We would like to acknowledge that we are gathered today on the traditional territories of the Musqueam, Squamish and Tsleil-Waututh peoples.

Source: www.johomaps.net/na/canada/bc/vancouver/firstnations/firstnations.html

COPD Diagnosis, Management, and Prevention: Bread and Butter +

VCH Family Practice Rounds, September 2023

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Learning Objectives

- Confidence in diagnosing and managing the care of patients with COPD.
- An understanding of evidence and expert input supporting the newest guideline recommendations for COPD management.
- Insights into key health equity considerations in COPD care, including but not limited to climate change resiliency.

Not Our Learning Objectives

- Comprehensive review of pathophysiology
- Management of COPD exacerbations (stable COPD)
- Extensive review of management of advanced COPD (supplemental oxygen, non-invasive ventilation, lung-volume reduction surgery, transplant referral)

Outline

- Diagnosis
- Management: CTS and GOLD 2023 updates
- Bonus topics in COPD: rurality, wildfire smoke

Abbreviations

Guidelines/Recommendations

- CTS – Canadian Thoracic Society
- ATS – American Thoracic Society
- ERS – European Respiratory Society
- GOLD – Global Initiative for Chronic Obstructive Lung Disease

Inhalers

- LAMA – Long-acting Muscarinic Antagonist (such as tiotropium)
- SAMA – Short-acting Muscarinic Antagonist (such as ipratropium)
- LABA – Long-acting Beta Agonist (such as olodaterol, formoterol)
- SABA – Short-acting Beta Agonist (such as salbutamol)
- ICS – Inhaled Corticosteroid (such as fluticasone, mometasone)

Diagnosis

Burden of Disease in Canada

- Canada
  - Prevalence: ~5% of entire population
  - ~2 million Canadians living with COPD

- British Columbia
  - Prevalence: ~6% of population >45 years old
  - ~140,000 British Columbians living with COPD

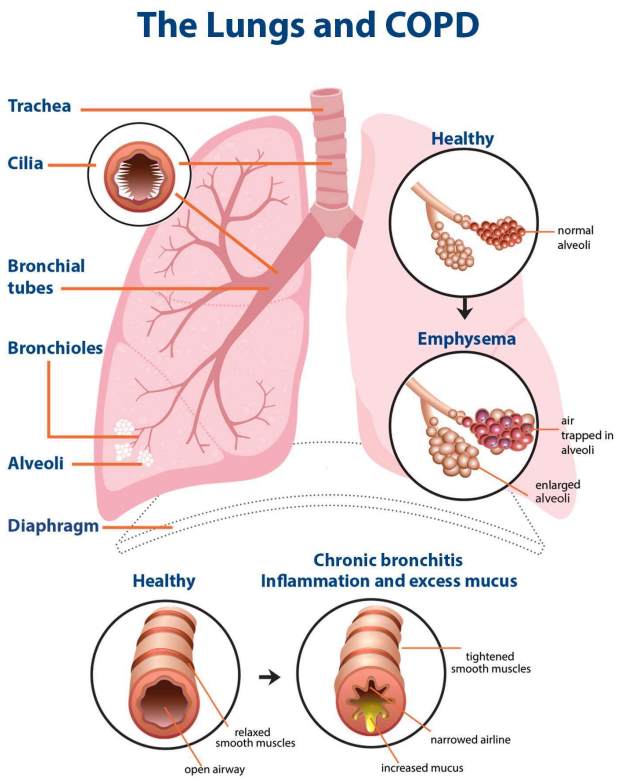


Image: COPD Foundation

Source: Institute for Health Metrics and Evaluation GBD 2019, BCGuidelines.ca

Burden of Disease in Canada

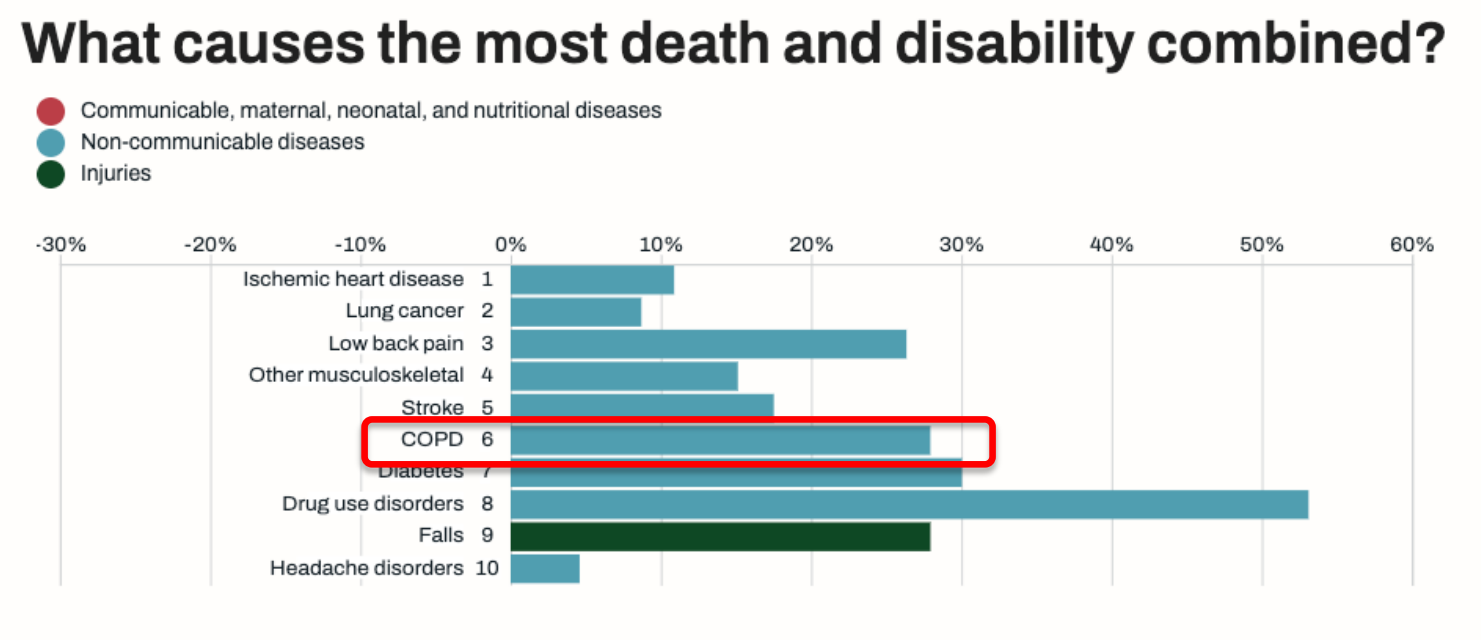
What causes the most deaths?

- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries

Cause	2009 rank	2019 rank	Change in deaths per 100k, 2009–2019
Ischemic heart disease	1	1	↑ +7.9
Lung cancer	2	2	↑ +2.4
Stroke	3	3	↑ +4.4
Alzheimer's disease	5	4	↑ +11.4
COPD	4	5	↑ +6.8
Colorectal cancer	6	6	↑ +4.5
Lower respiratory infect	8	7	↑ +5.8
Chronic kidney disease	10	8	↑ +4.6
Diabetes	7	9	↓ −0.6
Falls	12	10	↑ +3.4

Source: Institute for Health Metrics and Evaluation GBD 2019

Burden of Disease in Canada



Source: Institute for Health Metrics and Evaluation GBD 2019

Case 1

A 65 year-old person with a 40 pack-year smoking history (quit 2 years ago) gets a CT scan for abdominal pain, which incidentally identifies emphysema in lower part of the lung. What is the best next step?

A. They have emphysema and a smoking history confirming COPD, start inhalers

B. Obtain spirometry to confirm diagnosis of COPD

C. Check blood work for biomarkers like eosinophils, which can guide treatment

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Diagnosis: Spirometry Needed!

Consider COPD in patients with symptoms and history of exposure to risk factors

SYMPTOMS
Persistent dyspnea
Chronic cough
Chronic sputum production
Chest discomfort/Tightness

RISK FACTORS
Tobacco
Indoor/outdoor air pollution
Occupational pollutants
Family history
Age >40 years

Spirometry is **required** to make diagnosis

Persistent airflow limitation with postbronchodilator result

- $FEV_1/FVC < 0.70$ (GOLD 2023)
- $FEV_1/FVC <$ LLN (ATS/ERS 2021)

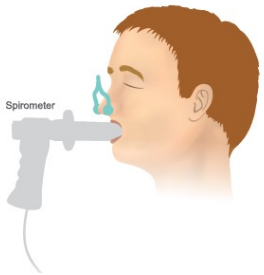

Image: ruralhealthinfo.org

Source: GOLD 2021, GOLD 2023, ATS/ERS 2021

Importance of Spirometry

Underdiagnosis:

70% cases of COPD worldwide are not diagnosed

Overdiagnosis

30-60% of patients with physician diagnosis of COPD do not have disease

Barriers to Spirometry:

- Access
- Lack of recognition of symptoms or atypical presentation

Consequences:

- Increased health care utilization without diagnosis/wrong diagnosis
- Delays to targeted treatment

Source: Diab AJRCCM 2018, Gershon CHEST 2018

Imaging Evidence of Emphysema: "Pre-COPD"

What about emphysema alone?

Evolving nomenclature:

- Etiotypes: environmental COPD, genetically determined COPD etc.
- **Pre-COPD:** no airflow obstruction, no evidence of treatment benefit

However, reasonable to treat empirically if high pre-test probability while awaiting spirometry

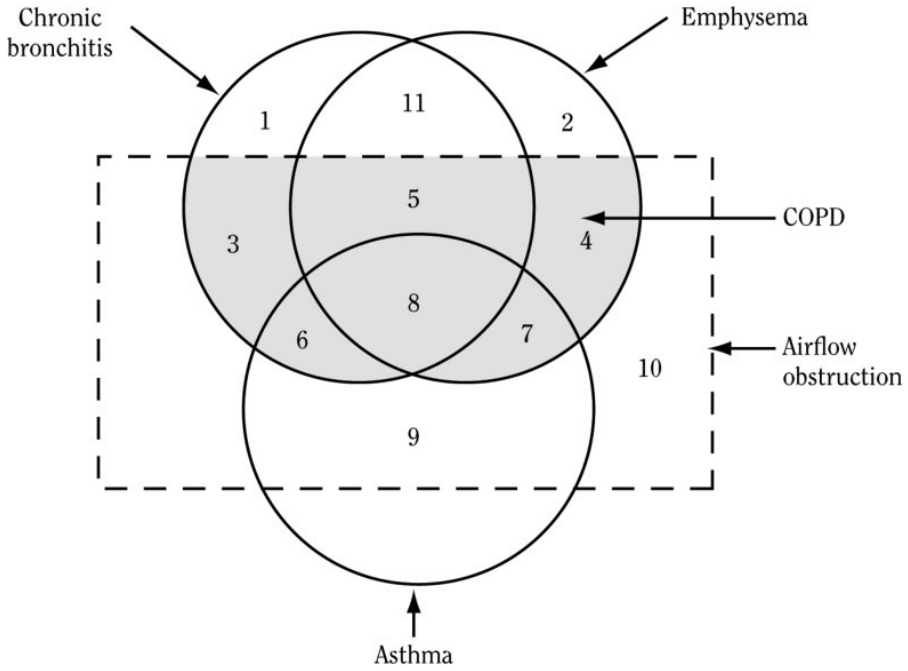

Image: ATS AJRCCM 1995

Source: Han AJRCCM 2020, GOLD 2023

Management

Case 2

A 55 year old person with a 35 pack-year history of smoking has confirmed COPD. They have dyspnea and lack of energy, finding it difficult to keep up with their partner when going out to the grocery store. Their inhaler regimen is currently ICS+LABA (fluticasone-salmeterol) which provides relief. They have not had any COPD exacerbations requiring clinic or hospital visits for more than 2 years. Assuming nothing has changed about their inhaler technique, what is the next best course of action among the following?

A. Add an individual LAMA inhaler such as tiotropium to the regimen
B. Swap to an all-in-one triple therapy inhaler (LABA+LAMA+ICS) for ease of administration
C. Re-visit symptoms with short (4-6 week) follow-up to avoid exacerbation
D. Swap her ICS+LABA for a LABA+LAMA (such as olodaterol/tiotropium)

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Assessment of Symptoms/Exacerbations Guides Therapy

Spirometrically confirmed diagnosis → Assessment of airflow obstruction → Assessment of symptoms/risk of exacerbations

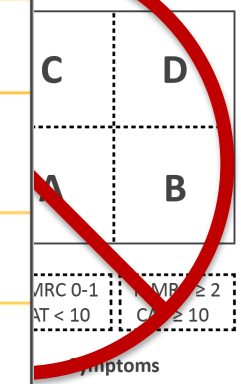
Post-bronchodilator FEV1/FVC < 0.7

MODIFIED MRC DYSPNEA SCALE[a]

PLEASE TICK IN THE BOX THAT APPLIES TO YOU | ONE BOX ONLY | Grades 0 - 4

mMRC Grade 0.	I only get breathless with strenuous exercise.	☐
mMRC Grade 1.	I get short of breath when hurrying on the level or walking up a slight hill.	☐
mMRC Grade 2.	I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level.	☐
mMRC Grade 3.	I stop for breath after walking about 100 meters or after a few minutes on the level.	☐
mMRC Grade 4.	I am too breathless to leave the house or I am breathless when dressing or undressing.	☐

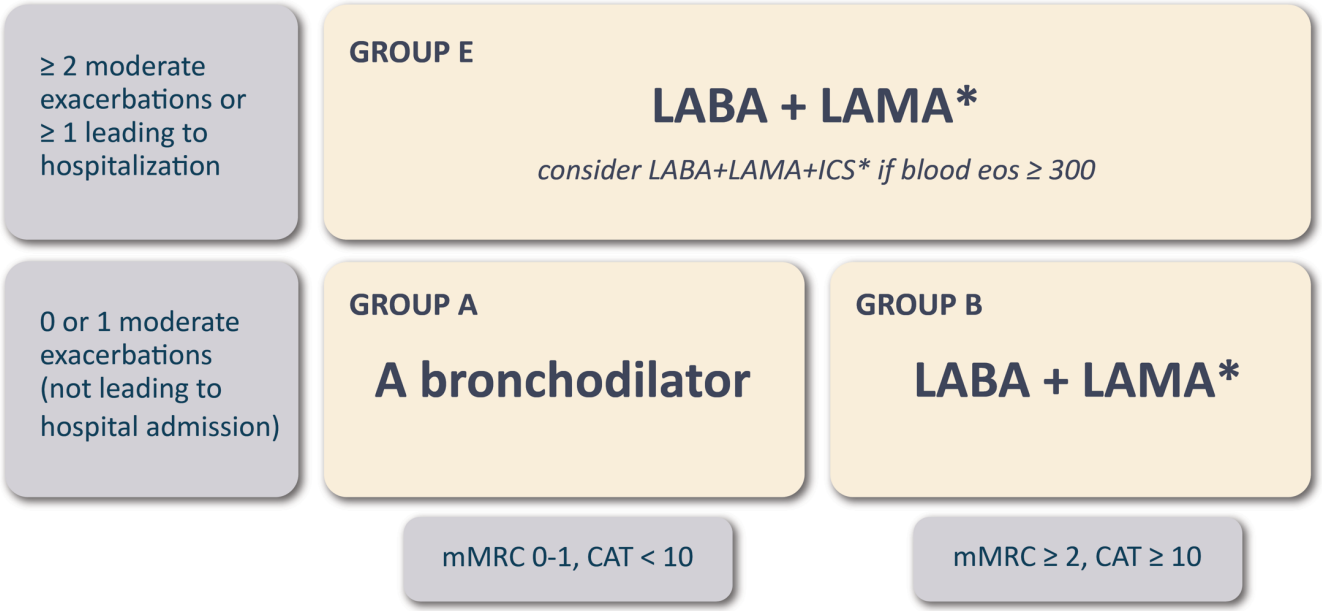
[a] Fletcher CM. BMJ 1960; 2: 1662.



Source: GOLD 2023

Treatment Algorithms: GOLD Initial Management

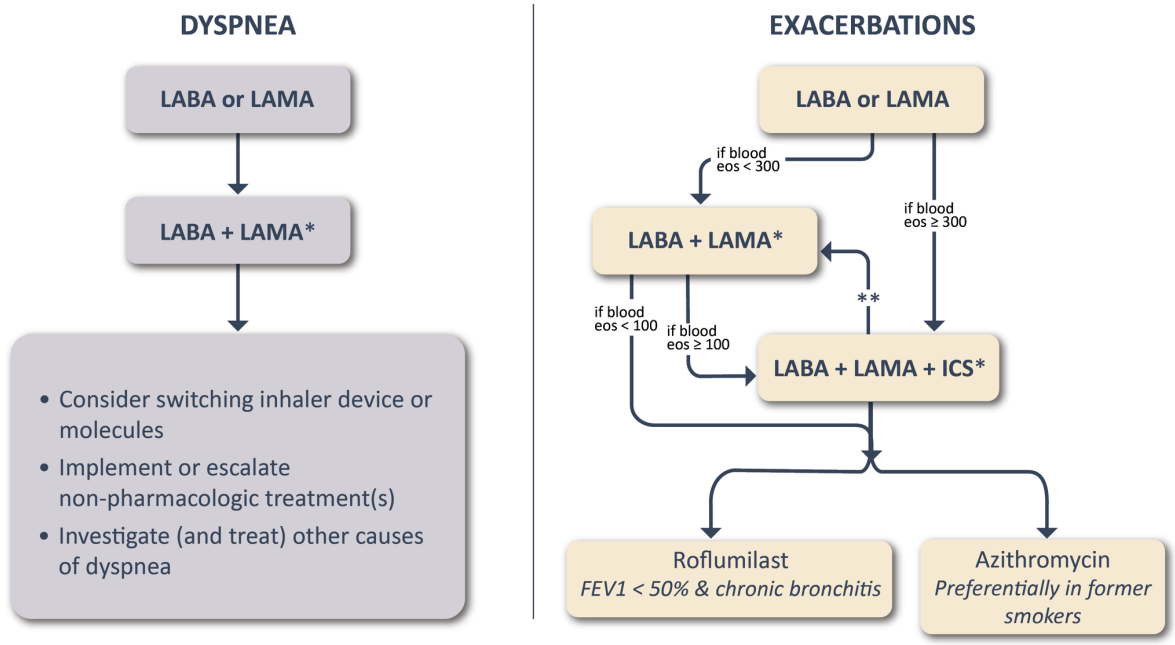
Goal of therapy: reduce symptoms, prevention exacerbations, reduce mortality



Treatment Algorithms: GOLD Subsequent Management

Before changing therapy:

- **Adherence**
- **Technique**
- **Comorbidities/Alternatives**



Treatment Algorithms: CTS

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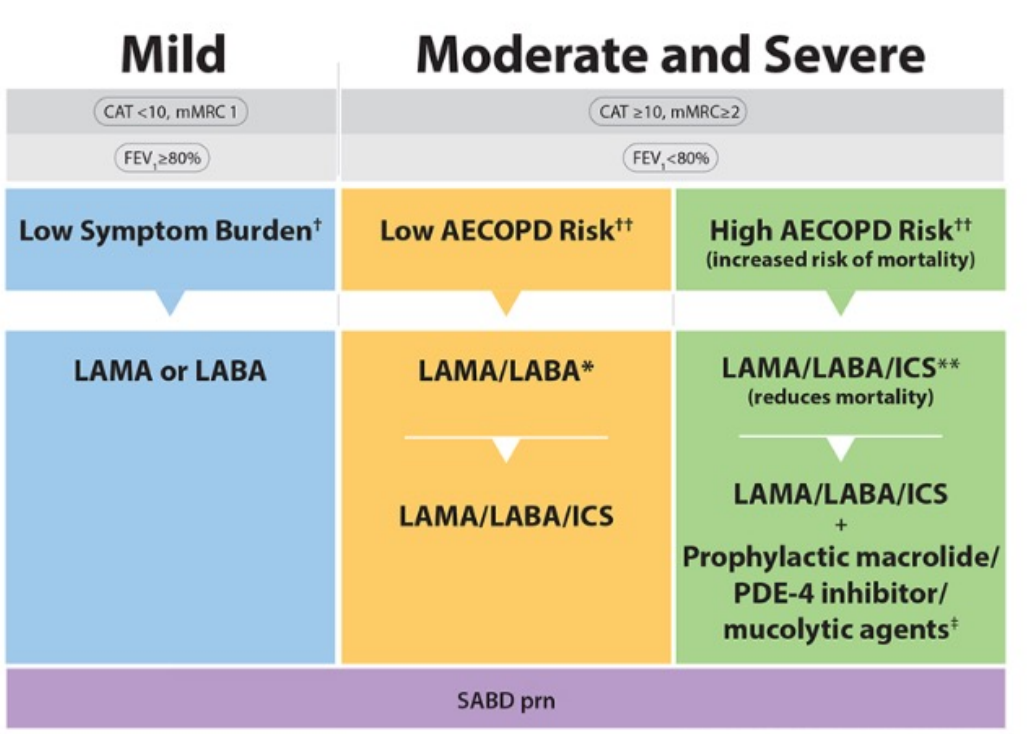

Source: CTS 2023

What happened to ICS?

Decreased role in COPD

- Harms: pneumonia
- Possible harms: adrenal suppression, osteoporosis, glycemic control
- Better lung function, fewer mild exacerbations with LAMA/LABA

Main indication in COPD: exacerbations

De-escalation:

- WISDOM + SUNSET trials: safe to withdraw (abrupt vs. taper)

STRONGLY FAVORS USE	History of hospitalization(s) for exacerbations of COPD[#]
	≥ 2 moderate exacerbations of COPD per year[#]
	Blood eosinophils ≥ 300 cells/µL
	History of, or concomitant asthma
FAVORS USE	1 moderate exacerbation of COPD per year[#]
	Blood eosinophils 100 to < 300 cells/µL
AGAINST USE	Repeated pneumonia events
	Blood eosinophils < 100 cells/µL
	History of mycobacterial infection

Source: Kew Cochrane 2014, Mkorombindo Clin Chest Med 2021, GOLD 2023, Magnussen NEJM 2014, Chapman AJRCCM 2018

Case 3

A 70 year-old person with COPD presents for evaluation of progressive dyspnea over the last year. They have had one moderate exacerbation in the last year and now have to take breaks while shopping for groceries. They have a chronic productive cough. They smoke tobacco, one pack per day, and have a 30 pack-year smoking history. They are using triple therapy (LABA+LAMA+ICS). In addition to smoking cessation, what is the best next step?

A. Add azithromycin given their likely chronic bronchitis
B. Refer for pulmonary rehabilitation
C. Add roflumilast for frequent exacerbations

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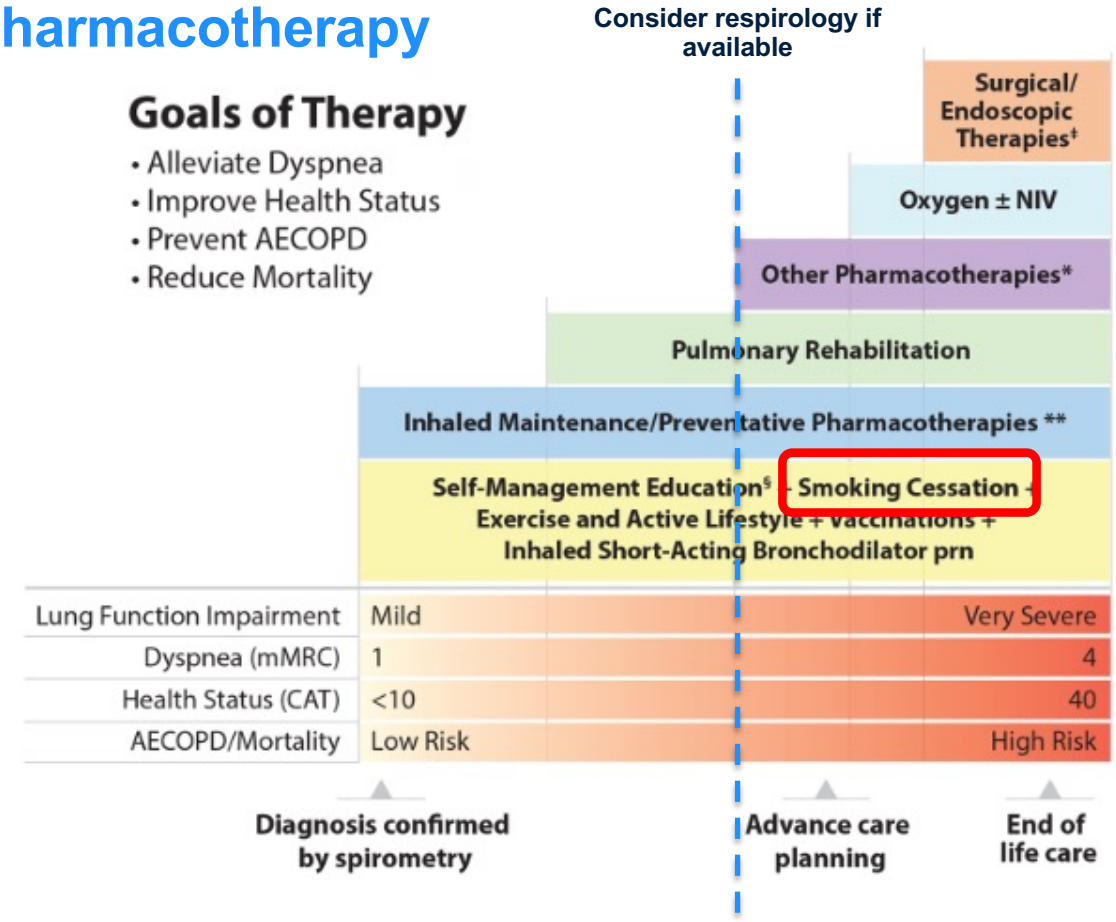
Beyond Pharmacotherapy



Source: CTS 2023

Pulmonary Rehabilitation

Comprehensive program

- 2-3 sessions/week, 6-8 weeks
- Supervised exercise, education, self-management (e.g. breath training), peer support

Outcomes: Improves dyspnea, health-related quality of life, exercise, readmissions

Cost-effectiveness: cost-savings at best, cost-effective at worst

Indications: symptoms (GOLD B), risk of exacerbation (GOLD E), post-exacerbation

Barriers to uptake: time, transportation, awareness, program availability

- Estimate: 0.4% of patients with COPD in Canada with access

Source: GOLD 2023, Puhan Cochrane 2016, McCarthy Cochrane 2015, Mosher JAMA Netw Open 2022, Camp Can Resp J 2015

Management: Take-home Points

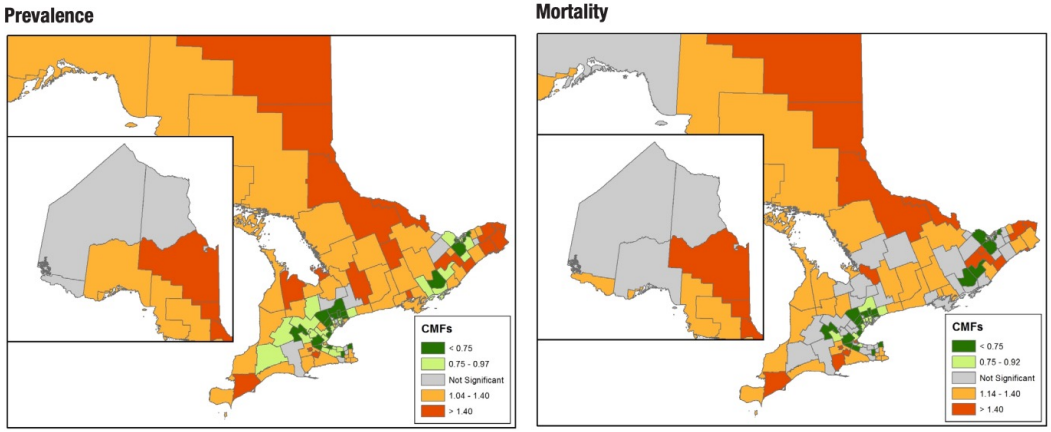
- Inhalers: depends on symptoms and exacerbation risk
- Bronchodilators (LABA and/or LAMA) are the mainstay
- ICS no longer routinely used without presence of exacerbations
- Pulmonary rehabilitation is beneficial and severely underutilized!

Bonus Topics: Rurality, Wildfire Smoke

Rurality

Rurality presents major challenge

- Access to care: limited spirometry
- Burden of disease: higher prevalence
- Disease outcomes: higher mortality



Potential health system solutions:

Telehealth

- Visits with specialists
- Pulmonary rehabilitation: tele-rehab may be non-inferior?

Care delivery models/care coordination:

- Project ECHO for COPD
- eConsults

Source: Gershon Stat Can 2015, Bhatt AJRCCM 2019

Climate Change and Wildfire Smoke

Health effects:

Exacerbations: 30-100% increased ED visits

Long-term health consequences of repeat exposure?

- Elevated inflammation
- Cancer risk: 4.9% higher incidence lung cancer over 10 years

Potential solutions for patients: limited evidence on public health interventions

Air filtration among former smokers with COPD:

- Decreased moderate exacerbations (IRR 0.32, 95%CI 0.12-0.91)
- Decreased rescue medication use (IRR 0.54, 95% CI 0.33-0.56)

Source: Rice Annals ATS 2021, Heft-Neal PNAS 2023, Korsiak Lancet Planet Health 2022, Hansel AJRCCM 2022

Summary

Summary

- Diagnosis: Spirometry needed to make diagnosis

- Management:
  - Exacerbations and symptoms key to determining therapy
  - Look at CTS guidelines, generally start with LAMA or LABA
  - Limited role for ICS: high risk of exacerbations

- Major challenges: improving care and reducing inequity, mitigating effect of smoke

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