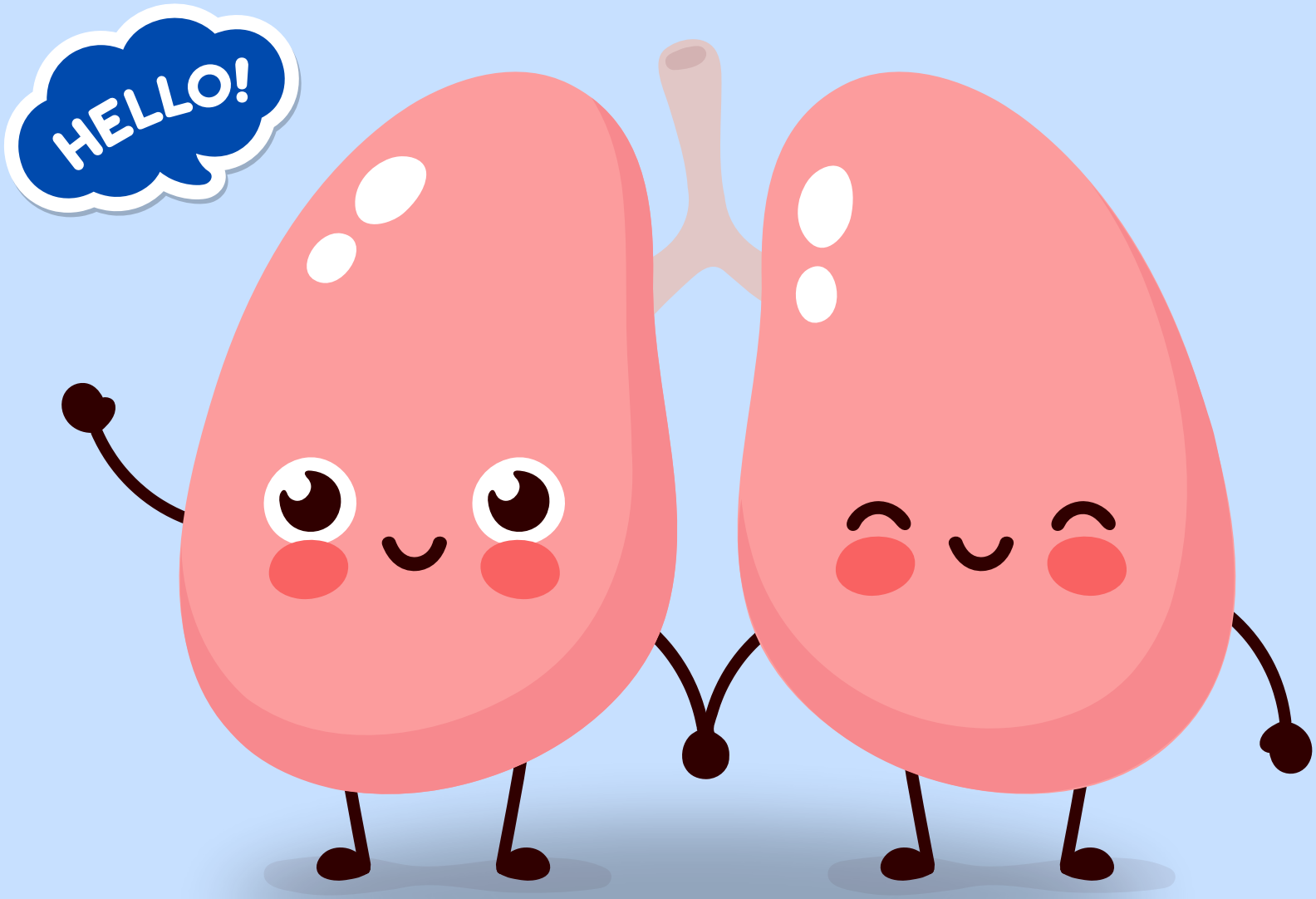

SPIROMETRY

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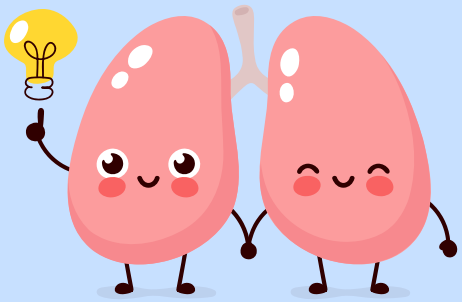
WHAT IS SPIROMETRY?



An objective physiological test of lung function

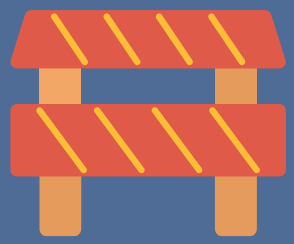
Spirometry measures flow and volume during a forced expiratory maneuver, which depends on:

- Lung elastic recoil
- Respiratory muscle strength
- Airway diameter
- Patient cooperation

WHY DO SPIROMETRY?

To identify:

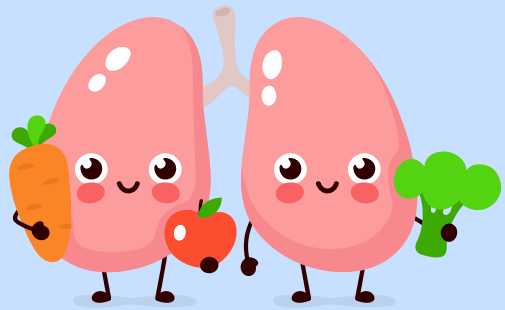
Obstructive Defects vs **Restrictive Defects**

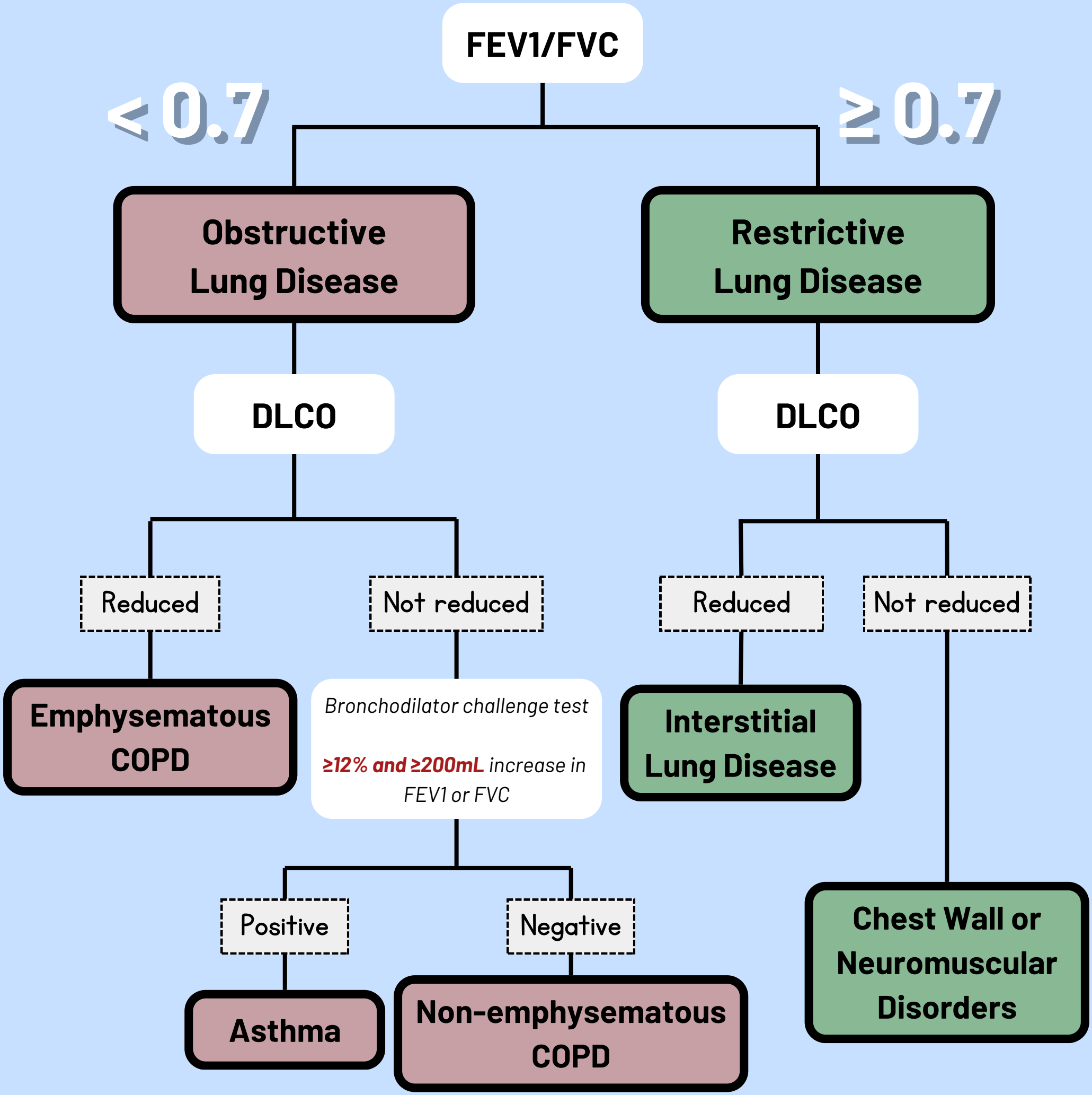


For investigation, diagnosis and treatment monitoring of respiratory diseases

INDICES

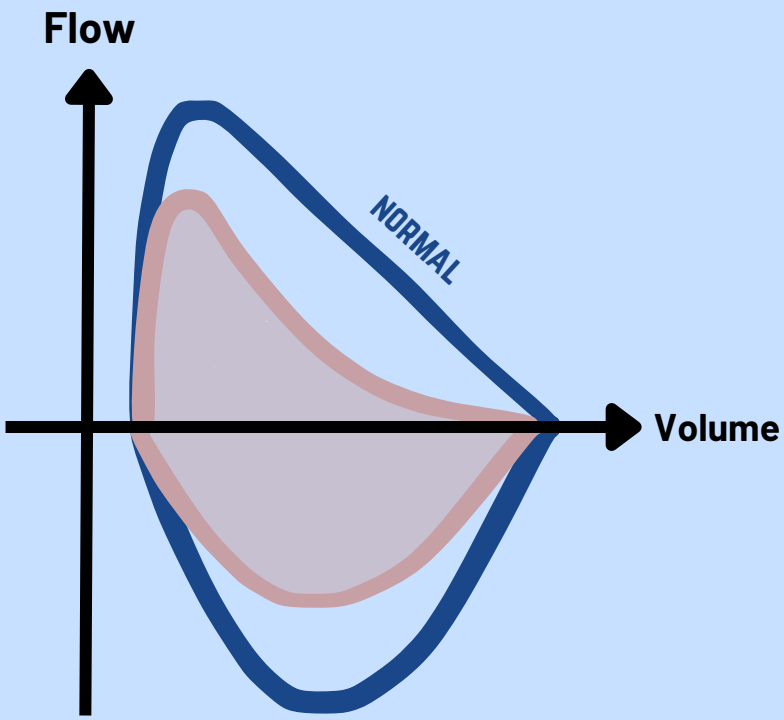
FEV1 Forced expiratory volume in 1 second	The volume of air that can be forcibly expired following maximal inspiration **in the first second**
FVC Forced vital capacity	The **total** volume of air that can be forcibly expired following maximal inspiration
DLCO Lung diffusing capacity for carbon monoxide	The capacity of the lungs to **exchange gas**, accounting for: • Diffusion coefficient of gas • Surface area of membrane • Thickness of membrane



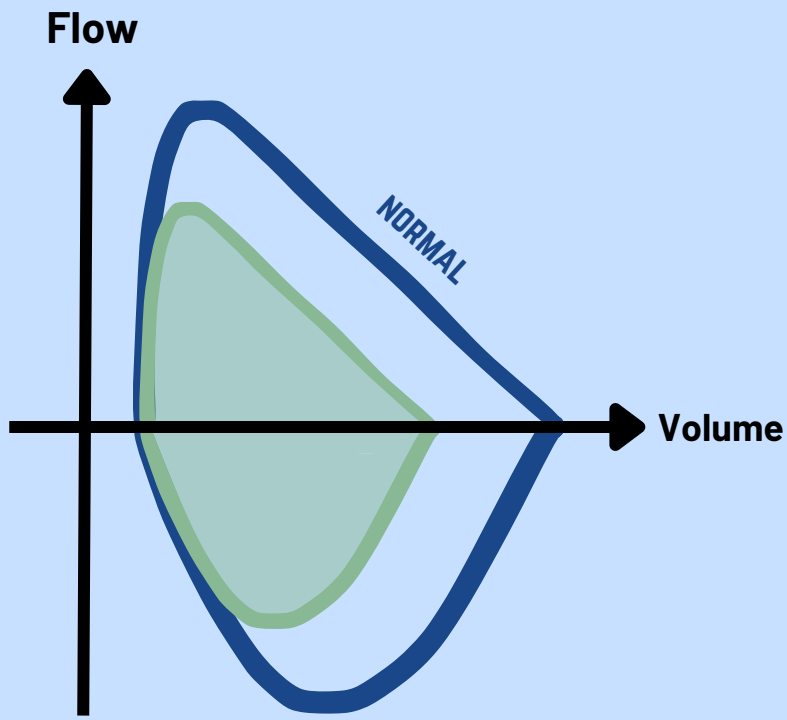

FEV1/FVC
< 0.7
≥ 0.7
Obstructive Lung Disease
Restrictive Lung Disease
DLCO
DLCO
Reduced
Not reduced
Reduced
Not reduced
Emphysematous COPD
Bronchodilator challenge test
≥12% and ≥200mL increase in FEV1 or FVC
Interstitial Lung Disease
Positive
Negative
Chest Wall or Neuromuscular Disorders
Asthma
Non-emphysematous COPD

FLOW-VOLUME LOOP

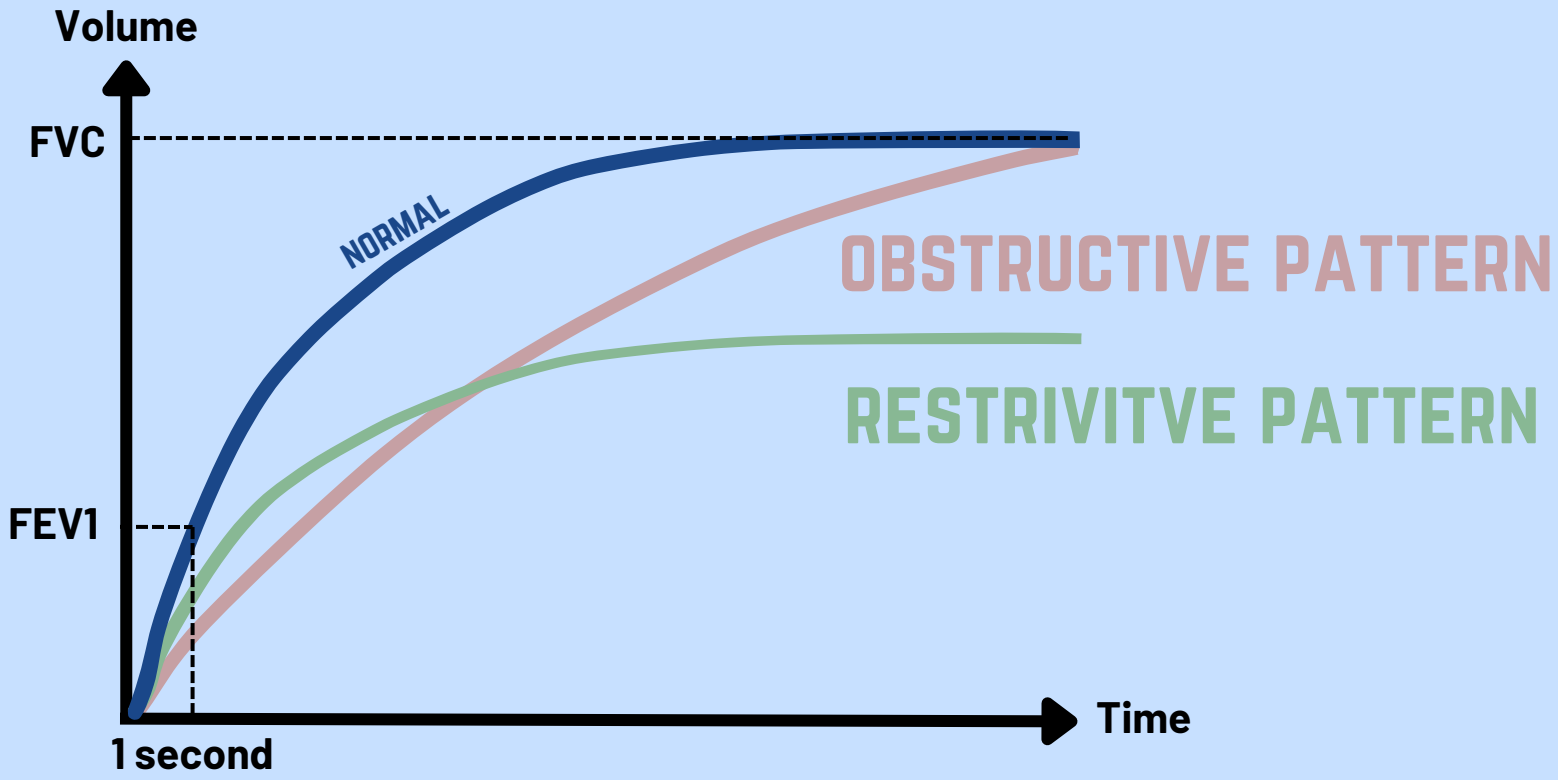
OBSTRUCTIVE PATTERN



RESTRICTIVE PATTERN

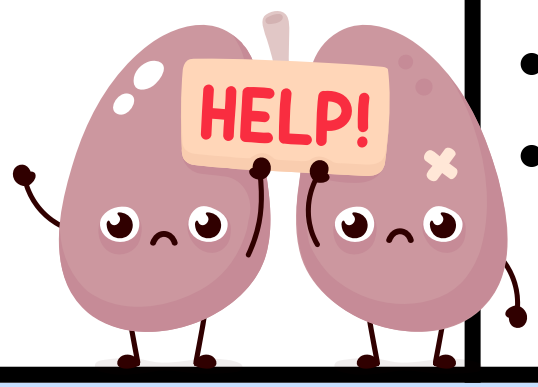


VOLUME-TIME GRAPH



SUMMARY

	Obstructive Lung Disease	Restrictive Lung Disease
Spirometry	• ↓ FEV1/FVC ratio • ↓ ↓ ↓ FEV1 • ↓ FVC • Concave flow-volume loop	• N or ↑ FEV1/FVC ratio • ↓ ↓ FEV1 • ↓ ↓ FVC • Small flow-volume loop
Examples	• Asthma • COPD	• Interstitial lung disease • Kyphoscoliosis • Rib deformity • Obesity



EXPLAIN TO A PATIENT

"HOW TO PERFORM SPIROMETRY TEST"

1. Sit upright, legs uncrossed and feet flat on the floor, without leaning forward
2. **Breathe in** rapidly and deeply **until lungs are completely full**
3. Immediately place mouthpiece in mouth and close lips to form a tight seal
4. Blast air out as **hard and fast** as possible and for **as long as possible**, until lungs are completely empty or cannot possibly blow out any longer
5. Remove the mouthpiece and breathe normally

3 acceptable maneuvers should be achieved

What is considered acceptable? 🤔

- **An explosive start**
- **Maximal inspiration and expiration**
- **No cessation of airflow during the maneuver**
- **No cough or evidence of leaks**
- **Exhaling for ≥6s**

LET'S TRY THIS QUESTION!

COMMENT YOUR ANSWER BELOW

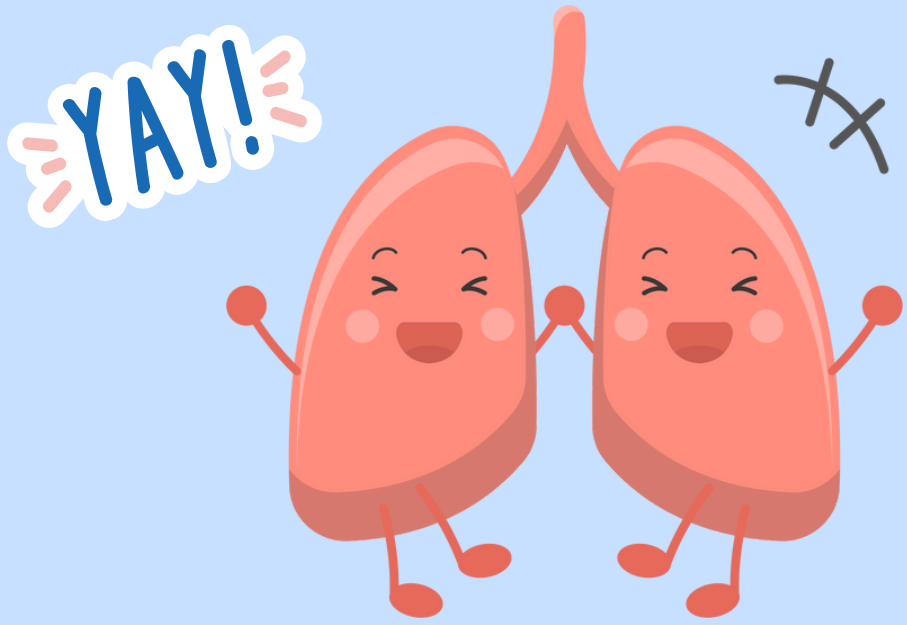
A patient has the following pulmonary function test results:

FEV1: 58% of predicted (75% after use of an inhaled bronchodilator)
FVC: 70% of predicted (85% after use of an inhaled bronchodilator)
FEV1/FVC ratio: 0.60 (before use of an inhaled bronchodilator)
DLCO: 98% of predicted (normal, >80% of predicted)

Which of the following best describes the pattern of this patient's airflow?

A. Obstructive, due to asthma
B. Obstructive, due to emphysema
C. Restrictive, due to neuromuscular disease
D. Restrictive, due to parenchymal lung disease

[We Hope This Helps!]



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@mumims_csjb

Monash University Malaysia
Internal Medicine Society - Mumims

monashintmedclub@gmail.com

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