Pulmonary

- **Hypoxia: Use OR algorithm + a few items incl <u>check ABG, CXR</u>**

  ddx→ ↓ FiO_2, hypoventilation, V/Q mismatch, shunt, ↓ diffusion

  - ↑ Vol (crackles, neck veins) → <u>CHF or iatrogenic vol overload</u> → **IV furosemide**, trial **NIPPV**, **fix rhythm**, **fix HTN** if concurrent; consider **cardiac ischemia w/u**
  - Wheezes → <u>Anaphylaxis</u> → as you would in the OR; also COPD/asthma
    - <u>COPD</u>: **nebs** (albuterol prn, ipratropium q4-6h), **prednisone** 40mg qday x5d, d/w ICU antibiotics; <u>Asthma</u>: continuous **albuterol neb**, heliox
  - Tachycardia → consider <u>PE</u>, Revised Geneva Score, **CTA (IV contrast)**, LE doppler to r/o DVT if CT not avail, start **heparin gtt** per protocol, **RV support**
    - Tachycardia + Hypotension → r/o <u>tamponade</u>
  - ↓ BS → <u>PTX, effusion, atelectasis, PNA</u> → u/s or CXR can r/o PTX, effusion
    - Lobar atelectasis → <u>Mucus plug</u> → bronch
    - Fever, ↑ WBC, infiltrate → **<u>PNA also r/o resp viruses incl flu, COVID</u>→ PPE, precautions, cultures before abx!**
      - <u>VAP (ventilator associated PNA)</u> → **BCx x2, tracheal aspirate/BAL, empiric abx vancomycin (cover MRSA), cefepime or piperacillin/tazobactam (cover gram- incl PsA)**
        Rates of co-infection <u>low</u> in COVID
  - ↓ breathing → r/o **Opioid o/d** → naloxone 0.04-0.4mg titrate to effect
- **Hypercarbia: see Opioid o/d, PE, COPD/Asthma (above)**

  ddx→ ↑ dead space, VQ mismatch, ↑ CO_2 production (fever, MH)

  - **Other emboli: air, fat, AFE** → support RV→ dobutamine or epi if hypotension

COVID Considerations: 1) can you skip CXR and make dx with phys exam (contamination) 2) bronch (aerosolization risk) only if absolutely needed (lung volume loss not just secretions)

- **Primer: Injured Lungs & ARDS**
  - Lung Injury → ↓ Compliance → ↓ TV for same pressure or ↑ pressure for same TV
    - Lung protection: 1) prevent overstretching stiff lungs (↓ TV), 2) prevent pressure injury to lung (↓ $P_{plateau}$, ↓ Driving pressure), 3)

prevent opening/closing of alveoli (↑ PEEP, recruitment), 4) treat other injuries

    - Lung protective ventilation → see Ventilation section
- **Lung rescue strategies**
    - **Prone positioning may improve outcomes**[1]; must involve entire team
    - **Early paralysis with NMBD** for 48h may be indicated[2]

      Sedation: see Neuro section
    - **Conservative fluid tx / diuretics**
    - **Trial of inhaled pulmonary vasodilator (epoprostenol / iNO)** to ↓ shunt → stop if no improvement or worsening (does not change mortality)
    - **Steroid do not improve outcomes in ARDS and early data cautions against use in COVID**
    - **Refractory hypoxemia/hypercarbia:** see ECMO section
- **PPx**
    - **VAP ppx: HOB>30, sedation interruption/SBT ≥qDay (d/w ICU Consult)**

      Stress ulcer ppx, DVT ppx: see Best Practices section
- **Team Approach**
    - **Nurses, Respiratory Therapists, Pharmacists** will all assist with management and should be involved in decisions
- **Goals of Care:** address early and often particularly when considering intubation in patients with ↑ age / ↑ comorbidities

[1] N Engl J Med 2013; 368:2159-2168
[2] N Engl J Med 2010; 363:1107-1116; N Engl J Med 2019; 380:1997-2008.