5 Causes of Hypoxemia:
(numbered in order of what’s most common)

1. V/Q mismatch (95%)
   (not extreme)
   →Airway dx:
   →Asthma, COPD
   →Vascular (i.e. PE)
   →Alveolar:
   →Pneumonia, edema

2. Hypoventilation
   →low RR, low V_T, or high V_D
   →Result: High PaCO2
   (>> 40mmHg)

3. Right-to-Left Shunt
   (V<<<Q; some blood perfusing unventilated regions. Ventilated blood cannot further ↑ O2 content (Hgb already 100% saturated), so 100% doesn’t help)

4. Thickened diffusion barrier
   (RARE at rest, may be problematic only during exertion - ↓ RBC transit time)
   →Interstitial Lung Disease (i.e. Asbestosis)
   →Alveolar Disease
   →Pulmonary Vascular Disease

5. Low inspired ppO2
   (FiO2 ↓ at higher altitude)
   →Lowers P_AO2 AND PaO2!
   (RARE)

Note: V/Q mismatch happens in normal lungs to a small degree:

- Damaged Lung Structure (more dead space; ↑V_D)
  →Status asthmaticus (advanced asthma pt unresponsive to SABAs)
  →Advanced COPD

- Central
  →Drugs (i.e. morphine)
  →Coma
  →Hypothyroidism

- Chest Wall disorder
  →Obesity
  →Kypho-scoliosis
  →Neuro-muscular dx

Normal A-a Gradient (<15mmHg)
(Normal Gas Exchange)

High A-a Gradient (>15mmHg)
(Bad gas exchange: less O2 transferred from alveoli into blood)

Improves w/ 100% O2

Does NOT improve w/ 100% O2

Low inspired ppO2
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100% O2

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