Chest Physical Examination

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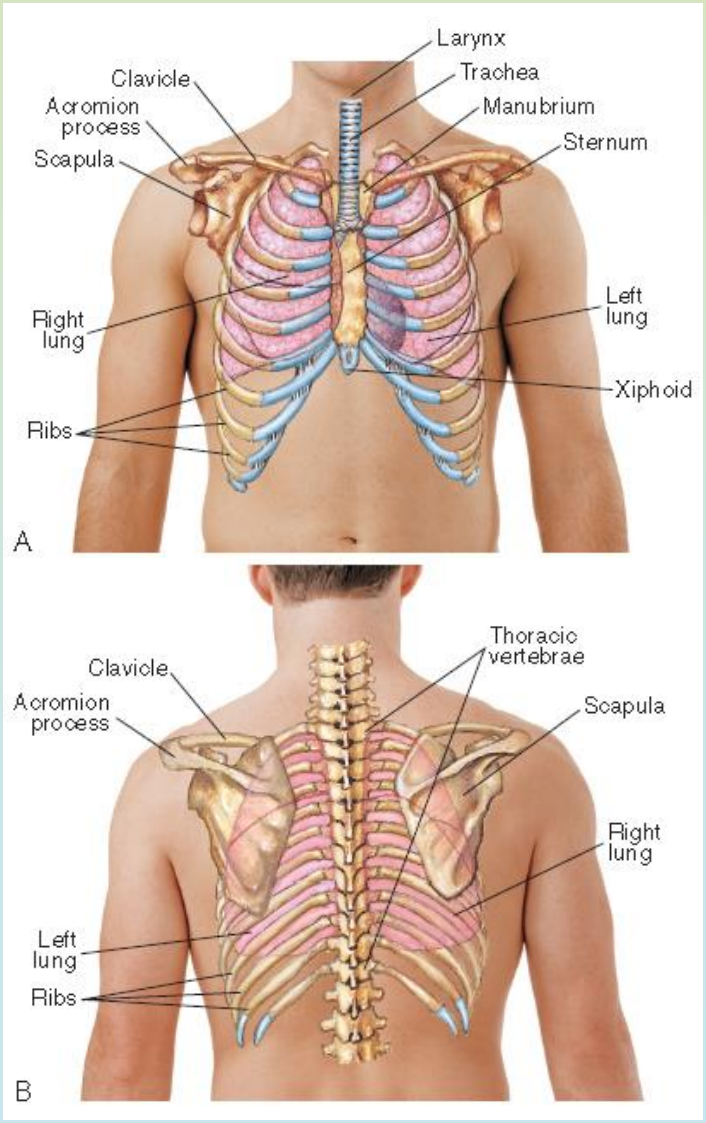
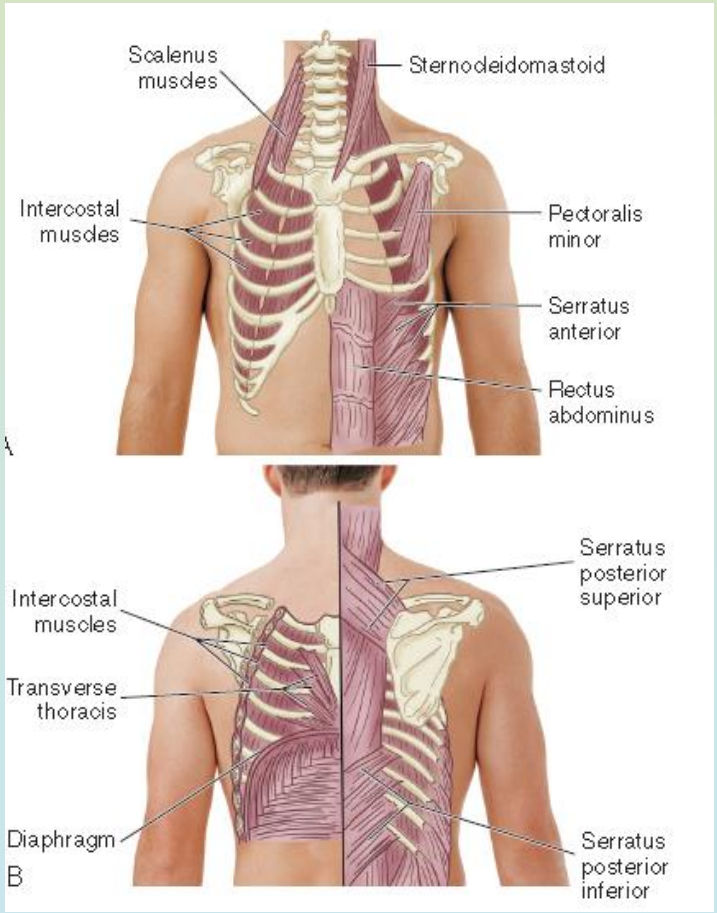
Let's go back to anatomy…





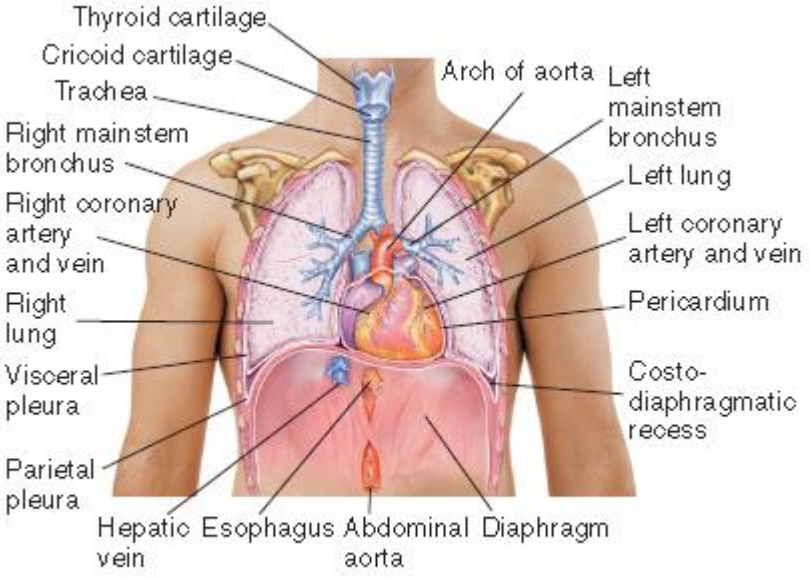


FIG. 14.2 Chest cavity and related anatomic structures.

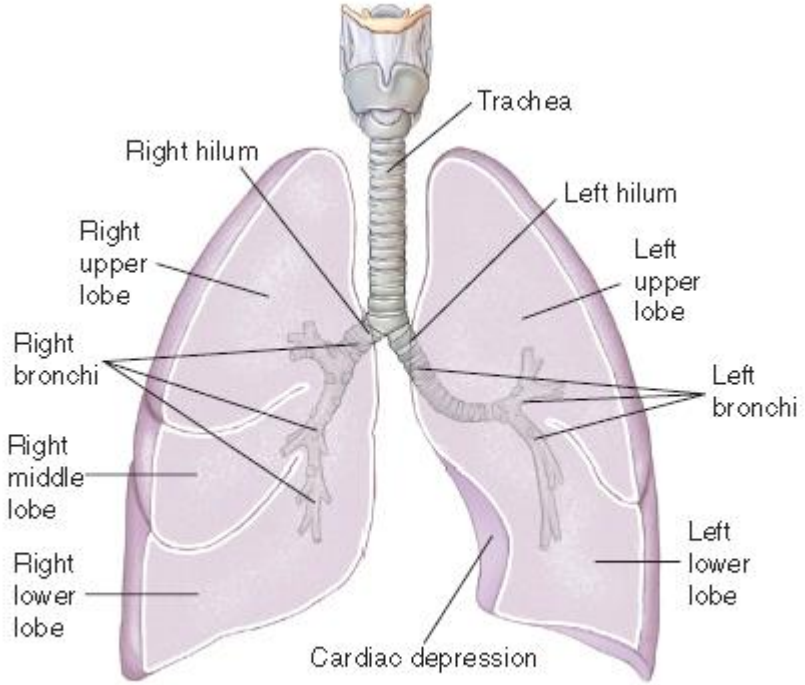
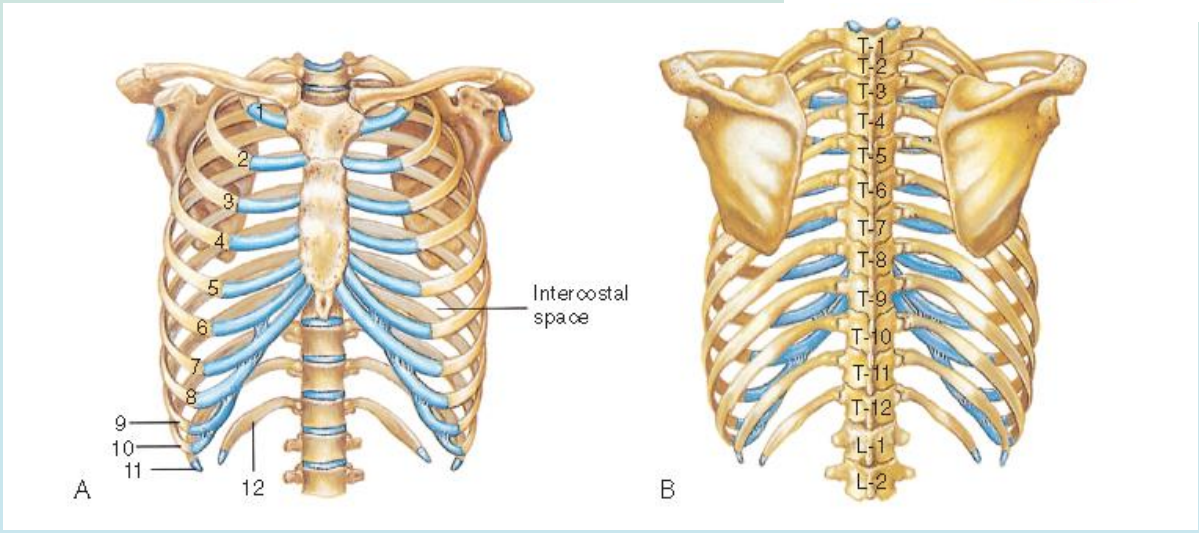
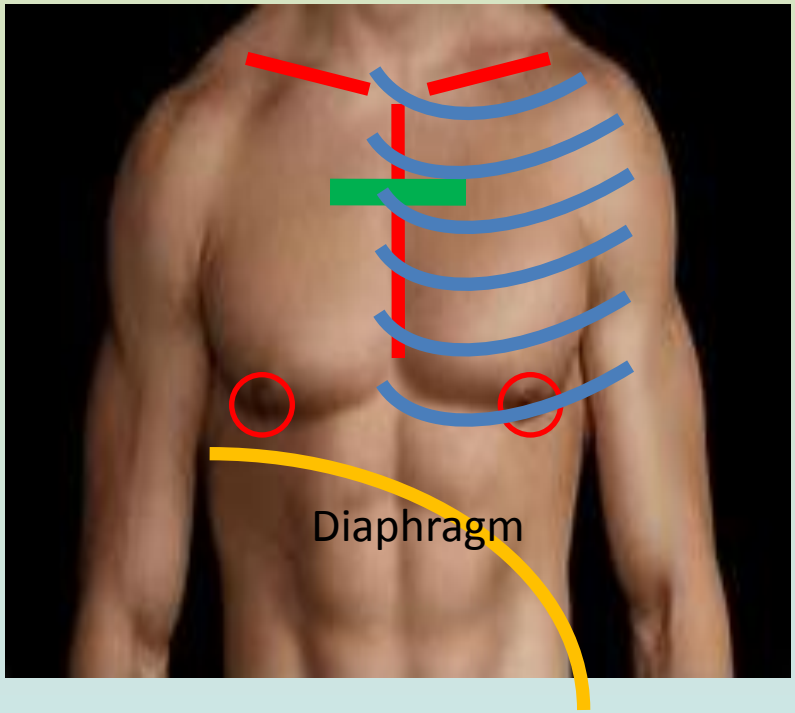


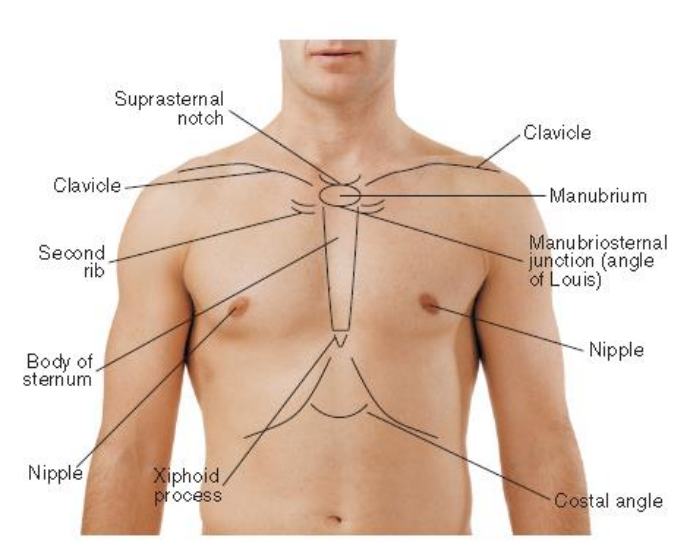
FIG. 14.4 The lobes of the lungs.



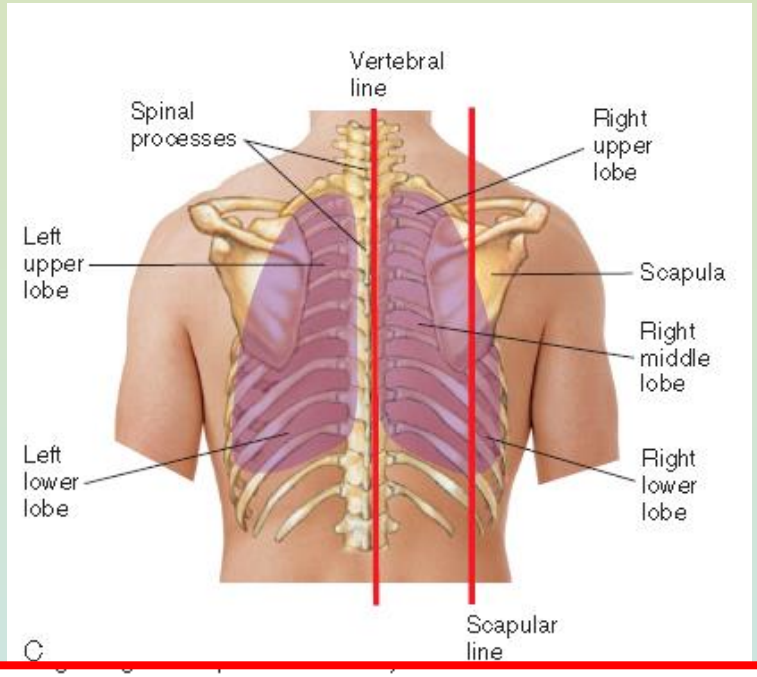
Anatomic Landmarks



1. NIPPLES and STERNUM
2. Manubriosternal junction (**ANGLE OF LOUIS**) the point at which the 2° rib articulates with the sternum
3. Intercostal spaces and RIBS are counted from this reference point
4. SUPRASTERNAL NOTCH
5. VERTEBRA PROMINENS (Spinous process of C7)
6. CLAVICLES



Chest Lines

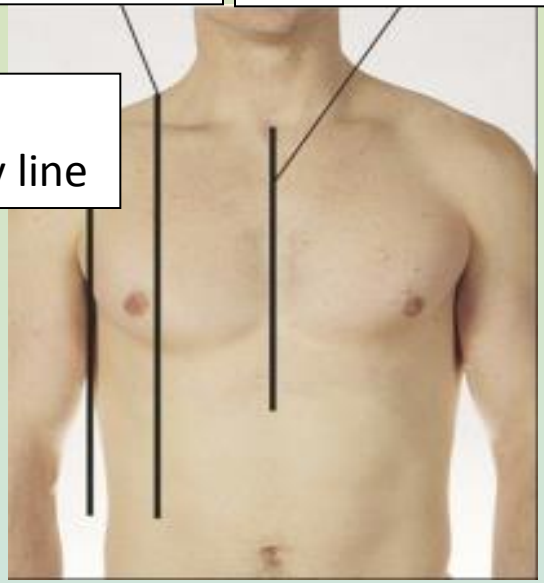


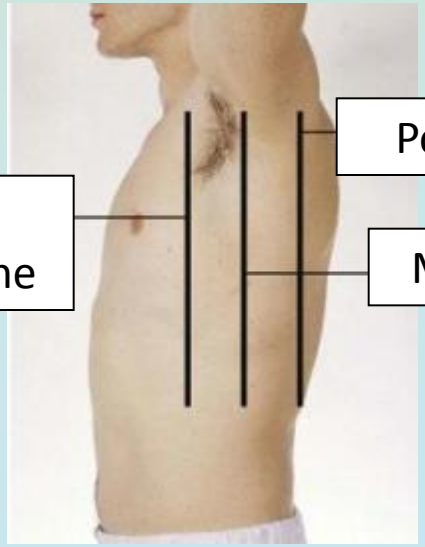
Vertebral line: vertically down the spinal processes
Right and left scapular lines: parallel to the vertebral line, through the inferior angle of the scapula when the patient is erect

Midclavicular line

Midsternal line

Right Anterioraxillary line





Posterioraxillary line

Left Anterioraxillary line

Midlaxillary line

Physical Examination

4 steps:

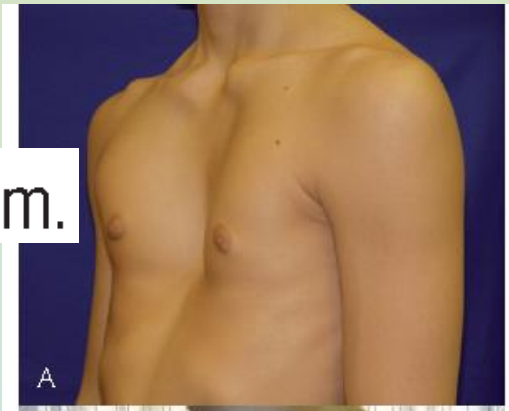
1. **INSPECTION/OBSERVATION**
2. **PALPATION**
3. **PERCUSSION**
4. **AUSCULTATION**

+ Vital Signs evaluation

Inspection & Observation

Exposure is a key point
…you can't describe what you can't see!

Pectus excavatum.



Pectus carinatum.

Inspection & Observation
Spine and Thorax

Watch the patient in standing position and look:

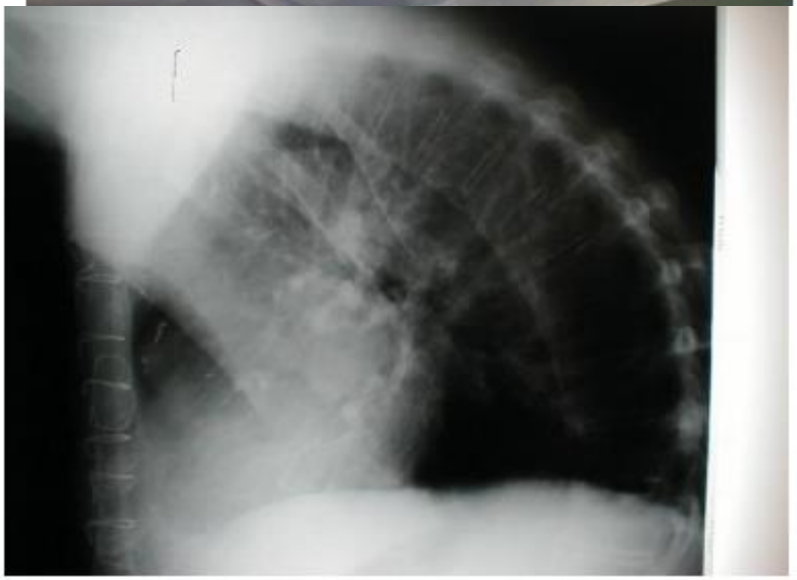
- **Shape** of **spine**
- Stand behind patient, inviting to **bend** at **waist**
- **Scoliosis** (curvature to one side and higher shoulder)
- **Kyphosis** (abnormally excessive convex curvature of the spine)

Chest wall abnormality may affect pulmonary function

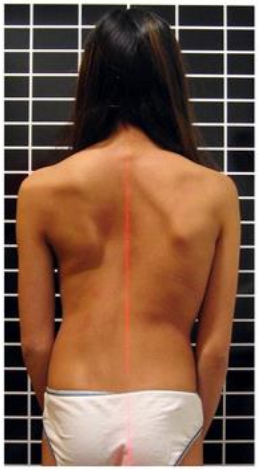
Inspection of the Chest

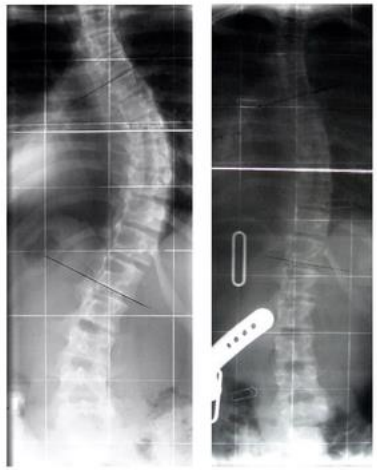
- Appearance of the chest/Shape
  - Bilaterally symmetrical and elliptical in cross section
  - Shape of the chest
    - Kyphosis
    - Scoliosis
    - Flattening
    - Over inflation
- Movement of the chest
  - ✓ symmetry
  - ✓ Unilateral lag
  - ✓ Chest indrowings,retractions
- Observe the chest for –rate and rhythm
  -chest expansion

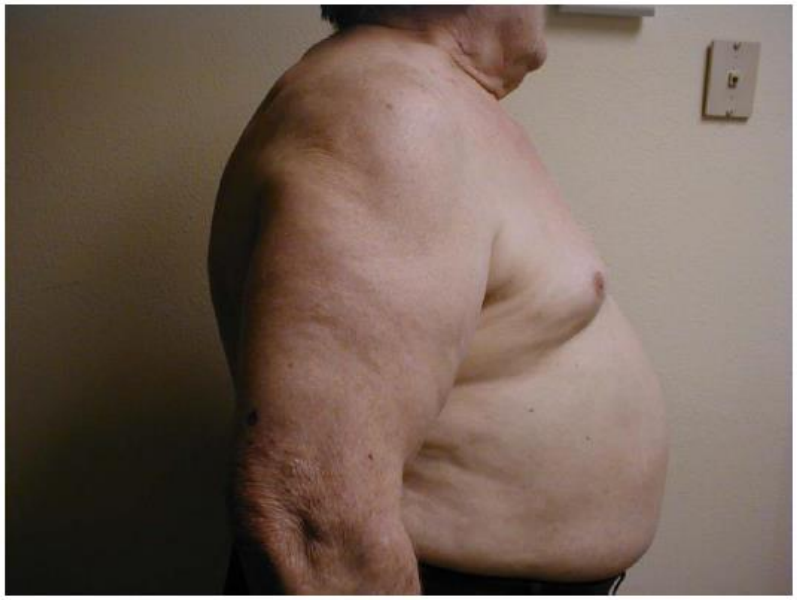
Scoliosis

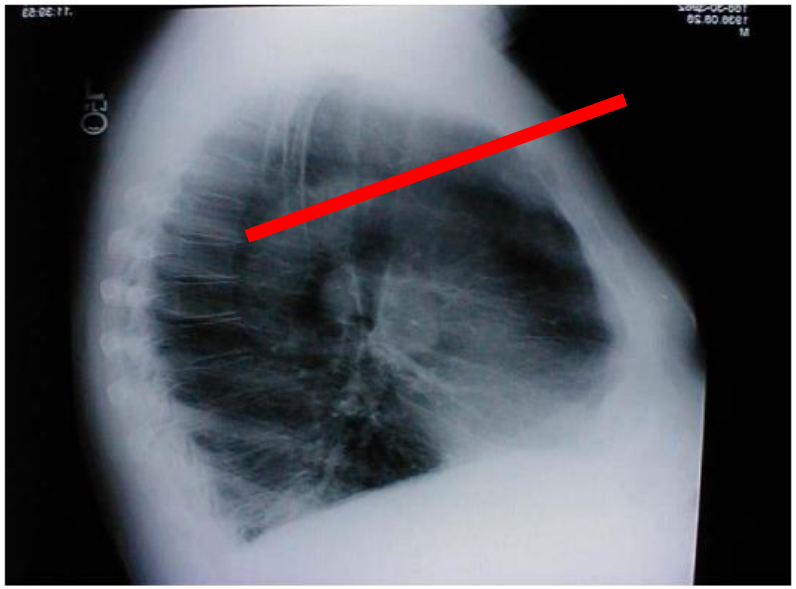


Kyphosis

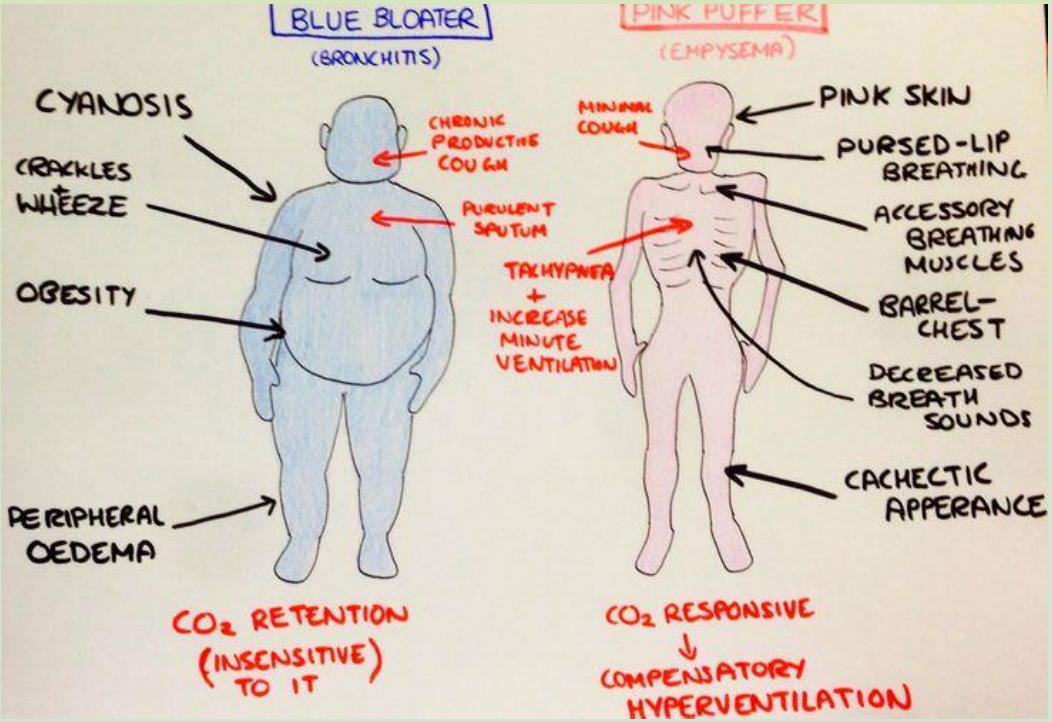


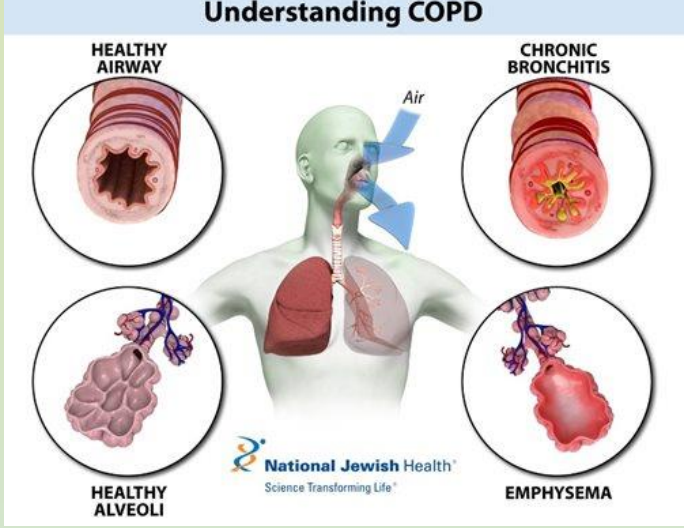




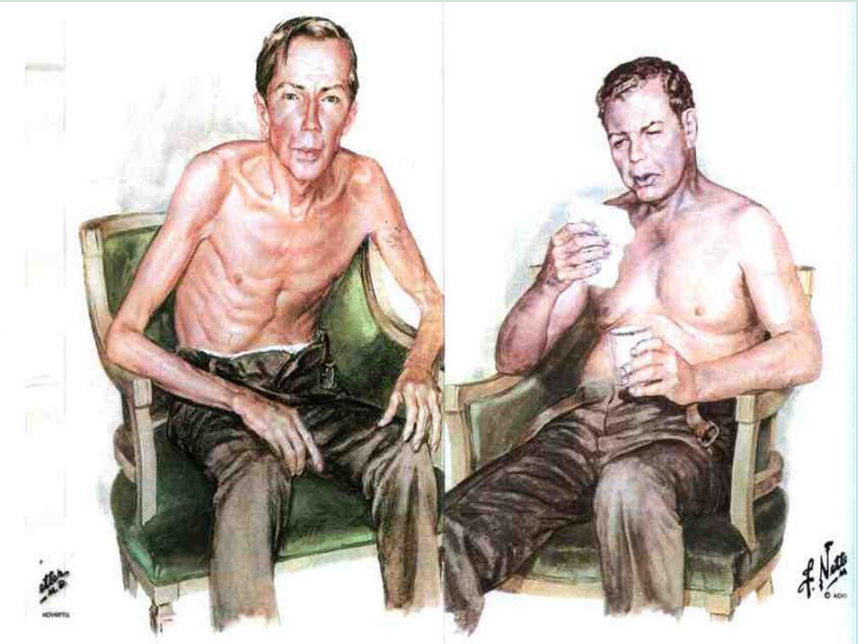


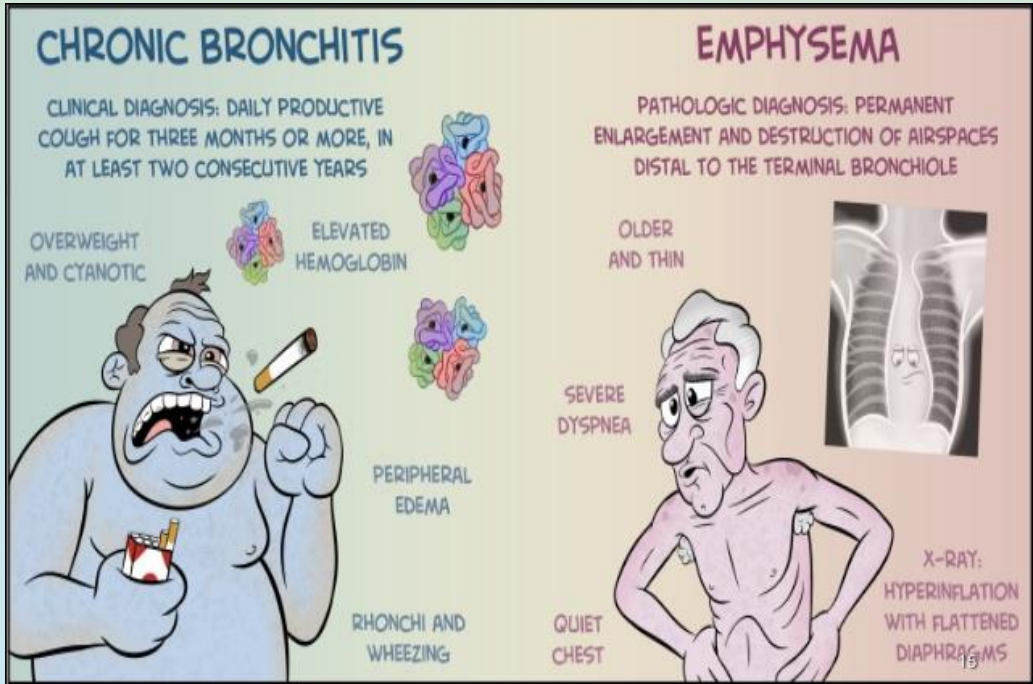
Linear diaphragm as hyperinflation due to
Chronic Ostructive Pulmonary Disease (COPD) and Obesity





BLUE BLOATER - PINK PUFFER



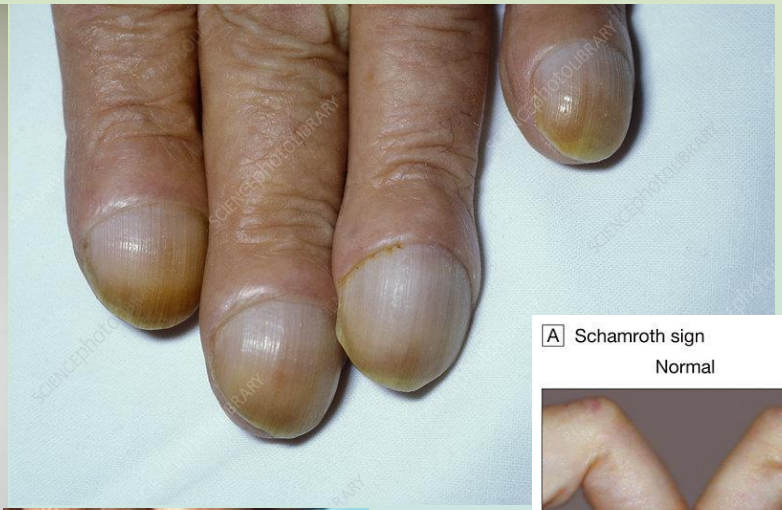


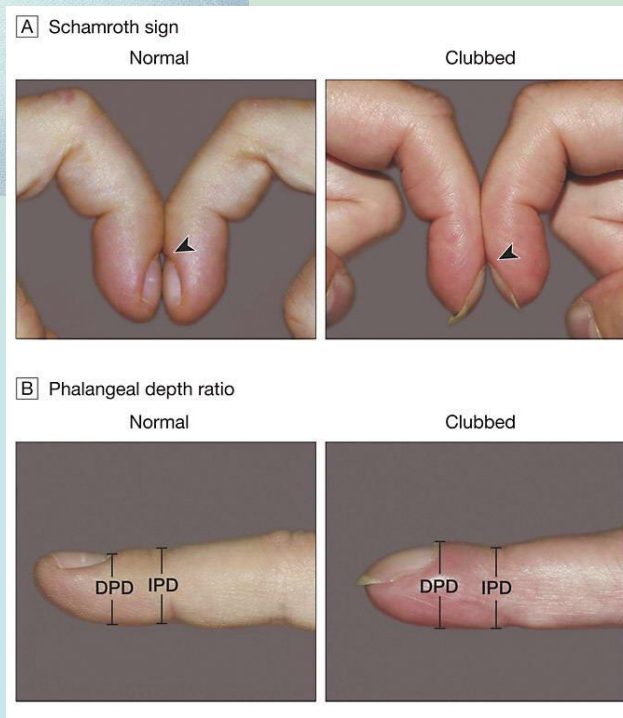
Cyanosis

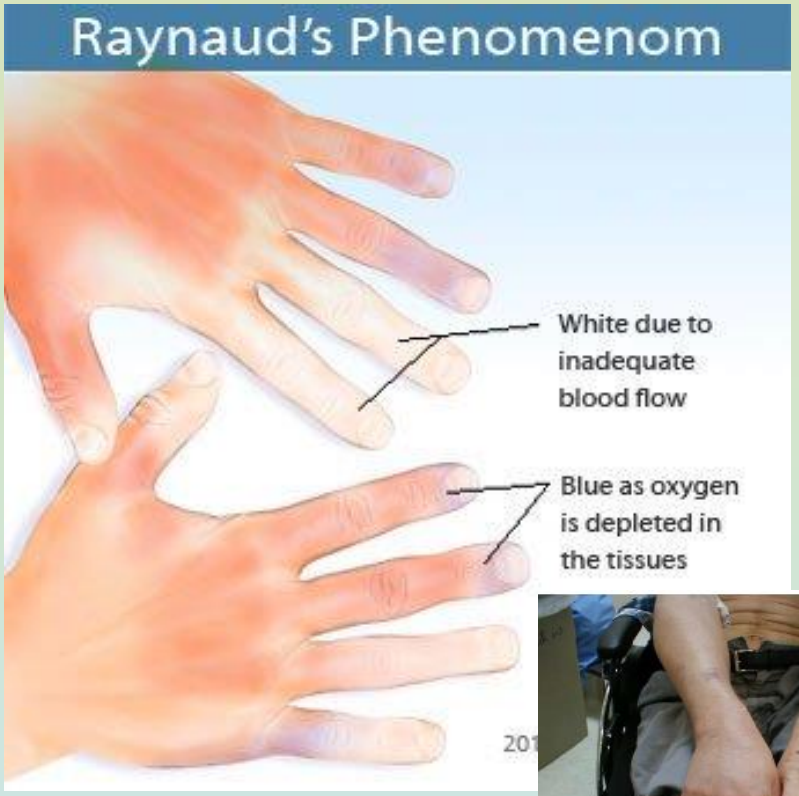
Nicotine Staining

Clubbing

CLUBBING enlargement of the terminal phalanges of the fingers and/or toes is associated with emphysema, lung cancer, congenital heart disease, cirrhosis, or cystic fibrosis







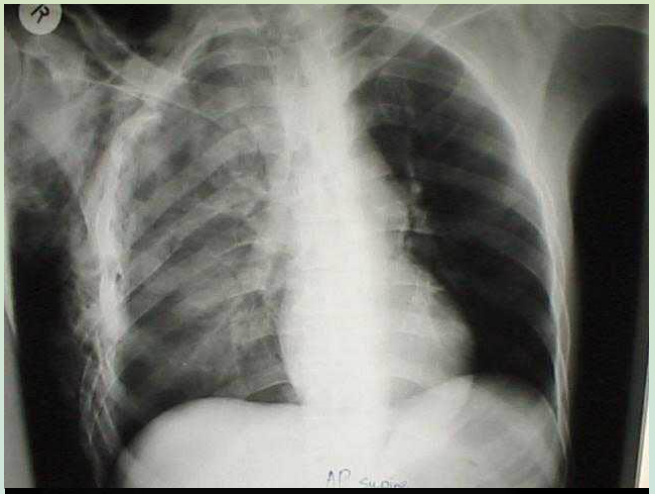
Spasm of arteries cause episodes of reduced blood flow triggered by cold or emotional stress

It could be secondary to a connective tissue and thyroid disorder

Other characteristics of the hands to describe

Subcutaneous emphysema

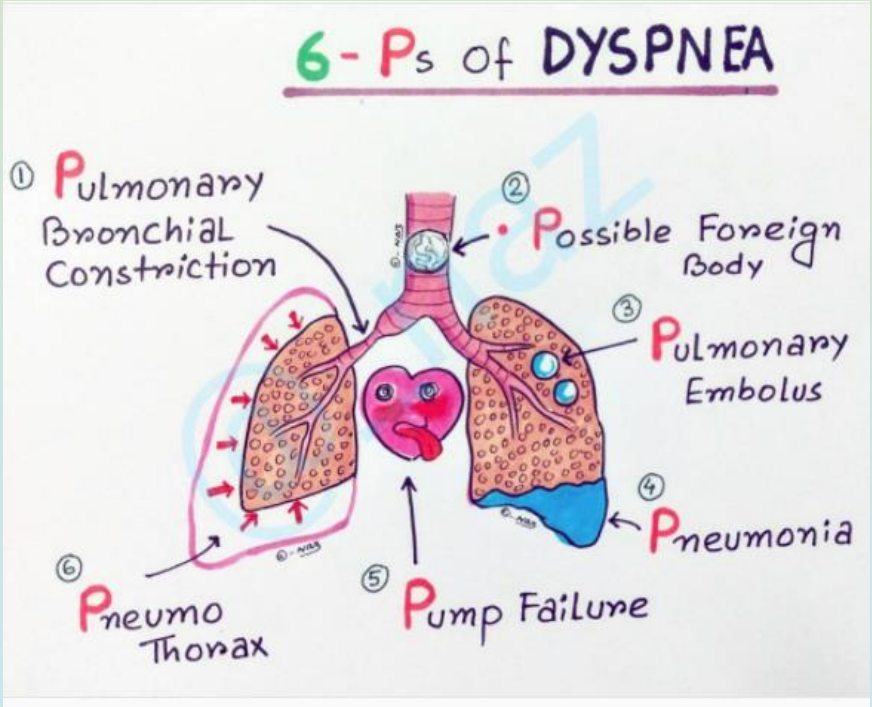
- Gas or air is in the layer under the skin
- *Subcutaneous* → beneath the skin
- *Emphysema* → trapped air
- usually occurs on the chest, neck and face, where it is able to travel from the chest cavity along the fascia.
- Characteristic crackling feel to the touch, a sensation that has been described as similar to touching snow (or Rice Krispies!) → *subcutaneous crepitation*.



Dyspnea

A subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity

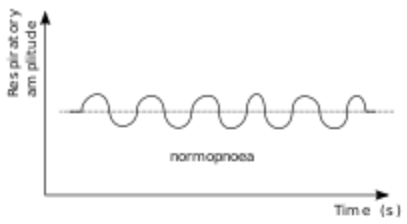
…Symptom or Sign?



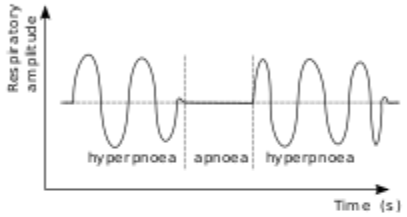
Investigate Dyspnea features:

- Acute or Chronic
- Night and Daytime
- At rest and/or exertional
- With or without respiratory sounds
- With or without chest pain
- Changing by position

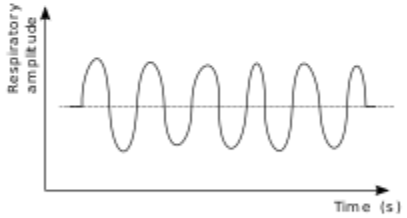
Dyspnea
(as a Sign)



Normal respiration

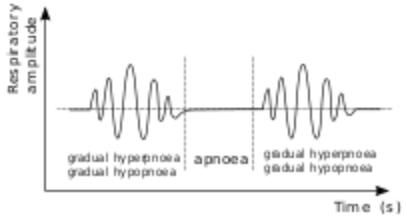


Biot's respiration
aka ataxic respiration
- Periodic breathing: hyperpnoea (or normopnoea) and apnoea
- Poor prognosis
- Neuron damage



Kussmaul breathing
- Metabolic acidosis (Diabetes mellitus)
- Hyperpnoea

K = Ketones (Diabetic ketoacidosis)
U = Uremia
S = Sepsis
S = Salicylates
M = Methanol
A = Aldehydes
(U)
L = Lactic acid/Lactic acidosis



Cheyne-Stokes respiration
- Periodic breathing: Gradual hyperpnoea/hypopnoea and Apnoea
- Sleep/Hypoxemia/Drugs
- Hypoperfusion of the brain (respiratory cente

BOX 14.2 Descriptors of Respiration

Dyspnea, or difficult and labored breathing with shortness of breath, is commonly observed with pulmonary or cardiac compromise. A sedentary lifestyle and obesity can cause it in an otherwise well person. In general, dyspnea increases with the severity of the underlying condition. It is important to establish the amount and kind of effort that produces dyspnea:

- Is it present even when the patient is resting?
- How much walking? On a level surface? Upstairs?
- Is it necessary to stop and rest when climbing stairs?
- With what other activities of daily life does dyspnea begin? With what level of physical demand?

Other manifestations of respiratory difficulty include the following:

Orthopnea—shortness of breath that begins or increases when the patient lies down; ask whether the patient needs to sleep on more than one pillow and whether that helps.

Paroxysmal nocturnal dyspnea—a sudden onset of shortness of breath after a period of sleep; sitting upright is helpful.

Platypnea—dyspnea increases in the upright posture.

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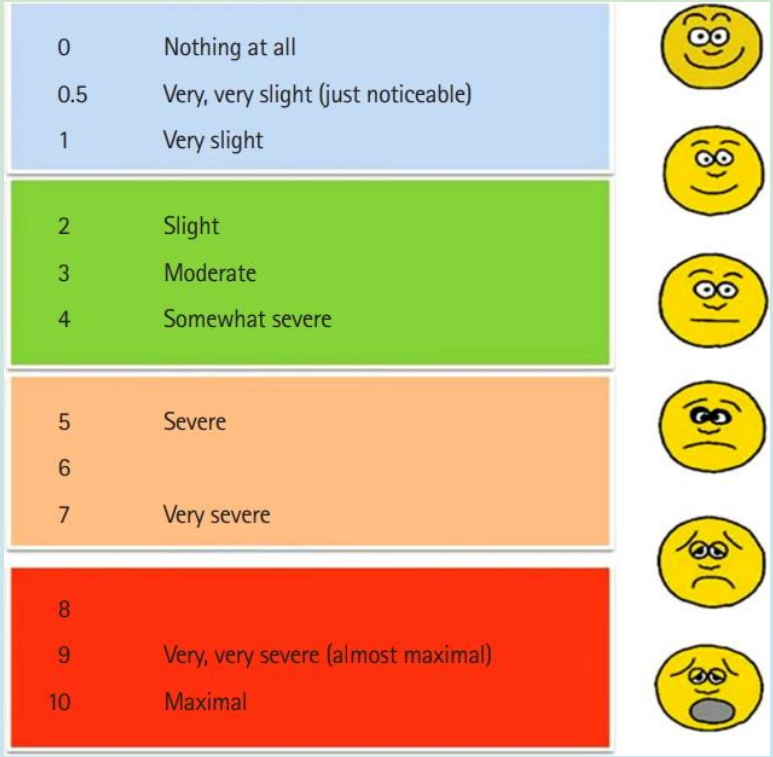
Grade of dyspnea	Symptoms
Grade 0	Not troubled by breathlessness except on strenuous exercise
Grade 1	Short of breath when hurrying or walking up a slight hill
Grade 2	Walks slower than contemporaries on the level because of breathlessness or has to stop for breath when walking at own pace
Grade 3	Stops for breath after walking 100 m or after a few minutes on the level
Grade 4	Too breathless to leave the house or breathless when dressing or undressing

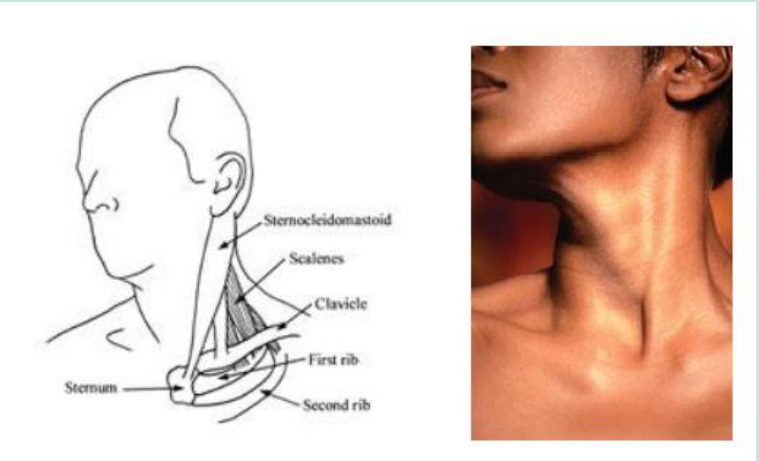
NYHA Class	Physical Activity	2-Year Mortality (%) on ACE-I
I	Asymptomatic (no limitation of physical activity; there is no shortness of breath, fatigue, or palpitations with ordinary physical activity)	10
II	Slight limitation (shortness of breath, fatigue, or palpitations with ordinary physical activity)	20
III	Marked limitation (shortness of breath, fatigue, or palpitations with activities of daily living)	30—40
IV	Symptoms at rest (shortness of breath, fatigue, or palpitations at rest)	40—50

ACE-I, angiotensin-converting enzyme inhibitors; NYHA, New York Heart Association.



DYSPNEA VISUAL SCALE (VAS)

- Is there **breathing difficulty (DYSPNEA)** during efforts
- High frequency of breathing **TACHYPNEA**
- Are there **audible noises (WHEEZING)?**
- Inability to **speak for dyspnea?**
- **Pursed lips**
- **Lips colour: Blue (CYANOSIS)** or cherry-red lips in CO toxicity
- **Use of accessory muscles** of neck (sternocleidomastoids, scalenes), inter-costals for breathing (**RESPIRATORY DISTRESS**)
- Position requested by the patient to breath better



Palpation

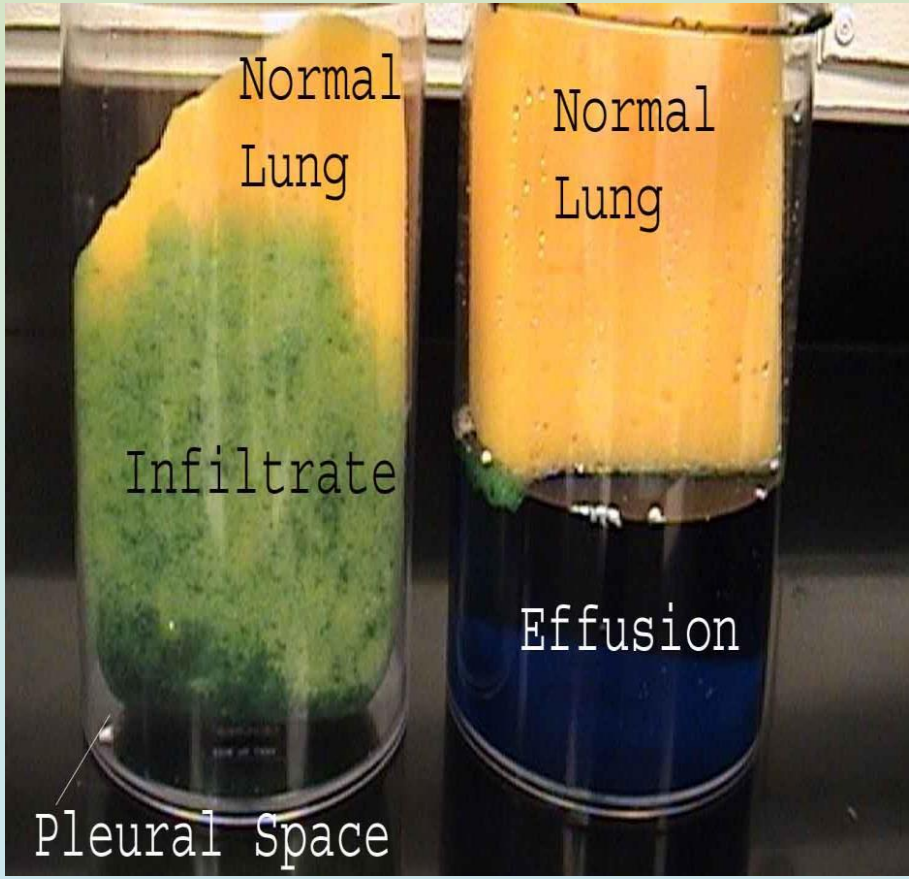
- Patient in gown → **chest accessible & exposed**
- **Explore** painful &/or abnormally appearing areas
- **Chest expansion** – position hands as below, have patient inhale deeply → hands lift out laterally

Palpation – Assessing Fremitus

- **Fremitus** = normal **vibratory** sensation w/**palpating** hand when patient speaks
- Place ulnar aspect (pinky side) of hand firmly against chest wall
- Ask patient to say *"99"*
- You'll feel transmitted **vibratory sensation → fremitus**!
- Assess posteriorly & anteriorly (i.e. lower & upper lobes)
- * Not Performed in the absence of abnormal findings *

Lung Pathology - Simplified

- **Lung** → sponge, **pleural cavity** → plastic container
- **Infiltrate** (e.g. pneumonia) → fluid within lung tissue
- **Effusion** → fluid in pleural space (outside of lung)

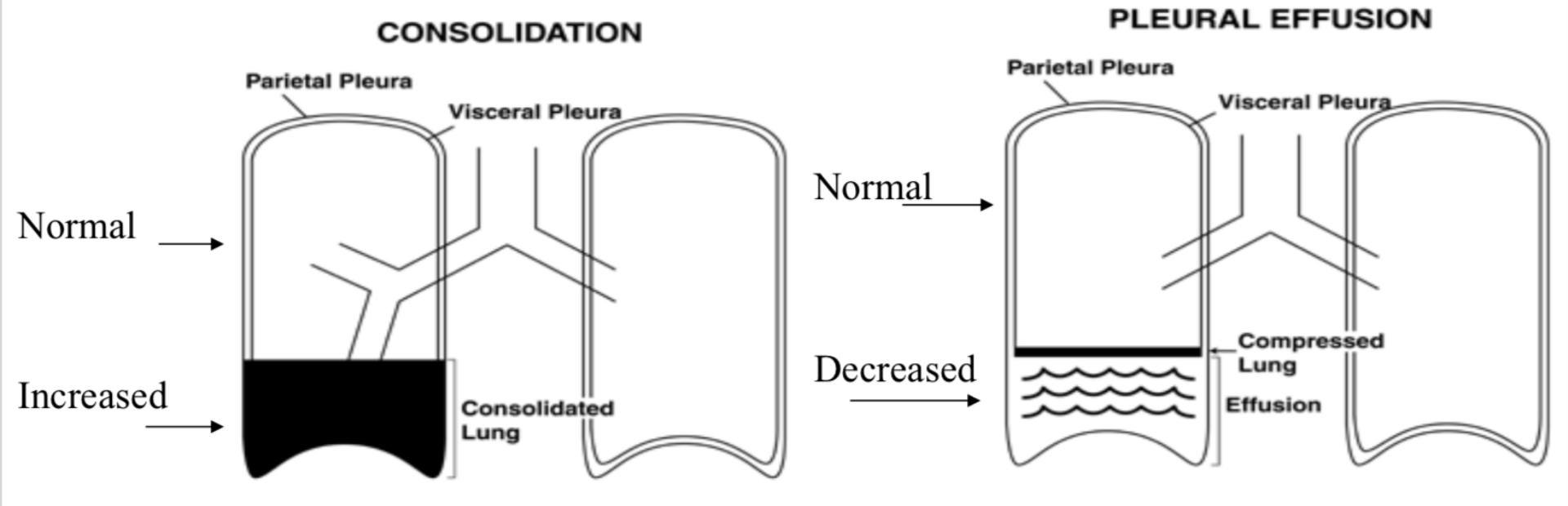


Fremitus - Pathophysiology

- **Fremitus**:

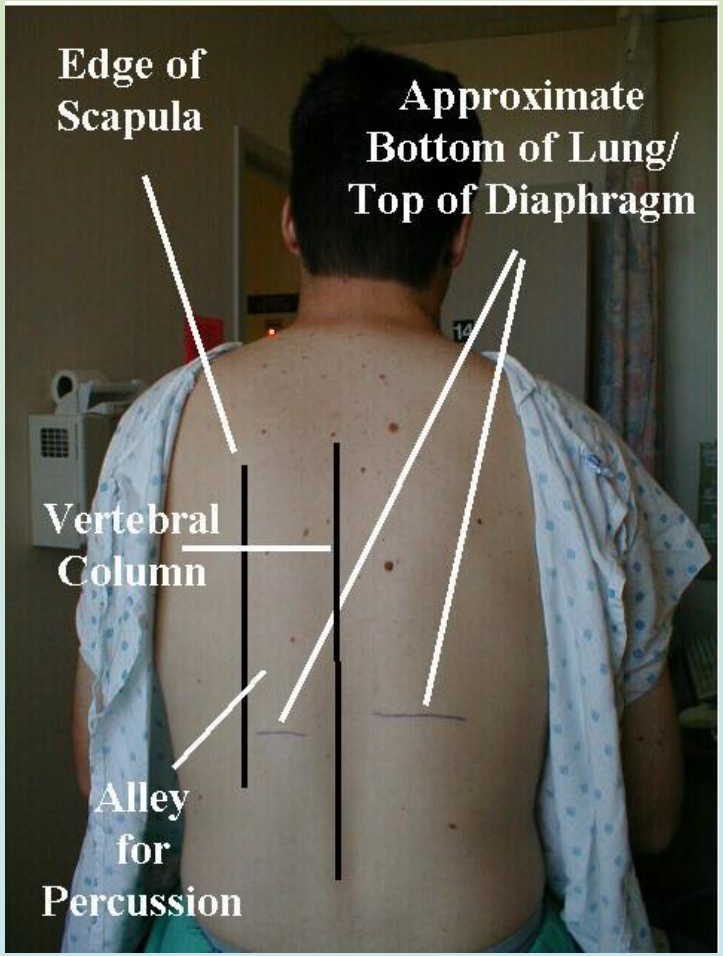
– Increased w/consolidation (e.g. pneumonia)

– Decreased in absence of air filled lung tissue (e.g. effusion).



Percussion

- Normal lung filled w/air
- Tapping generates drum-like sound → resonance
- When no longer over lung, percussion → dull (decreased resonance)
- Work in “alley”

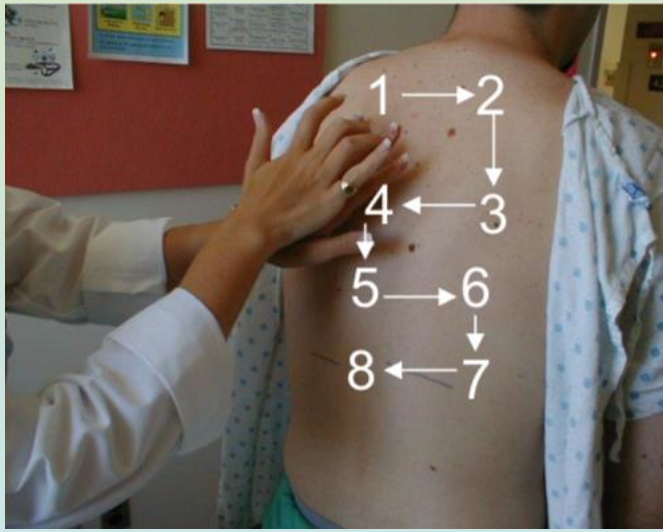


Percussion - Technique

- Patient crosses arms in front, grasping opposite shoulder (pulls scapula out of way)
- Place middle finger flat against back, other fingers off
- Strike distal interphalangeal joint w/middle finger of other hand - strike 2-3 times at each spot

Percussion

- Use loose, floppy wrist action – percussing finger → hammer
- Start at top of one side → then move across to same level, other side → R to L (as shown)
- at Bottom of lungs, detect diaphragmatic excursion → difference between diaphragmatic level at full inspiration v expiration (~5-6cm)
- Percuss upper lobes (anterior)
- Cut nails to limit pain to the patient

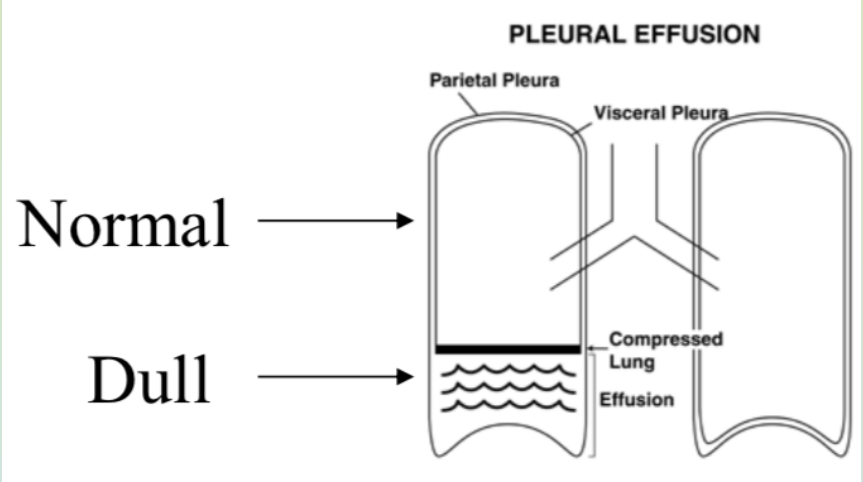


Percussion

- **Difficult** to master technique & detect tone changes - expect to be frustrated!
- **Practice** – on friends, yourself (find your stomach, tap on your cheeks, on your thigh, etc)
- Detect fluid level in container
- Find studs in wall

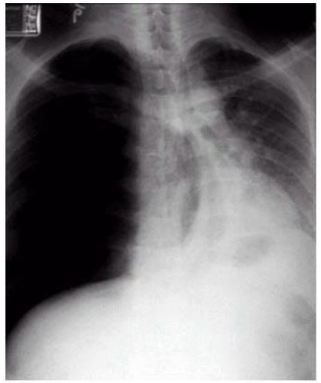
Percussion:
Normal, **Dull/Decreased** or **Hyper/Increased Resonance**

- Causes of Dullness:
  - ✓ Fluid outside of lung (effusion)
  - ✓ Fluid or soft tissue filling parenchyma (e.g. pneumonia, tumor)



- Causes of hyper- resonance:
  - ✓ COPD → air trapping
  - ✓ Pneumothorax (air filling pleural space)

Hyper-Resonant all fields→COPD



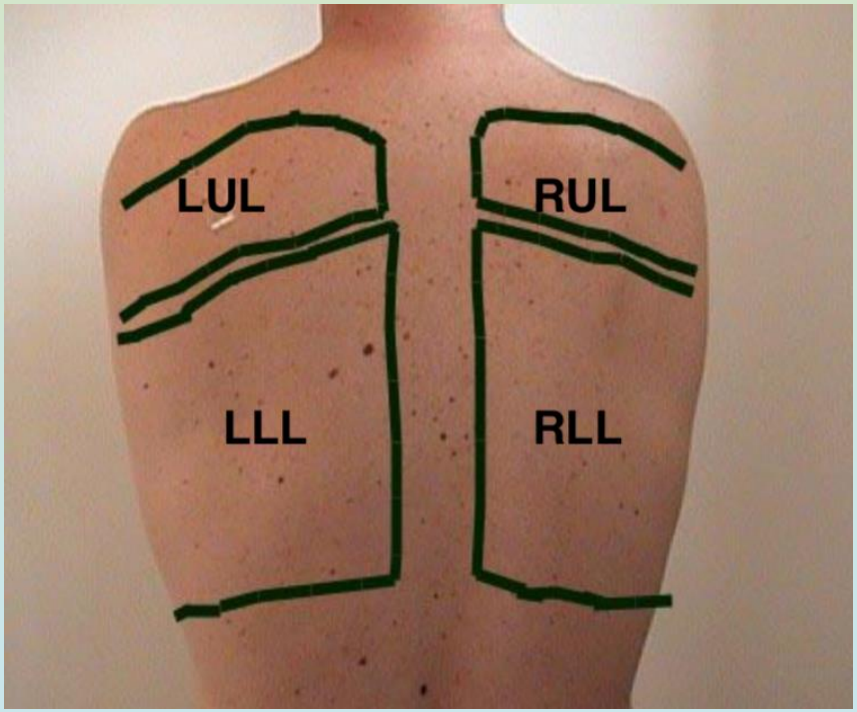
Hyper-Resonant R lung→Pneumothorax

Auscultation

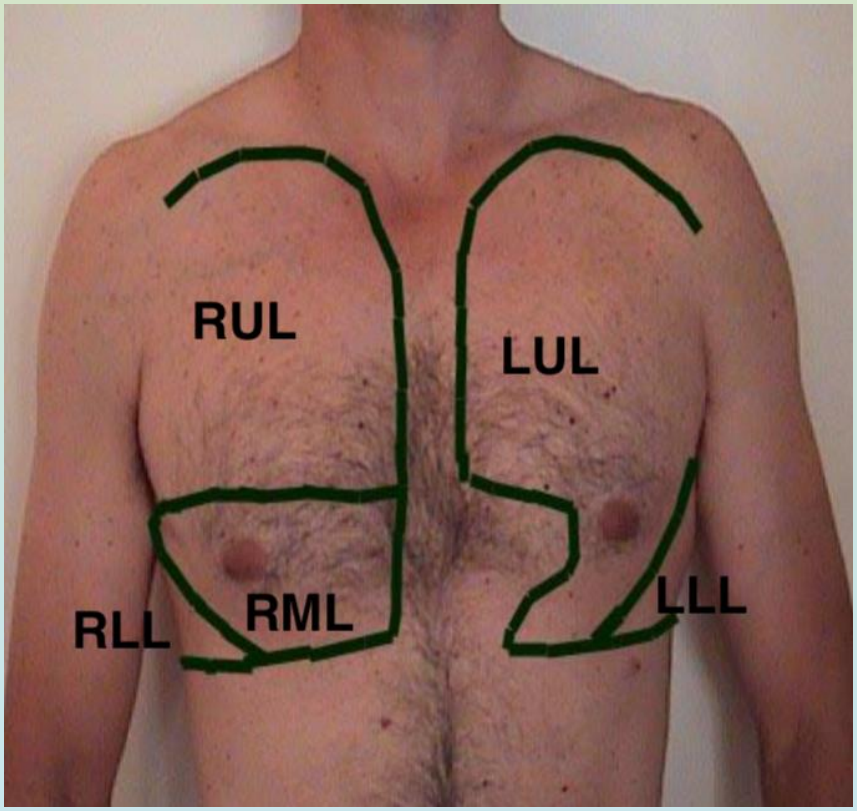
- **Normal** breathing creates sound → appreciated via stethoscope over chest → **"vesicular breath sounds" or "normal breath sounds"**
- Note sounds w/both expiration & inspiration – inspiration typically more apparent
- Pay attention to:
  - ✓ **quality**
  - ✓ **inspiration** versus **expiration**
  - ✓ **Location**
  - ✓ **intensity**

Lobes Of Lung

- Posterior View



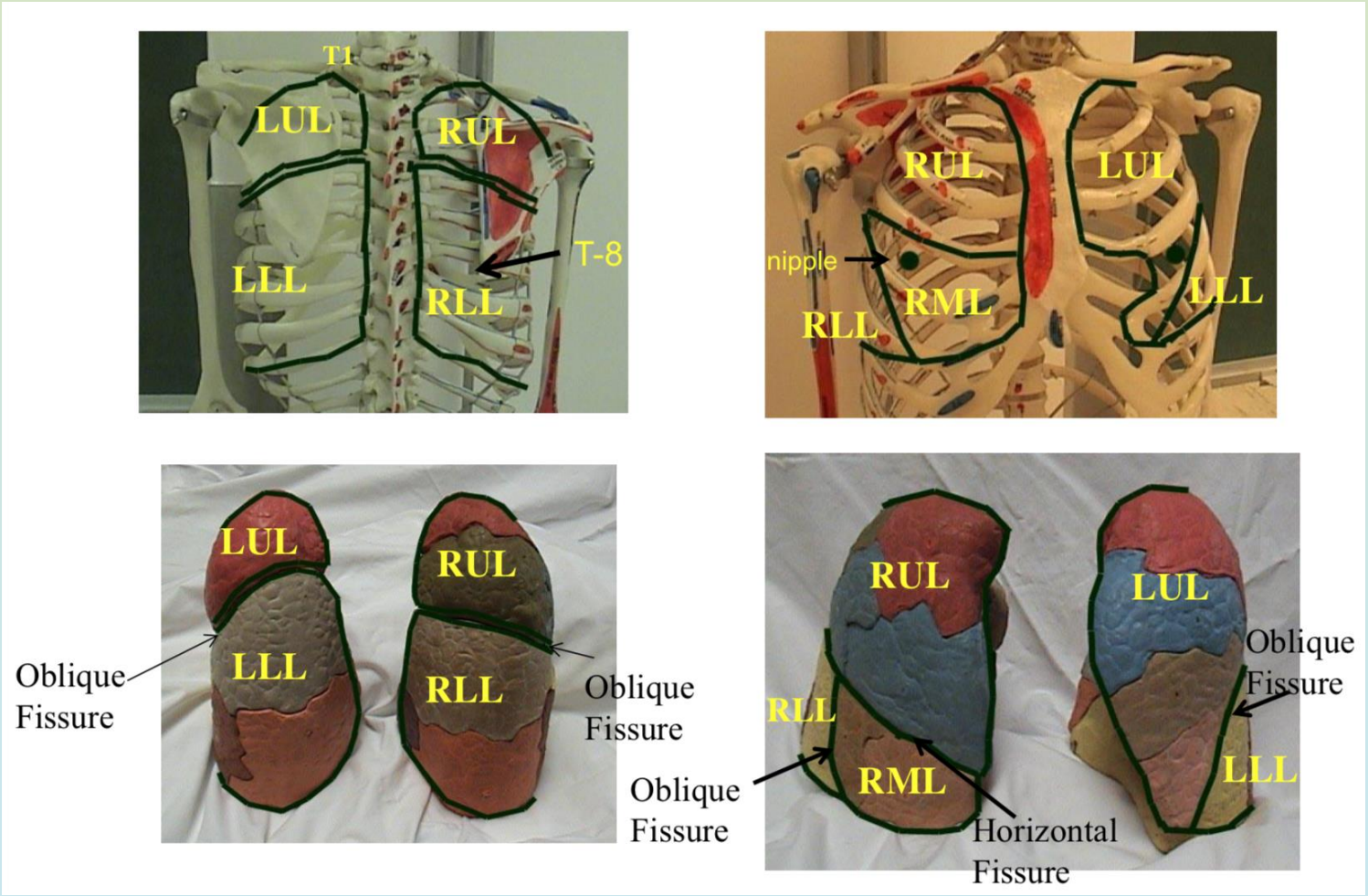
- Anterior View



Where you listen dictates what you'll hear!

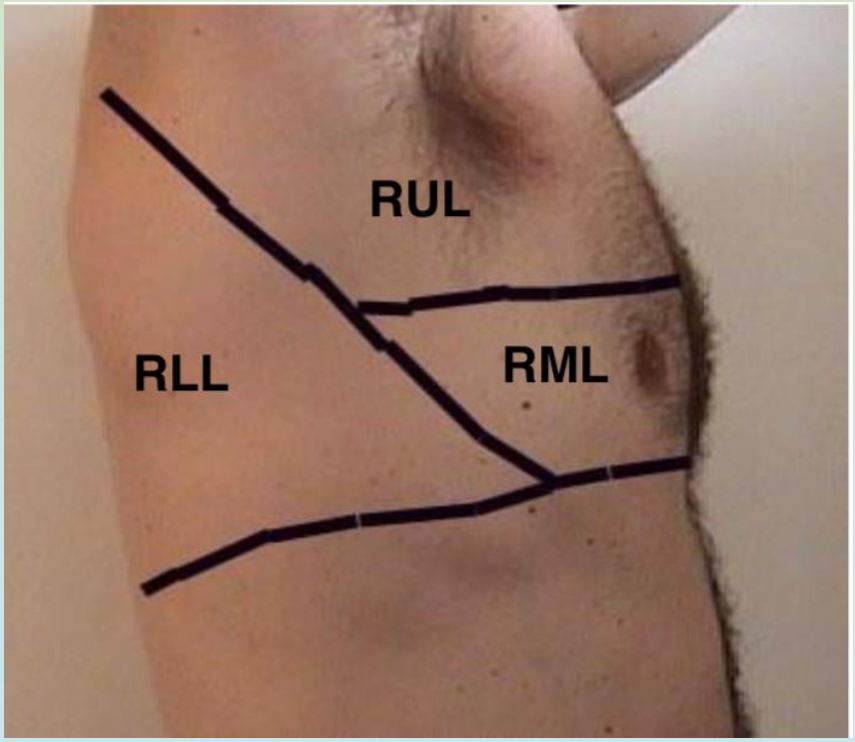
Lobes Of Lung

- Posterior View
- Anterior View

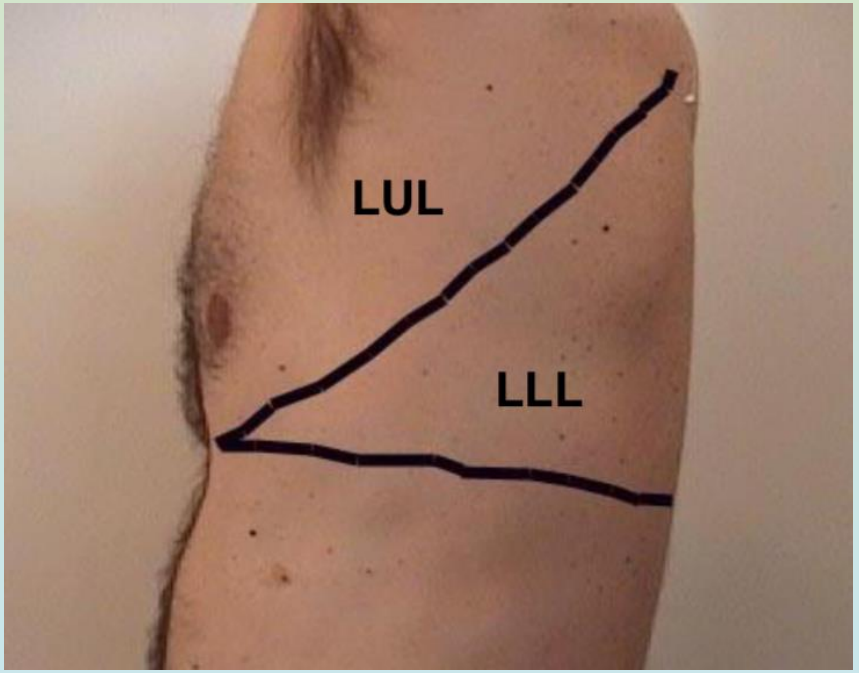


Lobes Of Lung

- Right Lateral View



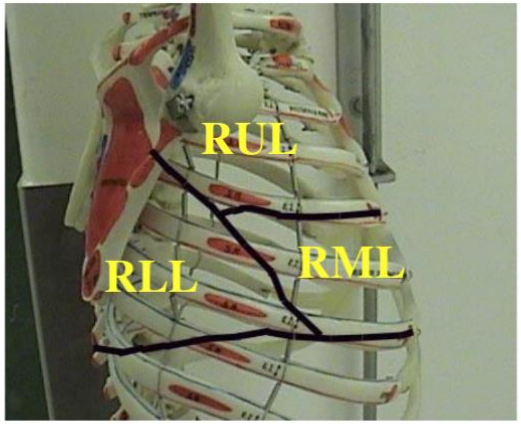
- Left Lateral View

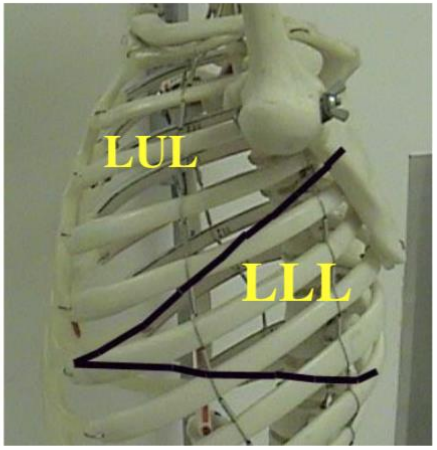


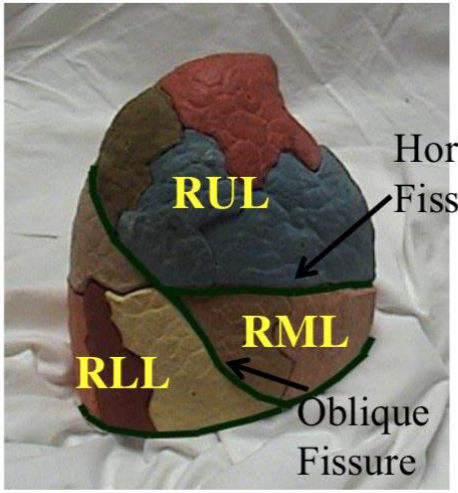
Where you listen dictates what you'll hear!

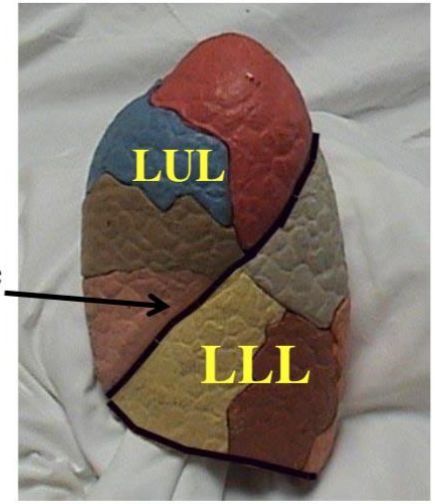
Lobes Of Lung

- Right Lateral View
- Left Lateral View

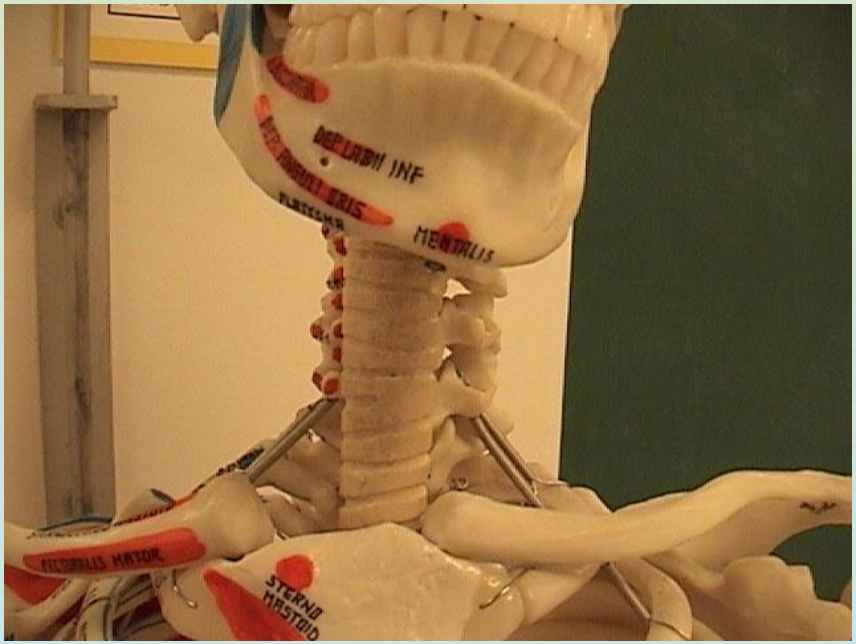








Trachea



Auscultation (listening w/Stethoscope)

Technique

- Use a Stethoscope
- Patient crosses arms, grasping opposite shoulders
- <u>Areas To Auscult</u>
  - Posteriorly (lower lobes) ~ 6-8 places - Alternate R → L as move down (comparison) - ask patient to take deep breaths trough mouth
  - Right middle lobe – listen in ~ 2 spots – lateral/anterior
  - Anteriorly - Upper lobes – listen ~ 3 spots each side
  - Over trachea

Pathologic Lung Sounds

- **Crackles** (**Rales**): “Scratchy” sounds associated w/fluid in alveoli & airways (e.g. pulmonary edema, pneumonia); finer crackles w/fibrosis
- **Ronchi**: “Gurgling” type noise, caused by fluid in large & medium sized airways (e.g. bronchitis, pneumonia)
- **Wheezing**: Whistling type noise, loudest on expiration, caused by air forced thru narrowed airways (e.g. asthma) – expiratory phase prolonged (E>>>I)
- **Stridor**: Inspiratory whistling type sound due to tracheal narrowing → heard best over trachea

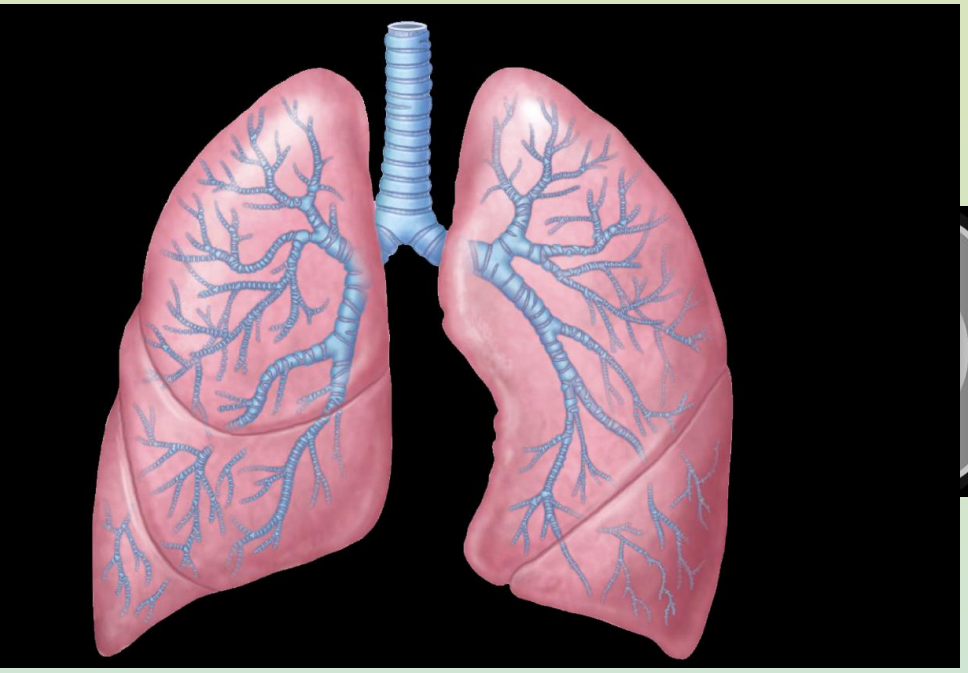
Pathologic Lung Sounds

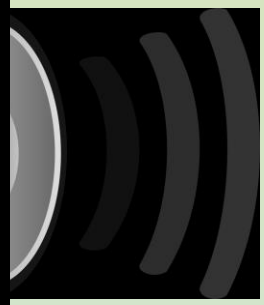
- **Bronchial Breath Sounds**: Heard normally when listening over the trachea. If consolidation (e.g. severe pneumonia) upper airway sounds transmitted to periphery & apparent upon auscultation over affected area.
- **Absence of Sound**: In chronic severe emphysema, often small tidal volumes & thus little air movement. Also w/very severe asthma attack, effusions, pneumothorax

Pathologic Lung Sounds

- **Egophony**: in setting of suspected consolidation, ask patient to say “eee” while auscultating. Normally, sounds like “eee”..
  Listening over consolidated area generates a nasally “aaay” sound.

  Not a common finding (but interesting)





Lung Sound Simulation

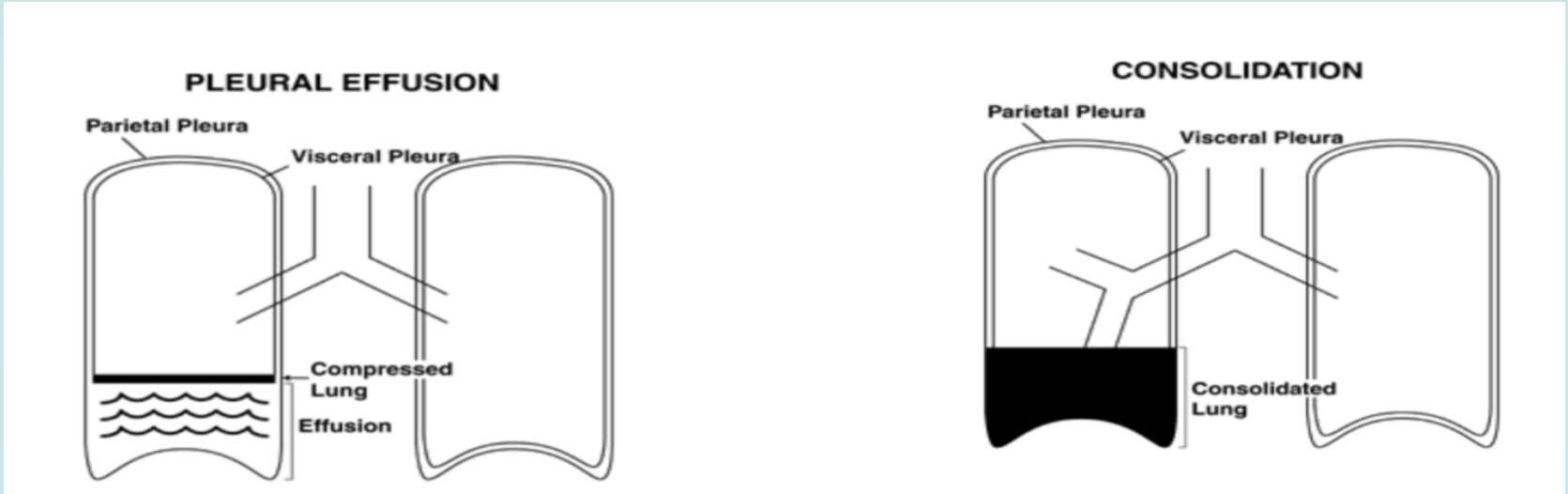
- R.A.L.E. Repository
http://www.rale.ca/Recordings.htm

- Bohadan A, et al. Fundamentals of Auscultation. NEJM 2014; 370: 744-51. Click on: Interactive Graphic - Fundamentals of lung sound auscultation. http://www.nejm.org/doi/full/10.1056/NEJMra1302901

TO SUM UP: Few pathognomonic findings

- **Effusion**
- Auscultation → decreased/absent breath sounds
- Percussion → dull
- Fremitus →

- **Consolidation**
- Auscultation → bronchial breath sounds
- Percussion → dull
- Fremitus →



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Summary of Skills

Observe & Inspect

- □ Nails, fingers, hands, arms
- □ Respiratory rate

Lungs and Thorax

General observation & Inspection

- □ Patient position, distress, accessory muscle use
- □ Spine and Chest shape

Palpation

- □ Chest excursion
- □ Fremitus

Percussion

- □ Alternating R & L lung fields posteriorly top □ bottom
- □ R antero-lateral (RML), & Bilateral anteriorly (BUL)
- □ Determines diaphragmatic excursion

Auscultation

- □ R & L lung fields posteriorly, top □bottom, comparing side to side

ANAMNESI

- **Fisiologica**
  - Familiare
  - Lavorativa e sociale
  - Propriamente detta
- **Patologica**
  - Remota
  - Prossima e motivo dell'osservazione clinica
- **Farmacologica ed Allergica**

Familiare

- Situazione familiare, nucleo familiare
- Patologie in anamnesi nella famiglia ed esclusione di morbosità a trasmissione ereditaria/genetica

Lavorativa/sociale

- Indagare la storia lavorativa con particolare riferimento alle esposizione ambientali, al carico di lavoro e rischio di tecnopatie.
- Indagare sempre la sintomatologia riferita ha correlazione temporale e spaziale rispetto al lavoro svolto
- Contesto familiare ed abitativo, salubrità degli ambienti
- Scolarità o svolgimento del servizio militare/adesione a screening di popolazione

Propriamente detta

- Indagare alvo, diuresi, alimentazione, ritmo sonno-veglia, deambulazione, stato mnesico
- Autonomia nelle mansioni quotidiane (IADL o ADL)
- Abitudini voluttuarie (fumo [pacchi/anno], alcool [Litri o Bicchieri/die], sostanze psicoattive)

INSTRUMENTAL ACTIVITIES OF DAILY LIVING SCALE (IADL)

M.P. Lawton & E.M. Brody

Rationale

This tool is valuable for evaluating patients with early-stage disease, both to assess the level of disease and to determine the patient's ability to care for him- or herself. At a higher level of functioning are the instrumental activities of daily living (IADLs). Whereas basic activities of daily living (ADLs) diminish in the late-middle and later phases of the illness, IADLs diminish earlier. Performance of IADLs requires mental as well as physical capacity. The IADL scale measures the functional impact of emotional, cognitive, and physical impairments. Only four IADLs are used when determining if an individual is eligible to receive personal care service. If an individual is eligible for personal care services, he/she may receive assistance with IADLs that are not considered when determining the eligibility for personal care services, but have been scored a 1 or 2. IADLs are scored based on what an individual can do rather than what he/she is doing. IADLs should be scored based on how an individual usually performs a task.

Ability to Use Telephone

1. Operates telephone on own initiative; looks up and dials numbers 1
2. Dials a few well-known numbers 1
3. Answers telephone, but does not dial 1
4. Does not use telephone at all 0

Shopping

1. Takes care of all shopping needs independently 1
2. Shops independently for small purchases 0
3. Needs to be accompanied on any shopping trip 0
4. Completely unable to shop 0

Food Preparation

1. Plans, prepares, and serves adequate meals independently 1
2. Prepares adequate meals if supplied with ingredients 0
3. Heats and serves prepared meals or prepares meals but does not maintain adequate diet 0
4. Needs to have meals prepared and served 0

Housekeeping

1. Maintains house alone with occasion assistance (heavy work) 1
2. Performs light daily tasks such as dishwashing, bed making 1
3. Performs light daily tasks, but cannot maintain acceptable level of cleanliness 1
4. Needs help with all home maintenance tasks 1
5. Does not participate in any housekeeping tasks 0

Laundry

1. Does personal laundry completely 1
2. Launders small items, rinses socks, stockings, etc 1
3. All laundry must be done by others 0

Mode of Transportation

1. Travels independently on public transportation or drives own car 1
2. Arranges own travel via taxi, but does not otherwise use public transportation 1
3. Travels on public transportation when assisted or accompanied by another 1
4. Travel limited to taxi or automobile with assistance of another 0
5. Does not travel at all 0

Responsibility for Own Medications

1. Is responsible for taking medication in correct dosages at correct time 1
2. Takes responsibility if medication is prepared in advance in separate dosages 0
3. Is not capable of dispensing own medication 0

Ability to Handle Finances

1. Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income 1
2. Manages day-to-day purchases, but needs help with banking, major purchases, etc 1
3. Incapable of handling money 0

ADL

Basic Activity of Daily Living

Activity	Description	Score
Hygiene	Autonomous	0
	Partial assistance for one part of the body	1
	Assistance for several parts of the body or toileting impossible	2
Dressing	Autonomous	0
	Dresses but needs assistance with shoes	1
	Needs assistance in choosing clothing, getting dressed, and remains partially or completely undressed	2
Toileting	Autonomous	0
	Needs to be accompanied; needs assistance	1
	Does not go to the toilet; does not use the toilet or urinal	2
Locomotion	Autonomous	0
	Needs assistance	1
	Bedridden	2
Continence	Continent	0
	Occasional incontinence	1
	Permanent incontinence	2
Meals	Autonomous	0
	Needs assistance to cut meat or peel fruit	1
	Total assistance or artificial feeding	2
Total		

Patologica remota

- Natalità a termine o meno/Parto eutocico o distocico
- Comuni estantemi dell'infanzia
- Anamnesi Chirurgica
- Anamnesi Medica (principali patologie croniche o pregresse riferite e relativo stato di follow-up) – In genere meglio ordine temporale (oppure per organi/apparati)

Patologica Prossima

- Breve epicrisi della clinica e della sintomatologia clinica riferita dal paziente che ha richiesto l'osservazione medica
- Indagare bene la durata, l'esordio, le modifiche ed i trattamenti eseguiti oltre agli esami diagnostici effettuati

Farmacologica ed Allergica

- Terapia cronica eseguita
- Indagare sempre intolleranze a farmaci o alimenti o inalanti al fine di determinare correlazione temporale con sintomi e clinica (es. rinite allergica)


Let's Practice
Thanks for your attention