Overview
COPD is a common respiratory disease, which affects >700,000 adults in Canada, and is the fourth most common cause of death. However, it remains underdiagnosed — index of suspicion must be high, and although chest X-ray findings may suggest it, diagnosis is formally made by spirometry only. Early diagnosis of high-risk patients is paramount.

Risk Factors
May be grouped into Exposure-based and Host-based:

- **Exposure** — smoking, occupation/environment, perinatal or childhood illness, atopy, social factors
- **Host** — genetics (e.g. alpha-1-antitrypsin deficiency), gender, airway (e.g. severe asthma)

Definition
COPD is characterised by progressive, partially reversible airflow limitation, which leads to air-trapping and hyperinflation

Complications
Ischemic heart disease, metabolic syndrome, cor pulmonale, anemia, pulmonary hypertension, lung cancer, cachexia, malnutrition, peripheral muscle dysfunction, osteopenia/osteoporosis, glaucoma, cataracts, anxiety, depression

Diagnostic Considerations
Key is suspecting the diagnosis — 5 screening questions can suggest:
- Do you cough regularly?
- Do you cough up phlegm regularly?
- Do even simple chores make you short of breath?
- Do you wheeze when you exert yourself, or at night?
- Do you get frequent colds that last longer than other people?

→ if > 1 positive answer, proceed to Spirometry

Differential Diagnosis and Approach

Respiratory
Asthma – see chart to right
Bronchiectasis – daily purulent sputum, CT findings
Tuberculosis – risk factors on Hx, Mantoux, granuloma on CXR
Diffuse panbronchiolitis – non-smoker, Asian, sinusitis; CT signs
Bronchiolitis obliterans – inhalation, transplant, rheum; CT signs
Pulmonary fibrosis – CXR or CT

Cardiac
Heart failure – basilar crackles, CXR + echocardiogram findings
Pulmonary vascular disease – echocardiogram findings
Anemia – bloodwork

Other
Alpha-1-antitrypsin deficiency – young, non-smoker, liver disease
Severe deconditioning
Obesity

When to Refer
Uncertain diagnosis
Suspected α-1-AT deficiency
FEV1<50%
>2 exacerbations/year
Onset of comorbidities

- Onset <40-years-old
- Rapid decline
- Unintentional weight loss
- Need for O2 therapy
- For surgery

The Medical Research Council Dyspnea Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Only short of breath (SOB) with strenuous exercise</td>
</tr>
<tr>
<td>2</td>
<td>SOB going up slight hill or hurrying on level</td>
</tr>
<tr>
<td>3</td>
<td>Walks slower than people of same age due to SOB, or have to stop for breath when walking on level</td>
</tr>
<tr>
<td>4</td>
<td>Stop for breath after walking 100yd (90m) or few minutes level</td>
</tr>
<tr>
<td>5</td>
<td>Too SOB to leave the house, or SOB when dressing</td>
</tr>
</tbody>
</table>


Increasing Disability and Lung Function Impairment


Dr Michael Evans developed the One-Pager concept to provide clinicians with useful clinical information on primary care topics.
Smoking cessation is the most effective intervention to decrease the risk of developing COPD, and to slow its progression. All patients should be encouraged to remain active, despite experiencing dyspnea (except when outdoor air quality is poor). Pulmonary rehabilitation for stable, symptomatic patients. Treat comorbidities and complications.

Educate patients re: self-management – smoking, exacerbations, inhaler use, community resources, end-of-life preparation.

Vaccination: annual

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Smoking cessation is the

### Medication

<table>
<thead>
<tr>
<th>Medication</th>
<th>Usual dose/cost</th>
<th>Indication/Efficacy</th>
<th>Caution/Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHORT ACTING BRONCHODILATORS (SABD)</strong> – 1st line PRN in mild COPD and always available as PRN rescue medication</td>
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<tr>
<td>Salbutamol MDI: 100 mcg/inh Diskus: 200 mcg/inh</td>
<td>1-2 puffs q 4-6h pm² Max: 800 mcg/day²</td>
<td>Improves lung function, dyspnea, exercise endurance in moderate to severe COPD. No consistent effect on quality of life.²</td>
<td>Tremor, nervousness, headache, dizziness, ↑ HR, palpitations, ↑ QT, ↓ K+, Tachyphylaxis⁴,⁵ Hyperglycemia in diabetes mellitus</td>
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<tr>
<td>Terbutaline Turbuhaler: 0.5mcg/inh</td>
<td>1 puffs q 4-6h pm² Max: 6 puffs/day⁵</td>
<td>Duration of action 4-6 hours.⁵</td>
<td></td>
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<tr>
<td><strong>SHORT ACTING ANTI-CHOLINERGIC</strong></td>
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<tr>
<td>Ipratropium bromide MDI 20 mcg/inh</td>
<td>2-4 puffs q 2-6×⁵ Max: 12 puffs/day²</td>
<td>Improves lung function, dyspnea, exercise endurance in moderate to severe COPD. No consistent effect on quality of life.⁴ Duration of action 4-8 hours⁶</td>
<td>Dry mouth, metallic, headache, more than SABA in elderly Caution: glaucoma/urine retention⁴,⁵</td>
</tr>
<tr>
<td><strong>LONG ACTING BRONCHODILATORS (LABD)</strong> – 1st line moderate COPD, or alternate for symptomatic mild COPD not responsive to SABA prn⁶</td>
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<tr>
<td>Formoterol $$$ onset 5min Turbuhaler: 6, 12mcg/inh</td>
<td>1-2 puffs q12h5 Max 48 mcg/day⁵</td>
<td>Improves lung function, chronic dyspnea, and health status⁵ Reduced frequency and severity of exacerbations (TORCH).⁶ Duration of action 8-12 hours.⁵</td>
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<tr>
<td>Salmeterol $$$ onset 1 hr Disks: 50 mcg/ing Diskhaler: 50 mcg/blister</td>
<td>1 puff q12h5 Max 50 mcg Q12h5</td>
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<tr>
<td>Indacaterol $ onset 5 min Neohaler: 75 mcg/ capsule</td>
<td>1 puff/day (75 mcg)</td>
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<tr>
<td><strong>LONG ACTING ANTI-CHOLINERGICS (LAAC)</strong></td>
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<tr>
<td>Tiotropium $$$$ Handi-Haler: 18 mcg/cap for inhalation</td>
<td>18 mcg (1 capsule) inhaled once daily⁴</td>
<td>1st line moderate COPD or adjunct for symptomatic mild COPD failing PRN short acting bronchodilator.² Improves lung function, exercise tolerance, dyspnea.⁴ Chronic use may ↑ quality of life, ↓ exacerbations, ↓ hospitalization on7, No change in rate of decline in FEV1, and no increased risk CV event or death.⁵ Duration of action 24h.⁵</td>
<td></td>
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<tr>
<td>Glycopyrronium $ Breezhaler 50 mcg/cap</td>
<td>1 puff/day (50 mcg)</td>
<td>Dry mouth, bitter taste⁴,⁵ Rare: urine retention, prostatic symptoms, glaucoma if dispersed into eyes⁴,⁵ Glycopyrronium: caution with hiatus hernia, hyperthyroidism, ulcerative colitis</td>
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<tr>
<td><strong>INHALED CORTICOSTEROIDS (ICS)</strong></td>
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<tr>
<td>Fluticasone $$$ MDI 50, 125, 250 mcg/ inh Disks 50, 100, 250, 500 mcg/inh</td>
<td>Lower steroid dose if less exacerbations 100-500mcg BID¹ Max 1000mcg/day¹</td>
<td>ICS should never be used alone → add to LABA for those with moderate-severe COPD with ≥ 1 exacerbations per year.⁴ Oral thrush 5-6%, dysphonia, skin bruising⁴,⁵ Long-term, high-dose may cause: adrenal suppression ↑ pneumonia rates 3.5%/year ↑ intraocular pressure Monitor bone density in those with ≥ 1 risk factor for osteoporosis⁴,⁵</td>
<td></td>
</tr>
<tr>
<td>Beclomethasone $ MDI 50, 100 mcg/inh</td>
<td>50-400mcg BID⁶ Max 800mcg/day²</td>
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<td></td>
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<tr>
<td>Budesonide $ Turbuhaler: 100, 200, 400 mcg/inh</td>
<td>200-400mcg BID⁶ Max 2400mcg/day²</td>
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</table>
### Methyloxanthines

**Theophyllines:** “Can half SR tabs”
- **Brandname:** Uniphyl®
  - 400, 600mg SR tab
- **Generics:** *dose q12h*
  - Novo-Theophyl SR 100, 200, 300mg SR tab
  - Apo Theo LA 100, 200, 300mg SR tab
- **Elixir:** *dose q6-8h*
  - 5.3mg/mL oral liquid

**Aminophylline $**
- 225, 350mg SR dose BID

**Daxas® (roflumilast)**
- **New drug**
  - Anti-inflammatory action
  - 500 mcg po daily
- **Add-on therapy to bronchodilators for the maintenance treatment of severe COPD associated with chronic bronchitis**
  - Modest benefit in airway function, FEV1, and ↓ frequency and severity of exacerbations

**GI nausea, vomiting, abdominal cramps, insomnia, tremor, hyperactivity, headache, tachycardia**
- Potential systemic toxicities → monitor and adjust dose based on clinical response and serum drug levels (55-85 umol/L).
  - Toxic >110 umol/L
- Toxicity: life threatening arrhythmias, seizures
- CAUTION: Possible drug interactions with cyp1A2 drugs (eg. macrolides, quinolones, etc.).

### Acute Exacerbation
Defined as sustained increased dyspnea, cough, or sputum, more use of maintenance medication. Treat with SABA, SAAC, oral steroids.
If Winnipeg criteria met (more cough, more sputum, change sputum quality) → then antibiotics.

### Patient Resources
- Smoking cessation guidelines (US) - [http://www.surgeongeneral.gov/tobacco/index.html](http://www.surgeongeneral.gov/tobacco/index.html)
- CLA breathworks – [http://www.lung.ca/diseases-maladies/copd-m poc/breathworks-actionair/index_e.php#fact_sheets](http://www.lung.ca/diseases-maladies/copd-m poc/breathworks-actionair/index_e.php#fact_sheets)

**References**
References can be found online at [http://www.dfcm.utoronto.ca/programs/postgraduateprograme/One_Pager_Project_References.htm](http://www.dfcm.utoronto.ca/programs/postgraduateprograme/One_Pager_Project_References.htm)