

# PULMONARY EXAMINATION

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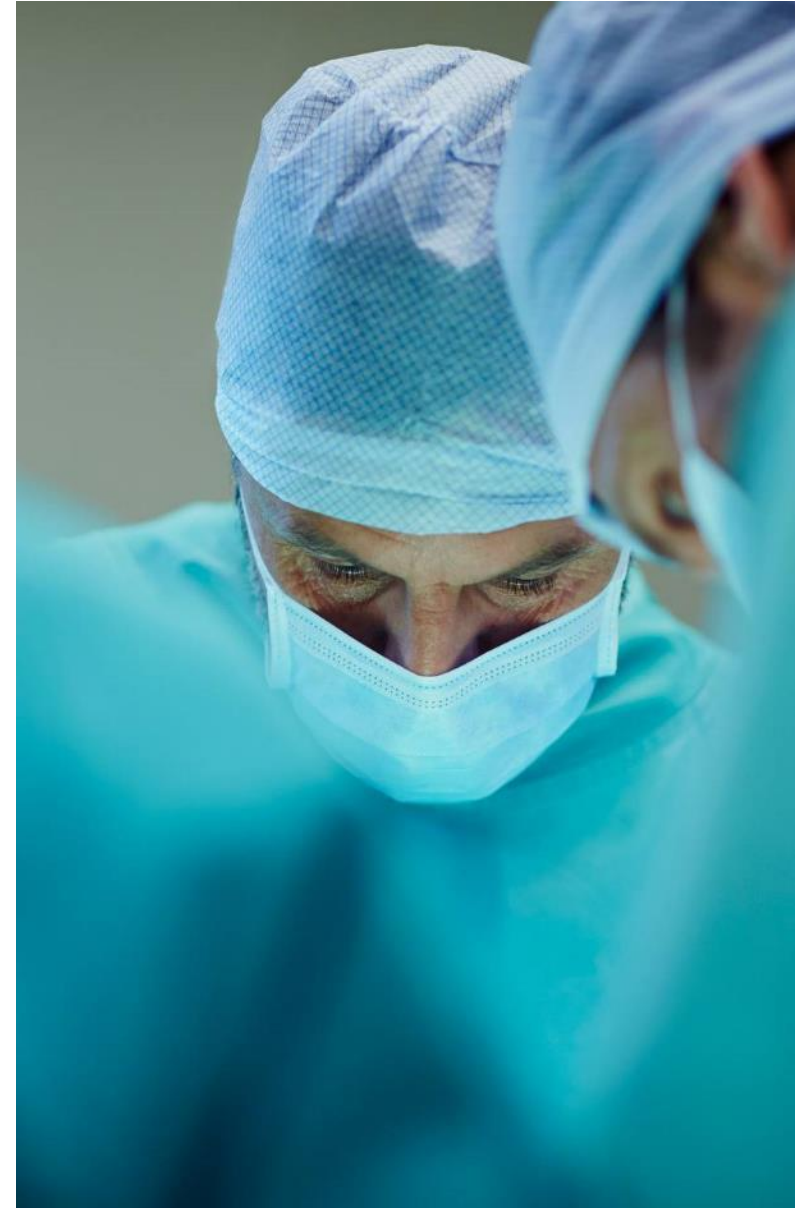
# DISCLOSURES

- I have no conflicts of interest
- I have no financial disclosures

# LUNG AUSCULTATION

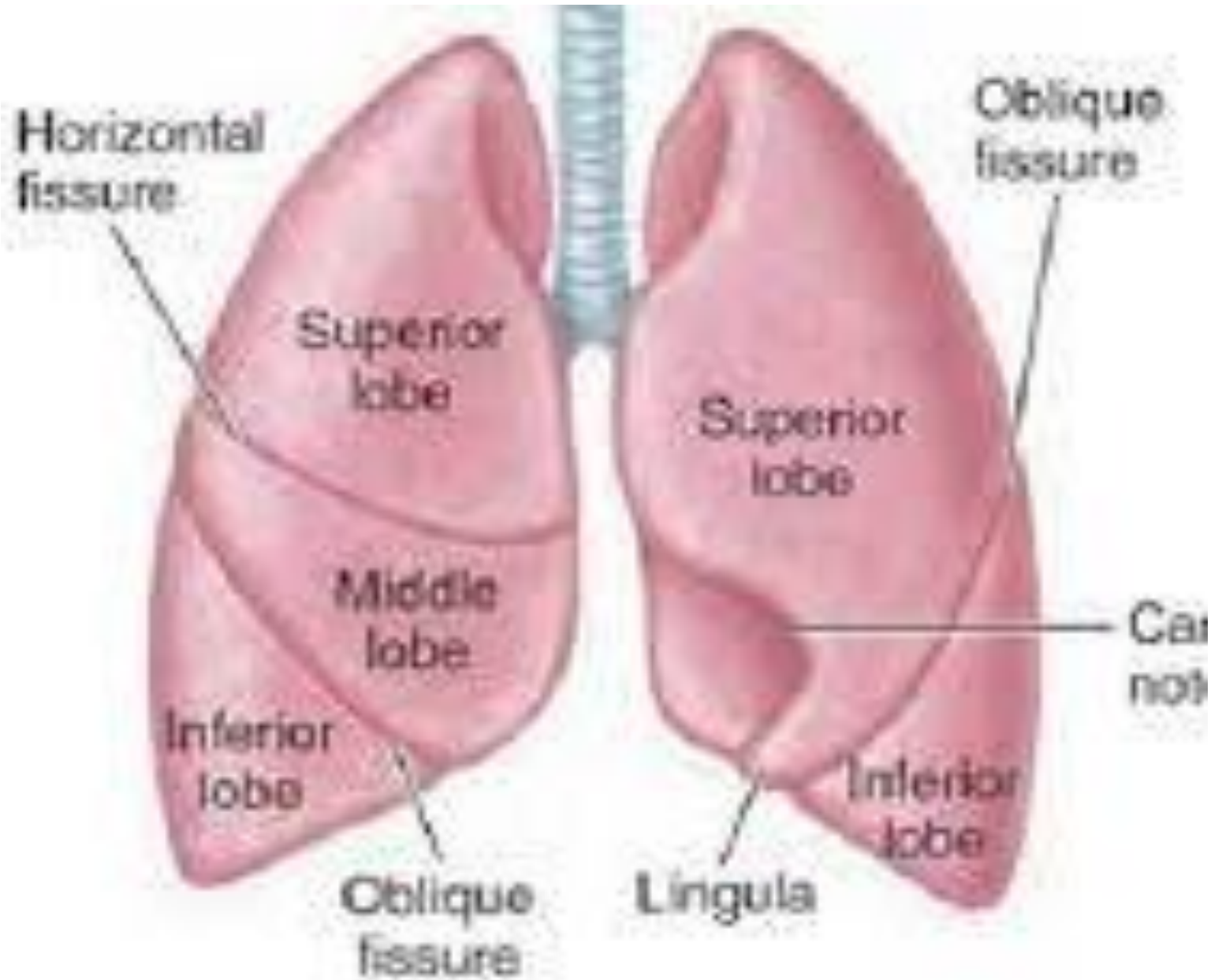
Objectives:

1. Identify normal breath sounds
2. Recognize abnormal breath sounds
3. Correlate findings with clinical conditions



# ANATOMY

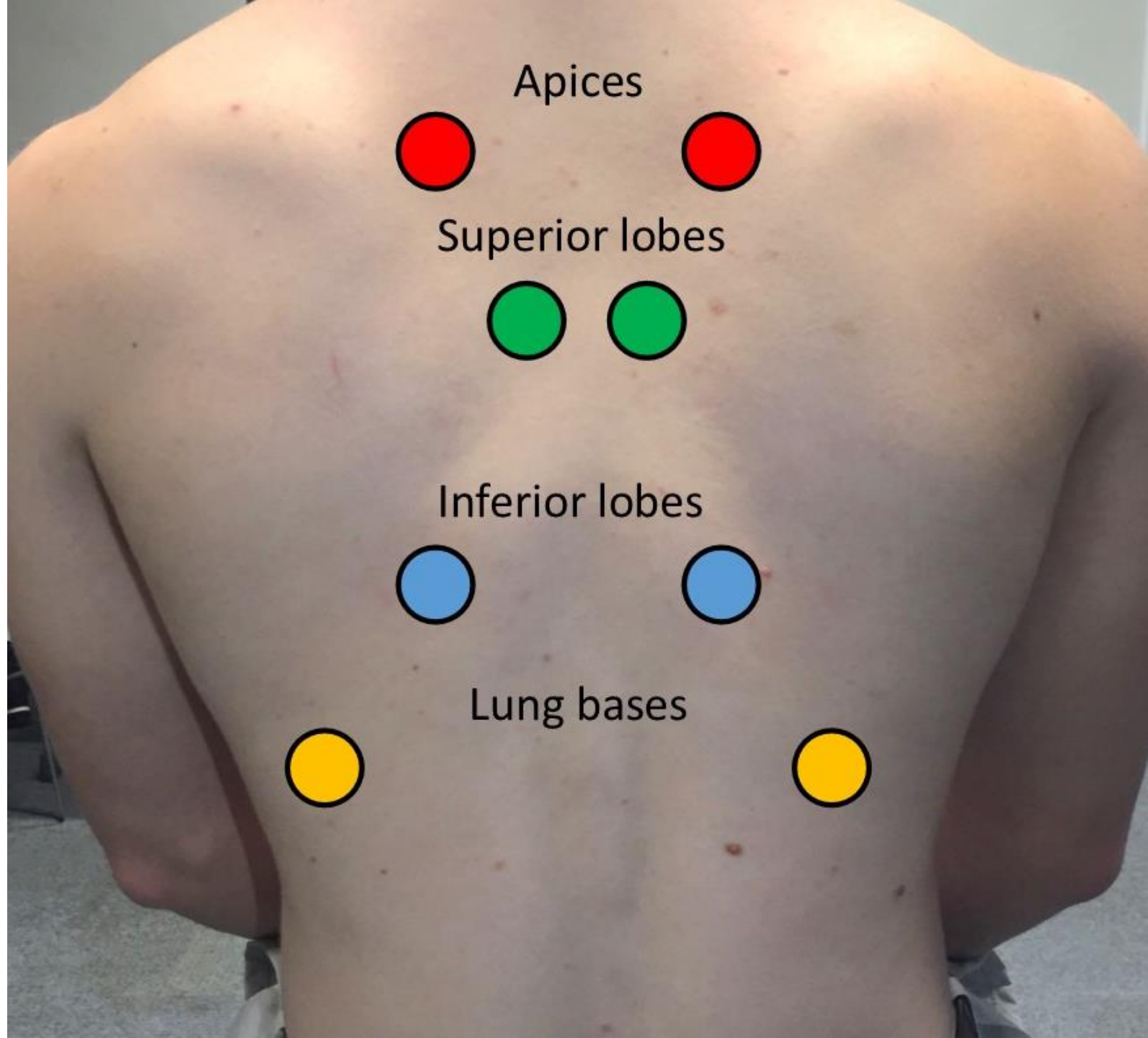
- Trachea
- Right and left mainstem bronchi
- Bronchioles
- Right lung: 3 lobes
- Left lung: 2 lobes and Lingula



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# LUNG EXAM

- Inspection
- Palpation
- Auscultation



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# BREATH SOUNDS NORMAL/VESICULAR



Soft

Low Pitch

Inspiratory > Expiratory

# BREATH SOUNDS: CRACKLES

Fine (rales) : end of inspiration, high pitch, discontinuous. Sounds like Velcro

Coarse crackles: low pitch, from larger bronchi. Like gurgling

Opening of collapsed segment (fine), thick mucus or fluid in airway


Typically heard at bases

Pulmonary edema, congestive heart failure, interstitial fibrosis, pneumonia



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# BREATH SOUNDS: RHONCHI

- Continuous sounds during inspiration & expiration 
- Lower in pitch than wheezing snoring sounds, can clear with coughing
- Large airways with secretions
- Bronchitis, pneumonia, cystic fibrosis



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## BREATH SOUNDS :WHEEZES

- High- or low-pitched musical whistle
- Heard during expiration
- Narrowed airways
- Asthma, COPD, viral infection



# BREATH SOUNDS: STRIDOR

- Typically inspiration
- High pitched
- From upper airways - narrowing of larynx or trachea
- Croup, epiglottitis, vocal cord dysfunction, anaphylaxis, obstruction by object



# THANK YOU

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- References
- Reyes FM, Modi P, Le JK. Lung Exam. [Updated 2023 Jul 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK459253/>
- Lung sounds from Youtube Medzcool
- Lung sounds from Lung sounds made easy: RegisteredNurseRN YouTube
- Kim Y, Hyon Y, Jung SS, Lee S, Yoo G, Chung C, Ha T. Respiratory sound classification for crackles, wheezes, and rhonchi in the clinical field using deep learning. *Sci Rep*. 2021 Aug 25; 11(1):17186. doi: 10.1038/s41598-021-96724-7. PMID: 34433880; PMCID: PMC8387488.
- Arts, L., Lim, E.H.T., van de Ven, P.M. *et al*. The diagnostic accuracy of lung auscultation in adult patients with acute pulmonary pathologies: a meta-analysis. *Sci Rep* 10, 7347 (2020). <https://doi.org/10.1038/s41598-020-64405-6>