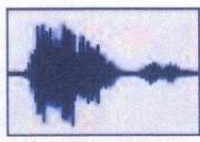


# Breath sounds

## Vesicular

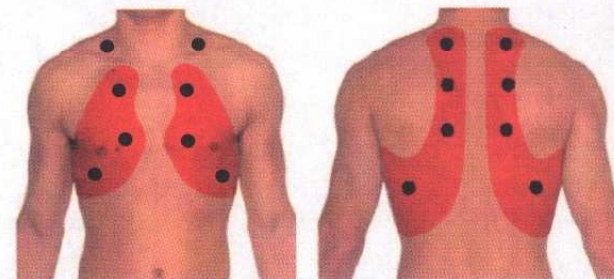


Inspir Expir

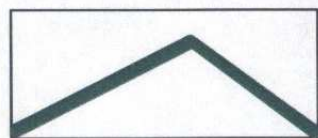
**Duration**  
inspiratory  
> expiratory

**Expiration**  
soft  
low pitch

**Location**  
over the  
whole lungs



## Bronchovesicular

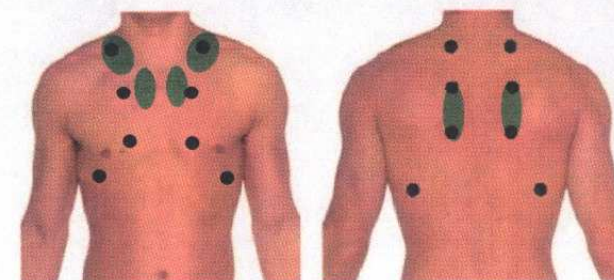


Inspir Expir

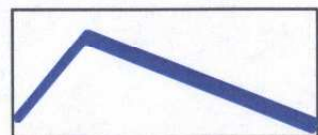
>= inspiratory  
expiratory

medium loud  
medium pitch

peristernal  
interscapular



## Bronchial

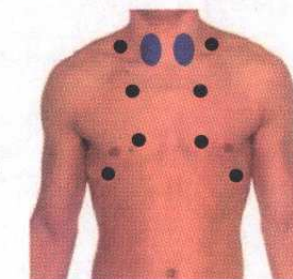


Inspir Expir

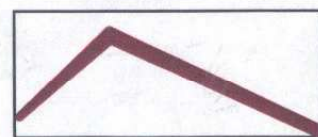
> expiratory  
inspiratory

loud, strong  
high pitched

above clavicle  
manubrium  
sterni



## Tracheal

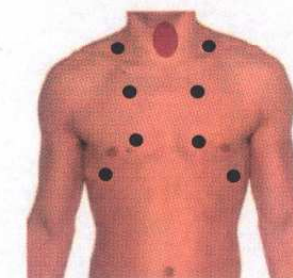


Inspir Expir

>= expiratory  
inspiratory

very loud  
high pitched

very loud  
high pitched

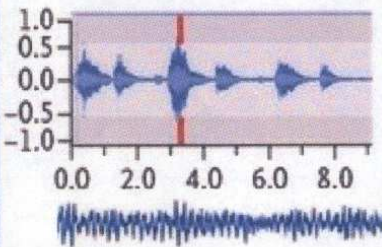


## Anterior

0. trachea
2. upper right lung field
3. upper left lung field

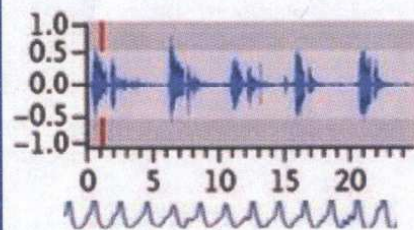
## Stridor

**Frequencies:** >500 Hz  
**Sound:** high pitch, distant  
**Site:** larynx, trachea, bronchi  
**Phase:** inspiratory or expir.  
**Cause:** laryngeal edema, epiglottitis, croup, tumors, aspiration, abscess



## Rhonchi

**Frequency:** > 150 Hz  
**Series of > 80 ms bursts**  
**Continuous**  
**Site:** trachea, bronchi  
**Cause:** Fluid, mucus in larger bronchi, turbulent  
**Sound:** coarse rattling, low pitch, cleared by cough, "blowing air through fluid"  
**Phase:** mostly expiration



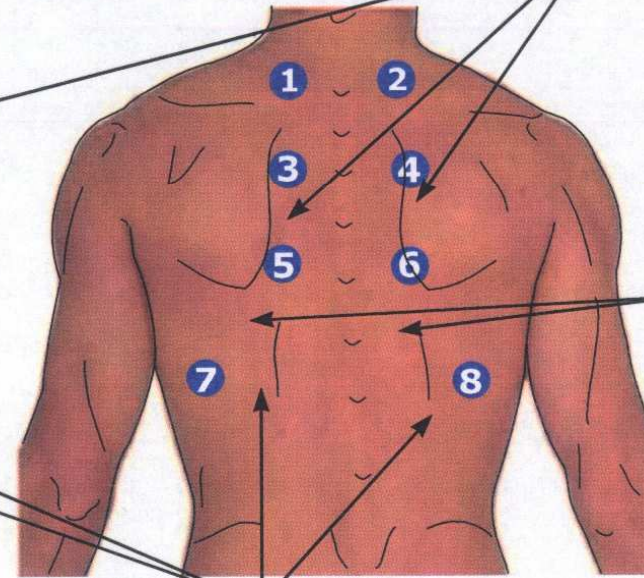
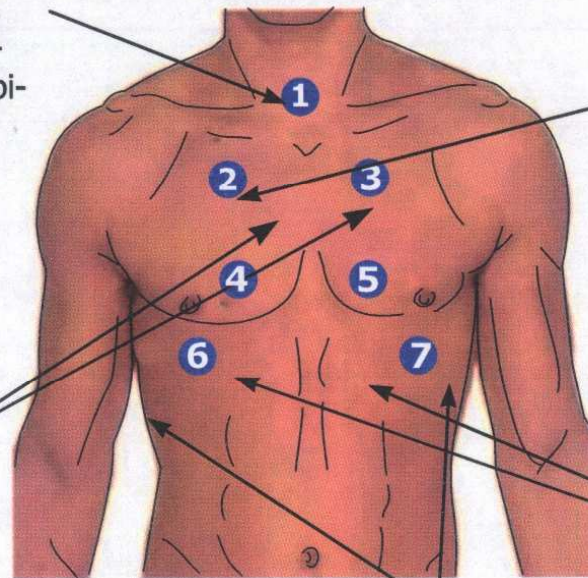
# Abnormal breathing sounds

Sound records from: Bohadana. A. et al.: Fundamentals of lung auscultation. N. Engl. J. Med. 20;370(8):744-751, 2014

4. middle right lung field
5. middle left lung field
6. lower right lung field
7. lower left lung field

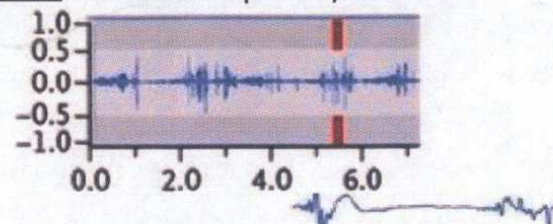
## Posterior

1. upper left lung field
2. upper right lung field
3. middle left lung field
4. middle right lung field
5. lower left lung field
6. lower right lung field
7. left costophrenic angle
8. right costophrenic angle



## Pleural friction rub

**Frequency:** < 350 Hz  
**Series of irregular > 15 ms bursts**  
**Sound:** grating, does not clear with cough  
**Phase:** best in inspiration  
**Site:** anterior lateral lung field in sitting  
**Cause:** inflamed pleura, tumors



## Crackles (rales)

**Rapidly dampened waves**  
**Site:** lung bases  
**Phase:** inspiration, expiration

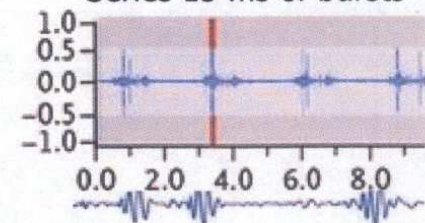
### Fine crackles

**Frequencies:** >650 Hz  
**Series of 5 ms bursts**



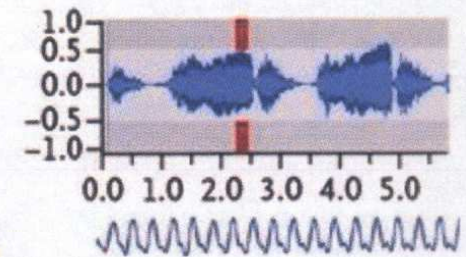
### Coarse crackles

**Frequencies:** >350 Hz  
**Series 15 ms of bursts**



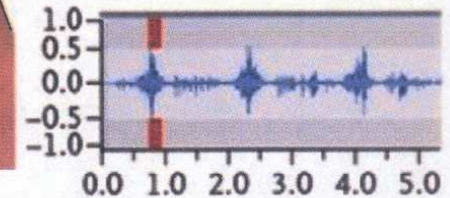
## Wheezes

**Frequencies:** > 100-5000Hz (400)Hz  
**Series of >80 ms bursts; Continuous**  
**Sound:** high pitch; musical sound  
**During:** inspiration or expiration  
**Site:** all lung fields  
**Cause:** severely narrowed bronchus, asthma, COPD, foreign body

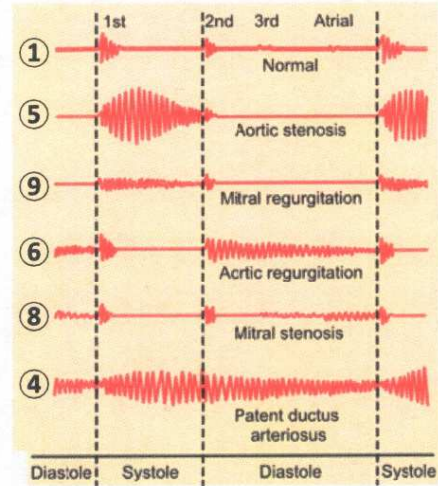
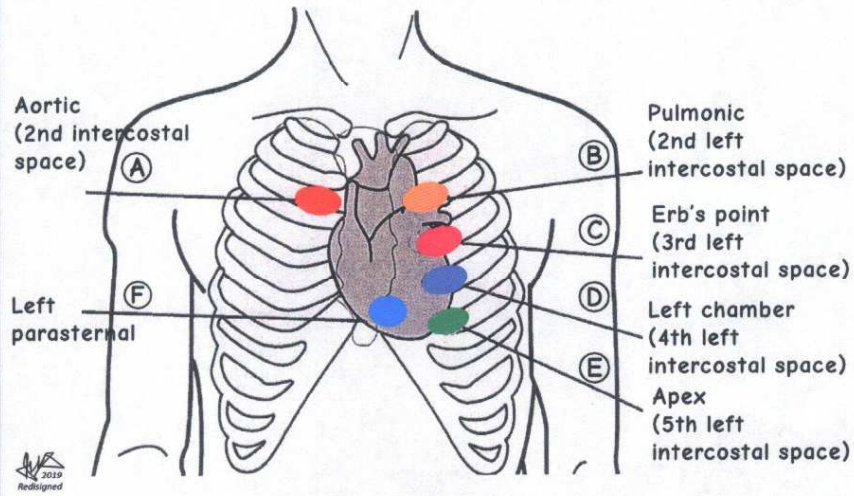


## Squawk

**Frequency:** >500 Hz  
**About 200 ms sound bursts**  
**Cause:** similar to wheezes



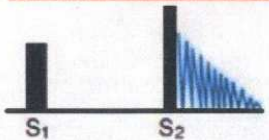
# CARDIAC SOUNDS



<b>1. Normal</b>	Normal S2 accentuated	Normal S2 accentuated	Normal S2 accentuated	Normal	Normal	Normal
<b>2. Atrial septal defect</b>	Normal	Mid-systolic murmur, fixed split 2nd, soft 3rd sound	Normal	Mid-systolic murmur fixed split 2nd, mid diastolic murmur	Normal	Normal
<b>3. Ventricular septal defect</b>	Normal	Normal	Holosystolic murmur, crescendo	Holosystolic murmur, crescendo	Normal	Normal
<b>4. Patent ductus</b>	Normal	Continuous murmur	Normal	Continuous murmur	Normal	Normal
<b>5. Aortic stenosis</b>	Load holosystolic ejection murmur	Normal	Normal	Normal	Normal	Normal
<b>6. Aortic regurgitation</b>	Early diastolic decrescendo murmur	Normal	Normal	Normal	Normal	Normal
<b>7. Pulmonary stenosis</b>	Normal	Systolic ejection murmur	Normal	Normal	Normal	Normal
<b>8. Mitral stenosis</b>	Normal	Normal	Opening snap 0,03 s after loud 2nd sound	Inspiratory augmentation; gallop of right ventricular origin	Opening snap; mid to late diastolic murmurs; load S1	Normal
<b>9. Mitral regurgitation</b>	Normal	Normal	Normal	Normal	Holosystolic murmur	Holosystolic murmur

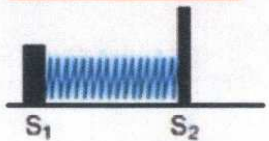
# CARDIAC MURMURS

## Early diastolic murmur

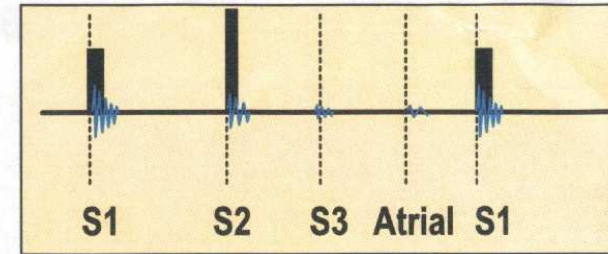


- Desrescendo diastolic murmur
- Aortic regurgitation
  - Pulmonary regurgitation

## Holosystolic murmur

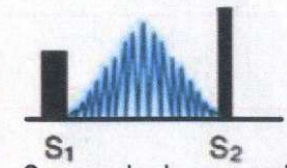


- Continuous murmur from S1 until S2
- Mitral regurgitation
  - Tricuspid regurgitation
  - Ventricular septal defect
  - Premature ventricular contractions



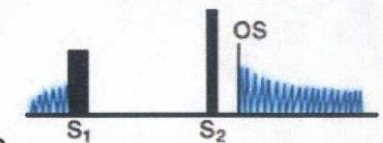
- Aortic stenosis
- Pulmonary stenosis

## Systolic ejection murmur



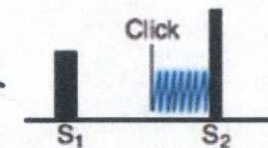
Crescendo-decrescendo, late peak soft S3 in mid diastole

## Mid-diastolic murmur



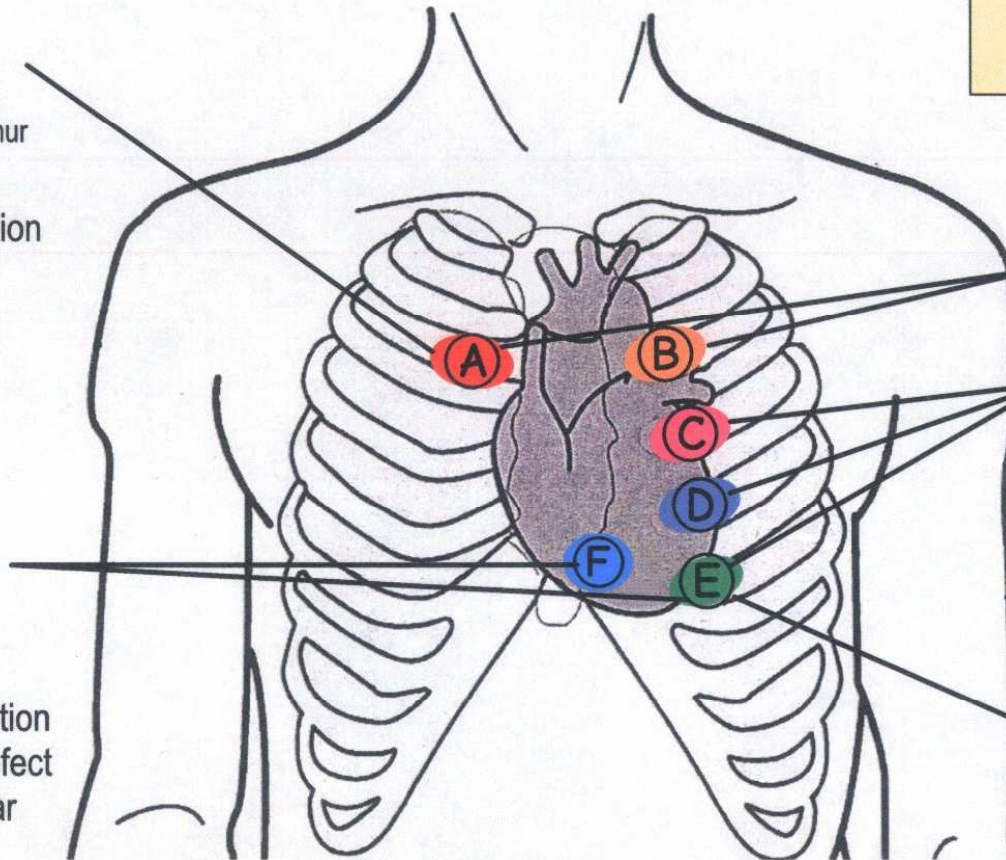
- Mitral stenosis
- Tricuspid stenosis
- Atrial myxoma

## Mid - & Late systolic murmur



Midsystolic click following murmur that ends before S2

- Mitral valve prolapse
- Tricuspid valve prolapse



Ⓐ

Aortic (2nd inter costal space)

Ⓑ

Pulmonic (2nd left intercostal space)

Ⓒ

Erb's point (3rd left intercostal space)

Ⓓ

Left chamber (4th left intercostal space)

Ⓔ

Apex (5th left intercostal space)

Ⓕ

Left parasternal