# Reference information for the accredited person

***How should I introduce myself to a patient and why is this necessary?***

Example:

"Hello, my name is ___, I am a sixth year medical student/ district general practitioner/..." (you can voice it the way you want)

The patient has the right to know the names and titles of those who care for them.

***Information about upcoming manipulations***

Example:

"Today I will need to examine your respiratory system. Examine your pulse, take your temperature, examine your chest, and listen to your lungs. Do you consent to this?" (you can voice it the way you want)

When informed, the patient feels calmer and more confident and is more willing to be involved in the process.

***Do I need to say anything during the examination process?***

During the examination itself, it is worthwhile to warn the patient before each manipulation:

"I'm going to examine your hands now. Please do it like this…"

as well as commenting on the results:

"Pulse symmetrical, rhythmic, good filling and tension."

Try to always be in contact with the patient, this will help to create a trusting and calm atmosphere.

# Interviewing the patient. Information gathering

1. After introducing yourself and asking for the patient's full name and age, the interview should begin with the question **"What are you here for?"** in order to clarify complaints. All you need to do next is to listen carefully to the patient's history.

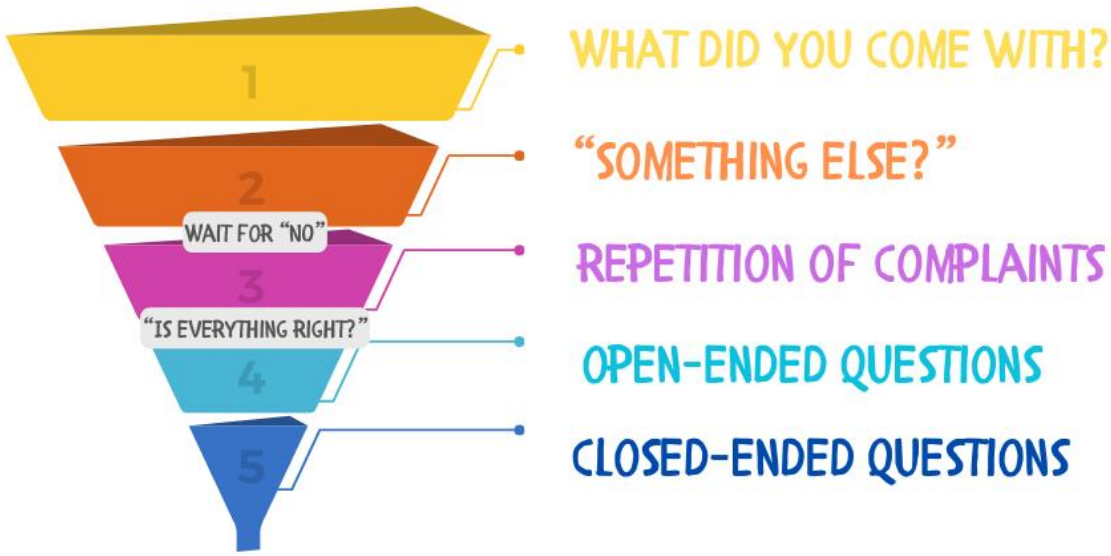
2. After the patient has listed his or her complaints, it is important to clarify whether the patient has talked about everything that is bothering him or her **("Anything else?")** until the patient says, "No, that's it."

3. Next, you should **list aloud all the complaints expressed by the patient** in order to clarify whether everything has been recorded and understood correctly by you. This also has a positive effect on the patient's confidence, as he or she realizes that you have listened attentively to him or her.

4. History-taking should begin with **open-ended questions** that elicit a detailed response from the patient. (For example: "Tell me about your condition from the beginning").

5. Gradually move to **closed questions** that require a precise answer from the patient. (For example: "What kind of cough do you have?", "Where exactly do you have pain?").

This principle is called the **funnel principle**, where you move from more "broad" questions to more "narrow" ones.



# Inspection

## Patient's position

The position of the patient can be active, passive or forced.

Active position - the patient easily and freely performs voluntary (active) movements.

Passive position - the patient is unable to perform voluntary movements, maintains the position he or she has been given.

Forced position - the patient assumes the position himself in order to reduce (decrease the level of) pain and other pathologic symptoms.

Examples of forced positions:

In abdominal pain associated with inflammation of the peritoneum, the patient lies or sits with legs bent, avoiding any touch on the abdomen.

In pleurisy, the patient lies on the sick side to reduce pain and facilitate the excursion of the healthy lung.

In suffocation - sitting, resting his or her hands on the bed to facilitate breathing, turn on the auxiliary muscles (orthopnea position).

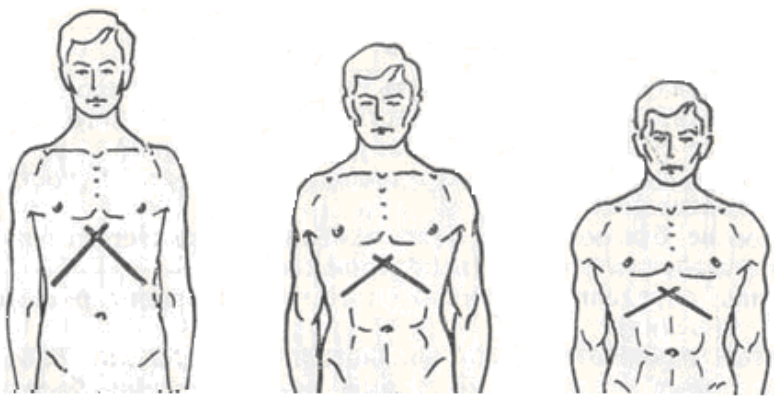
Due to a decrease in blood oxygen saturation with pathology of the respiratory system, diffuse cyanosis **of the skin** appears, sometimes with a gray or pink tint.

For the same reasons, the **terminal phalanges of the hands and feet** thicken (the "drumstick" symptom/ "clubbing"), and the nails become deformed to look like "hour-glasses" (Schamroth's window test). (see "Reference information for the accredited person (cardiovascular system)").

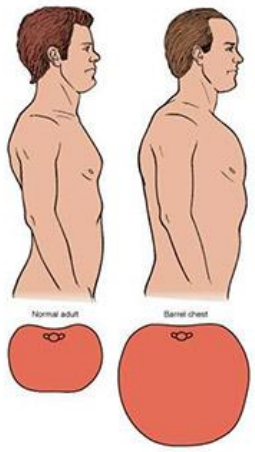
## Chest (thorax) shape

The anteroposterior diameter of the thorax should be less than the lateral diameter.
Also look at the rib angle - the angle between the rib edges below the scapula.
Normal is about 90°.

- *Normosthenic thorax* - characterized by a truncated cone shape, weakly expressed supra- and subclavian fossae.
- *Asthenic thorax* - characterized by a small diameter and elongated shape, and the clavicles, supra- and subclavian fossae are strongly marked.
- *Hyperstenic thorax* - has well-developed musculature of the thoracic region, in shape similar to a cylinder - diameter of anteroposterior and lateral positions are practically the same.



## Chest deformities




Barrel-shaped: large rib cage and over-expanded "barrel" shaped chest. Most often associated with emphysema.

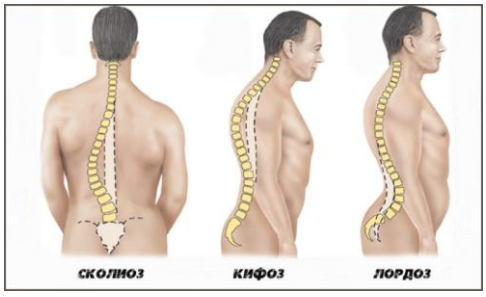
Pectus carinatum (keeled rib cage): protrusion of the sternum and ribs. It is usually idiopathic or associated with rickets.

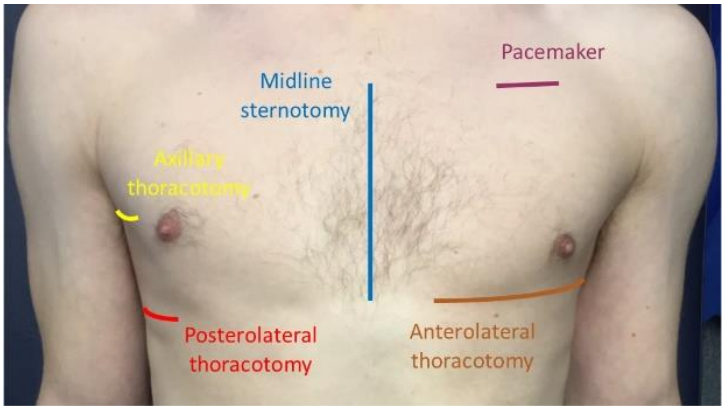

Pectus excavatum (funnel chest): the chest is sagging. It is a congenital defect.


Kyphosis: increased curvature of the thoracic spine.

Scoliosis: an increase in the lateral curvature of the spine.

Lordosis: abnormal curvature of the spine with a bulge toward the front.



**Chest symmetry** is assessed during quiet breathing. In a healthy person, the chest is symmetrical both on inhalation and exhalation.

- Increased volume of one half - hydro- or pneumothorax.
- Decreased volume of one half - obturator atelectasis and cirrhosis of the lung.

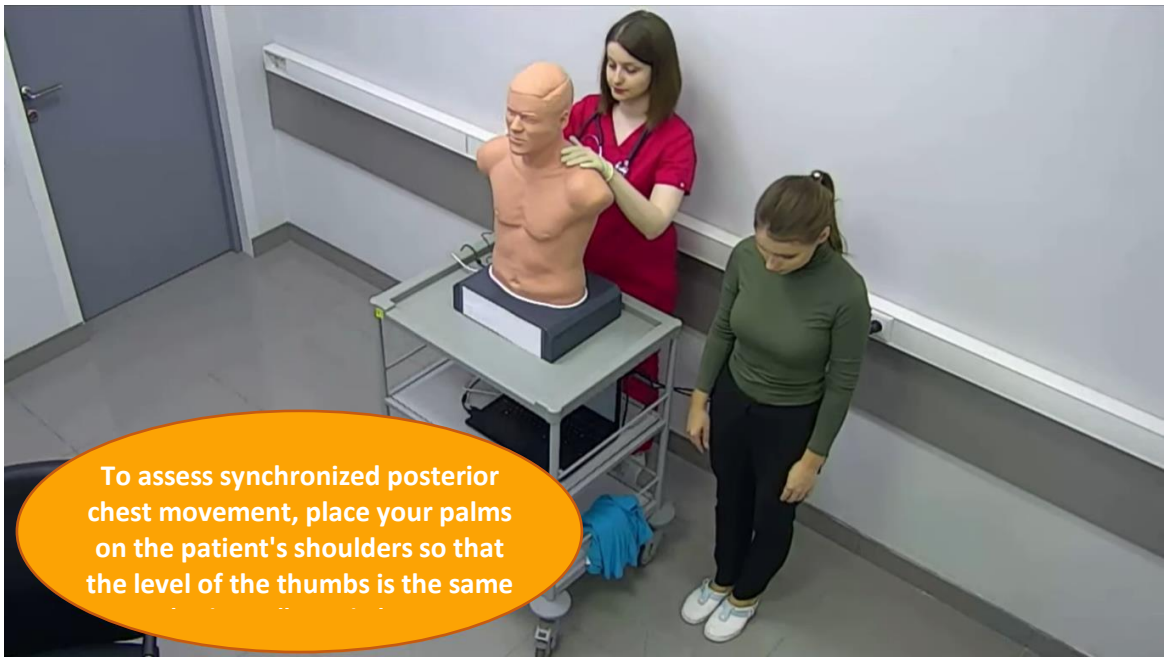
Establishing **the type of breathing** is based on determining the group of muscles that provide inhalation and exhalation: the abs and diaphragm are responsible for the abdominal type, intercostal muscles - for the thoracic type of breathing.
Also distinguish a mixed type of breathing, in which there is no predominance of the abdominal or thoracic component.

- Men and children - abdominal type predominates.
- Women - thoracic type predominates.

A change in the type of breathing can be associated with fractured ribs, inflammation of the pleura, etc.

Assessment of **synchronization of breathing** is carried out against the background of deep breathing movements of the patient. In this case, convenient reference points from the front are the position of the rib arches and their respiratory excursion, from behind - the position of the shoulder blades and their movement during the act of breathing.

- In a healthy person, both halves of the chest participate in breathing synchronously.
- Lagging of any of them is found in unilateral pathological processes in the lungs or in the pleural cavity.



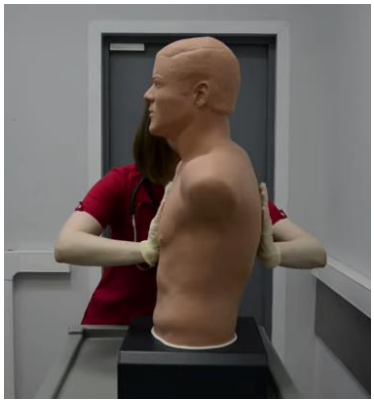

In describing the **respiratory rhythm**, the depth of inhalation, the ratio of inhalation and exhalation phases, and the loudness of the breath are considered.
If the time intervals between breathing movements are the same - breathing is rhythmic, if not - arrhythmic.

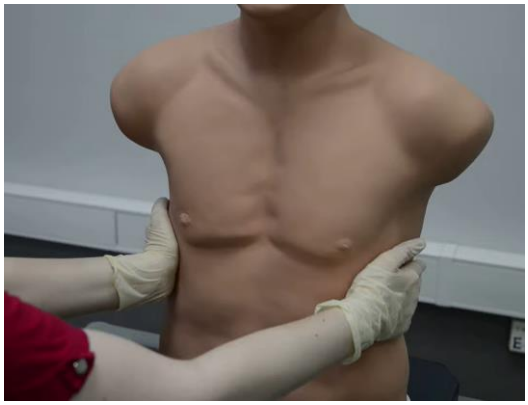
Determining if there is **retraction of the yielding areas of the** chest (e.g., intercostal spaces)
This is caused by a decrease in air pressure inside the chest. This can happen if the upper airways (trachea) or the small airways of the lungs (bronchioles) are partially blocked. This causes the intercostal muscles to pull inward when breathing. This is a sign of airway obstruction.

# Palpation of the thorax

**The elasticity of the rib cage** depends mainly on the degree of ossification of the rib cartilages and is determined by the sensation of its resistance when squeezed.

- The most common causes of increased chest stiffness are pulmonary emphysema, massive lung tissue thickening, and certain pleural diseases such as exudative pleurisy.

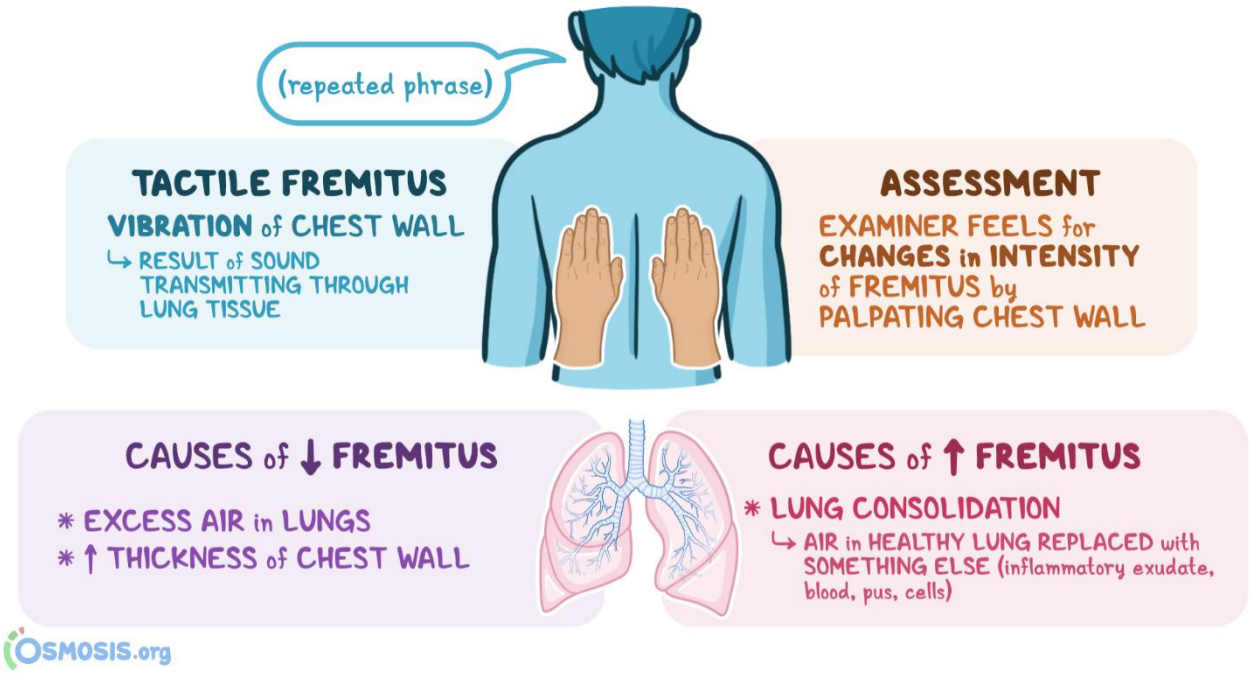




The definition of **tactile fremitus** is based on the ability of tissues to conduct vibrations produced by vocal cord tension.

Tactile fremitus is assessed by asking an individual to repeat a certain phrase while the examiner places the palms or the bony edge of their hands on the individual's chest wall to feel for sound vibrations.

Low-frequency vibrations, such as those created by two adjacent vowel sounds (e.g. "coin", "sound", or "boat"), are transmitted more effectively down the tracheobronchial tree, and thus evoke a more noticeable fremitus.



Supraclavicular areas

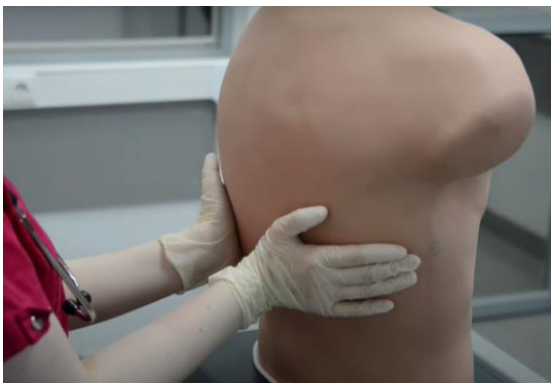
Subclavian areas

Lateral areas

Supra scapular areas

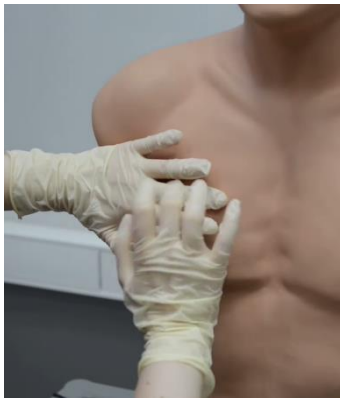
Ask the patient to lean forward slightly with their head down and cross their arms over their chest, placing their palms on their shoulders

Interscapular areas



Subscapular areas

## Lung percussion



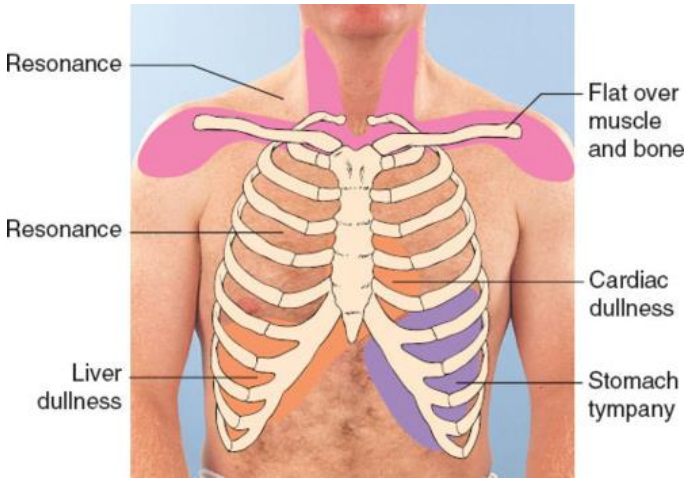
Percussion of the chest produces sounds ranging from ringing to blunt, depending on the density of the underlying tissues.

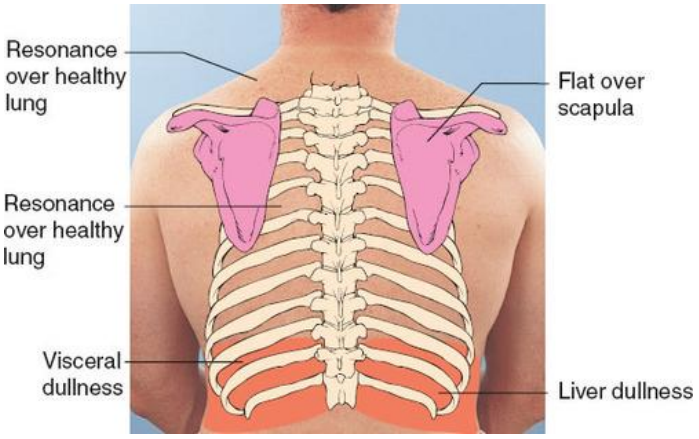
Normally, the percussion sound over the lung tissue is the clearest in the whole body and is called the pulmonary sound (Resonance).

Drum-like percussion sound (Hyperresonance) - emphysematous changes, increased airiness of lung tissue, pneumothorax.

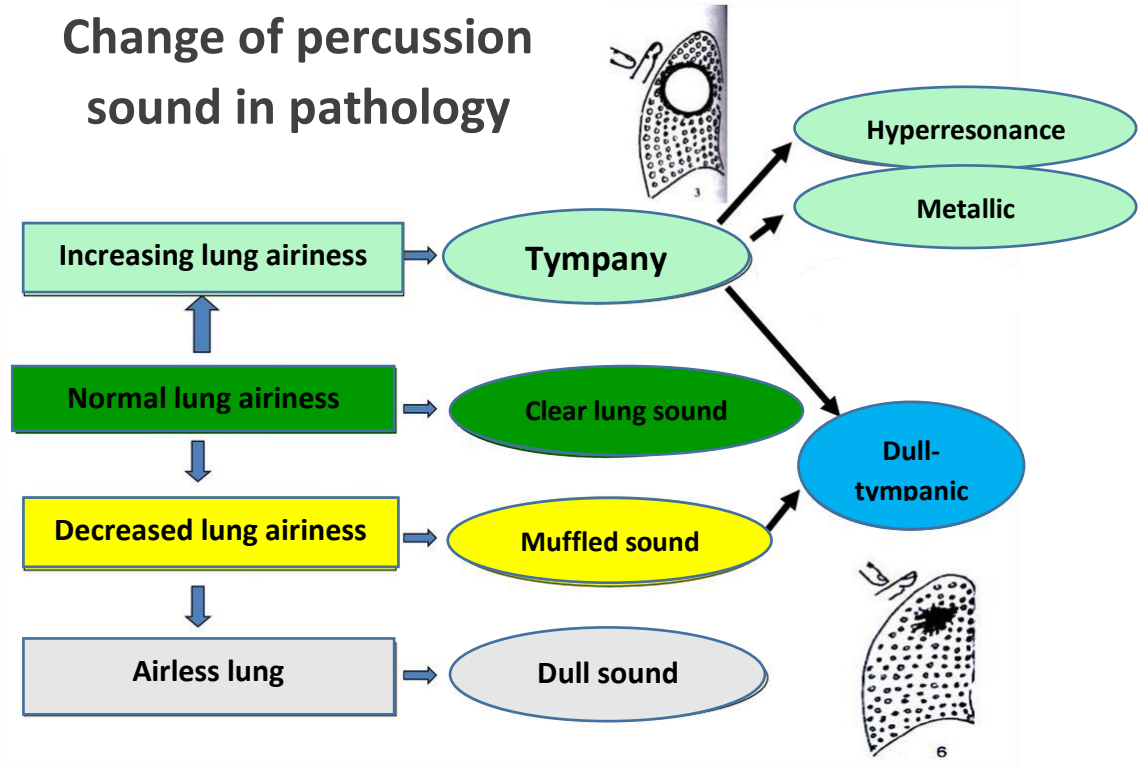
Dullness of percussion indicates denser tissue, such as areas of effusion or consolidation.

### The norm of percussion:



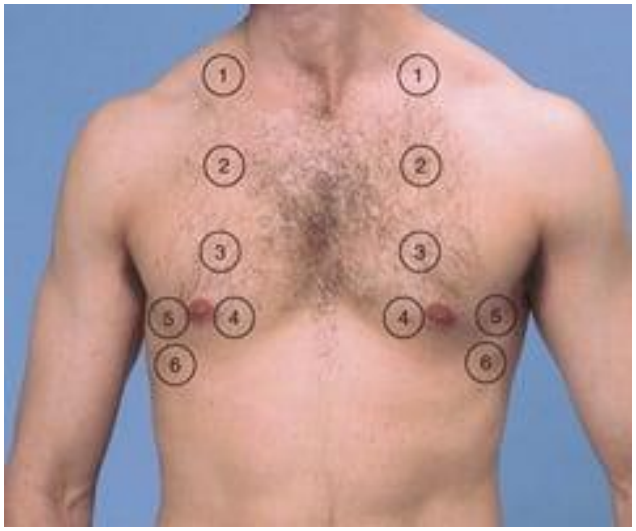

### Change of percussion sound in pathology

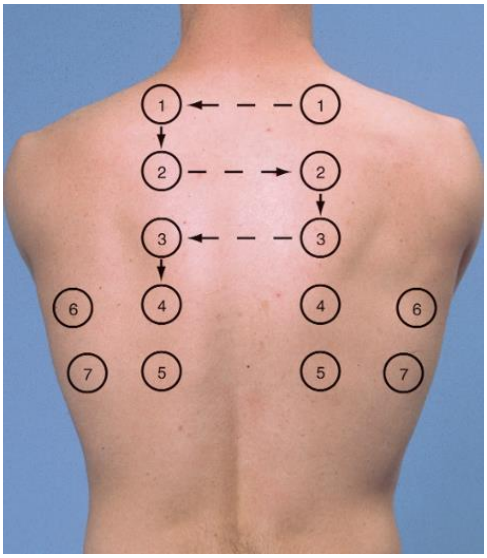


| Sound | Intensity | Pitch | Duration | Quality | Source |
|---|---|---|---|---|---|
| **Resonance** | Mod-Low | Low | Long | Hollow | Normal Lung |
| **Tympany** | Loud | High | Moderate | Drum-Like | Gastric Air Bubble<br>Intestinal Air |
| **Dullness** | Soft-Mod | High | Moderate | Thud-Like | Liver<br>Spleen<br>Full Bladder<br>Pregnant Uterus<br>Diaphragm<br>Pleural Effusion<br>Lobar Pneumonia |
| **Hyperresonance** | Very Loud | Very Low | Long | Booming | Hyperinflated Lung<br>Emphysema<br>Pneumothorax |
| **Flatness** | Soft | High | Short | Flat | Muscle<br>Bone<br>Thigh |

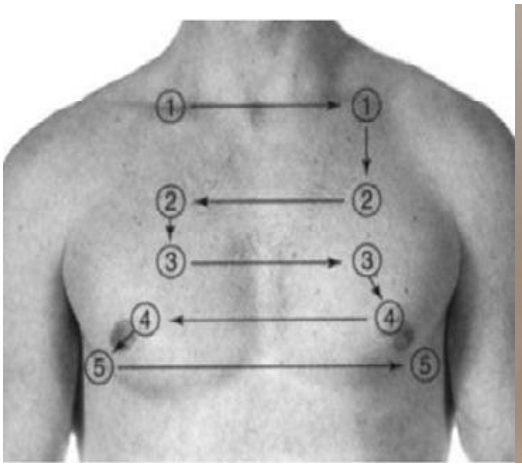
Upper, middle and lower parts of the interscapular space

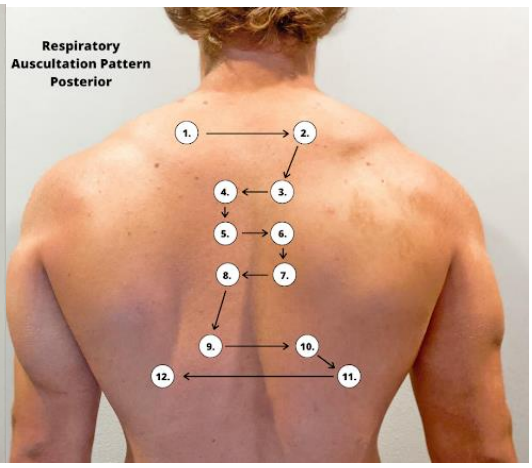
Subscapular areas in VII, VIII and IX intercostal spaces



# Lung auscultation






## Lung areas:

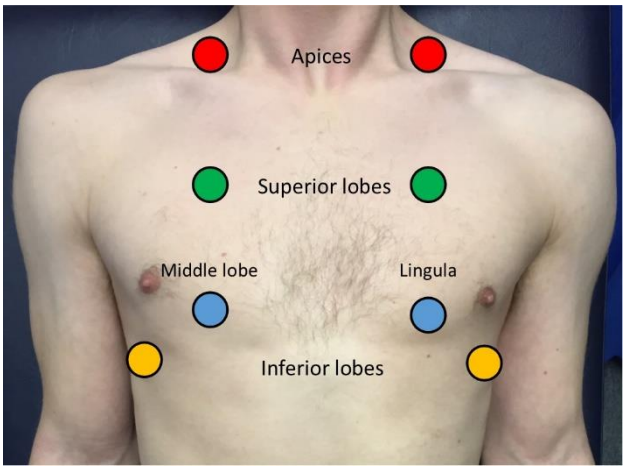
**Front**

Apex: in the supraclavicular fossa

Superior lobe: in the 2nd intercostal space along the midclavicular line

Middle lobe: at the level of the 5th rib, midclavicular line

Inferior lobe: 7th intercostal space, midaxillary line



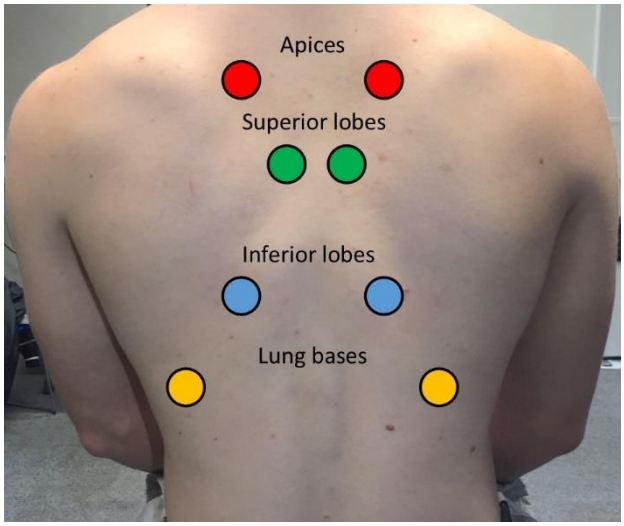

**Back**

Apex: above the medial angle of the scapular spine

Superior lobe: medial to the scapular axis

Inferior lobe: 5 cm below and medial to the inferior angle of the scapula

Lung base: at the level of T10, 5 cm lateral to the vertebral column



## WHAT DO I NEED TO DETERMINE WHEN AUSCULTATING THE LUNGS?

1. **MAIN RESPIRATORY (LUNG, BREATH) SOUND** (by comparing the duration of the inhalation and exhalation phases);
2. Are there any **ADVENTITIOUS (ABNORMAL) RESPIRATORY SOUNDS**;
3. **AT WHAT PHASE OF THE RESPIRATORY CYCLE (INHALATION, EXHALATION)** are these adventitious sounds heard?

## MAIN RESPIRATORY SOUNDS (NORMAL)

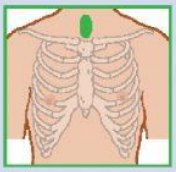
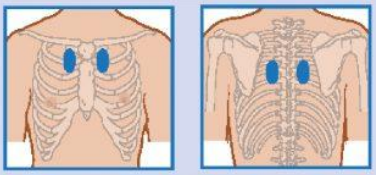
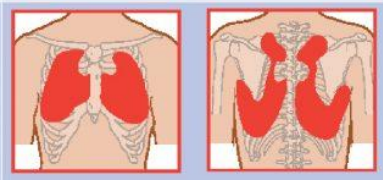
Tracheal – over the trachea

Bronchial – (lower) over the manubrium and posteriorly paravertebrally to the level of 3-4 thoracic vertebrae

Bronchovesicular – large bronchi

Vesicular – periphery

Table 1. **Quality of normal breath sounds**

| Breath sound | Intensity and pitch | Inspiratory: expiratory ratio | Positions to hear sounds | |
|---|---|---|---|---|
| Tracheal  | Very loud, high pitch | Inspiratory and expiratory sounds equal | Over the trachea (above the subclavicular notch) |  |
| Bronchial  | Loud, relatively high pitch | Inspiratory sound shorter than expiratory | Over the manubrium (just above the clavicles) |  |
| Bronchovesicular  | Medium loudness, intermediate pitch | Inspiratory and expiratory sounds equal | First and second intercostal spaces next to the sternum and between the scapula |  |
| Vesicular  | Soft, relatively low pitch | Inspiratory sound longer than expiratory | Most of the lung field |  |

## HOW DO I DETERMINE THE MAIN SOUND?

- **Based on the difference in inhalation and exhalation durations**

Vesicular breathing:

- inhalation/exhalation ratio of 3:1 or 3:0 (inhalation is fully audible, exhalation is almost inaudible)
- there's no pause between inhalation and exhalation;
- is heard equally over symmetrical areas of the chest;
- is heard over healthy lung tissue.

Bronchial (and tracheal) breathing:

- 1:1 ratio of inhalation to exhalation;
- there's a silent pause between inhalation and exhalation;
- is normally heard only in specific locations (over the manubrium).

Bronchovesicular breathing:

- a 1:1 ratio of inhalation to exhalation duration (BRONCHIAL SIGN);
- there is no pause between inhalation and exhalation (VESICULAR SIGN);
- usually heard in the interscapular region.

**Normal tracheal/bronchial sounds** are hollow nonmusical sounds with a wide spectrum of frequencies that are clearly heard at the suprasternal notch or the lateral neck in both respiratory cycles.

**Pathologic tracheal/bronchial sounds** are audible over peripheral lung areas and may suggest lung consolidation (due to inflammation, infection, hemorrhage, protein, or malignancy). In patients with upper airway obstruction, tracheal sounds may become musical and can present as either stridor or localized wheeze.

If the main respiratory sound is not heard where it should be - THIS IS PATHOLOGY

## When does the vesicular breathing change?

Physiological *weakening* of vesicular breathing – occurs in patient with excessively developed muscles or fat.

Pathological *decreased* vesicular breathing:

- in the early acute lobar pneumonia (because alveoli become filled with effusion);
- in the weakened inspiration phase (inflammation of the respiratory muscles, intercostal nerves, rib fracture);
- in lung emphysema - significantly decreasing of the number of functional alveoli because of their dystrophy;
- in obstruction of a large bronchus lumen;
- over a large amount of fluid or air in pleural cavity.

Physiological *intensification* – in undeveloped muscles or subcutaneous fat, physical activity.

Pathological *increased* vesicular breathing:

can be heard in increased expiration - because of the obstruction of the air passage through the small bronchi; this obstruction usually is due to contracted lumen of small bronchi and bronchiole (bronchospasm, inflammatory edema of the mucosa).

This increased vesicular breathing is called harsh respiration and it appears in the uniform narrowing of small bronchi (bronchitis).

**Quantitative changes in vesicular respiration include:**

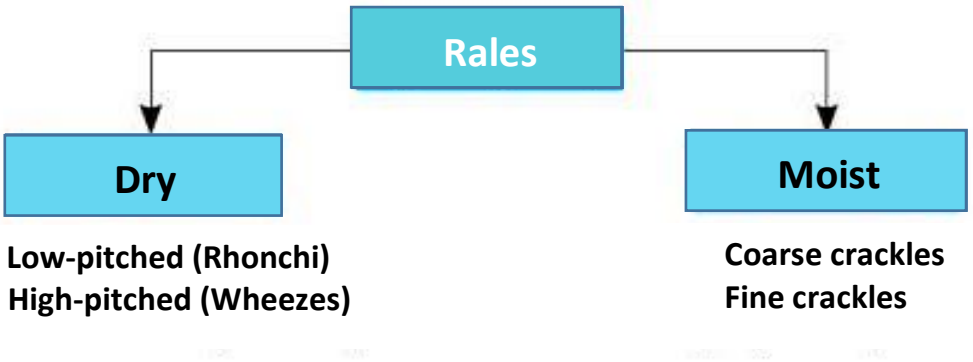
- weakening;
- amplification.

**Qualitative changes in vesicular breathing include:**

- harsh vesicular breathing;
- vesicular breathing with prolonged exhalation;
- intermittent vesicular breathing.

## Adventitious respiratory sounds

### (PATHOLOGICAL; NORMALLY SHOULD NOT BE HEARD ANYWHERE)




+ Pleural friction rub, Stridor, Squawk etc.

1) **Crackles** are nonmusical, short (<0.25 seconds), explosive respiratory sounds heard mostly during inspiration, caused by the sudden equalization of gas pressures between two areas of the lung. They occur during the opening of previously closed small airways. Crackles may be transiently apparent in healthy people but disappear after a few deep inspirations.

a) **Fine crackles**, formerly termed crepitations or "velcro rales," are heard mid-to-late inspiration mostly in dependent lung regions, uninfluenced by cough or body position, and not transmitted to the mouth. These high-pitched sounds may be due to pulmonary fibrosis, congestive heart failure, or pneumonia. Of note, fine crackles are minimal or absent in sarcoidosis, as the disease affects mostly central lung zones.

b) **Coarse crackles** are heard early in inspiration and throughout expiration, can be transmitted to the mouth, and can change with cough, but they are not influenced by changes in body position. These low-pitched sounds are commonly observed in the setting of bronchiectasis and other conditions characterized by secretions in the airways.

2) **Wheezes** and **rhonchi** are musical continuous breath sounds (>0.25 seconds), which may be high-pitched (wheezes) or low-pitched (rhonchi) and are generally audible during expiration. Wheezes (hissing, whistling sounds) are produced by the turbulent flow of air through narrowed airways, while rhonchi are mainly caused by secretions present in the airways. **Expiratory wheeze** is mostly caused by narrowing of the airways within the chest, which can occur in the setting of asthma, chronic obstructive pulmonary disease, aspiration of gastric contents, or heart failure. Of note, localized wheeze may be due to a focal process, including a tumor, foreign body, or mucous plug.

3) **Stridor** is a particularly loud, high-pitched, continuous sound, more clearly heard on inspiration over the upper airways or sometimes even without a stethoscope. This sound is caused by large airway narrowing and may indicate obstruction of the larynx or trachea. Stridor may be heard in patients with vocal cord dysfunction, epiglottitis, airway edema, anaphylaxis, laryngotracheitis, extrinsic compression of the trachea, or a foreign body.

4) **Squawk, also known as "squeak,"** is a mixed sound consisting of short wheezes accompanied by crackles that are heard in the middle to the end of inspiration. Squawks are most frequently present in patients with hypersensitivity pneumonitis and less often in patients with other interstitial lung diseases, bronchiectasis, or pneumonia.

5) **Pleural friction rub** is caused by the rubbing of the parietal and visceral layers of the pleura due to the deposition of fibrin in the course of an inflammatory or neoplastic process. This is generally biphasic in nature and heard best in basal and axillary regions.