

Pulmology



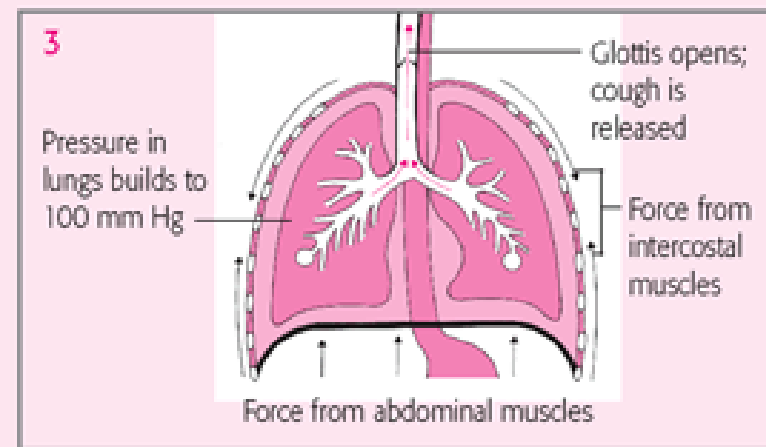
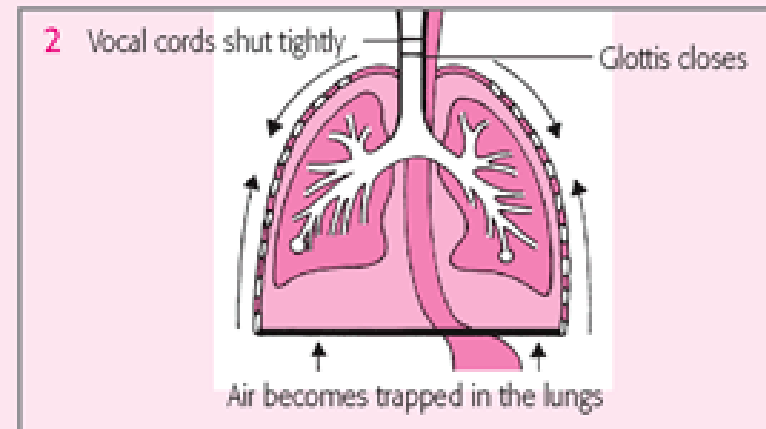
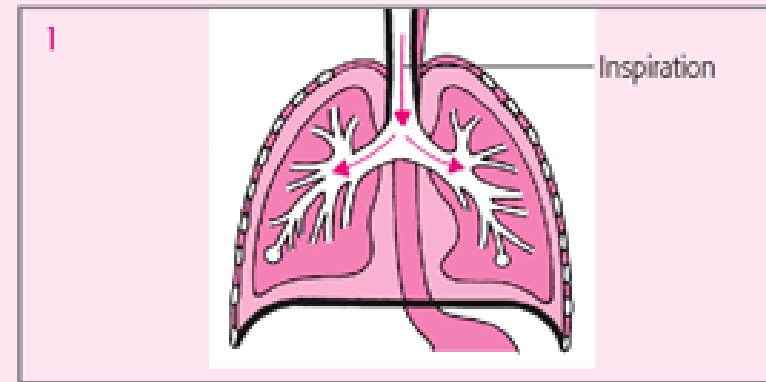
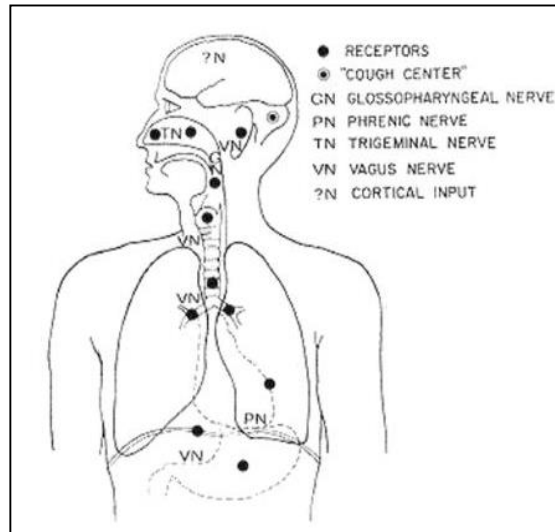
Symptoms of respiratory diseases

- Cough
- Dyspnea
- Stridor
- Chest pain
- Hemoptysis
- Cyanosis
- Finger clubbing

Cough

protective reflex, which helps to clear the large breathing passages from fluids, irritants, foreign particles and microbes

1. Irritation of inflammatory, mechanical, chemical, thermal receptors
2. Impulses thru n. vagus and n. laryngicus get to medulla oblongata
3. Then impulses pass thru motoric nerves to respiratory muscles
4. Muscle contraction and opening of closed glottis



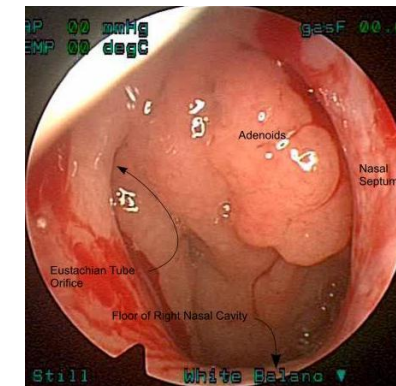
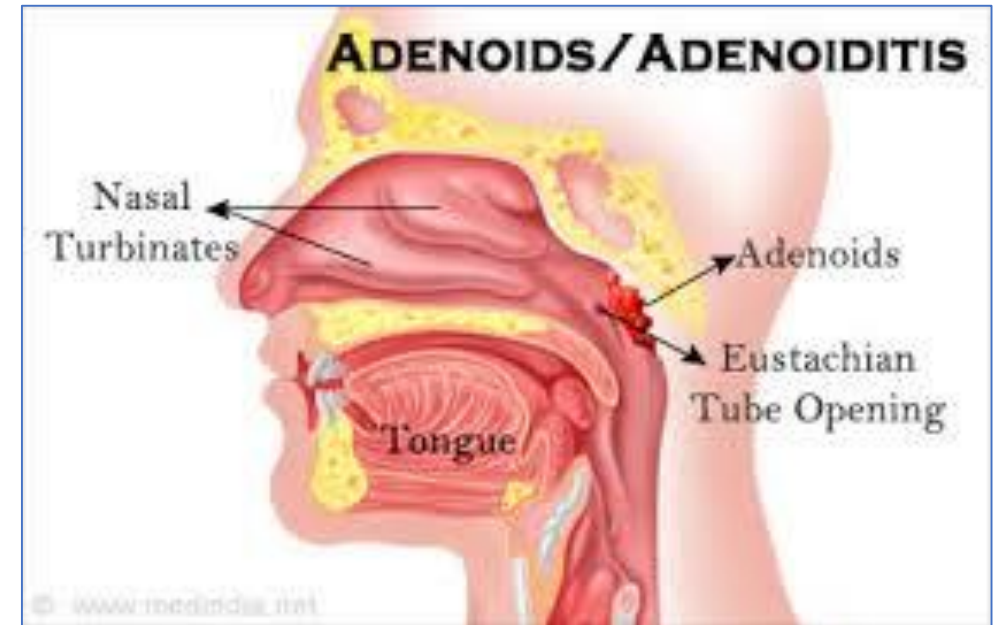
The most often causes of cough

- Respiratory infections
- Upper airways – enlarged adenoids, rhinitis, sinusitis
- Asthma
- Gastroesophageal reflux
- Aspiration due to swallowing discoordination or GE reflux
- Chronic bronchitis

The most often causes of cough

https://www.youtube.com/watch?v=2w_AbqXd40c

Enlarged adenoids



Bronchial asthma

dry cough or cough episodes after physical activity

- Chronic condition characterised by a **variable and mostly reversible lower airway obstruction.**
- Multifactorial etiology
 - **Genetic background**
 - **Interaction with the environment**
 - Secondhand tobacco smoke
 - Exposure to indoor and outdoor allergens
 - Irritants exposure
 - Viral infections (RSV, RV)
 - Development of chronic inflammation, sometimes remodeling of bronchi wall with irreversible obstruction
 - <https://www.mayoclinic.org/diseases-conditions/asthma-attack/multimedia/asthma/vid-20084746>

Aspirations

cough episodes or chronic bronchitis

Gastroesophageal reflux

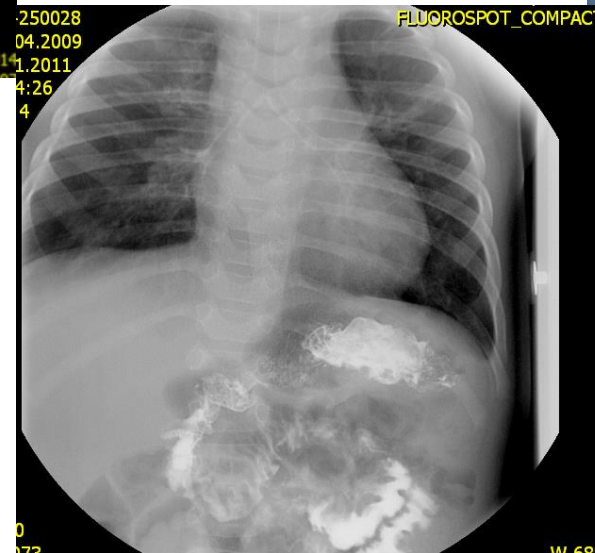
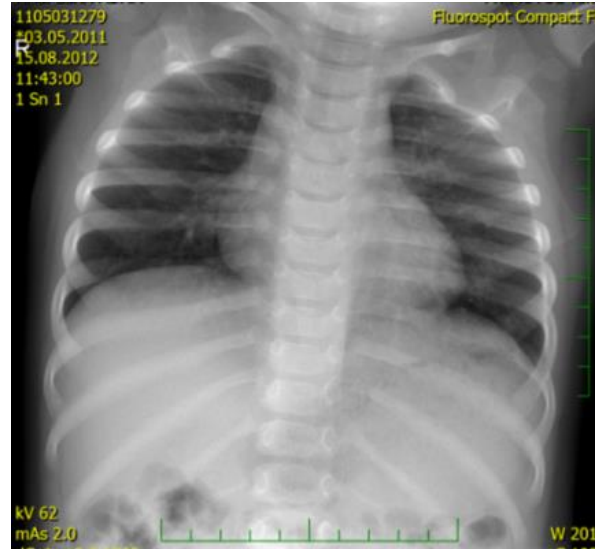
(especially in neurologically impaired children)

Swallowing discoordination

Anatomical abnormalities

(as for example laryngeal cleft)

Saliva aspiration (especially in neurologically impaired children)



Dyspnea

subjective experience of breathing discomfort

Respiratory

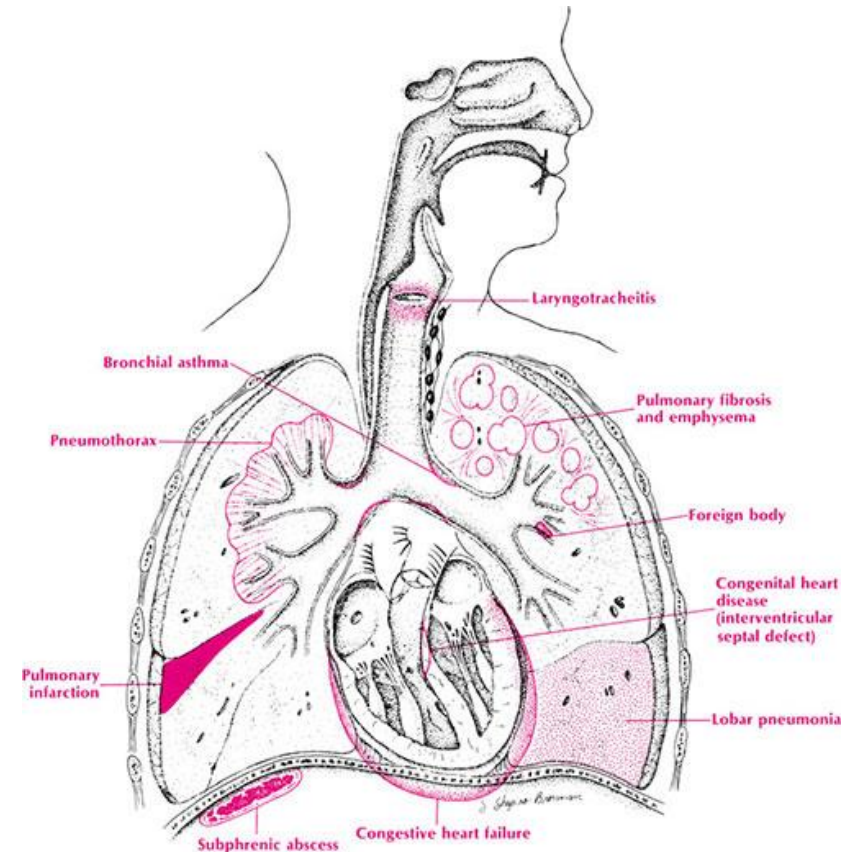
- Stimulation of respiratory centres
 - Hypoxia or hypercapnia – obstruction, inflammation, oedema
 - Medicaments
 - Ketoacidosis
- Ventilation – increased work of breathing
 - Neuromuscular weakness
 - Reduced compliance of chest wall or lungs
- Gas exchange (alveolocapillary membrane disease)
 - Inflammation (pneumonia, pneumonitis)
 - Destruction of the diffusing membrane

Cardial

- Heart failure

Anemia

Deconditioning

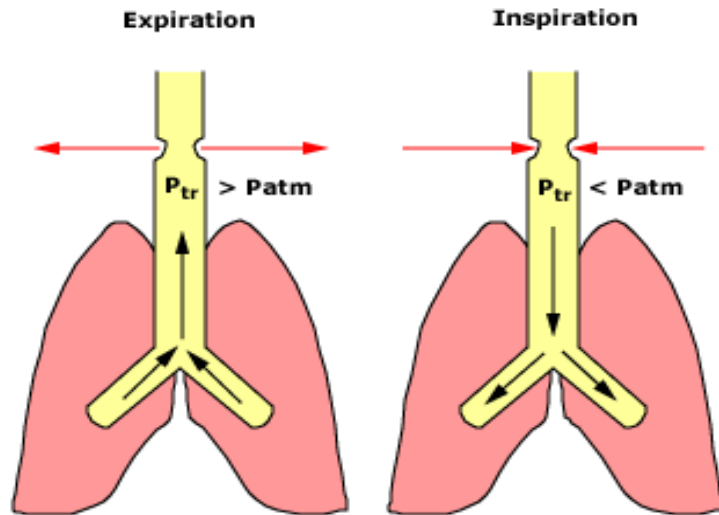


Obstruction of airways

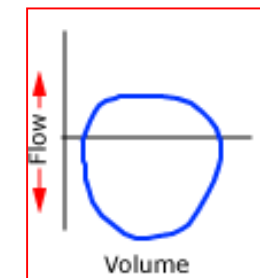
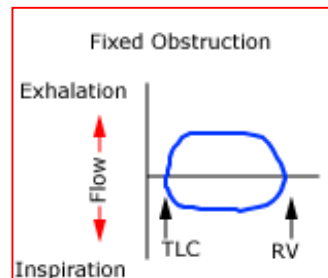
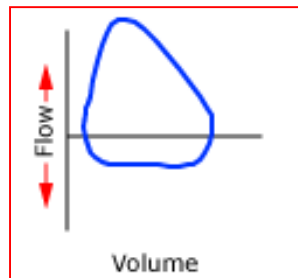
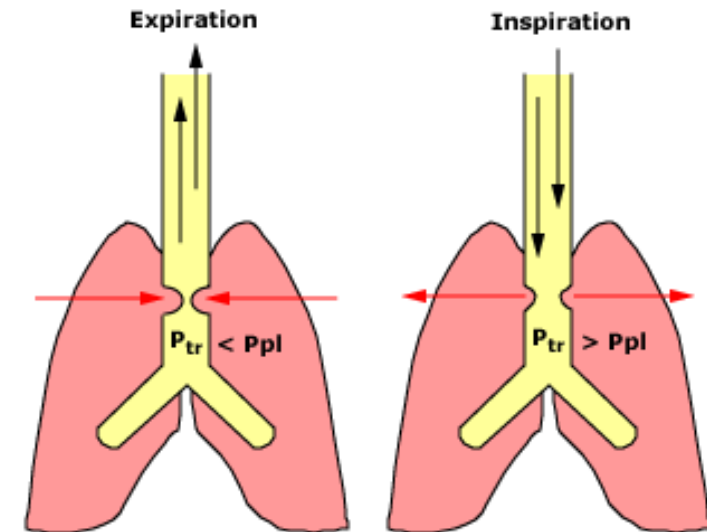
Variable obstruction in extrathoracic airways leads to worsening of obstruction in inspiration

Variable obstruction of intrathoracic airways leads to worsening of obstruction in expiration

Effect of dynamic extrathoracic airway obstruction



Effects of dynamic intrathoracic airway obstruction



Stridor

caused by the oscillation of a narrowed airway, and its presence suggests significant obstruction of the large airways

Extrathoracic area

- Glottic and subglottic area
- Laryngomalacia, laryngitis, laryngotracheitis, epiglottitis, laryngeal cleft

Intrathoracic

- Intrathoracic part of trachea
- Main bronchi

Stridor

caused by the oscillation of a narrowed airway, and its presence suggests significant obstruction of the large airways

Acute onset

- Foreign body aspiration
- Laryngitis /laryngotracheitis
- Epiglottitis
- Anaphylaxis

Chronic/recurrent

- Laryngomalacia
- Tracheomalacia
- Vocal cord paralysis
- Subglottic stenosis
- Vascular ring
- Tumor

Stridor

caused by the oscillation of a narrowed airway, and its presence suggests significant obstruction of the large airways

<https://www.youtube.com/watch?v=JSdEK79J4dw>

Acute onset

- Foreign body aspiration

<https://pedclerk.bsd.uchicago.edu/page/foreign-body-aspiration>

- Laryngitis /laryngotracheitis

<https://www.kidmedva.com/kidmed-ical-journal/croup/>

- Epiglottitis

4D: dysphagia, dysphonia, drooling, resp. distress

<https://www.youtube.com/watch?v=eC0VD795iag>

- Anaphylaxis

Stridor

caused by the oscillation of a narrowed airway, and its presence suggests significant obstruction of the large airways

Chronic/recurrent

- Laryngomalacia

<https://www.youtube.com/watch?v=IYHg--J1iKw>

- Tracheomalacia

<https://www.youtube.com/watch?v=4XZlhyqkK1w>

- Vocal cord paresis

<https://www.youtube.com/watch?v=HYFrs80Z>

- Subglottic stenosis



<http://entokey.com/pediatric-laryngology-diagnosis-and-treatment-of-acquired-disorders-of-the-larynx>

Vascular ring

<https://doctorlib.info/cardiology/park-pediatric-cardiology-practitioners/17.html>



Hemoptysis

Hemoptysis is the expectoration of blood or the presence of blood in the sputum

Expectoration of blood originating from lower respiratory tract (pulmonary arterial or bronchial circulation) x hematemesis, epistaxis

Airway diseases :

- infection, bronchiectasis, foreign body, trauma

Pulmonary parenchymal diseases

- infection, trauma, diffuse alveolar haemorrhage,

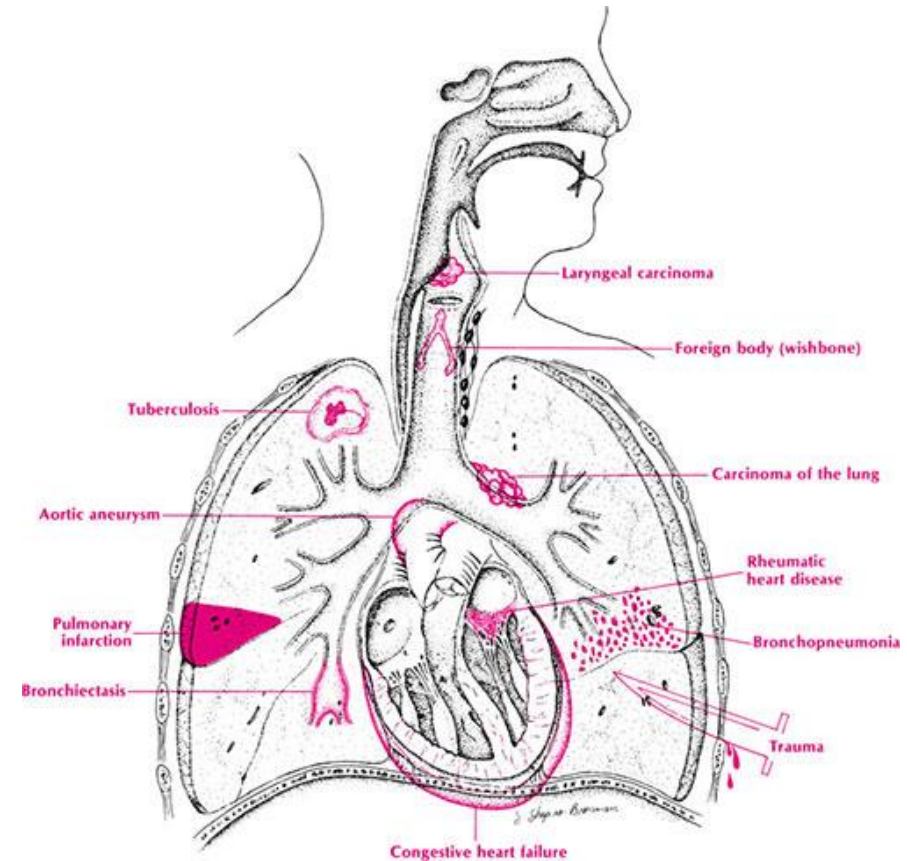
Pulmonary vascular disorders:

- arteriovenous malformations, embolism, PAH

Cardiac – related causes

- congestive heart failure

Coagulopathy



Chest pain

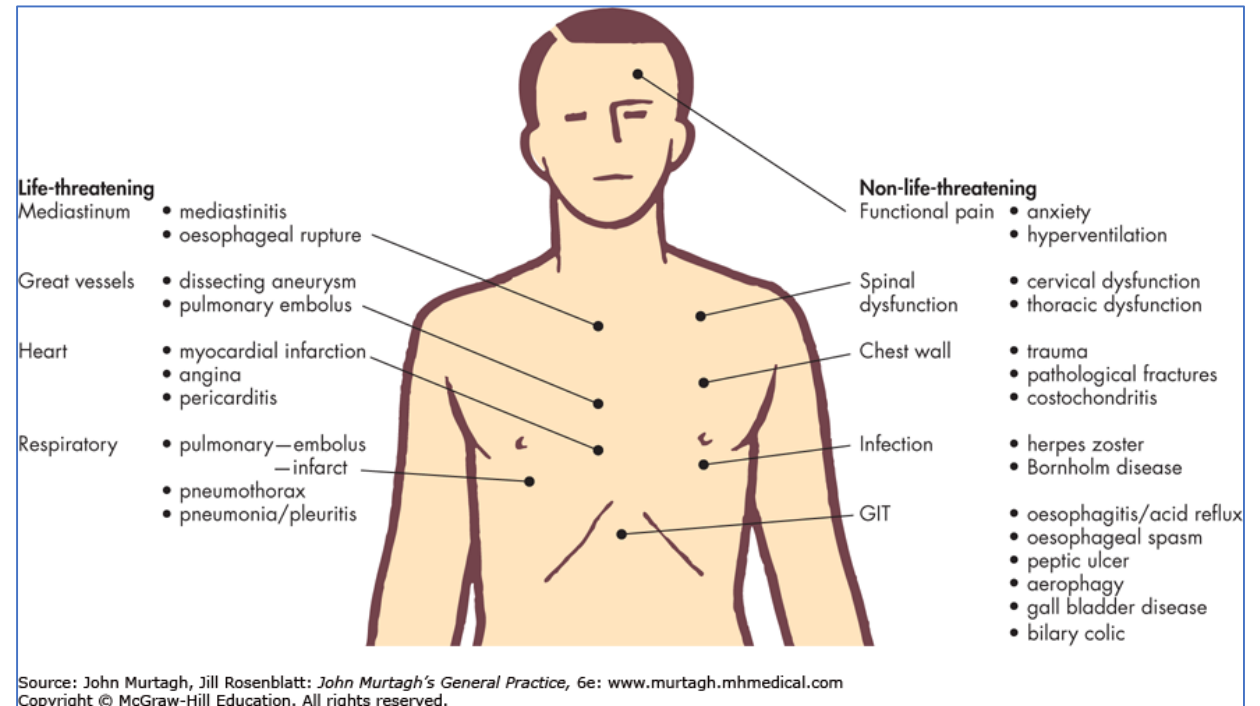
- Musculoskeletal conditions
- Psychiatric
- **Respiratory – pleuritis, spontaneous pneumomediastinum, pneumothorax**

airway foreign body

tumor

pulmonary embolism

- Gastrointestinal - oesophagitis
- Cardiac conditions



Cyanosis

bluish purple discoloration of the tissues due to an increased concentration of deoxygenated hemoglobin in the capillary bed

Central cyanosis

- Deoxygenated Hb exceeds 3,1 mmol/l
 - Respiratory causes – decreased inspired oxygen, trauma, lung disease
 - Circulatory causes
 - Mixing of oxygenated and deoxygenated blood - congenital heart disease
 - Structural or vascular alteration of blood flow – embolism, haemorrhage
 - Cardiac decompensation



Peripheral cyanosis

- Increased extraction of oxygen – sluggish movement of blood through the capillary circulation
 - Vasoconstriction, venous obstruction, polycythemia, low cardiac output



Examination

- History

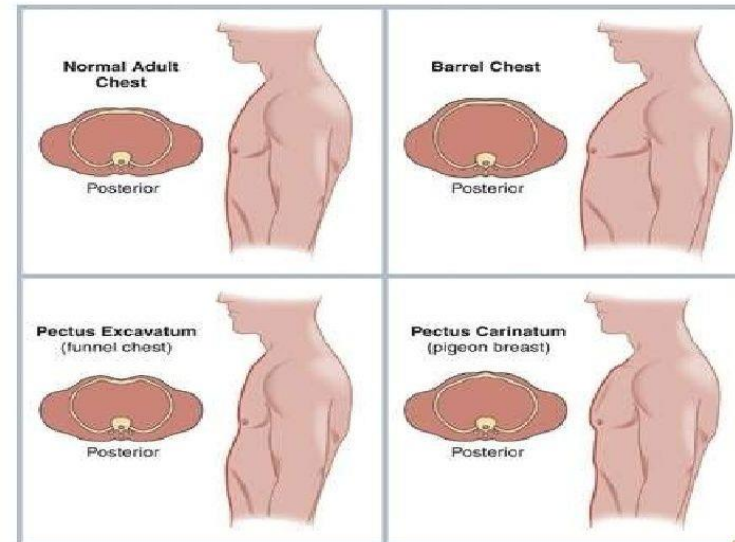
- current disease
- personal medical history (perinatal history!)
- family history
- allergic history
- epidemiological history
- environmental history

- Objective assessment

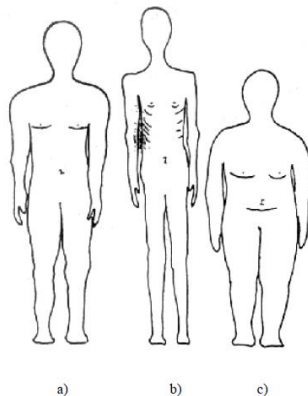
- development, growth, nutrition
- skin colour, mucosal membranes
- thorax shape
- finger clubbing
- percussion, auscultation, fremitus pectoralis, bronchophony
- heart sounds

Physical examination of the chest

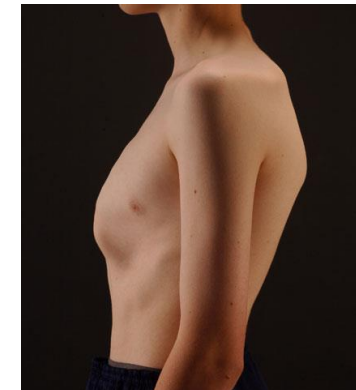
- pectus excavatum — sternum depressed
- pectus carinatum — anterior protrusion of sternum
- „barrel“ chest
- asthenic
- kyphoscoliosis



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- Tipurile constituționale:
a) normostenic; b) astenic; c) hiperstenic



Physical examination of the chest

• Auscultation

- **Normal bronchial sound:**

vesicular, puerile, tracheal sound

- **Patological sounds :**

Wheeze (high-pitched)

Rhonchi (lower-pitched)

Crackles (crepitations, rales)

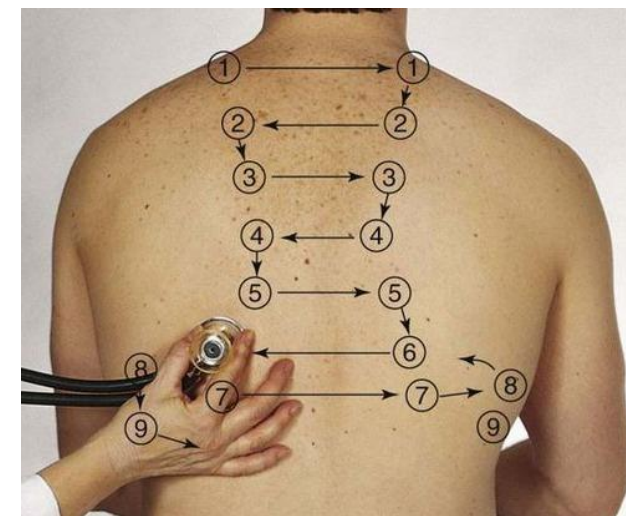
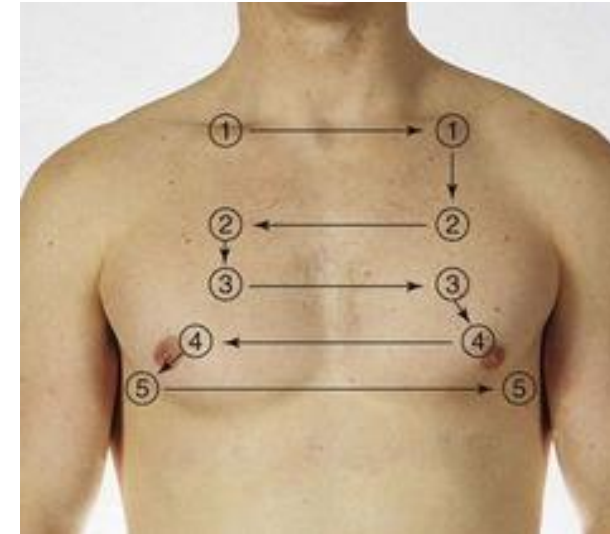
- High (fine)

- Low (coarse)

Pleural friction rub

https://www.youtube.com/watch?v=U8byn2NT_lo

<https://www.ausmed.com/cpd/articles/rhonchi-vs-ales-wheezing-crackles>



Breathing

Maximal normal respiratory rate	
< 2 month	< 60/min
2 – 12 month	< 50/min
1 – 5 years	< 40/min
6 – 8 years	< 30/min

Apnea - suspension of breathing

Dyspnea – difficult breathing

Bradypnoea – abnormally slow breathing

Hyperpnoea - more rapid and deep than breathing at rest

Tachypnoea - abnormally rapid breathing


Hyperventilation - increased rate or depth of respiration causing decreased levels of blood carbon dioxide

<https://www.youtube.com/watch?v=aVyAWjaGT8Q>

Kussmaul breathing (hyperpnoea)

Cheyne-Stokes respiration

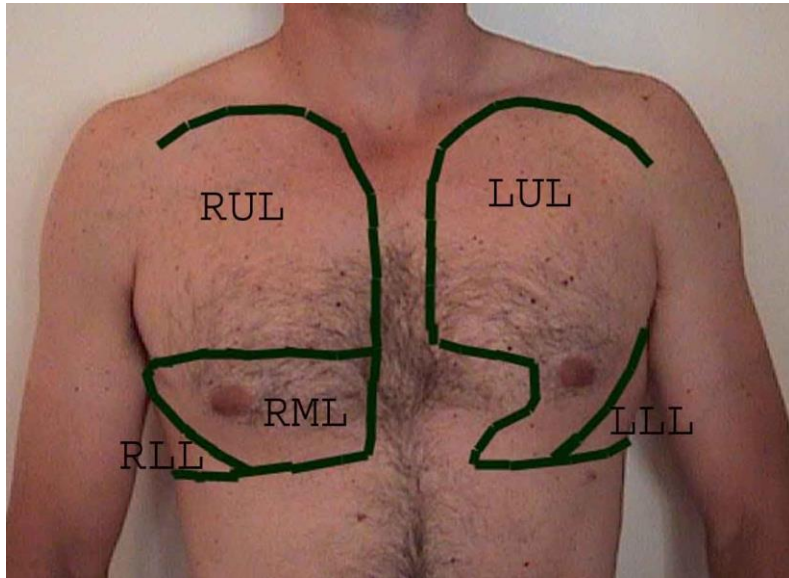
(gradual hyperpnoea/hypopnoea and apnoea) 

Biot's respiration (hyperpnoea or normopnoea and apnoea) 

Physical examination of the chest

Auscultation:

upper lobes mostly from front,
lower lobes mostly from back



Physical examination of the chest

• Percussion

- Comparative – left and right side
- Clear
- Hyperresonant – (pneumothorax, emphysema)
- Dull – lower than normal (consolidation)

- Topographic
- Organ margins

- <https://www.youtube.com/watch?v=GBywApgW3T0>
- https://www.youtube.com/watch?v=84AzA_SmLaQ

• Fremitus pectoralis



• Bronchophony



- Lowered (impaired lung airiness - fluidothorax, pneumothorax)
- Increased (infiltration – pneumonia)

	Auscultation	Percussion	Fremitus pectoralis	Movement of thorax
Pneumonia	Crackles	Dull	↑	affected side ↓
Pleural effusion	Diminished breath sound	Dull	↓	affected side ↓
Atelectasis	Diminished breath sound	Dull	↓	↓
Emphysema	Diminished breath sound/cracles prolonged expiration	Hyperresonant	↓	affected side ↓
Pneumothorax	Diminished breath sound	Hyperresonant	none	↓
asthma	Wheezes, Prolonged Expiration	Hyperresonant	Normal	↓
Bronchitis	Wheeze, rhonchi, prolonged expiration	Clear	normal	normal