# Official PFT Guides

| Official Guides |
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| ATS Rapid Interpretation Guide |
| 2010 GOLD Spirometry Guide |
| 2022 ERS/ATS Interpretive Strategies for PFTs |

# Interpretation Position

### Why I use GOLD Criteria

At UMMC, PFTs do report LLN and reference value (pop mean?) but not percentiles or z scores.

One can back-calculate the SD using $\sigma = \frac{LLN - ref}{-1.65}$ (this assumed LLN on our reports corresponds to 5th percentile).

Once $\sigma$ is known for the each value (e.g., $\sigma_{FVC} \neq \sigma_{FEV1} \neq \sigma_{RV}$), you could then use $z = \frac{PT_{value} - ref}{\sigma}$ and refer to the tables below to grade severity.

Given the complexity of this, using ERS/ATS for diagnosing and grading abnormalities is not possible.

Therefore, I use GOLD criteria.

# Step-by-Step to Interpreting PFTs

## Assess Flow-Volume Loops

1. Are the loops similar between attempts?
    1. YES: Skip to next
    2. NO: See first page's comment if ATS reproducibility criteria was met
2. Roughly speaking, do the loops appear obstructive or restrictive?

## Assess Spirometry

### Spirometric Severity

#### ATS Criteria

Source

| Grade | FEV1 z score | Severity |
|---|---|---|
| NA | −1.65 to −2.5 | Mild |
| NA | −2.51 to −4.0 | Moderate |
| NA | <−4.1 | Severe |

#### GOLD Criteria

Source

| Grade | FEV1 Percent Predicted | Severity |
|---|---|---|
| 1 | ≥80% | Mild |
| 2 | 50% − 79% | Moderate |
| 3 | 30% − 49% | Severe |
| 4 | <30% or <50% with CHRF | Very Severe |

### Bronchodilator Response

#### ERS/ATS Definition

1. Required:
    1. BDR >10%

1. Calculation
    1. $ BDR = \frac{FEV1_{postBD} - FEV1_{preBD}}{FEV1_{predicted}}$

#### Important NOTE:

1. Calculation is not
    1. $ BDR = \frac{FEV1_{postBD} - FEV1_{preBD}}{FEV1_{preBD}}$
2. Does NOT require
    1. $\Delta FEV1_{volume} >200 mL$

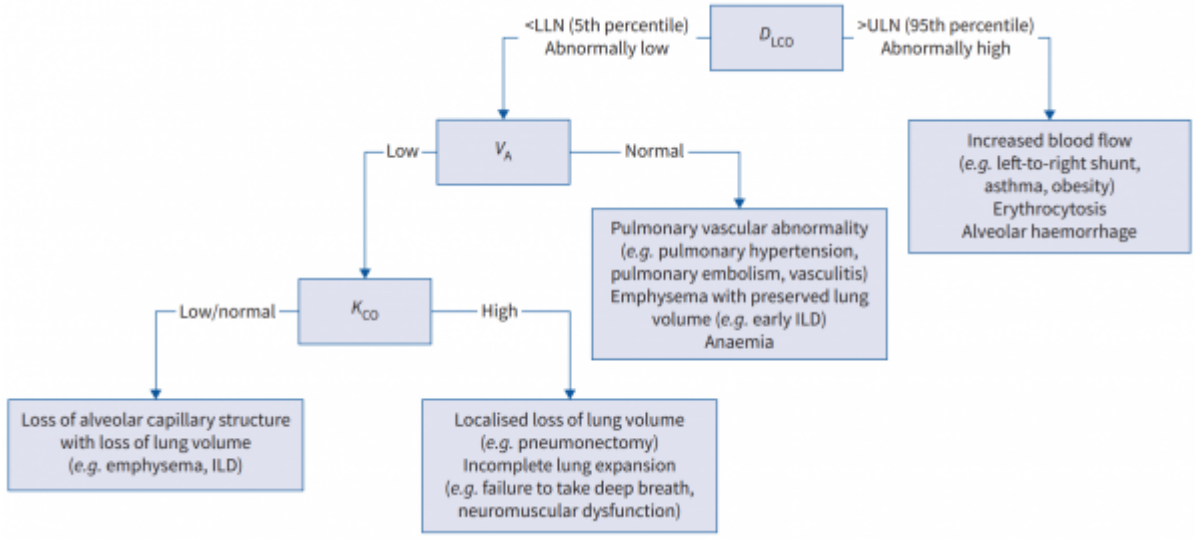
#### GOLD Definition

1. Required:
    1. $BDR >12%$
    2. $\Delta FEV1_{volume} \geq 200 mL$

1. Calculation
    1. $ BDR = \frac{FEV1_{postBD} - FEV1_{preBD}}{FEV1_{preBD}}$
    2. **NOTE: this differs from ERS/ATS calculation**

## DLCO Severity

#### ERS / ATS Definition




Source

| Grade | FEV1 z score | Severity |
|---|---|---|
| NA | −1.65 to −2.5 | Mild |
| NA | −2.51 to −4.0 | Moderate |
| NA | <−4.1 | Severe |

**Gold Definition**

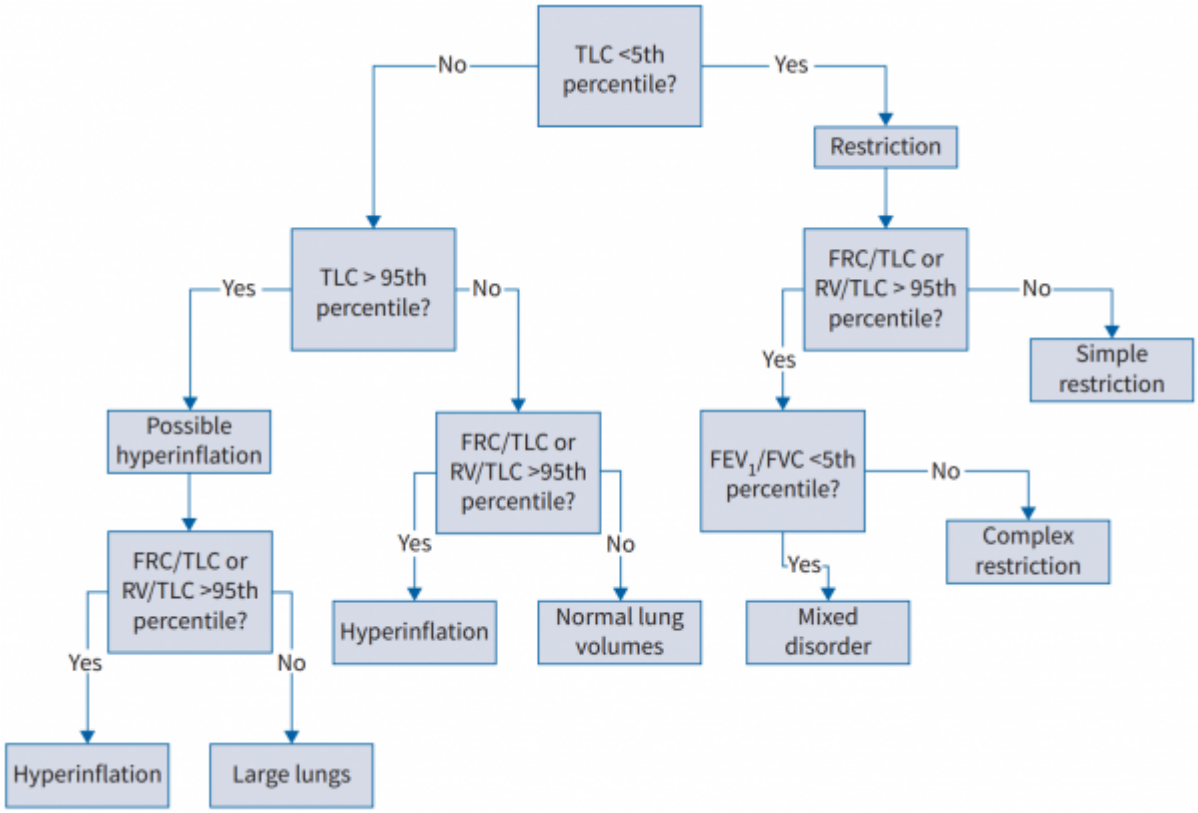
| DLCO Percent Predicted | Severity |
|---|---|
| >140% | Abnormally High |
| 76%-140% | Normal |
| 61-75% | Mild |
| 41-60% | Moderate |
| <40% | Severe |

# Assessing Restriction

### ATS Criteria

Source, pg 17

1. Check spiro
    1. Is $FVC \cdot z_{score} \leq -1.65$ (*e.g.* < 5th percentile)?
        1. Yes: get lung volumes
        2. No: no restriction
2. Check lung volumes
    1. Is $TLC \cdot z_{score} \leq -1.65$ (*e.g.* < 5th percentile)?




Source

| Grade | FEV1 z score | Severity |
|---|---|---|
| NA | −1.65 to −2.5 | Mild |
| NA | −2.51 to −4.0 | Moderate |
| NA | <−4.1 | |

**GOLD Definition**

| TLC Percent Predicted | Severity |
|---|---|
| >70% | Mild |
| 50%-69% | Moderate |
| <50% | Severe |

# Other Lung Volumes

VC: ↓ in restriction, ↓ in air trapping RV & FRC: ↑ with air trapping RV & FRC: ↓ with restriction ERV: ↓ in obesity

## Lung Volume

FRC is the primary thing calculated in lung volume calculations.

# Other

### Plethysmography

### Boyle's Law

- $P_1V_1 = P_2V_2$
- $\implies V_{tg} = 970\frac{\Delta V}{\Delta P}$

$ FRC = ERV + RV $

$TLC = VC + RV $

### Helium

- Helium is used because He doesn't cross the alveolar-capillary membrane
  - $ C_1V_1 = C_2(V_1+V_2)$
  - $\implies V_2 = V1(\frac{C_1}{C_2}-1)$
  - **limitations** since inhalation done only for a few minutes, would get into poorly ventilated lungs, so will underestimate FRC

### Nitrogen

Method for calculation is similar to Helium method.

From:
https://ewrobbins.com/ - **ewrobbins.com**

Permanent link:
**https://ewrobbins.com/doku.php?id=resources:pulm:interpreting_pfts&rev=1703102559**

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