

FREE

CONTINUING EDUCATION LESSON



APPROVED FOR 1.25 CEUs

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OBJECTIVES

Upon successfully completing this lesson, the pharmacist will be able to:

1. outline the causes and associated risk factors of COPD.
2. educate patients around the differences in clinical features between COPD and asthma
3. assess the need for patients to seek referral based on symptoms of COPD
4. discuss severity of COPD according to classification by symptoms and disability or lung function criteria.
5. recommend appropriate activities aimed at preventing COPD.
6. recommend appropriate COPD treatment that is aimed at improving symptoms and slowing progression of disease.

INSTRUCTIONS

1. After carefully reading this lesson, study each question and select the one answer you believe to be correct. Circle the appropriate letter on the attached reply card or answer online at www.pharmacygateway.ca in the CE Online section, "More CCEP-Approved" area.
2. To pass this lesson, a grade of 70% (14 out of 20) is required. If you pass, your CEU(s) will be recorded with the relevant provincial authority(ies).
(Note: some provinces require individual pharmacists to notify them.)

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ANSWERING OPTIONS

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The Pharmacist's Role in Management of COPD:

A Focus on the Canadian Thoracic Society COPD Recommendations 2007 Update

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INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a condition that is under-diagnosed and unfamiliar to a large portion of the general population.¹ In fact, in a survey of 2,568 adult Canadians, aged 18 and over, conducted over a five-week period in 2005, fewer than half (45%) had ever heard of Chronic Obstructive Pulmonary Disease, and only 17% had heard of the term COPD.² The need for greater awareness and identification of people with COPD is underscored by the following facts:¹

- COPD has moved from the fifth leading cause of death in 1999 to the 4th leading cause of death in 2004 in both men and women.
- The number of COPD deaths in women has increased by 117% from 1988 to 2003 and will likely surpass the number of deaths in men in the near future.
- Mortality rate is likely underestimated

because the primary cause of death is often listed as a different diagnosis such as congestive heart failure.

- COPD is a progressive disease that severely impacts quality of life in the later years. The learning objectives outlined here speak to the opportunity for pharmacists to make a significant impact in the identification and care of people with COPD.

COPD – A Complex and Diverse Disease

As defined by the COPD 2007 Recommendations Update, COPD is a respiratory disorder largely caused by smoking, characterized by progressive, partially reversible airflow obstruction, systemic manifestations, and increasing frequency and severity of exacerbations.¹ The pathophysiology of COPD is complex and diverse and is associated with persistent inflammation of the small and large airways, as well as the lung parenchyma and its vasculature.¹ The nature of the disease varies from patient

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TABLE 1: Clinical features of asthma, bronchitis and emphysema^{1,3,4}

	Asthma	Chronic Bronchitis	Emphysema
Primary symptoms	Wheezing, cough or dyspnea, chest tightness	Cough and sputum production	Dyspnea
Reversible with β_2 -agonists	Yes	Little	Little
Allergic component	Frequent but not always	Infrequent	Infrequent
Inflammation	Yes (eosinophilic and leukotrienes)	Yes (neutrophilic)	Alveoli only (neutrophilic)
Sputum production	During acute attack only	Copious, continuous	Scanty
Cough	Yes (nonproductive); morning cough may be sign of nocturnal asthma	Yes (productive)	No
Age of onset	Usually < 40 years	Usually > 40 years	Usually > 50 years
Chronic nature	Episodic (e.g., according to allergen triggers) or continuous	Continuous	Continuous
Smoking history	Possible but not causal	Usually > 10 pack-years	Usually > 10 pack-years
Body build	Varied	Often obese	Often thin and barrel chested
Hypoxia, CO ₂ retention	During acute attack only	Yes (blue bloater)	No (pink puffer), but yes during an acute attack
Lung function (spirometry)	May normalize	May improve but never normalizes	May improve but never normalizes
Other	Wheeze, cough, chest tightness, shortness of breath, mucus plugging, airway edema, difficulty exhaling. Often worse at night, or following exercise.	Steady course with progressive worsening	Steady course. With progressive worsening

to patient and research has revealed that the inflammatory process in COPD is different than in asthma.¹

One or both of the conditions referred to as “chronic bronchitis” and “emphysema” may occur in COPD. Chronic bronchitis is defined as the presence of cough and sputum for three months in at least two consecutive years while emphysema is defined as abnormal and permanent enlargement of the air-spaces distal to the terminal bronchioles, accompanied by destruction of their walls.³

Patients and health professionals alike should understand the important differences between COPD and asthma, as recommended treatment regimens are very different. Table 1 contrasts asthma with COPD (chronic bronchitis and emphysema).

Pharmacists can help identify patients who may require further assessment for COPD. Patients will usually have had a significant smoking history and exhibit cough and/or sputum production, shortness of breath and

will likely present many prescriptions for respiratory tract infections.¹

DIAGNOSIS AND CLASSIFICATION OF COPD

Spirometry is the most important measurement for the identification of obstructive impairment of the airways associated with COPD and is a requirement for diagnosis.¹ Following is a brief overview of terms used in spirometry and utility in assessment of COPD:⁵

- Forced vital capacity (FVC) – the total volume of air that can be exhaled during a maximal forced expiration effort.
- Forced expiratory volume in one second (FEV₁) – the volume of air exhaled in the first second under force after a maximal inhalation.
- FEV₁/FVC ratio – The percentage of the FVC expired in one second – this is the most important measurement for identification of obstructive impairment associated with COPD.¹

- FEF_{25-75%} – Forced expiratory flow over the middle one-half of the FVC; the average flow from the point at which 25% of the FVC has been exhaled to the point at which 75% of the FVC has been exhaled.
- Total Lung Capacity (TLC) – The volume of air in the lungs at maximal inflation.
- Vital Capacity (VC) – the largest volume measured on complete exhalation after full inspiration.

A patient’s spirometry results are compared with predicted values for people of the same age, height, weight, and sex. Normal ranges for spirometry results vary with patients’ height, weight, age, sex, and racial or ethnic background.⁵

COPD severity has traditionally been assessed using the Medical Research Council (MRC) Dyspnea Scale as follows:¹

Grade 1 – Not troubled by breathlessness except with strenuous exercise.

Grade 2 – Troubled by shortness of breath when hurrying on the level or walking up a slight hill.

Grade 3 – Walks slower than people of the same age on the level because of breathlessness or has to stop for breath when walking at own pace on the level.

Grade 4 – Stops for breath after walking about 100 yards (90 m) or after a few minutes on the level.

Grade 5 – Too breathless to leave the house or breathless when dressing or undressing.

In the COPD Recommendations 2007 update the Canadian Thoracic Society classifies COPD severity by impairment of lung function (as measured by spirometry) and by symptoms and disability. These are presented in Table 2.

Early diagnosis of COPD along with smoking cessation can provide substantial long-term health benefits for the patient. Pharmacists have a tremendous opportunity to impact on care in this patient population by identifying those at risk and recommending referral for assessment. The Canadian Lung Association has recommended that patients older than 40 years of age who are current or ex-smokers should be referred for spirometry if they answer yes to any of the following questions:¹

- 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 persist longer than those of other people you know?

TABLE 2: COPD Severity classified by symptoms and disability, and lung function

COPD Stage	Classification by Symptoms and Disability	Classification by impairment of lung function
Mild (Corresponds to MRC Grade 2)	Shortness of breath from COPD when hurrying on the level or walking up a slight hill	$FEV_1 \geq 80\%$ predicted, $FEV_1/FVC < 0.7$
Moderate (Corresponds to MRC Grades 3 to 4)	Shortness of breath from COPD causing the patient to stop after walking approximately 100 m (or after a few minutes) on the level	$50\% \leq FEV_1 \leq 80\%$ predicted, $FEV_1/FVC < 0.7$
Severe (Corresponds to MRC Grade 5)	Shortness of breath from COPD resulting in the patient being too breathless to leave the house, breathless when dressing or undressing or the presence of chronic respiratory failure or clinical signs of right heart failure.	$30\% \leq FEV_1 \leq 50\%$ predicted, $FEV_1/FVC < 0.7$
Very severe	N/A	$FEV_1 < 30\%$ predicted, $FEV_1/FVC < 0.7$

The COPD Recommendations 2007 Update support the following as steps for the clinical evaluation of patients with COPD:¹

1. Quantification of tobacco consumption: total pack years = number of cigarettes smoked per day ÷ 20, multiplied by number of years smoked. Occupational or environmental exposure to other lung irritants should be included in the assessment.
2. Assessment of the severity of breathlessness using the MRC dyspnea scale. This provides information around survival prognosis.
3. Assessment of the frequency and severity of exacerbations.
4. Assessment of symptoms that could point to complications of COPD, such as ankle swelling that might indicate cor pulmonale. A history of progressive weight loss (with reduced fat-free mass) indicates a poor prognosis.
5. Assessment of symptoms that suggest comorbidities (e.g., heart and circulatory diseases, lung cancer, osteoporosis, musculoskeletal disorders, anxiety and depression).
6. Assessment of current medical treatment.

MANAGEMENT OF COPD

Goals of Therapy

The COPD Recommendations Update 2007 list management goals as follows:¹

- Prevent disease progression. Smoking cessation is a critical strategy.
- Reduce the frequency and severity of exacerbations.
- Alleviate breathlessness and other respiratory symptoms.
- Improve exercise tolerance and daily activity.
- Treat exacerbations and complications of

the disease.

- Improve health status.
- Reduce mortality.

Smoking Cessation

Since symptoms of COPD vary widely from patient to patient, treatment strategies should be individualized. Education of the patient and family and support based on disease-specific self-management principles should be a part of ongoing care. Smoking cessation is a critical intervention. Systematic minimal interventions lasting less than three minutes should be offered to every smoker with the understanding that more intensive counseling and smoking cessation aids result in the highest quit rates.¹ Unfortunately education in this area is beyond the scope of this continuing education lesson. There are many excellent patient and health professional support programs available. Support materials and/or programs are available from organizations listed below:

Health professional tools and education for helping patients to quit smoking can be found at:

- Canadian Pharmacists Association – Quit: Quit Using and Inhaling Tobacco. Online at http://cpha.learning.mediresource.com/select_catalog.asp
- Clinical Tobacco Intervention Program (Ontario) – Online at www.ctica.org

Patient Resources can be found at:

- Smoker's Helpline 1 877 513-5333
- Canadian Cancer Society 1 888 939-3333 also online at www.cancer.ca – Booklets – “For Smokers Who Want to Quit,” “For Smokers Who Don't Want to Quit”

- Canadian Lung Association www.lung.ca – Section to help patients quit smoking http://lung.ca/protect-protegez/tobacco-tabagisme_e.php
- Heart and Stroke Foundation of Canada www.heartandstroke.ca – Section to help patients quit smoking <http://ww2.heartandstroke.ca/Page.asp?PageID=1613&ContentID=23083&ContentTypeID=1>
- Health Canada http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/quit-cesser/index_e.html

Pharmacological Treatment of COPD

The recommended pharmacological treatment of COPD follows a continuum of care as outlined in Figure 1.

Figure 1 represents an update from recently published Canadian COPD guidelines. The rationale for the progression of therapy aligns with recently published studies. Table 3 highlights recommendations that are new to the 2007 guidelines.

Bronchodilators

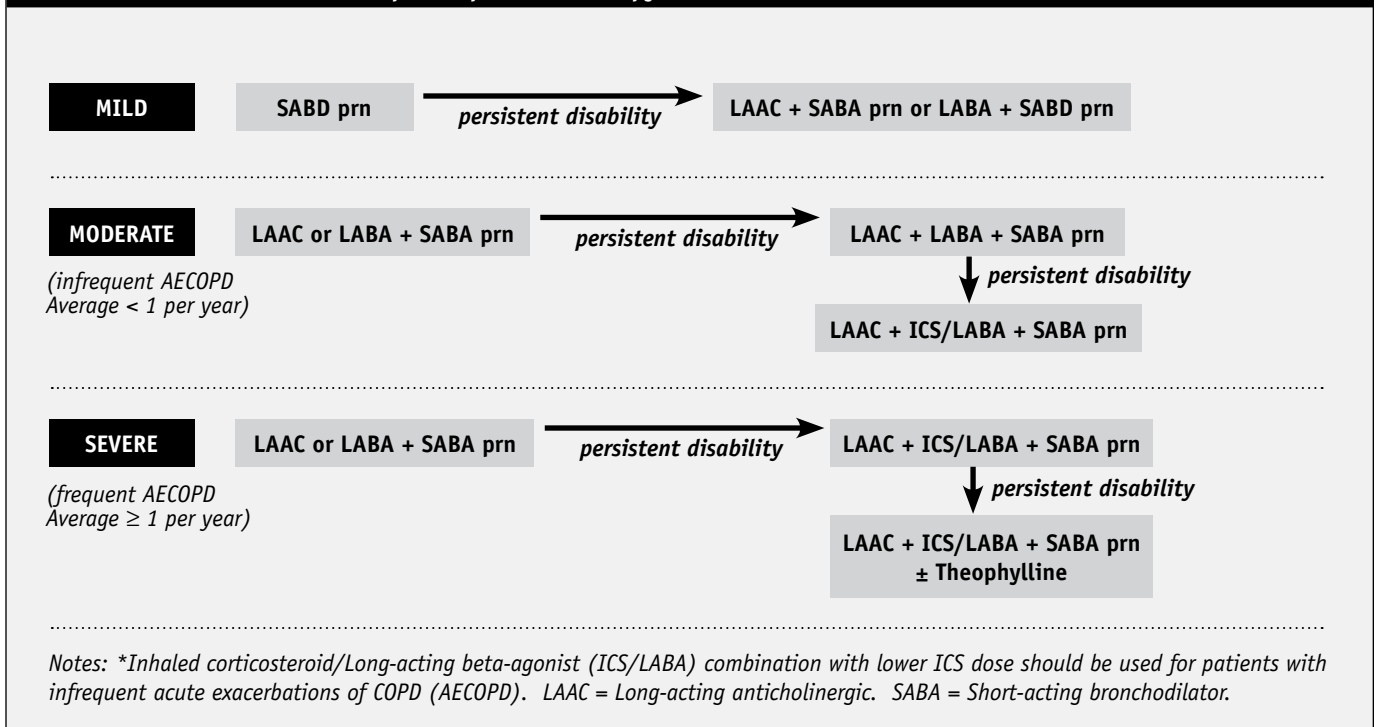
Bronchodilators (both short and long-acting anticholinergics and beta₂-agonists) are the cornerstone of COPD treatment. Improved expiratory flow and lung emptying is facilitated by reduction in airway smooth muscle tone. Bronchodilator therapy does not change the course of the disease.

Short-acting bronchodilators – beta₂-agonist or anticholinergic?

Over the years, COPD guidelines have at times recommended short-acting beta₂-agonist as bronchodilator of choice due to rapid onset of action. Others have recommended use of ipratropium as primary treatment due to its favourable side-effect profile and targeting of the cholinergic system (which predominates in older individuals more likely to have COPD). Current guidelines are less prescriptive and recommend that choice of either salbutamol or terbutaline, or ipratropium be made based on individual responses (i.e., effectiveness and tolerance) of the individual, as these vary from person to person.¹

Although recommended dosing of ipratropium is 40 µg (2 inhalations) three to four times daily, maximal bronchodilation may occur at higher doses. Many clinicians recommend doses of 60-80 µg four times daily for COPD symptom control.³ Higher doses pose little extra risk for adverse effects for most patients.

Salbutamol and terbutaline have historically often been prescribed as a regular four times daily therapy for COPD management.³ There

FIGURE 1: Recommendations for optimal pharmacotherapy in COPD¹

is little evidence to suggest that this regimen is better than 'prn' use as rescue medication.³ Maximum dose of 8 inhalations daily (800 µg) salbutamol or 6 inhalations daily (3 mg) terbutaline should be observed. Patients should have their short-acting bronchodilators on hand in case of acute symptoms.

There is no evidence to suggest that one short-acting bronchodilator is better than another, or better than combined bronchodilator therapy in terms of acute symptom relief.³ Use of a short-acting bronchodilator before an exercise session may reduce dynamic hyperinflation and allow better training effects to be received.

Long-acting bronchodilators – beta₂-agonist or anticholinergic?

Tiotropium interacts with the anticholinergic (M) receptors differently than ipratropium. Tiotropium binds to M₁, M₂ and M₃ receptors but dissociates quickly from the M₂ receptor where blockade might increase bronchoconstriction through release of acetylcholine.⁴ Blocking of M₂ receptors by ipratropium may account for some cases of paradoxical bronchoconstriction which are occasionally observed.⁶ In contrast, tiotropium dissociates 100 times more slowly from M₁ and M₃ receptors, resulting in effective bronchodilation with once-daily dosing.⁶ Tiotropium has been shown to have longer-lasting effects on pulmonary function, chronic activity-related dyspnea and quality of life than ipratropium

40 µg four times daily or placebo in patients with moderate to severe COPD.

Use of long-acting beta₂-agonists (LABAs) (i.e., formoterol or salmeterol) results in more sustained improvements in pulmonary function, chronic dyspnea and quality of life than short-acting bronchodilators in patients with moderate to severe COPD. The effects of LABAs on exercise performance have not been consistent.¹ Although there are few studies available to compare LABAs with tiotropium, two such comparison studies suggest that tiotropium provides marginally greater improvement in lung function than salmeterol.^{7,8} Small short-term studies suggest that tiotropium provides either comparable, or greater, improvements in lung function than combined LABA and inhaled corticosteroid (ICS).¹

Combination of tiotropium with LABA has been shown in two short-term studies to provide additive and sustained effects on pulmonary function in patients with moderate to severe COPD.^{8,9} In a one-year study the combination of salmeterol and tiotropium in patients with more advanced COPD resulted in consistent health status improvement but without any change in spirometry results or reduction in frequency and severity of exacerbation compared with tiotropium alone.¹⁰

Theophylline

Theophylline is a relatively weak oral bronchodilator and offers modest improvements

in lung function, dyspnea and exercise performance. It is not a first-line agent in the treatment of COPD due to potential toxicity and adverse events which include nausea, vomiting, insomnia, hyperactivity and tachycardia.³ Theophylline has a narrow therapeutic range. When toxic levels are reached, life-threatening arrhythmias and seizures are possible. Therefore, blood level monitoring is necessary. Drug interactions are a concern as agents such as erythromycin or ciprofloxacin may cause increases in theophylline levels through inhibition of metabolism. Smoking increases metabolism of theophylline. Therefore if one quits smoking while taking theophylline, levels may increase.

The COPD Recommendations 2007 Update assert that theophylline is a "consideration" for patients in the "severe" category of increasing disability and lung function impairment with frequent AECOPD of ≥ 1 per year (see Figure 1).¹

Inhaled Corticosteroids (ICS) and combination ICS/LABA

In considering the role of ICS in management of COPD, one must take into account the differing mechanism of inflammation compared to that associated with asthma. Unlike studies in patients with asthma, randomized controlled trials have not shown any effect on the progressive decline in lung function in patients with mild to severe COPD.¹ There is much over-use of inhaled corticosteroids in

TABLE 3: Revised or new recommendations included in the COPD Recommendations 2007 Update

• While short-acting bronchodilator therapy was previously promoted as either regular or prn, the current guidelines favour prn use based on evidence that there is no advantage to regular short-acting bronchodilator use. ¹
• The combination of inhaled corticosteroid with long-acting bronchodilator has been given a limited role in treatment of moderate-severity COPD, whereas previously evidence suggested a role only in severe disease. ¹
• New treatment algorithm outlines optimal pharmacological and non-pharmacological management for COPD. ¹
• The 2007 guidelines recognize spirometry, not just as a diagnostic tool, but to determine which patients will most benefit from specific pharmacological interventions. ¹

TABLE 4: Probable pathogens and recommended antibiotic treatment for purulent acute exacerbations of COPD¹

Clinical State	Symptoms and risk factors	Probable pathogens	First choice of antibiotics
Simple COPD without risk factors	Increased cough and sputum, sputum purulence and increased dyspnea	<i>Haemophilus influenzae</i> , <i>Haemophilus</i> species, <i>Moraxella catarrhalis</i> , <i>Streptococcus pneumoniae</i>	Amoxicillin, doxycycline, trimethoprim/sulfamethoxazole, second- or third-generation cephalosporins, extended-spectrum macrolides
Complicated COPD with risk factors	As in simple COPD plus at least one of: • FEV ₁ < 50% predicted • ≥ 4 exacerbations per year • ischemic heart disease • use of home oxygen • chronic oral corticosteroid use • antibiotic use in the past 3 months	As in simple plus: <i>Klebsiella</i> species and other gram-negatives. Increased probability of beta-lactam resistance.	Beta-lactam/beta-lactamase inhibitor, fluoroquinolones, (antibiotics for uncomplicated patients when combined with oral steroids may suffice).

the treatment of mild to moderate COPD.¹

Combination therapies or ICS/LABA have been shown to be of more benefit in treatment of COPD than ICS alone.¹ The combination of salmeterol/fluticasone 50/250 µg used twice daily was found to be more effective in patients with moderate to severe COPD with respect to pulmonary function. The TORCH trial, which included 6,112 patients with FEV₁ < 60% of predicted value, found that combination salmeterol/fluticasone reduced all-cause mortality at three years from 15.2% in the placebo group to 12.6% in the treatment group (a non-significant trend, $p=0.052$).¹¹ Secondary outcome measures such as exacerbation reduction, improved lung function and health status were significantly improved compared to placebo and to treatment with either drug alone.¹¹ The Optimal Therapy study results did not find a difference in overall exacerbation rates when salmeterol/fluticasone was added to tiotropium; however, secondary outcomes of lung function, quality of life and hospitalization rates were significantly improved.¹⁰

TREATMENT OF ACUTE EXACERBATIONS OF COPD

The COPD Recommendations 2007 Update defines acute exacerbation of COPD (AECOPD) as a sustained (48 hours or more) worsening of dyspnea, cough or sputum production, leading to an increase in the use of maintenance medications and/or supplementation with additional medications.¹ The average COPD patient experiences approximately two exacerbations per year, although this is highly variable. The need for antibiotic therapy is often predicted by whether the exacerbation is purulent or non-purulent.¹ At least one-half of AECOPDs are thought to be infectious in nature. Many are initially viral. Additional triggers of AECOPD include congestive heart failure, exposure to allergens and irritants and pulmonary embolism.¹

Inhaled short-acting bronchodilators are recommended for all patients with acute exacerbations of COPD with combination short-acting beta-agonist and anticholinergic in the acute situation.¹ An MDI with spacer is pre-

ferred for delivery of the medication in most situations. Wet nebulizers and/or systemic administration of bronchodilators have not demonstrated any advantage over inhaled bronchodilators in clinical trials. The addition of intravenous aminophylline has not added benefit either, but has increased risk for adverse effects.³

There is good evidence to support the use of oral or parenteral corticosteroids in most patients with moderate to severe AECOPD.¹ Dose should be individualized. Usual recommended doses range from 30-40 mg/day prednisone or equivalent for 10 to 14 days.¹ Antibiotics should be considered for use in patients with purulent exacerbations.¹ Patients with only white or clear sputum during AECOPD usually recover without the use of antibiotics. Table 4 outlines probable pathogens and recommended antibiotic treatment for purulent acute exacerbations of COPD.

Prevention of AECOPD

By assisting in the recognition of AECOPD pharmacists can help patients prevent prolonged periods of symptoms and reduced quality of life that is often associated with the occurrence. Mortality rates can be as high as 24% when patients are admitted to an intensive care unit with respiratory failure.¹ In addition, a high percentage of patients requiring hospitalization for AECOPD are readmitted due to persistent symptoms and suffer a temporary decrease in their functional abilities after discharge.

The following are measures which can be recommended to prevent AECOPD:¹

- Smoking cessation
- Annual influenza vaccination (reduces morbidity and mortality by as much as 50% in the elderly and incidence of hospitalization by as much as 39% in patients with chronic respiratory conditions).
- Pneumococcal vaccine at least once. In high-risk patients, consideration should be given to repeating the vaccine in five to ten years.
- Regular therapy with tiotropium with or without LABA in patients with FEV₁ less than 60% predicted.
- Combination of LABA/ICS should be considered for patients with FEV₁ less than 60% and who experience one or more AECOPD per year.

THE PHARMACIST'S ROLE IN MANAGEMENT OF COPD

Pharmacists have the opportunity to play a critical role in the prevention and management of COPD. Active promotion of activities aimed at helping patients become smoke-free

is by far the most important prevention-related activity. Asking patients about their smoking status and offering assistance in moving the smoking cessation process forward is one of the most important public health-related activities a pharmacist can undertake. Resources for education of pharmacists in this area, as well as resources to recommend to patients, are suggested in the section entitled “smoking cessation.”

This continuing education module has focused on helping the patient who already has COPD. Pharmacists are often the first health professional to come into contact with patients seeking assistance or simply looking for relief from over-the-counter aids. These encounters provide an opportunity to assess risk factors and symptoms that may be associated with undiagnosed COPD (see “Diagnosis and Classification of COPD” on page 2). Patients at risk of COPD should be referred to their physician for assessment and diagnosis. Early recognition of COPD can lead to treatment strategies that could add years and quality of life to a patient affected by this progressive condition.

Patients may have a difficult time coping with the diagnosis of a condition that has no chances of reversal. Pharmacists should play an important role in educating patients around

the prospects of slowing the progression of the disease and improving quality of life through adherence and treatment strategies. Empowering patients to effective self-management is an important goal of pharmacist-patient interaction.

As inhaled bronchodilator therapy is the cornerstone of COPD treatment, pharmacists should regularly assess and help patients optimize inhaler technique and address adherence issues. Therapeutic recommendations based on current evidence are another important role for today’s pharmacist. For example, a patient refilling their short-acting bronchodilator more often than once every month should prompt discussion and assessment for the need to move up the continuum of treatment regimens. Symptoms of exacerbation identified should prompt referral of the patient to their physician. Recommendations and discussion with the physician that are in the best interest of patient care should be made, citing current guidelines which have been a focus of this continuing education module.

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QUESTIONS – Answer online at pharmacygateway.ca, CE section, “More CCCEP-approved” dept.

CASE 1: TL is a woman who has been in your pharmacy often for recommendation of cough medications. She finds herself wheezing at times and coughs up whitish mucus. She has experienced these types of breathing problems fairly consistently for the past 6 months or so. She has also found that exertion, such as climbing stairs or walking quickly or up a slight hill, gets her more out of breath than it used to. TL hasn't seen her doctor about the problem because she hasn't previously experienced breathing problems and she feels she will eventually get better on her own. When asked, TL, who is 58 years old, tells you she has smoked 10 cigarettes (= one-half pack) daily since she was 20 years old.

1. Which of the following of TL's symptoms would be LEAST likely to suggest she has COPD as opposed to asthma?

- a) chronic nature of the mucus production and cough
- b) age of onset of breathing difficulties
- c) wheezing symptoms
- d) chronic nature of breathing difficulties

2. You have recommended TL see her doctor for further follow-up. You tell her that there is a possibility that smoking has contributed to her condition. How many pack-years has TL smoked?

- a) 9
- b) 19
- c) 28
- d) 38

3. Which of the following most likely describes TL's symptoms with respect to the Medical Research Council dyspnea scale?

- a) grade 1
- b) grade 2
- c) grade 3
- d) grade 4

4. Which of the following spirometry results would be more indicative of COPD than of asthma?

- a) post-bronchodilator $FEV_1 > 80\%$
- b) improvement in post-bronchodilator FEV_1
- c) normalization of post-bronchodilator FEV_1/FVC
- d) post-bronchodilator $FEV_1/FVC < 0.7$

5. TL visited her doctor as recommended.

She has recently had a lung function test done and tells you that she blew out 65% of her lung capacity in one second. She said that the amount of air she blew out in one second was about 82% predicted for her age. Which COPD stage is TL in, according to her lung function?

- a) mild
- b) moderate
- c) severe
- d) very severe

6. Which of the following is NOT a goal of COPD treatment?

- a) improve exercise tolerance and daily activity
- b) reduce mortality
- c) restore lung function to normal over time
- d) reduce the frequency and severity of exacerbations

7. You strongly support the doctor's recommendation of smoking cessation for TL. Which of the following statements is FALSE?

- a) “Quit smoking” interventions lasting less than three minutes should be offered to every smoker.
- b) Systematic minimal interventions are as effective as more intensive counseling.
- c) More intensive counseling and quit smoking aids result in higher quit rates than systematic intensive counseling.
- d) Education of both the patient and the family around smoking cessation should be part of ongoing care.

8. TL's physician would like a recommendation on which bronchodilator to use. Which of the following statements is TRUE?

- a) Ipratropium is the bronchodilator of choice for mild COPD.
- b) Beta₂-agonists are the bronchodilators of choice for COPD.
- c) Salbutamol is the bronchodilator of choice for COPD.
- d) Choice of bronchodilator therapy should be based on effectiveness and tolerance as per individual.

9. Which of the following statements about dosing of bronchodilators in the treatment of COPD is correct?

- a) Short-acting bronchodilators should be

dosed 4 times daily regularly.

- b) Single-entity short-acting bronchodilators should be dosed 4 times daily regularly while combination bronchodilators (i.e., ipratropium/salbutamol) should be used only on a prn basis.
- c) Short-acting inhaled bronchodilator therapy should be used on a prn basis up to a maximum dose.
- d) Short-acting bronchodilators should be used 2 to 4 times daily regularly based on response.

10. Why might ipratropium result in paradoxical bronchoconstriction, whereas it would be unlikely with tiotropium?

- a) The propellant in ipratropium has been associated with paradoxical bronchoconstriction.
- b) Ipratropium blocks M₂ receptors, promoting acetylcholine release whereas tiotropium has more activity at M₁ and M₃ receptors.
- c) The overall dose of ipratropium needed to relieve symptoms is higher than tiotropium.
- d) Tiotropium has some beta₂-agonist activity which prevents bronchoconstriction.

11. TL returns four weeks after receiving a prescription for salbutamol inhaler. She has been using appropriate inhaler technique and has been adherent with therapy. She tells you that she is still short of breath when in a hurry and is continuing to cough up phlegm. Which of the following would be the most appropriate recommendation?

- a) add tiotropium once daily to therapy
- b) assess therapy after one more month
- c) add formoterol twice daily to therapy
- d) add salmeterol/fluticasone twice daily to therapy

CASE 2: RR is a 72-year-old man with a 30 pack-year history of smoking (he quit smoking 5 years ago when he was diagnosed with emphysema). He has had an acute exacerbation of COPD about once every 2 years on average. He is currently using tiotropium once daily plus formoterol twice daily on a regular basis and terbutaline prn. He complains that he is having symptoms of breathlessness after walking a couple of blocks, despite therapy.

QUESTIONS – Answer online at [pharmacygateway.ca](http://www.pharmacygateway.ca), CE section, “More CCCEP-approved” dept.

12. Which of the following would be the most appropriate recommendation for RR?

- a) add theophylline to therapy
- b) change formoterol to combination budesonide/formoterol
- c) change terbutaline prn to salbutamol prn
- d) increase dose of formoterol

13. Which of the following statements about LABAs in treatment of COPD is TRUE?

- a) Use of LABAs before exercise in patients with COPD has demonstrated consistent improvement in exercise performance.
- b) LABAs have been shown to provide greater improvement in lung function compared to tiotropium.
- c) LABAs result in more sustained improvement in pulmonary function and quality of life compared to salbutamol in moderate to severe COPD.
- d) LABAs are recommended to be used before tiotropium in treating COPD.

14. RR’s wife, ER, who has been diagnosed with mild COPD tells you that her friend has a breathing problem and has taken fluticasone twice daily on a regular basis since she was diagnosed. Her friend is doing really well and ER is wondering if she should be prescribed fluticasone as well. What would your most appropriate response to ER be?

- a) ER’s friend likely has a worse level of COPD and ICS shouldn’t be used before that stage.
- b) Perhaps fluticasone may be a reasonable

- option for treatment.
- c) ER’s friend likely has asthma. Unfortunately COPD does not respond nearly as well to ICS.
- d) ER’s friend likely takes other drugs that are actually keeping her breathing problems under control.

15. What did the Optimal Therapy Study results find with respect to combination of tiotropium and salmeterol/fluticasone?

- a) There was a significant reduction in exacerbation rates but no change in lung function.
- b) Exacerbation rates were unchanged but lung function improved.
- c) Neither exacerbation rates nor lung function improved.
- d) Both exacerbation rates and lung function improved.

16. RR comes in one month later and says that his doctor has told him that he is having an exacerbation of COPD. Which of the following defines AECOPD? Worsening of dyspnea, cough or sputum production leading to an increase in use of maintenance medication and/or supplementation with additional medications for:

- a) 48 hours or more
- b) 72 hours or more
- c) 4 days or more
- d) One week or more

17. In general, which of the following would NOT be an appropriate recommendation for prevention of AECOPD?

- a) smoking cessation
- b) regular therapy with tiotropium in patients with FEV₁ < 60% predicted
- c) annual influenza vaccination
- d) annual pneumococcal vaccination

18. Which of the following would best define need for antibiotic therapy in RR?

- a) chronic cough
- b) increased use of prn bronchodilators
- c) purulent sputum production
- d) worsening of dyspnea

19. At what point would oral or parenteral corticosteroid treatment be appropriate for AECOPD treatment for RR? At the point when his FEV₁ falls below:

- a) 50% predicted
- b) 60% predicted
- c) 65% predicted
- d) 70% predicted

20. Which of the following would likely affect theophylline levels?

- a) smoking
- b) erythromycin therapy
- c) ciprofloxacin therapy
- d) all of the above affect theophylline levels

FACULTY: The Pharmacist’s Role in Management of COPD: A Focus on the Canadian Thoracic Society COPD Recommendations 2007 Update

About the author

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Reviewers

All lessons are reviewed by pharmacists for accuracy, currency and relevance to current pharmacy practice.

Continuing Education Project Manager

Sheila McGovern, Toronto, Ont.

This lesson is valid until February 14, 2011.

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