

Patient Assessment and Physical Examination

Why do we have two eyes, two ears and only one mouth?

So that we can see more, hear more and talk less.

Medical Chart Review

- Allergies
- Code Status (DNR, Chem Code only, etc)
- Chief Complaint or History of Present Illness
- Patient history and physical (H&P)
- Past Medical and Surgical History
- Social and Family History
- Diagnosis
- Current orders (medicine, diet, activity, ect)
- Physician Progress Notes

Verbal Interview

- Patient orientation to people, place and time
- Ability to answer questions and follow simple verbal commands appropriately

Visual Inspection (Physical Appearance)

- Skin: Note color (cyanosis, flushed, pale, jaundiced), diaphoresis, flushed, pallor, rash
- Work of Breathing (accessory muscle use, retractions, nasal flaring, tachypnea, tripodding)
- Chest (shape and symmetry)
- Neck: tracheal shifts, JVD
- Extremities: Note clubbing, edema, ecchymosis, “skin tears”
- Discomfort (anxiety, pain)
- Obtunded, lethargic, somnolent
- Malnourish or obese

Pulmonary Exam

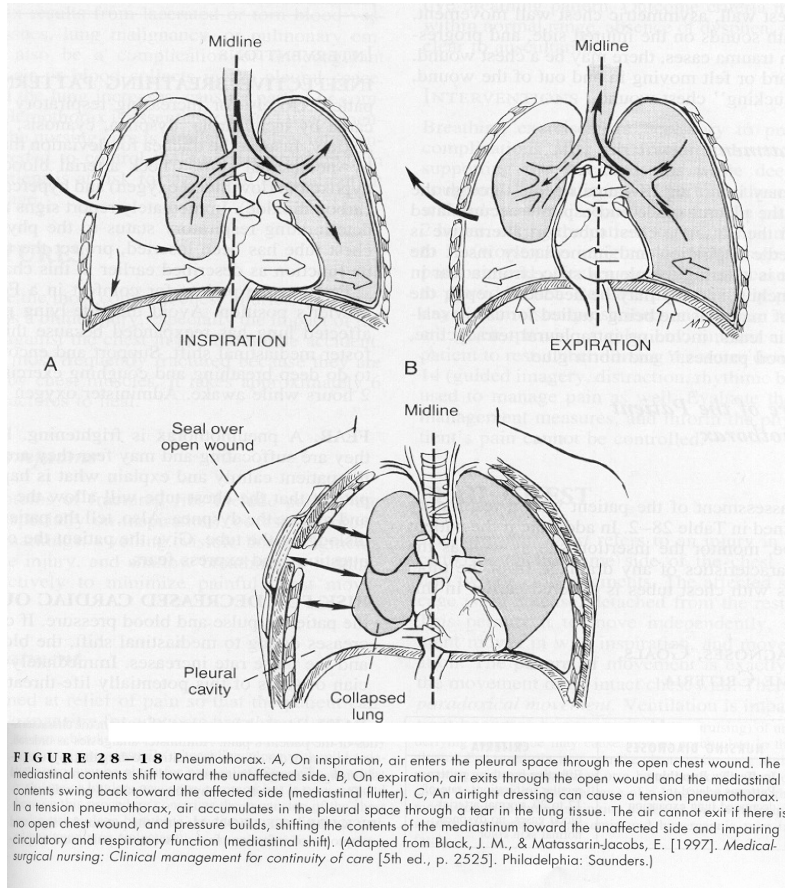
- Inspection (chest shape and symmetry)
- Palpation
- Percussion
- Auscultation—in GI exam, you **auscultate before you palpate**—if you palpate first, you’ll create bowel sounds (thus you won’t know if they were absent to begin with).

Neck Inspection

Tracheal Shifts

- Shifting *toward* a lung means that lung has lost volume → bronchial obstruction
 - Shifting *away* from a lung means there’s something in excess on that side—could be fluid or air → pneumothorax (PTX), pleural effusion
- Must determine why a lung collapsed—excess air?
- Collapse because of pneumothorax → shift away
- Collapsed lung because you can’t get air into it → shift toward lung
- Side with PTX will be dark on CXR because there is no lung tissue in there
 - Massive PTX on **right** side → everything is shifted over to the **left** side of the body
 - If you ask this person to say “99,” you will get no vocal fremitus on **right** side
 - If you were to percuss on **right** side, it would be hyper-resonant
 - Breath sounds absent on **right** side and present on left side

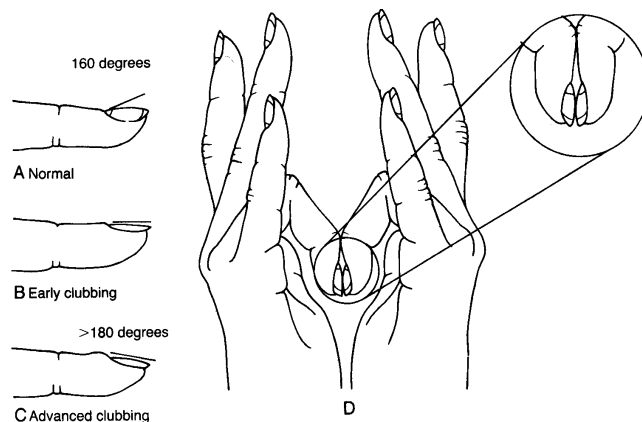
- If you wait for pt to get x-ray this pt will die on you because they are only using the left lung to oxygenate themselves – Correction = chest tube insertion



Extremities Inspection

Clubbing – loss of angle between nail and terminal phalanx

- Look at the nail bed; the skin is a little higher and the nail is a little lower
- Have patient put their fingers’ nail bed to nail bed—you should be able to see light thru a space b/t the nail beds → **no clubbing**
- If you don’t see light between the 2 nail beds, then there’s **clubbing**.



Picture: Angel b/t nail bed and terminal phalanx is lost—you would *not* see light coming through the nail bed

Causes:

- **Bronchogenic cancer is #1**
- Chronic pulmonary disease

- Cystic fibrosis
- Bronchiectasis
- COPD (less common so look for Ca [abbreviation for cancer?] or Bronchiectasis)—you'll see more COPD pts across the bridge, so you'll naturally want to make the association of clubbing occurring frequently in COPD, but don't mistake COPD as the most common cause of clubbing.
- Hepatic fibrosis

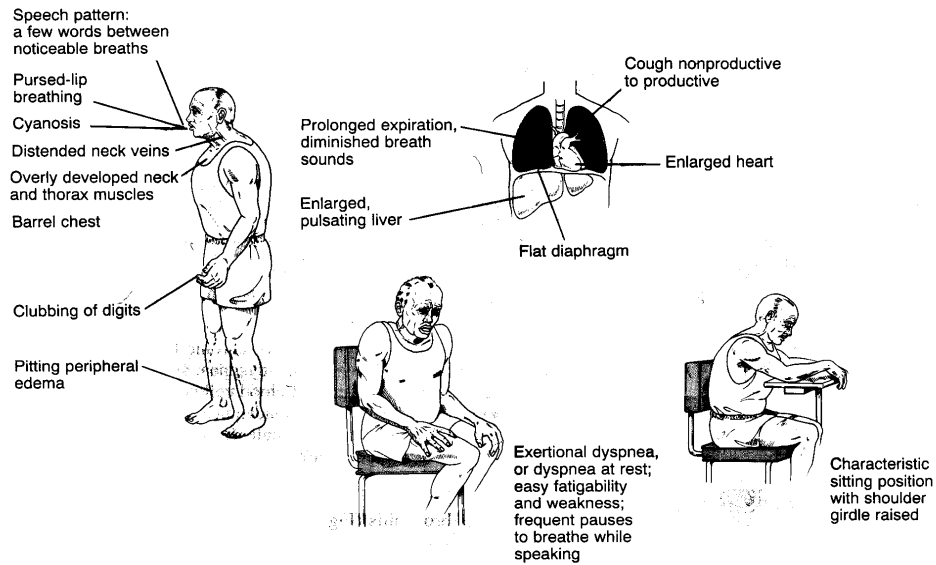


FIGURE 29 – 6 Signs and symptoms of chronic obstructive pulmonary disease. (Modified from Black, J. M., & Matassarin-Jacobs, E. [1993]. *Luckmann and Sorensen's medical-surgical nursing: A psychophysiologic approach* [4th ed., p. 1028]. Philadelphia: Saunders.)

Chest Inspection

- Focus on the landmarks: sternal line, midclavicular line, etc
- Look for use of accessory muscles of respiration—i.e. intercostal retraction, elevation of shoulders, straining of neck muscles to help lift the clavicle.



FIGURE 29 – 5 Patient with chronic bronchitis and all the classic findings of the "blue bloater." Note the elevation of the shoulders and the tense muscles. (From Kersten, L. D. [1989]. *Comprehensive respiratory nursing* [p. 109]. Philadelphia: Saunders.)

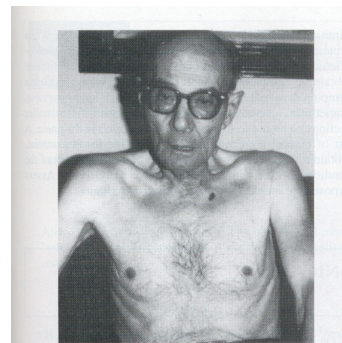


FIGURE 29 – 7 Patient with emphysema and all the classic findings of the "pink puffer." Note the use of accessory muscles in the neck and chest. (From Kersten, L. D. [1989]. *Comprehensive respiratory nursing* [p. 109]. Philadelphia: Saunders.)

PALPATION

Vocal fremitus - transmitted voice vibrations

Procedure:

- Have pt say “99.” When pt says “99” you’re feeling for vocal fremitus
- Palpate intensity of vibration on chest wall—use ulnar surface of hands and use finger tips
- If you curve and cup your hand, you form a sound chamber and get more vibrations—good thing

Increased intensity → **consolidation**

Decreased intensity—is it decreased bilaterally or unilaterally?

- Unilateral/localized → **PTX, pleural effusion, bronchial obstruction** (w/lung collapsed)
- Bilateral/diffuse → **COPD, bilateral pleural effusion**
- Picture the lung only half filled w/air
- If you have a pleural effusion (lots of fluid between the chest wall and the lungs), don’t just say fluid in the lungs
- Bilateral pleural effusion may also make you think of malignancy



SPECIMEN 1: Normal Lung - This is a clean lung. The black specks are from having breathed smoggy air. Compare the smooth surface of this lung with the rough, ugly surface of the lung with emphysema.

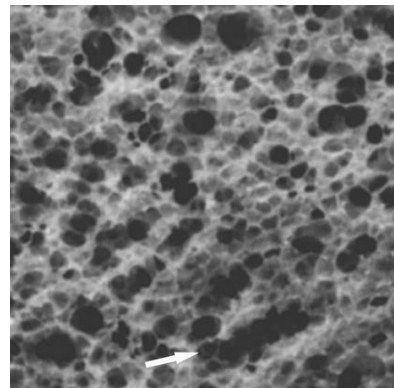


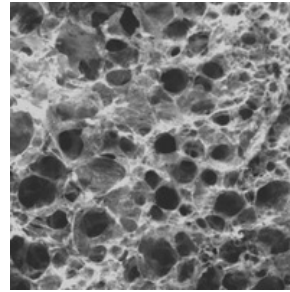
Photo micrograph of a normal lung parenchyma. The alveoli are of normal size



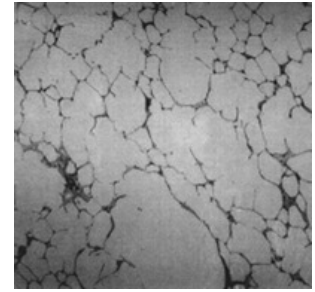
SPECIMEN 2: Lung with Emphysema - This lung shows damage caused by smoking. Note the hollow bubbles in what was once healthy lung tissue.



SPECIMEN 3: Emphysema Close-up - This is a close-up view of what air sacs damaged by emphysema look like. Are your cigarettes worth this kind of permanent damage to your lungs?



Photomicrograph of the centrilobular emphysema



- If lung is destroyed in COPD, there's more air in the lung but also **less lung tissue participating** → **decreased breath sounds** (due to decr lung tissue)

PERCUSSION

- Put one finger on pt's chest and tap that finger
- Focus on the releasing phase: tap and release—don't let your tapping finger sit there

Resonance – Normal Lungs, when percussed, will have a resonant sound due to the presence of air.

Dullness/Flat = increased fluid or soft tissue w/in chest cavity

→ Consolidation, pleural effusion, bronchial obstruction (w/lung collapse)

Hyper-resonance, Tympany = increased air w/in chest cavity (Tympany is heard if the chest contains free air (pneumothorax) or the abdomen is distended with gas.

→ Sounds like there is more air in the chest

→ Pneumothorax (PTX), obstructive airway disease (COPD & asthma)

AUSCULTATION

Breath sounds

Types:

- **Vesicular** (normal sounds)—sounds like Darth Vaders
 - Intensity - Soft, low-pitched
 - Peripheral lung areas
- **Bronchovesicular** – qualities of both vesicular and bronchial
 - Intensity – Moderate, moderate –pitched
 - Around upper part of sternum, between scapulae
- **Tracheal** – heard over trachea
 - Intensity – loud, High-pitched
- **Bronchial**
 - Loud, high-pitched, tubular
 - Heard in areas of consolidation
 - Expiratory longer than inspiratory

Intensity: Normal vs decreased (distant)

- Decreased → PTX (BS may even be absent), pleural effusion, COPD/asthma

Transmitted sounds

- **Egophony** – “eee” sounds like “aaa”
 - Transmitted voice has a nasal/muffled quality

- If patient sounds like “aaa” when you tell them to say “eee” → consolidation
 - ****Heard in consolidation & collapsed lung above pleural effusion****
- **Bronchophony**
 - Transmitted normal voice is increased in intensity—everything sounds louder → **consolidation**
 - **Whispered Pectoriloquy**
 - Transmitted whisper is increased in intensity
 - Ask patient to whisper. If it sounds like they are speaking normally → **consolidation**
 - Basically, this is the same thing as bronchophony, but patient is whispering instead of speaking

Adventitious sounds – abnormal lung sounds produced by the movement of air in the lungs

- **Crackles**
 - Crackling, popping sound—sounds like Velcro
 - Opening of collapsed alveoli
 - Doesn't mean there is fluid, just means that alveoli are collapsing; same as rales and crepitations (“creps”)
 - Heard in atelectasis, consolidation, fibrosis, regional collapse
- **Rubs - when you hear a friction rub, it can be CV or pleural**
 - Grating sound
 - 2 components: (1) Inspiration (2) Expiration
 - Fibrosis of pleura: PE w/ infarction
 - A **pleural friction rub has only 2 components**
 - **Pericardial friction rub has 3 components (early and late diastole and then systole)**
- **Wheeze**
 - Wheeze and rhonchi are basically the same sound; the difference is “the size of the piping”
 - Wheeze comes from **small airways** (bronchi) → **high-pitch sound**
 - Heard with narrowed bronchus—tends to be due to bronchospasm
 - Heard in expiration or inspiration or both
- **Rhonchi**
 - Comes from **large airways** → slightly **lower-pitched sounds**
 - Large airways tend *not* to spasm (because of cartilage)
 - Usually there is mucus in the airway—this is what you hear, tends to clear after suctioning or cough (most of the time)
 - COPD (bronchitis), Consolidation

Pulmonary Exam—summary

- **Palpation** – feel for **Vocal Fremitus** – refers to the vibrations created by the vocal cords during phonation. These vibrations are transmitted down the tracheobronchial tree and through the alveoli to the chest wall. When these vibrations are felt on the chest wall, they are called **tactile fremitus**.
 - Increased → consolidation
 - Decreased → pleural effusion
- **Percussion** – Resonance
 - Hyperresonant → COPD and Pneumothorax
 - Resonant → normal
 - Dull → consolidation and pleural effusion
- **Auscultation** – Breath sounds
 - Vesicular (normal) vs. Bronchial (consolidation)
 - Adventitious sounds (wheezes, rhochi, crackles)

Pulmonary Exam Comparative Analysis					
	Hx	Inspection	Pal	Per	Ausc
Pneumonia	Progress		↑ VFUni	DullUni	CracklesUni
PTX	Sudden	TS aw	↓ VFUni	↑ ResUni	↓ BSUni
PE	Sudden				
CHF	Progress	↑ JVP	↑ VFDiff	DullDiff	CracklesDiff
Effusion	Progress	TS aw (not always)	↓ VFUni	DullUni	↓ BSUni
COPD	Episodic	Barrel	↓ VFDiff	↑ ResDiff	↓ BSDiff
ILD	Progress				CracklesDiff
Obx	Sudden	TS to	↓ VFUni		

This chart summarizes everything we've talked about—abbreviations are bellow

- Hx = history
- Insp = inspection
- Barrel = barrel chest
- Uni = unilateral
- VF = vocal fremitus
- Res = resonance
- BS = breath sounds
- Diff = diffuse
- TSaw = trachial shift away
- TSto = trachial shift toward
- ILD = interstitial lung dz
- Obx = obstruction

Note how you distinguish conditions

PTX is rarely bilateral

Case 1 – A 60-year-old man comes to the emergency department after sustaining facial injuries in a fight. He is mouth breathing, apparently due to his injuries, but he denies any respiratory problems. He is **known to be alcohol- and drug-dependent**. He has **smoked** one to two packs of cigarettes per day for 35 years. There is **dullness to percussion, increased vocal fremitus, and bronchial breath sounds, and rales over the right upper lobe**.

- Which of the following is the most likely diagnosis?
 - A. Pneumothorax – **Dec VF, inc res**
 - B. Pleural effusion
 - D. Pulmonary embolism
 - D. Sarcoidosis
 - E. Tuberculosis**
- Dullness to percussion—could be consolidation or pleural effusion
- Increased vocal fremitus → consolidation
- Bronchial breath sounds → consolidation (because you don't hear air going thru the alveoli because they are filled)
- TB is the only process here that causes consolidation
- Rales over the R upper lobe → TB
- Note: alcohol and smoking can also put someone at risk for PTX or pleural effusion

Case 2 – A 67-year-old man presents to the physician's office with **shortness of breath, pleuritic chest pain, mild coughing** without sputum production, and exertional breathlessness. These symptoms have lasted 12 days. The respiratory rate is 24 /min. The trachea is midline. There is **dullness to percussion, decreased fremitus, and decreased breath sounds** in the lower one third of the left side of the chest. Cardiac examination shows normal heart sounds, and no murmur. There is no peripheral edema. Chest x-ray is ordered.

- Which of the following is the most likely cause of the lung findings on physical examination?
 - A. Pulmonary embolism
 - B. Alveolar consolidation (infiltrate from bacterial pneumonia)
 - C. Pleural effusion**
 - D. Bronchial obstruction
 - E. Pneumothorax
- Normal respiratory rate = 12 breaths/min
- Dullness to percussion, Decreased breath sounds, decr fremitus → pleural effusion
- Note: COPD does NOT present w/dullness to percussion
- If the pleura is inflamed, there is pain upon movement—breathing, turning, coughing, etc.
- Angina doesn't present with non exertional movement

Case 3 – A **21-year-old man** arrives at the urgent care center with right-sided pleuritic chest pain. Two days earlier, he had noticed the onset of the chest pain, very mild shortness of breath, and occasional dry cough. He has had no fever, sweating, or weight loss. He is a college student and has **smoked 1 pack of cigarettes a day for the past 5 years**. The patient appears well and is in no distress. He is 188 cm (**74 in**) tall and weighs 70 kg (**155 lb**), for a **body mass index of 20**. The **respiratory rate is 26 /min** and shallow. The trachea is midline. Physical examination of the chest shows **decreased vocal fremitus, and diminished breath sounds throughout most of the right chest**, which is also **hyperresonant to percussion**. There is **no clubbing, cyanosis, or edema of the extremities**.

- Which of the following is the most likely diagnosis?
 - A. Bronchogenic Cancer
 - B. Acute pulmonary embolism
 - C. Spontaneous pneumothorax**
 - D. Bacterial pneumonia with Mycoplasma
 - E. Viral upper respiratory tract infection
- E is an attractor—Things in the upper respiratory tract do *not* yield lung findings
- Decreased VF → pleural effusion
- There's an empty chest cavity (lung collapsed) → diminished breath sounds on percussion & hyperresonance
- COPD has to be diffuse, but here it is right chest
- COPD is unlikely in a young person—need 10-15 years for it to develop

Case 4 – A 65-year-old male retired teacher presents with **dyspnea on exertion** that **began 15 months ago** and has **gradually progressed** to the point that he is unable to perform his usual activities. He **has never smoked** and has had no known exposure to environmental respiratory hazards. On physical examination he has **clubbing, mild cyanosis,** and **fine inspiratory crackles.**

- Which of the following is the **most likely** diagnosis?
 - A. Chronic pulmonary embolism
 - B. Idiopathic pulmonary fibrosis (IPF)**
 - C. Chronic obstructive pulmonary disease (COPD)
 - D. New adult-onset asthma
 - E. Adenocarcinoma of the lung
- COPD should be lowest on the list
- IPF is the *most likely* in this case b/c he's never smoked
- Lung cancer is what most commonly causes clubbing, but if a pt has never smoked, then lung cancer is unlikely

Case 5 – A 30-year-old woman is evaluated in the emergency department because of **severe shortness of breath.** On physical examination, she **is using accessory muscles** of respiration. Temperature is 37 °C (98.6 °F), **pulse rate is 120/min, respiration rate is 32/min,** and **blood pressure is 130/80 mm Hg, which decreases to 112/68mm Hg with inspiration.** Cardiac examination reveals tachycardia with distant heart sounds.

- Which of the following is the most likely diagnosis?
 - A. Acute pulmonary embolism
 - B. Acute exacerbation of asthma**
 - C. Pneumothorax
 - D. Pneumonia
 - E. Anxiety
- Pulse and resp rate are high
- Pulsus paradoxus = decr in systolic bp by degree > 10 upon inspiration
- ****Pulsus paradoxus is seen in COPD, pericardial tamponade and asthma****
- Object of this question: In which of the following does pulsus paradoxicus occur?

Don't forget to look at the cases he didn't cover in class (Below).

Case 6 – A 36-year-old woman presents to the ED for the second time in a week with pleuritic chest and left shoulder discomfort and a low-grade fever. She had been **involved in a rear-end car accident** 6 days previously during which she did not experience any appreciable external trauma. On physical examination, her pulse rate is 100/min and regular, and **BP is 94/70mmHg.** Her **left iris is green,** and her **right iris is blue.** She is slender with a straight back and **a slight pectus excavatum.** The **palate is high-arched,** and **the fingers are longer than yours** despite the fact that she is 3 in shorter.

- Which of the following is the most likely diagnosis?
 - A. Recurrent pulmonary embolism
 - B. Pericarditis
 - C. Pneumothorax
 - D. Myocardial infarction
 - E. Aortic dissection**

Case 7 – A 24-year-old woman is admitted to the hospital because of the sudden onset of **severe shortness of breath** and **two-pillow orthopnea** associated with palpitations. She is 4 months pregnant. On physical examination, the pulse rate is 125/min and irregular, respiration rate is 20/min, and blood pressure is 90/60 mm Hg. There is marked **elevation of the JVP** with no visible a waves. **Bibasilar pulmonary rales** are present, as well as a right ventricular lift, a **loud S1,** a loud P2, an **opening snap,** and **a diastolic rumble.**

- Which of the following is the most likely diagnosis?
 - A. Aortic regurgitation
 - B. Atrial septal defect
 - C. Mitral valve stenosis**
 - D. Tricuspid stenosis
 - E. Patent ductus arteriosus