Lung Testing Pathway for Ages 6 and Above

Quick links: Pathway primer | Expanded details | Provider resources | Patient resources

Patient Presentation, History and Physical Exam

This is not an extensive list of presentations (exclude upper respiratory, pulmonary vascular, cardiac, metabolic, haematologic, neuropsyc, etc.)

This primer on lung testing doesn't replace clinician judgment and is not intended for use in acute presentations or in clinical urgencies.

- **Age: 6 - 50**, with any of the following:

Symptoms
- *Episodic* cough, wheeze, chest tightness, and/or dyspnea
- Triggers: cold air, exercise, infection, allergens, etc.

History
- Personal and/or family history of atopy

- **Age: 35+**, with any of the following:

Symptoms
- Persistent cough, sputum, wheeze, and/or dyspnea

History
- Tobacco/ cannabis use
- Occupational exposure
- Familial early onset COPD

Daily cough > 8 weeks not yet diagnosed

Chronic dyspnea

With any of the following:

Symptoms
- Dry cough with or without fine crackles
- Rheumatologic disease

History
- Occupational exposure
- >3 months following acute COVID-19

Lower respiratory condition suspected:

Asthma | COPD | Chronic Cough | Interstitial Lung Disease (ILD) including post COVID ILD | Dyspnea not yet diagnosed

Optional chest x-ray | Chest x-ray | Chest x-ray

Spirometry
Measures airway flow rates pre & post-bronchodilator FEV_1, FVC, FEV_1/ FVC ratio, flow volume loops

Choosing Wisely recommends spirometry for asthma and COPD

Results indicate

- FEV_1/FVC normal
  - **Does not exclude Asthma** Re-evaluate differential diagnosis
    - Consider consulting Respirologist
- FEV_1/FVC < 0.70 or lower limit of normal
  - With reversible expiratory airflow obstruction i.e. FEV_1 and/or FVC increase by 12% and 200 mL
    - Consistent with Asthma
    - Asthma Guidelines
  - Without reversibility
    - Consistent with COPD
    - COPD Guidelines

FVC < 80% or < lower limit of normal

Possible restrictive disease

Full PFT
Spirometry followed by additional measures of alveolar loss (volumes & gas exchange)

Results indicate

- TLC < lower limit of normal
  - DLCO low
    - Consistent with:
      - Interstitial Lung Disease
      - Pneumonitis
      - Pulmonary vascular disease
    - Order high resolution CT scan
  - DLCO normal
    - Consider extra-parenchymal cause:
      - Chest wall deformity
      - Neuromuscular weakness
      - Pleural disease
      - Obesity
- TLC normal and DLCO > upper limit of normal
  - Consistent with:
    - Pulmonary haemorrhage
    - Left → right intracard shunt
    - Polycythaemia

Refer to relevant specialist

Lung Testing Pathway

PATHWAY PRIMER

The purpose of this document is to serve as evidence-based framework to support accurate diagnosis of the most common chronic respiratory presentations among adults in primary care. It expands principally on the role of community-based investigations and appropriate choice for **lung function testing** and may serve as primer for the non-respirology clinician. It doesn't replace (clinician) clinical judgement and is not intended for use in emergent situations.

Spirometry is a probabilistic tool that references respiratory function norms to corroborate clinical diagnoses quantitatively. Ideally accessed through an accredited facility, spirometry is crucial in confirming an objective diagnosis of chronic lung disease phenotypes such as asthma and COPD. The plateau in asthma morbidity and mortality are related to underdiagnosis, undertreatment and imprecise assessment of control (Lowry, 2018). In the absence of spirometry and objective testing, up to ***30% of asthma and >⅓ of COPD*** *diagnoses in Canada are a misdiagnosis of another condition. Of these,* ***<6%*** *have a* ***critical serious alternative diagnosis*** (Aaron et al., 2018).

Therefore, using the previously accepted choice of a therapeutic trial to assess clinical response exposes the patient to the risks and costs of inappropriate treatment and delayed management of an unrecognized condition. In the non-acute setting, this practice should be considered historical.

Consider only judiciously referring for a complete (full) set of pulmonary function testing maneuvers. For suspicion of airways disease, spirometry alone is supported by best practice (evidence). Even in the case of restrictive lung disease, **spirometry** may 1) identify the vast majority of individuals, 2) enable monitoring with FEV1 and FVC, and 3) is more accessible and less burdensome to the patient. However, when clues in detailed history and examination increase index of suspicion, the clinician should expedite confirmation with full PFT. Complete lung function testing (full PFT) requires greater patient effort and time.

EXPANDED DETAILS

1. Lower Respiratory Conditions Details

Lower Respiratory Condition	Details
Asthma	• >½ of asthma diagnoses have no confirmatory spirometry, yet nearly 80% of these are given asthma treatment. With suspected asthma, it is essential to perform spirometry (Choosing Wisely - Gupta, 2022) (and possibly other testing - see below) to demonstrate **reversible expiratory flow obstruction** • Patient presents with ≥ 2 of intermittent or persistent cough, dyspnea, chest tightness and/or wheezing, varying intensity over minutes to days due to waxing nocturnally and/or hyperreactivity induced by cold air/food, laughing, exertion, viral infections, allergens (D'Urzo et al., 2021). Exam may reveal tachypnea, prolonged expiratory phase with diffuse wheeze and/or decreased breath sound intensity, etc.
Chronic Cough	Isolated chronic cough may be indicative of asthma, cystic fibrosis, interstitial lung disease, COPD, bronchiectasis (generally also associated with sputum production) or post-infectious cough (~15% of cases), but also upper airway cough syndrome, GERD, medication side effect and non-respiratory conditions. Consider concomitant causes.
Chronic Obstructive Pulmonary Disease (COPD)	• ⅔ of COPD diagnoses have no confirmatory spirometry demonstrating its hallmark. With suspected COPD, it is essential to perform **spirometry** to demonstrate **irreversible** (treatment-unresponsive) **expiratory flow limitation** • Since earliest smoking cessation reduces mortality and morbidity and disease is subclinical for > 10 years, screening populations at risk may be appropriate. • Most at risk are those with: 1. >20 years' smoking (including inhaled marijuana) and/or indoor biomass fuel exposure 2. Asthma and/or severe childhood respiratory disease 3. Exacerbation-like respiratory events ("bronchitis") requiring medical care. • α_1-Antitrypsin deficiency: special consideration (Lougheed et al., 2012; Yang et al., 2021) warranted when COPD diagnosed **< 65 years old**, **< 20 pack-year** history, early, severe **emphysema** or **inexplicable transaminitis**, or family history thereof: screen serum α_1-antitrypsin (A_1AT) level. • Bronchiectasis associated with cough productive of copious (> 2-4 tbsp) **sputum**, recurrent lower respiratory **infections,** and **hemoptysis**: consider high-resolution CT (Smith, 2017).

<table>
<tr><td>Dyspnea not yet diagnosed</td><td>Having ruled out non-pulmonary (particularly valvular and myocardial diseases, dysrhythmias) and pulmonary vascular diseases, a customary differential diagnosis for secondary causes of shortness of breath can facilitate diagnosis and inform primary screening:<table><tr><th>Autoimmune</th><th>Drug-induced including:</th></tr><tr><td>Systemic sclerosis – up to ½ will develop ILD (Rahaghi et al., 2023)
Sjögren’s syndrome
Poly-/dermatomyositis
Rheumatoid arthritis
Lupus erythematosus
Mixed connective tissue diseases
Vasculitis
Sarcoidosis</td><td>Nitrofurantoin; Isoniazid, ethambutol
Amiodarone, procainamide, hydralazine
Phenytoin; carbamazepine
Methotrexate, sulphasalazine, cyclophosphamide
Biological agents and Anti-neoplastics (including checkpoint inhibitors) >1000 others
Thoracic external beam radiation (5-15% of breast, lung, Hodgkin’s lymphoma)</td></tr></table></td></tr>
<tr><td>Interstitial Lung Disease (ILD)</td><td>The heterogeneous diffuse lung parenchymal diseases (interstitial lung diseases) are either initiated by exposure to a toxin (e.g., inhaled silica [late stage], coal, asbestos, myriad drugs), or antigen (e.g., microbe, plant or animal protein hypersensitivity) or can be autoimmune, or idiopathic (i.e., idiopathic pulmonary fibrosis). Shared pathophysiology is alveolar wall inflammation and fibrosis which hampers parenchymal compliance, consequently raising vital capacity, functional residual capacity, total lung capacity and residual volume. Symptom onset varies from insidious to episodic to acute fulminant and may precede in onset antigen exposure or any antecedent autoimmune/collagen vascular disease.
Morbidity is high and mortality substantial. There is an early therapeutic window for anti-inflammatory or anti-fibrotic treatment (Boleto et al., 2022) to reduce disease progression and improve quality of life, although management is complex & individualized by respirology ILD expertise.
Therefore, a vital role of primary care is early recognition followed by timely full PFT (or spirometry with DLCO when lower suspicion), prompted by:
Comprehensive history: methodical environmental, occupational and drug/radiation exposure, rheumatologic disease and other risk factor inquiry (see Dyspnea not yet diagnosed section for commonest non-occupational causes).
Presymptomatic screening of identified high risk groups may enable early detection & could minimize treatment initiation delays.</td></tr>
</table>

	3. Highest index of suspicion should be prompted by activity-limiting **dyspnea** accompanied by chronic **non-productive cough** ± fixed unilateral or bilateral **basilar crepitus** (crackles) on exam. • Spirometric FVC < lower limit of normal (or customarily 0.8) is strongly suggestive but has specificity <0.6 (arguably higher in primary care), so proceed whenever possible to full PFT (if not already completed because of presentation): **TLC & DLCO both below lower limit of normal** is consistent with restrictive lung disease • Arrange without delay: chest X-ray, high resolution **chest CT** scan and assessment and treatment by General Respirology or multidisciplinary ILD clinic at South Health Campus if in Calgary via Pulmonary Central Access and Triage. • See the Canadian Thoracic Society (CTS) position statement on Evaluation of ILD
Long COVID	See AHS Long COVID PFT Recommendations

2. Lower Respiratory Tests

2.1. Treatment Initiation Prior to Test

Per Choosing Wisely Canada (Choosing wisely Canada, updated September 2023), treatment can be initiated when diagnostic testing is not available in a timely manner. However, medications should NOT be continued unless diagnosis has been confirmed with objective testing. Where safe and possible, asthma controller therapy should be discontinued 4-8 weeks prior to spirometry to optimize testing sensitivity.

2.2. Chest X-ray

- Performed partly based on clinical presentation, excludes structural, infectious, extra parenchymal et al diseases that may present similarly, and any complications of the suspected respiratory condition.
- For asthma – consider X-ray if patient is 40 years or older at symptom onset.

2.3. Spirometry

Spirometry has 3 main uses in primary care (Dempsey et al., 2018):

1. Screening for subclinical lung disease in **high-risk populations**:
    - Asymptomatic smokers >40 years: 20% lifetime risk of COPD, risk high as exceeds > 15-20 pack-years, especially women; subclinical for > 10 years. Early cessation (Anthonisen et al., 1994) is the highest yield intervention to reduce further decline in function. May not be cost-effective <40 years.
    - Environmental or occupational pulmonotoxin exposure
    - Family history of lung or liver disease e.g., α_1-antitrypsin deficiency
    - Systemic disease with known lung-impairment component
2. Spirometry will diagnostically **confirm** many symptomatic presentations and largely **distinguish** between the two major pathophysiologies:

	Obstructive	**Restrictive (<5% of presentations)**
Pathology	**Expiratory** airflow **obstruction**	**↓ parenchymal distensibility (compliance)**
FEV/FVC	< LLN*	>LLN* + ↓ FVC = high suspicion
Archetype	Most commonly COPD or symptomatic asthma	The most critical restrictive diseases arise from alveolar surface area loss (interstitial lung diseases)
Exception	• False negative: suspected asthma may require challenge testing or repeat spirometry when symptomatic (see Section 3.7) • Severe asthma causes gas trapping→ ↓FVC	• False [-]: A normal FVC has negative predictive value for restrictive lung disease of >97% (Aaron et al., 1999), but very *early* interstitial disease may not yet have progressed to impede FVC • False [+]: mild ↓FVC may arise merely from deconditioning or abdominal obesity

*LLN = lower limit of normal = Z-Score - 1.65

3. Monitoring severity and therapeutic efficacy (since 2019, reports performed in all Alberta Health Services and some independent operated facilities can be found in Netcare – "Operative/Procedure/Investigations" folder) through serial spirometry to:
    - Investigate ↑ intensity or frequency of symptoms, or ↑ medication use
    - Corroborate patient report of disease severity with improvements in pre-bronchodilator FEV_1 & therapeutic reduction of reversibility
    - Measure therapeutic response 2-4 weeks after initiating or changing therapy
    - Detect critical FEV_1 levels or rapid FEV_1 drop triggers prompt treatment (see Section 3.2).

Use clinical judgement for repeating spirometry periodically to evaluate disease progression (expert opinion), which, in addition to above goals, also may detect:

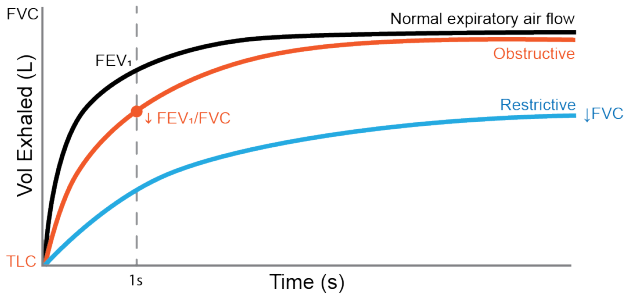
- Disease evolution to asthma-COPD overlap, restrictive disease, etc.
- Need for intensification e.g., supplementary oxygen, transplant candidacy

Spirometry measures - before and after inhalation of β-adrenergic agonist – 4 core metrics:

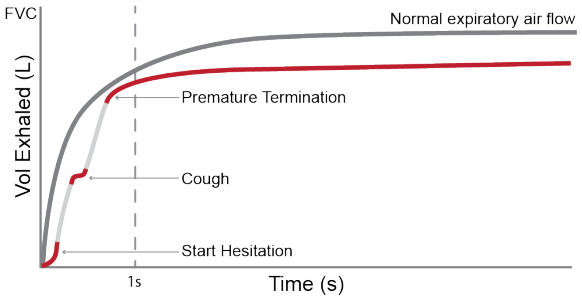
FEV_1 ($\%_{predicted}$): maximum volume expired in 1 second from fully expanded lungs	**FVC** forced vital capacity ($\%_{predicted}$): volume that can be expired from fully expanded lungs	**Ratio** of FEV_1/FVC (absolute): customarily abnormal if <0.7, but influenced by several variables such that ATS-defined threshold is **lower limit of normal (LLN)**	**Flow-Volume Loops**: graphical curves of inspiratory and expiratory flow plotted to volume; pictorial summary of diagnostic metrics and quality assurance criteria
All other reported values, including forced expiratory flows at 25-75%$_{vital\ capacity}$ ("midflows"), have **unreliable** specificity (Haynes, 2018).			

By age 25, FEV_1 and FVC decline 20-30mL/year (≤ 60mL in smokers). Aside from the FEV_1/FVC ratio, which is compared directly to norm, values are all calculated as percentage of predicted normal for age, biological sex, height (Stanojevic et al., 2022)). Normal spirometry is defined by these core metrics being within normal range. Normal spirometry doesn't entirely exclude lung disease, especially in the case of asthma, where most individuals would be only episodically beneath the normal range (Haynes, 2018).

Flow-Time Expiratory Curve (schematic)



Artifacts in a PFT



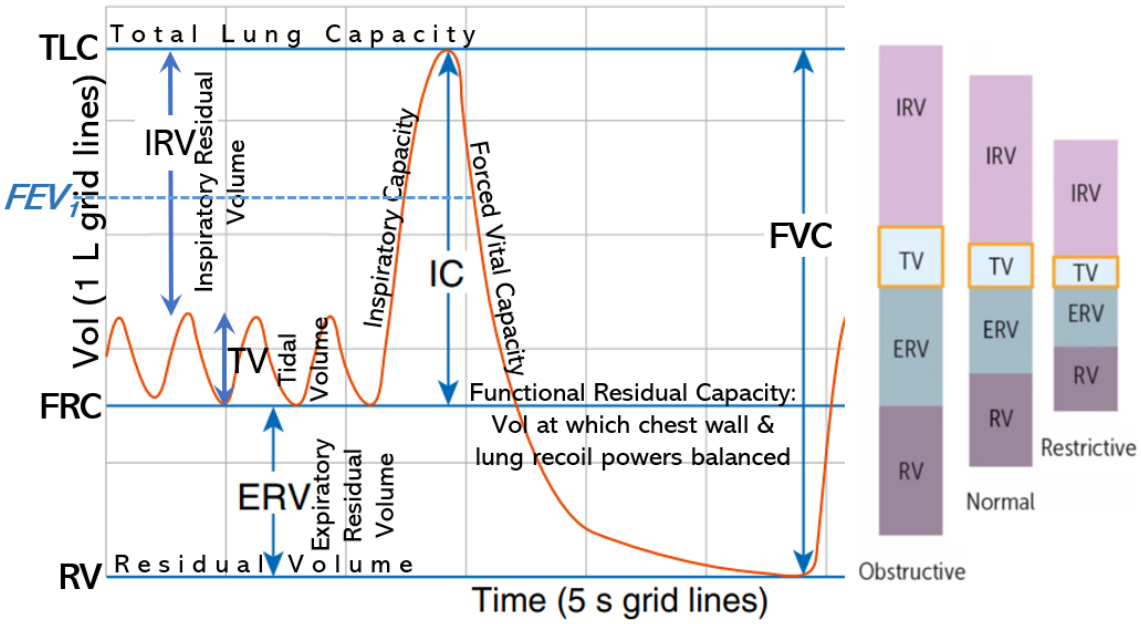
ATS Validity Criteria (Graham et al., 2019): Since maximal expiratory effort is pivotal, the interpreter will report when ATS criteria are **not** fulfilled: any of cough, submaximal effort, adult expiratory time < 6 seconds, < 3 tests with FEV_1 and FVC variances < 0.15 L (Haynes, 2018). Therefore, lung function testing is not achievable under the age of 5 years, but generally is possible by age 6. However, the interpreter may be able to interpret suboptimal spirometry with reasonable accuracy when errors and their effect on results are recognized.

2.4. Full Pulmonary Function Test (Full or Complete PFT)

Full Pulmonary Function Test; may also be called 'PFT' or 'full PFT' or 'complete PFT'.

For context, spirometry is more accessible and will identify > 97% (Aaron et al., 1999) of untriaged restrictive lung disease. When index of suspicion is elevated, full PFT should be chosen. It is of longer duration as it involves spirometry followed by one or both:

Lung volumes	Total Lung Capacity (TLC) = Vital Capacity (VC) + Residual Volume (RV)
Gas exchange (DLCO) (%)	Carbon monoxide (CO) diffusion capacity (see Section 3.5) – can be corrected for any anemia



Adapted from ATS Standardisation Update, 2019, Amer J Resp Crit Care Med 200(8)

2.5. Precautions for Lung Testing

Since lung testing metrics are based on population-based probabilities, it must be correlated with the clinical presentation. See (Haynes, 2018) and comprehensive online course on lung testing here.

Contraindications (review found here - Cooper, 2011) to testing include:

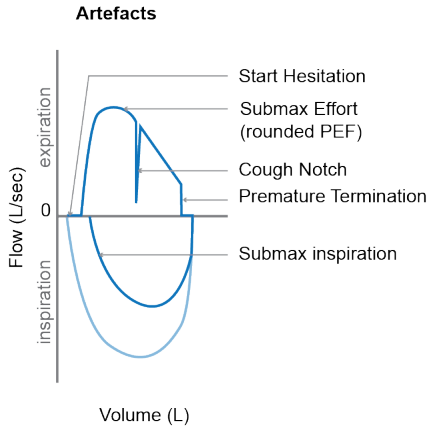
- Hemoptysis, unstable pulmonary embolism, uncontrolled pulmonary hypertension, acute cor pulmonale, unstable myocardial disease (acute infarction <1 week., decompensated heart failure), blood pressure >200/120, systemic hypotension or syncope related to forced expiration/cough, significant dysrhythmia, ascending aortic aneurysm.
- Intracranial/intraocular: cerebral aneurysm, brain surgery <4 week., recent symptomatic concussion, eye surgery <1 week.
- Sinus and middle ear: Sinus surgery or middle ear surgery or infection <1 week.
- Intrathoracic and intraabdominal: pneumothorax, thoracic or abdominal surgery <4 week., late-term pregnancy.
- Infection control: Active or suspected transmissible respiratory or systemic infection, including tuberculosis.

3. Lung Testing Results

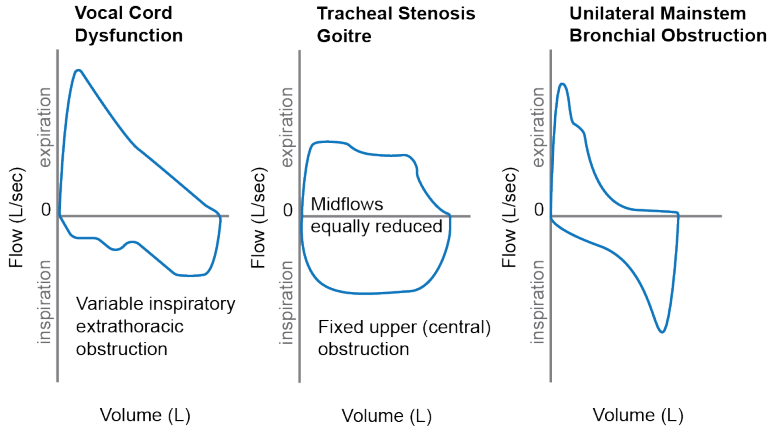
3.1. Spirometric Flow-Volume Loops (FVL) interpretation

Assessment of spirometry flow-volume loops morphology can identify:

Artifacts may affect validity

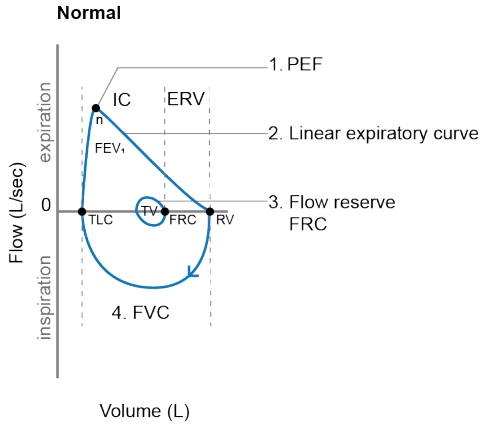


Upper airway disease deforms one or both curves, such as “plateauing” (resulting from reduction in mid-volume expiratory and/or inspiratory flows) (adapted from ATS - Stanojevic et al., 2022)



Morphologies of intrathoracic & infrathoracic pathology:

Normal Flow-Volume Loops (FVL)



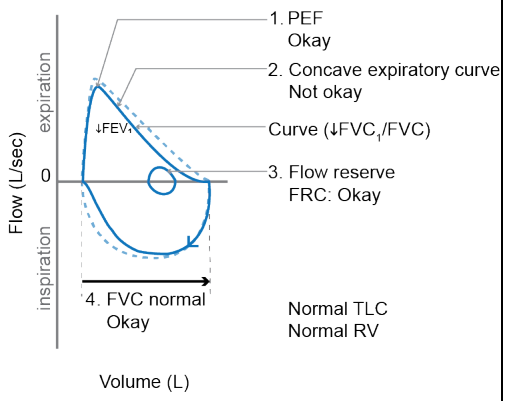
Systematically analyze:

1) Peak expiratory flow (PEF)
2) Expiratory curve (upward concavity indicates airflow obstruction)
3) Functional reserve (Functional residual capacity, FRC)
4) Lung volumes (FVC, TLC, RV typically ↓ in restrictive disease)

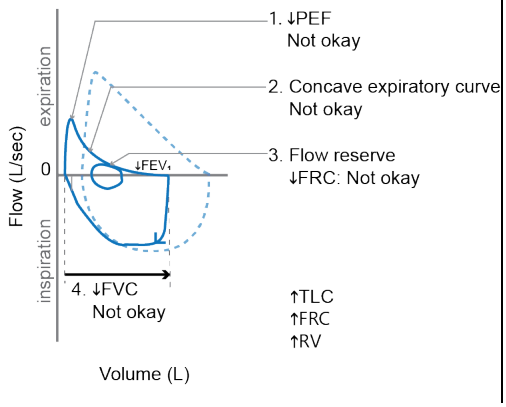
Obstructive FVL

Expansion of inspiratory curve “scoop” from mild to severe airway obstruction:

Mild Airway Obstruction

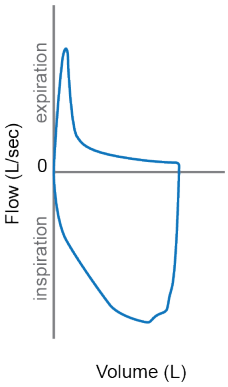


Severe Airway Obstruction
“Witch’s Hat”



Mixed

Both ↓flows and ↓TLC reflected in morphology

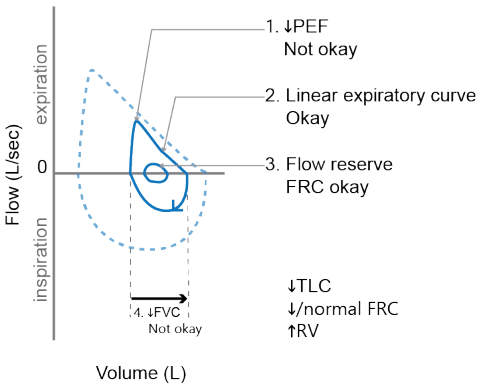


(Haynes, 2018)

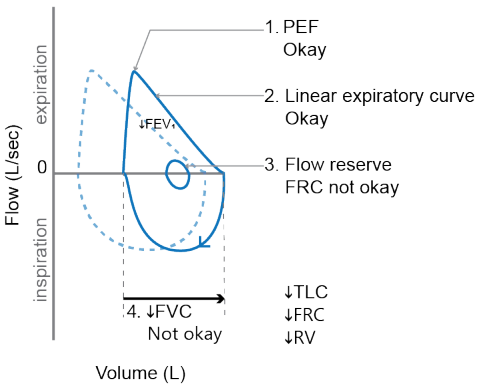
Restrictive FVL

“Shrinking iceberg” along both axes as alveolar loss produces ↓FVC, TLC, RV:

Restriction Chest Muscle Weakness



Restriction Stiff Lungs



3.2. Grading of Lung Function Impairment and Severity of Clinical Disease

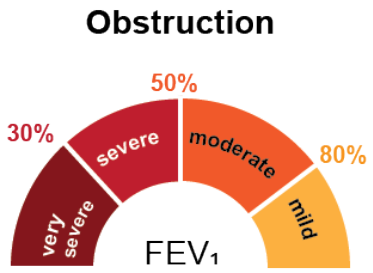
“…Severity of lung function impairment is not necessarily equivalent to **disease severity**, which encompasses assessment of quality of life, functional impairment, imaging, etc. Disease severity will be influenced by many other possible clinical features not related to lung function impairment such as anemia, neuromuscular weakness or drug side-effects…” (Stanojevic et al., 2022).

Obstructive disease severity (Yang et al., 2021; Lougheed et al., 2012) is based on **exacerbation frequency** and intensity of past and current treatment required to achieve control, and can be refined by spirometric measurements.

Staging of **ILD disease severity** is multidimensional, incl cause, type and pathology, radiography, demographics, functional capacity, cardiovascular studies and lung function.

Quantitative grading of **physiologic lung impairment** correlates with higher **morbidity**, **progression** and **mortality**, although grade cut-offs have no universal consensus.

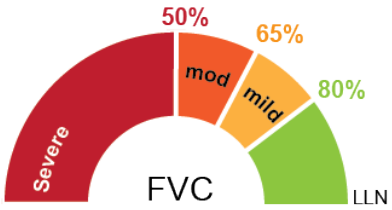
Severity of Expiratory Limitation



Specific uses include:

1. **Rapid** decline and **severe** ↓FEV_1 is predictive of morbidity and mortality (Petty, 1997): narrow window for treatment initiation and optimization
2. **Very severe** obstruction also signals need to assess oxygenation capacity (arterial blood gas, exertional oximetry)

Severity of Parenchymal Destruction



DLCO and FVC (absolute or relative decline over 6-12 months) correlate with parenchymal loss, worsening mortality and supplement the evaluation of mortality risk & for potentially toxic therapy – consult local ILD expertise. Monitoring of fibrotic interstitial lung disease (Jolene et al., 2020)

Severity Grading of Functional Impairment

A joint ATS (Stanojevic et al., 2022) and European Respiratory Society statement unifies normal reference standards, including grading of physiologic severity using standard deviations referenced to updated global population (called GLI) norms

Z-score of -1.65 = lower limit of normal = LLN

3.3. Fixed post-bronchodilator ratio

Consider a pulmonology consult if diagnostic uncertainty, high risk, absence of risk factors despite clinical findings, suboptimal control, radiographic suspicion of concomitant asthma. If ratio on 1st spirometry is equivocal (between 0.6 and 0.8), then a repeat spirometry may be indicated.

In comparison to ATS-defined threshold based on LLN, which incorporates age-related FEV_1 decline, 0.7 to define airflow obstruction tends toward underdiagnosis in young adults, and overdiagnosis in older ages (GOLD) (Vogelmeier, et al., 2023).

3.4. Mixed Obstructive-Restrictive Combination

In primary care, restrictive lung disease accounts for a small minority of cases. As a result, a FVC firmly < lower limit of normal (or customarily 0.8) is suggestive of restrictive lung disease but should be **confirmed with full PFT**.

This pattern may arise from concomitant diseases e.g., COPD and idiopathic fibrosis, or a single entity such as cystic fibrosis or sarcoidosis (Dempsey et al., 2018).

- Non-specific PFT pattern: when FVC <0.8 but full PFT excludes decreased volumes (i.e., TLC, RV normal), clinical presentation or flow-volume loop morphology often provide qualitative evidence of an obstructive process. In the remainder, submaximal effort or extra parenchymal process is the cause (Dempsey et al., 2018; Stanojevic et al., 2022).

3.5. Diffusion Capacity (DLCO)

By using inhaled carbon monoxide's high hemoglobin affinity, diffusion capacity measures the proportion of functional alveolar-capillary membrane relative to predicted norm. In those with partial lung resection or muscle weakness, DLCO/VA (D/VA_{sb}) corrects for TLC (alveolar volume). Differential diagnosis (Johnson et al., 2014):

DLCO	Obstructive pattern	Restrictive pattern
Low	Emphysema, silicosis (early), cystic fibrosis	Asbestosis, silicosis (late), berylliosis, hypersensitivity pneumonitis, idiopathic pulmonary fibrosis, Langerhans cell histiocytosis, sarcoidosis, lymphangitic tumour, miliary tuberculosis
Normal	Asthma, chronic bronchitis, α_1-antitrypsin deficiency, bronchiectasis, foreign body	• Pleural: effusion, fibrosis, pneumothorax, etc. • Chest wall: kyphoscoliosis, ribcage deformity, myoneural weakness (muscular dystrophies, myasthenia gravis, Guillain-Barré syndrome, amyotrophic lateral sclerosis) • Abdominal distension or obesity

DLCO	In setting of normal lung volumes, DLCO differential diagnosis:	
Low	Early interstitial lung disease, primary pulmonary hypertension, chronic pulmonary thromboembolism	Heart failure, collagen vascular diseases, granulomatosis with polyangiitis, anemia (hence DLCO is sometimes downward corrected for low Haemoglobin)
High	Asthma	Intrapulmonary hemorrhage, left → right intracardiac shunt, polycythemia

3.6. Evidence of reversibility

Reversibility may be sub-diagnostic in severe asthma exacerbations.

3.7. Does not entirely exclude asthma

- Since spirometry can typically be normal when asthma is under control, (Dempsey et al., 2018), repeat spirometry after initially normal results at a clinically symptomatic phase or refer to respirologist to confirm the diagnosis.
- Referral to a respirologist is typically required for airway hyperreactivity **challenge tests** such as bronchoprovocation (methacholine challenge [low specificity], exercise test [lower sensitivity and greater specificity than methacholine challenge], eucapnic hyperpnea test), sputum eosinophilia and nitrous oxide measurement.
- Also consider referring to a respirologist if high risk (e.g., life-threatening event such as admission to ICU for asthma, suspected or confirmed severe asthma), diagnostic uncertainty, significant smoking/clinical history, radiographic suspicion of asthma-COPD overlap, bronchiectasis, or bronchiolitis.

3.8. ILD

See current guidance from Canadian Thoracic Society. Link to Assessment (Johannson et. al., 2017) and Management (Assayag et al., 2018).

4. Asthma Guidelines

- Canadian Thoracic Society: https://cts-sct.ca/wp-content/uploads/2022/01/Corrected-Ver_2021_CTS_CPG-DiagnosisManagement_Asthma.pdf (Yang et al., 2021)
- Global Initiative for Asthma: 2022 GINA Main Report - Global Initiative for Asthma (GINA, 2023)

A referral to a specialist for consultation or co-management is recommended for the following:

- Diagnostic uncertainty
- Children not controlled on moderate doses of ICS or adult not controlled on moderate to high dose of ICS-LABA with correct inhaler technique and appropriate medication adherence
- Suspected or severe asthma
- Life-threatening event such as admission to ICU for asthma
- Need for allergy test to assess possible role of environmental allergens in those with a suggestive clinical history
- Any asthma related hospitalization (all ages), ≥ 2 ED visits (all ages) or ≥ 2 courses of systemic steroids (children)

5. COPD Guidelines

- Canadian Thoracic Society: https://cts-sct.ca/guideline-library/

A referral to a specialist for consultation is recommended for the following (Chronic Obstructive Pulmonary Disease (COPD): Diagnosis and Management) (BC Guidelines, updated 2020):

- The diagnosis is uncertain
- A patient is < 40 years with COPD and limited smoking history, or has severe symptoms and disability which is disproportionate to their lung function
- There is evidence of an alpha-1 antitrypsin (A_1AT) deficiency (e.g. early onset of emphysema or COPD, unexplained liver disease, family history)
- There are signs and symptoms of hypoxemic or hypercarbic respiratory failure
- There are severe or recurrent exacerbations and treatment failure
- The patient has severe COPD and disability requiring more intensive interventions
- A more intensive comorbidity assessment and management is required
- A patient is frail and may benefit from multidisciplinary or comprehensive geriatric assessment, and/or
- There is difficulty in assessing home oxygen or sleep disorders

6. Choosing Wisely Guidelines

6.1. For Asthma:

- Don’t continue medications for asthma (e.g., inhalers, leukotriene receptor antagonist or other) in individuals who have not had a clear clinical benefit or confirmation of reversible airflow limitation with spirometry or peak flow testing, and when non-diagnostic, a positive methacholine or exercise challenge test, provided timely access to testing allows it.
- Although international guidelines uniformly recommend objective testing to establish an asthma diagnosis, this diagnosis is often made clinically, and asthma medications are often initiated on that clinical basis. However, physical exam findings and symptoms such as cough, wheeze, and/or dyspnea can be caused by other conditions. As a result, up to one third of patients who have been diagnosed with asthma do not have evidence of asthma when objectively tested with pulmonary function tests. A false clinical diagnosis of asthma may delay diagnosis of the actual underlying condition, which may include serious cardiorespiratory conditions. Furthermore, patients with a false diagnosis of asthma who are started on asthma medications are unnecessarily exposed to both the side-effects and the costs of these medications.
- For individuals 6 years of age and older who can reliably perform pulmonary function testing, an abnormal spirometry (or challenge test) can be helpful for confirming a diagnosis of asthma, however spirometry can also be falsely negative, especially in individuals with episodic symptoms. Objective testing for asthma is not broadly available for children less than 6 years old and, in this age group, the diagnosis of asthma should be made clinically.

6.2. For COPD:

- Don’t initiate long-term maintenance inhalers in stable patients with suspected COPD if they have not had confirmation of post-bronchodilator airflow obstruction with spirometry.
- A diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough, and/or sputum production and an appropriate history of exposure to noxious stimuli. However, not all patients with these symptoms have COPD, and a spirometry demonstrating a post-bronchodilator FEV_1/FVC ratio < 70% (or less than the lower limit of normal, if available) is required to make a definitive diagnosis. Starting maintenance inhalers without first objectively diagnosing COPD results in unnecessary treatment in those patients who do not actually have the disease. In turn, this exposes these patients to both the side-effects and the cost of these medications and might delay the appropriate diagnosis.

PROVIDER RESOURCES

- Calgary Zone Pulmonary Central Access Triage (referral to specialist)
    - Central booking: 403-943-4718
    - Fax: 403-592-4201
    - Calgary Zone Pulmonary Referral Pathway (albertahealthservices.ca)
    - Accepts referrals from all physicians within Calgary zone for triage and book initial appointments for: Asthma, bronchiectasis, COPD (chronic obstructive pulmonary disease), SOB (shortness of breath), hemoptysis, hypoxemia, cough - Chronic Cough Clinic; interstitial lung disease Pulmonary Clinic, infection, lung nodules, sarcoidosis, pleural disease, pulmonary hypertension, pulmonary embolism, tobacco cessation, pulmonary rehabilitation, Lymphadenopathy, mediastinal mass, neuromuscular related respiratory disorder
- Edmonton Zone Specialist Referral
    - Visit Alberta Referral Directory
    - Select ‘Specialist’ and ‘Edmonton’
    - Enter the keyword ‘Pulmonary’
- Canadian Thoracic Society Guidelines and Tools – https://cts-sct.ca
- Global Initiative for Chronic Obstructive Lung Disease: https://goldcopd.org/2023-gold-report-2/
- Primary Health Care Resources: https://www.albertahealthservices.ca/info/Page15627.aspx

PATIENT RESOURCES

- MyHealth Alberta: https://myhealth.alberta.ca/health/tests-treatments/pages/conditions.aspx?Hwid=hw5022
- Alberta Lung Association: Home - Alberta Lung (ablung.ca)
- Asthma Action Plan: ASTHMA ACTION PLAN.pdf (alberta.ca)
- COPD Action Plan: COPD Action Plan (alberta.ca)

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