Function resting interpretation			
Clinical Presentation	Recommended Testing		
Dyspnea	Spirometry before/after bronchodilator, volumes, DLCO		
	Ambulatory pulse oximetry		
Cough	Spirometry before/after bronchodilator		
	Consider Methacholine challenge		
Asthma	Spirometry before/after bronchodilator		
	Consider Methacholine challenge		
COPD	Spirometry before/after bronchodilator, oximetry		
	Consider lung volumes and DLCO in initial evaluation		
Suspected ILD	 Spirometry, volumes, DLCO, oximetry 		
Neuromuscular disease, diaphragmatic weakness	Upright spirometry, volumes		
	Max inspiratory and expiratory force		

For initial, diagnostic PFTS, ask the patient to hold their bronchodilators so that bronchodilator response can be assessed. Hold short acting for 4 hours and long acting for 12 hours.



Spirometry: forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and their ration (FEV1/FVC).

- Normal ratio is >70; other normal are >80% of predicted in general
- Supine spirometry to evaluate diaphragm dysfunction: supine decrease in VC by 25% unilateral and 50% bilateral **Post-Bronchodilator:** significant with increase in FEV1 more than 12% **and** 0.2 liters

Lung Volumes: vital capacity (VC), functional residual capacity (FRC)- this is the end of a tidal breath, residual volume (RV), expiratory reserve volume (ERV), inspiratory capacity (IC), total lung capacity (TLC)

• Decreased vital capacity alone may be due to air trapping in severe obstruction. You can see air trapping when the FRC or RV is increased >120%

DLCO:	Restriction, Reduced DLCO	Obstruction, Reduced DLCO	Isolated decrease in DLCO
	Intrinsic disease: ILD, fibrosis	Emphysema	Pulmonary vascular disease, PAH,
	Extrinsic restriction, i.e., obesity,	Normal in other obstructive disease	СТЕРН
	DLCO is normal or slightly reduced		
Maximal Inspiratory Pressures: MIP and MEP- used to follow patients with neuromuscular disease			
 Neuromuscular disease pattern: increased RV, normal FRC, low MIP and MEP, low MVV 			



In obstructive disease, forced expiratory volume in the first second is decreased (FEV1). Expiratory flow in the latter two-thirds of expiration are effort independent and vary directly with elastic recoil of the lung and inversely with airway resistance. In COPD elastic recoil is decreased due to loss of lung parenchyma and airway resistance is increased due to secretions, bronchospasm, or loss of small airways.

Upper Airway Obstruction Flow Volume Loops



B: intra- and extra-thoracic masses, adenopathy, fixed airway stenosis

C: laryngomalacia, tracheomalacia, vocal cord abnormalities, i.e., paradoxical vocal fold motion **D**: introthoracic tracheomalacia, bronchogenic cysts, tracheal masses, i.e., malignancy

Approach to pulmonary function test interpretation

