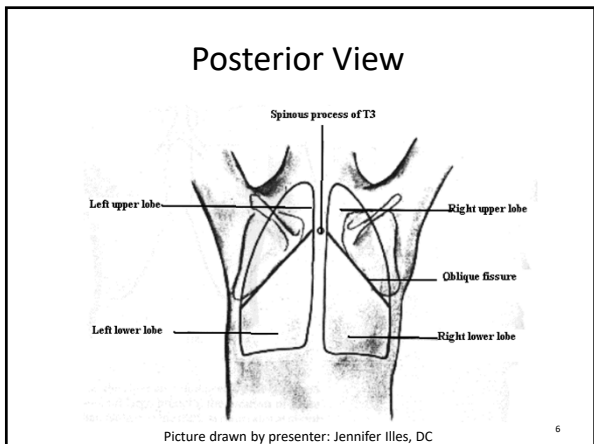
---

---

---

---

---



6

---

---

---

---

---

---

---

---

## CONTRIBUTERS OF RESPIRATION

- Controlled in the brainstem
- Mediated by muscles of respiration
  - Diaphragm and intercostals primary muscles
  - Accessory muscles of inspiration
    - SCM
    - Scalenes
    - Traps
- Expiration is a passive process from elastic recoil of lung and chest wall, with passive diaphragm relaxation

7

7

---

---

---

---

---

---

---

---

## The Health History

1. Chest Pain: Initial questions should be as broad as possible, such as “Do you have any discomfort or unpleasant feelings in your chest? Have the patient point to the location of the pain
  2. Coughing (onset, nature, sputum, pattern, etc)
  3. SOB (onset, nature, best position, severity, etc.)
- Get past medical hx, and family hx

8

8

---

---

---

---

---

---

---

---

## The Health History

- Hemoptysis
  - Hemoptysis is the coughing up of blood from the lungs; it may vary from blood-streaked phlegm to frank blood
  - Ask the patient to describe the volume of blood produced as well as other sputum attributes
  - Try to confirm the source of the bleeding by history and examination before using the term “hemoptysis.” Blood may also originate from the mouth, pharynx, or gastrointestinal tract

9

9

---

---

---

---

---

---

---

---

## PERSONAL AND SOCIAL HX

- Employment = any work hazards (exposure to chemicals, asbestos), allergens, emotional stress
- Home environment = new carpets, AC, heating
- Exposure to any respiratory infections (ex. TB)
- Travel exposures
- Use of drugs (cocaine can cause CA spasm, etc)
- Exercise tolerance
- Hobbies: owning pigeons & parrots; photography
- Tobacco use

10

10

---

---

---

---

---

---

---

---

## Techniques of Examination

- In General
  - Examine the posterior and lateral thorax while the patient is sitting arms folding in front
  - Anterior examination
  - Compare one side of the thorax and lungs with the other, so the patient serves as his or her own control
  - Proceed in an orderly fashion: inspect, palpate, percuss, and auscultate

11

11

---

---

---

---

---

---

---

---

## Techniques of Examination

- Initial Survey of Respiration and the Thorax
  - Observe the rate, rhythm, depth, and effort of breathing
  - Inspect for any signs of respiratory difficulty
    - Assess the patient's color
    - Listen to the patient's breathing
    - Inspect the patient's neck
  - Observe the shape of the chest

12

12

---

---

---

---

---

---


---

---

### Inspection

#### Chest deformities

- **Barrel chest:**
  - Ribs angled more horizontally (usually at 45°)
  - Normal: .8 / 1.0 ratio of AP to Lateral measure
  - Associated with emphysema and lung hyperinflation.



Mosby's Guide to Physical Examination (Seidel, H. 2007) 13

13

---

---

---

---

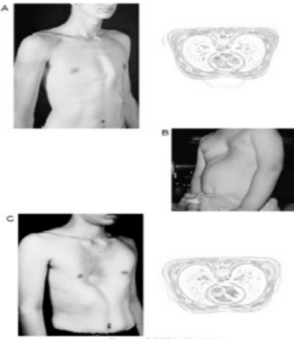
---

---

---

---

### Observation



- Pectus Carinatum - (Pigeon Chest)
- Pectus Excavatum (funnel chest).
- Bottom picture is same patient 14 years latter.

Copyright © 2002 by Mosby, Inc. 14

14

---

---

---

---

---

---

---

---

### NORMAL RESPIRATORY RATES

- Infant 30-60
- Toddler 24-40
- Preschooler 22-34
- School-age child 18-30
- Adolescent 12-16
- Adult 12-20

- Bradypnea: rate less than 12 per minute
- Tachypnea: rate greater than 20 per minute

15

15

---

---

---

---

---

---

---

---

## 10 P's of Dyspnea

- P = Pneumonia
- P = Pneumothorax
- P = Pulmonary Constriction/Asthma
- P = Peanut (foreign body)
- P = Pulmonary Embolus
- P = Pump failure (heart failure)
- P = Peek seekers (high altitudes)
- P = Poisons
- P = Psychogenic
- P = Pericardial Tamponade

16

16

---

---

---

---

---

---

---

---

## Bad Breath ???

- Sweet and fruity – diabetic ketoacidosis
- Musty fish, clover – hepatic failure, portal vein thrombosis
- Foul, feculent – Intestinal blockage, diverticulum
- Foul – URI, nasal pathology, foreign body
- Cinnamon – pulmonary TB



17

17

---

---

---

---

---

---

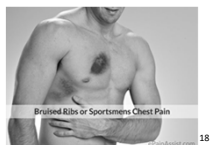
---

---

## PALPATION

- Identify tender areas
  - Bruising with rib fracture
- Observe for appropriate chest wall expansion
  - Test chest expansion by placing your thumbs at the level of the 10th ribs, with your fingers loosely grasping and parallel to the lateral rib cage. Watch the distance between your thumbs as they move apart during inspiration

Check supra & infraclavicular nodes, and axillary nodes.



18

18

---

---

---

---

---

---

---

---

## Palpation

### • Chest expansion

- Stand behind patient
- Fingers wrap around lateral chest
- Thumbs medially pull in skin slack
- Instruct patient to deeply inhale
- Look for symmetrical expansion and thoracic cage movement



Mosby's Guide to Physical Examination (Seidel, H. 2007)

19

19

---

---

---

---

---

---

---

---

## TRACHEA PALPATION

- Begin by establishing whether the trachea is in the midline.
- Place the thumb and index fingers of the examining hand on the lateral aspects of the trachea in the suprasternal notch and palpate the relative distances from the fingers to the borders of the sternocleidomastoid muscles.
- Normally, the trachea will be the midline and the distances will be equal.
- Also, check the SCM mm.

20

20

---

---

---

---

---

---

---

---

## TRACHEA

- May be displaced by:
- Thyroid enlargement
- Pleural effusion/fibrosis
- Pneumothorax
- Tumor
- Atelectasis



Image Internet resource accessed 12/13: <http://meded.ucsd.edu/clinicalmed/head.htm>

21

---

---

---

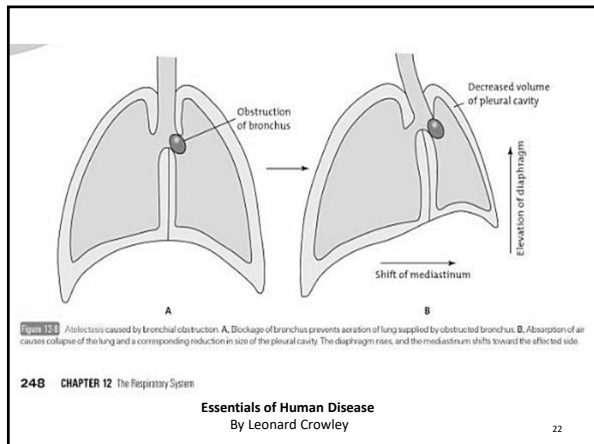
---

---

---

---

---



22

---

---

---

---

---

---

---

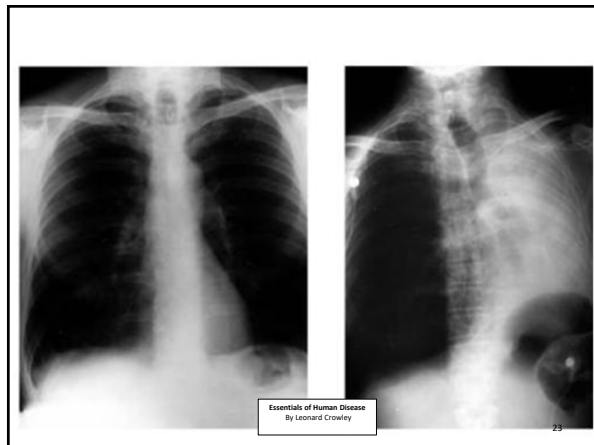
---

---

---

---

---



23

---

---

---

---

---

---

---

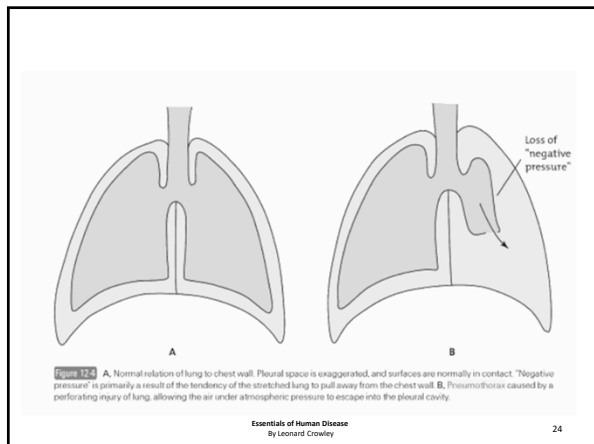
---

---

---

---

---



24

---

---

---

---

---

---

---

---

---

---


---

---



**Palpation**  
Fremitus

- Instruct patient to repeat 'Toy Boat' or 'Blue Moon'



**Increased Fremitus**

- Lung Consolidation

**Decreased Fremitus**

- Excess air in lungs
- Collapsed Lung (Pneumothorax)

Mosby's Guide to Physical Examination (Seidel, H. 2007) 25

---

---

---

---

---

---

---

---

25

**TACTILE FREMITUS**

- Normal finding is a mild purr-like sensation.
  - **Increased** tactile fremitus occurs in conditions where solid conducts vibrations better than air. Ex. Pneumonia, tumor, pulmonary fibrosis (also fluids)
  - **Decreased** tactile fremitus occurs when there is increased distance that sound has to travel before it reaches chest wall. Ex. Pleural Effusion, pneumothorax, COPD.

26

---

---

---

---

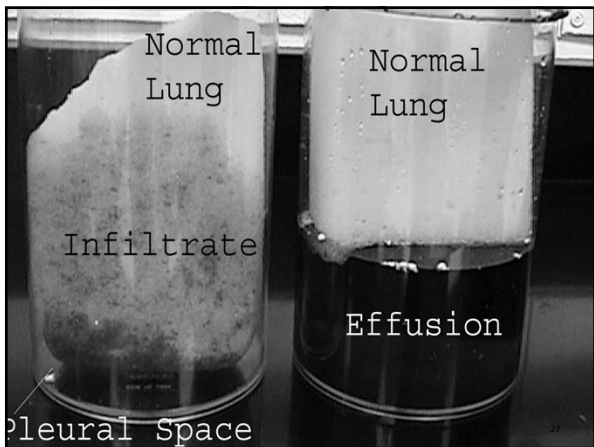
---

---

---

---

26




---

---

---

---

---

---

---

---

27

## PERCUSSION

- Examination of the Chest
  - Percussion:
    - Percussion helps establish whether the underlying tissues (5 to 7 cm deep) are air-filled, fluid-filled, or solid
    - Estimate the extent of diaphragmatic excursion
- Always percuss symmetrically on chest wall
  - Hyperextend middle finger of either hand and press against chest wall
  - Strike with flexed middle finger of opposite hand

28

28

---

---

---

---

---

---

---

---



## Percussion & Auscultation

- Compare areas bilaterally, using one side as the control for the other.
- Arms folded in front to move scapulas out of way
- Areas: At least
  - Anterior: 4 or 5
  - Laterally: 2 -4
  - Posterior: 5

Mosby's Guide to Physical Examination (Seidel, H. 2007)

29

29

---

---

---

---

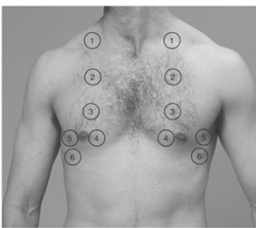
---

---

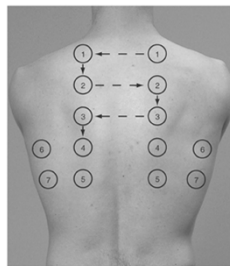
---

---

## Points for Percussion and Auscultation



Locations for Percussion and Auscultation



Locations for Percussion and Auscultation

Mosby's Guide to Physical Examination (Seidel, H. 2007)

30

30

---

---

---

---

---

---

---

---

## PERCUSSION SOUNDS

- **Dullness** replaces resonance when fluid or solid tissue replaces air containing lung
  - PNA
  - Asthma
  - Pleural Effusions
  - Hemothorax
  - Tumor
- **Unilateral Hyperresonance**
  - Pneumothorax
- **Generalized Hyperresonance**
  - COPD
  - Emphysema
  - Pneumothorax (??)

31

31

---

---

---

---

---

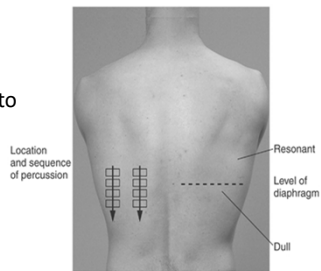
---

---

---

## Diaphragmatic Excursion

- Normal = 3-5 or 6cm
- Listening for resonant to dull sounds
- 2 measurements



Diaphragmatic Excursion  
Copyright 2007 Lippincott Williams & Wilkins. Individual Rights Reserved. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without permission in writing from the copyright owner.

Mosby's Guide to Physical Examination (Seidel, H. 2007)

32

---

---

---

---

---

---

---

---

## Techniques of Examination

- Examination of the Posterior Chest
  - Auscultation:
    - Listen to the breath sounds with the diaphragm of a stethoscope after instructing the patient to breathe deeply through an open mouth
    - Use the pattern suggested for percussion, moving from one side to the other and comparing symmetric areas of the lungs
    - Listen to at least one full breath in each location
    - Clinical pearl for CHF (start at bases)

33

33

---

---

---

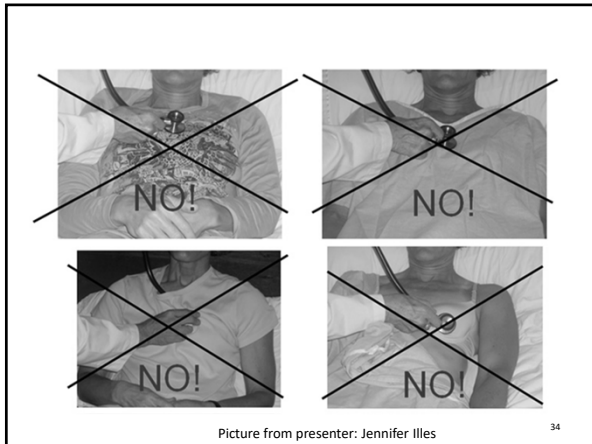
---

---

---

---

---



34

---

---

---

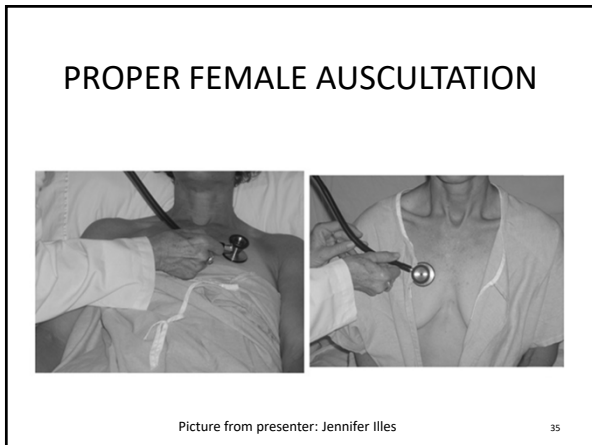
---

---

---

---

---



35

---

---

---

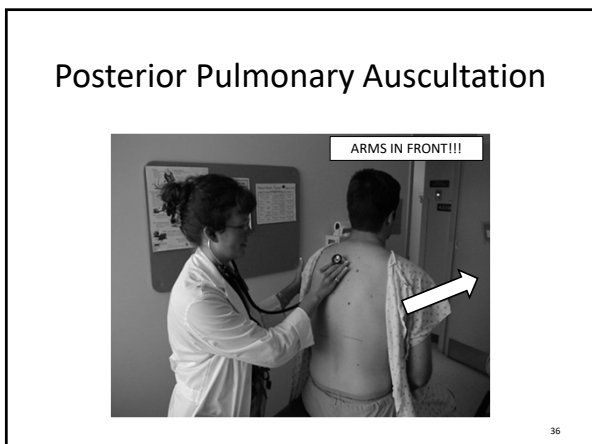
---

---

---

---

---



36

---

---

---

---

---

---

---

---

## NORMAL BREATH SOUNDS

- Created by turbulent air flow
- Inspiration
  - Air moves to smaller airways hitting walls
  - More turbulence, Increased sound
- Expiration
  - Air moves toward larger airways
  - Less turbulence, Decreased sound
- Normal breath sounds
  - Loudest during inspiration, softest during expiration

37

37

---

---

---

---

---

---

---

---

## Techniques of Examination

- Examination of the Posterior Chest
  - Auscultation:
    - Normal Breath Sounds:
      - **Bronchial** – louder and higher in pitch; heard over the manubrium (exp > insp sounds)
      - **Bronchovesicular** – intermediate intensity and pitch; usually heard over the 1st and 2nd interspaces (insp = exp sound duration)
      - **Vesicular** – soft and low pitched; usually heard over most of both lungs (insp>exp sounds)
    - Adventitious (Added) sounds:
      - **Crackles/Rales, Wheezes, Pleural Rub, Stridor and Rhonchi**

38

38

---

---

---

---

---

---

---

---

## Crackles

- Discontinuous, intermittent, nonmusical, brief sounds
- Heard more commonly with end of inspiration
- Classified as fine or coarse
- Crackles caused by air moving through secretions and collapsed alveoli (pops the alveoli open)
- Associated conditions
  - pulmonary edema, early CHF, pneumonia

39

39

---

---

---

---

---

---

---

---

## Wheezing

- Continuous, high pitched, musical sound, longer than crackles
- Hissing quality, heard > with expiration, however, can be heard on inspiration
- Produced when air flows through narrowed airways
- Associated conditions
  - asthma, COPD, bronchitis

40

40

---

---

---

---

---

---

---

---

## STRIDOR

- Inspiratory musical wheeze
- \*only heard on inspiration
- Loudest over trachea
- Suggests obstructed trachea or larynx
- Medical emergency requiring immediate attention
- Associated condition
  - inhaled foreign body
  - Croup

- **OFTEN A MEDICAL ER**

41

41

---

---

---

---

---

---

---

---

## Rhonchi

- Similar to wheezes, continuous “snore”
- Low pitched, snoring or rattling quality, continuous, musical sounds
- Implies obstruction of larger airways by secretions
  - \*seen usually in exp when air being forced through\*
- Associated condition
  - acute bronchitis

Rhonchi tend to disappear after coughing while crackles don't

42

42

---

---

---

---

---

---

---

---

## PLEURAL RUB

- Differentiate from cardiac origin: have Pt. hold breath- if **continues Cardiac** origin, if **stops-Lung** origin.
- Discontinuous or continuous brushing sounds
- Dry, crackly, low-pitched
- Heard during both inspiratory and expiratory phases
- Occurs when pleural surfaces are inflamed and rub against each other
- Associated conditions
  - pleural effusion, pleurisy, pericarditis

43

43

---

---

---

---

---

---

---

---

## TRANSMITTED VOICE SOUNDS

- If abnormally located bronchial or bronchovesicular breath sounds assess transmitted voice sounds with stethoscope

### **BRONCOPHONY: "99"**

- NL. Muffled sound
- Abnormal: hear, clear loud "99" (consolidation)

### **WHISPERED PECTORILOQUAY**

- Whisper "99"
- Normal-Don't hear or very faint
- Abnormal hear "99"

### **EGOPHONY** Say "E"

- Normal- hear "E", Abnormal-hear "A"

- Increased transmission of voice sounds suggests that air filled lung has become airless

44

44

---

---

---

---

---

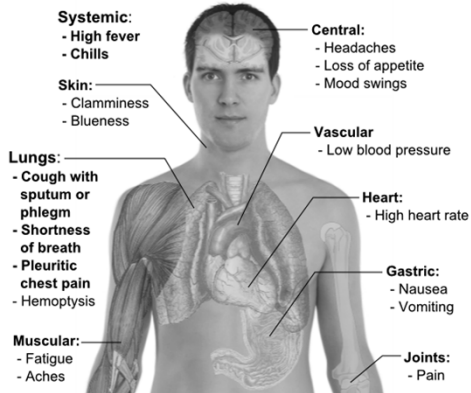
---

---

---

Main symptoms of infectious

## Pneumonia



45

45

---

---

---

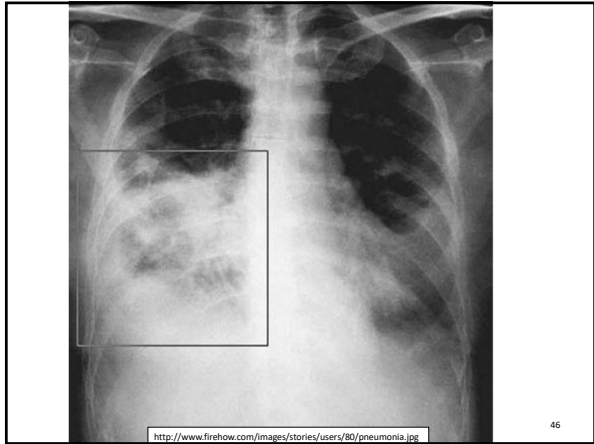
---

---

---

---

---



46

---

---

---

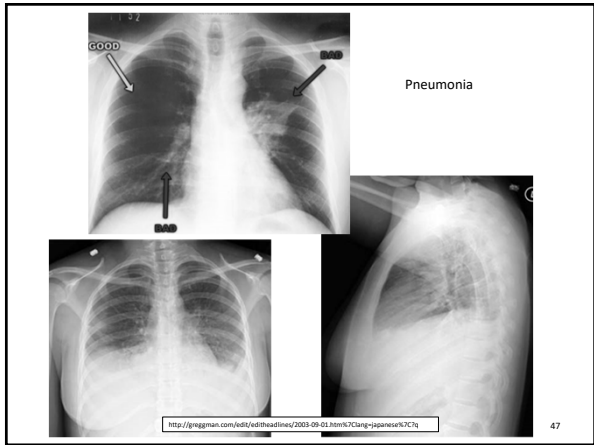
---

---

---

---

---



47

---

---

---

---

---

---

---

---

**Clinical Diagnosis: CXR**

- Demonstrable infiltrate by CXR or other imaging technique
  - Establish Dx and presence of complications (pleural effusion, multilobar disease)
  - May not be possible in some outpatient settings
  - CXR: classically thought of as the gold standard

48

---

---

---

---

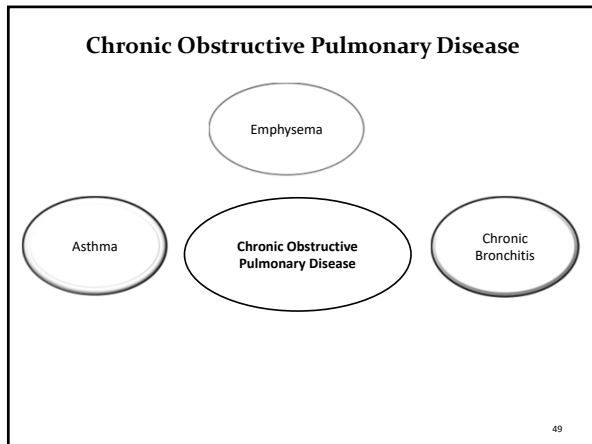
---

---

---

---





49

---

---

---

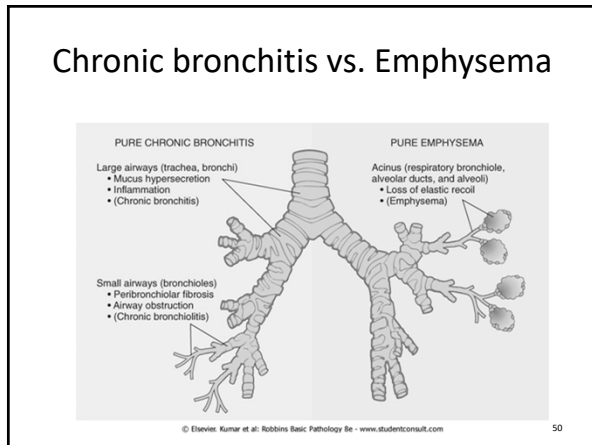
---

---

---

---

---



50

---

---

---

---

---

---

---

---

### Emphysema and Chronic Bronchitis

	Predominant Bronchitis	Predominant Emphysema
Appearance	“Blue bloaters”	“Pink Puffers”
Age	40-45	50-75
Dyspnea	Mild, late	Severe, early
Cough	Early, copious sputum	Late, scanty sputum
Infection	Common	Occasional
Respiratory Insufficiency	Repeated	Terminal
Cor pulmonale	Common	Rare, terminal
Airway resistance	Increased	Normal or slightly increased
Elastic recoil	Normal	Low
Chest radiography	Prominent vessels, large heart	Hyperinflation, small heart

51

51

---

---

---

---

---

---

---

---



52

---

---

---

---

---

---

---

---