

COPD is avoidable, detectable and treatable

Patients and physicians: partners in prevention

Devastating, unknown and silent

In Canada, chronic obstructive pulmonary disease (COPD) is the fourth cause of death among men and the fifth among women. COPD is one of very few deadly diseases whose prevalence is rising worldwide. By 2020, it will be the third cause of death globally. In Canada, COPD is the seventh cause of hospitalisation among men and the fifth among women, resulting in some 60 000 hospitalisations each year. This number will double by 2016 as a result of decades of smoking as well as an ageing population. In 2000-2001, the estimated number of Canadians for whom a COPD diagnosis was confirmed was 714 000. One third of COPD cases are in Quebec, even though its population represents only about a quarter of the total population in Canada¹. This silent disease evolves slowly over a period of several years; it eventually has a significant impact on quality of life, and leads to death. Half of cases have still not been diagnosed¹. Less than half of Canadians are familiar with the term chronic obstructive pulmonary disease². Yet, it is possible to avoid getting COPD, to detect it early and to treat it effectively.

Definition and aetiology

COPD is a respiratory disease characterised by progressive, partially reversible airway obstruction. Although initially confined to the lungs, the chronic inflammatory process will later result in the appearance of various systemic manifestations (skeletal muscle dysfunction, altered nutritional status, right heart failure, polycythaemia and depression) and contribute to disability and handicap, and reduced quality of life. Increasing frequency and severity of acute exacerbations represent significant clinical events that can lead to numerous visits to a physician's office or an emergency room, as well as to hospitalisation and death.

Chronic bronchitis is clinically defined as a persistent cough with sputum production on most days for at least three months in two consecutive years, in the absence of other diseases that can cause these symptoms. There does not need to be obstruction to establish a diagnosis of chronic bronchitis. Emphysema is defined pathologically as the destruction of the lung parenchyma. These two conditions coexist in COPD on different levels, where the presence of obstruction is essential to the diagnosis.

Smoking is the main cause of the disease, and about 15% to 20% of smokers develop COPD. Heredity, exposure to ambient pollution at work and in the environment, and a history of respiratory tract infections during childhood are also risk factors.

The Canadian Thoracic Society (CTS) COPD Guidelines recommend a step-wise therapeutic approach based on severity of symptoms and disability³⁻⁵.

Diagnosis and classification

Diagnosis of this 'silent disease' is rarely established before the disease is in the advanced stages. The main symptoms (cough

and shortness of breath) are too often attributed to poor physical shape or age. Although a physical examination and chest x-ray do not suggest obstruction except at an advanced stage, they are nonetheless useful to eliminate other pathologies.

Spirometry performed during maximum forced expiration can establish an early diagnosis:

- among smokers and ex-smokers more than 40 years old
- among patients with persistent cough and sputum production
- among patients who experience frequent respiratory tract infections
- among patients with increasing exercise-related shortness of breath.

This examination can be done in pulmonary function laboratories or in some CLSCs. Simple peak flow measurements are not enough to confirm a diagnosis. We are looking for:

- post-bronchodilator forced expiratory volume in 1 second (FEV₁) of less than 80% of the normal predicted value
- and an FEV₁/FVC ratio of less than 0.7

The severity of COPD based on airway obstruction is rated as mild if FEV₁ is 60% to 79% of the predicted value, moderate if it is 40% to 59%, and severe if it is less than 40% (Figure 1). Arterial blood gas measurements should be considered if FEV₁ is less than 40% predicted.

However, we now know that dyspnea as described by the patient is more closely linked to mortality. For this reason, the CTS advocates use of the scale noted in Table 1.

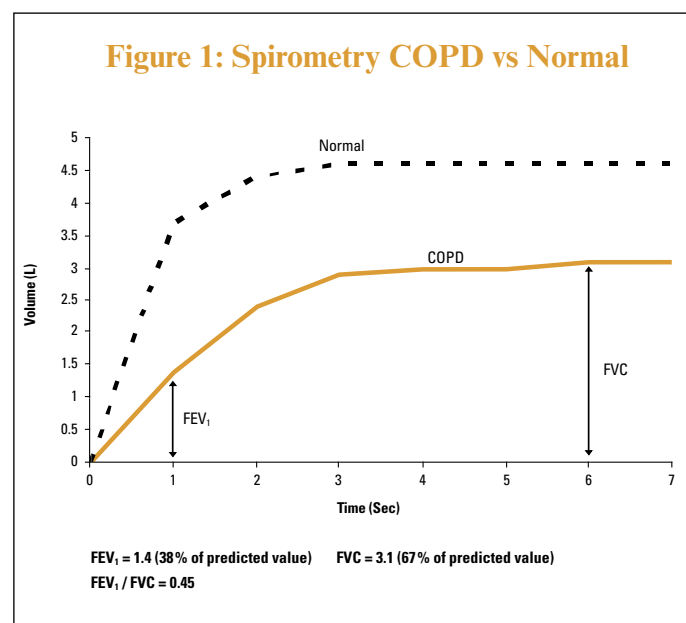


Table 1. COPD classification by symptoms and disability (CTS*)

COPD stage	Symptoms
At risk (does not yet fulfill the diagnosis of COPD)	Asymptomatic smoker, ex-smoker, cough/sputum; post-bronchodilator FEV ₁ † / FVC†† ≥ 0.7, and/or FEV ₁ ≥ 80% of predicted value
Mild	Shortness of breath when hurrying on the level or walking up a slight hill
Moderate	Too breathless to walk 100 metres (or a few minutes) on the level without stopping
Severe	Too breathless to leave the house; breathlessness when dressing; or chronic respiratory failure or clinical signs of right heart failure

* CTS: Canadian Thoracic Society † Forced expiratory volume in 1 second †† Forced vital capacity

Management of COPD

An individualised symptom-based approach will help attain the ultimate treatment objective, which is to improve quality of life (Figure 2). Management of COPD involves:

- early diagnosis
- prevention
- treatment to slow its progression and improve symptoms
- prevention of acute exacerbations of chronic obstructive pulmonary disease (AECOPD).

Smoking cessation, self-management and prevention

Smoking cessation is the only intervention that has been shown to slow down COPD progression. Minimal counselling interventions should be offered to all smokers, use of nicotine replacement therapy or bupropion should be recommended, taking into account each smoker's personal preference and contraindications. Intensive individual or group counselling results in higher quitting rates.

A recent multi-centre study conducted in Quebec ("Living well with COPD" programme) shows that an approach that includes a specific COPD self-management programme improves patients' quality of life, and reduces unplanned medical visits by 59%, admissions for other health problems by 57%, visits to emergency departments by 41% and hospitalisations for AECOPD by 40%.⁶ Self-management is based on disease-specific education and support, with tasks delegated to appropriate professionals especially trained in COPD who act as resource persons for the patient. These care and services programmes are designed with the patient and revised according to the patient's characteristics and trajectory of his or her disease.

Specific interventions designed to prevent deterioration of COPD in patients include: smoking cessation, annual vaccination against influenza, vaccination against pneumococcus (one time during a person's life),

and use of an action plan to minimise the severity and consequences of AECOPD. The Montréal area has an integrated network composed of a group of partners: local community service centres (CLSC), general and specialised hospital centres (CHSGS), long-term care facilities (CHSLD), regional home-care services for chronic pulmonary patients (SRSAD), and general practitioners in the community. This network ensures management of patients with COPD.

Pharmacotherapy

Pharmacological treatment reduces dyspnea and improves exercise tolerance and quality of life even in the absence of improvement in FEV₁. Short-acting bronchodilators (short-acting β_2 -agonists and/or anticholinergic) should be used initially. If symptoms persist, long-acting bronchodilators (anticholinergic or β_2 -agonists) are indicated. Thereafter, a combination of long-acting bronchodilators can be considered (tiotropium+formoterol or tiotropium+salmeterol), adding the effects of the anticholinergic to long-acting β_2 -agonist. The addition of theophyllines may reduce dyspnea in one out of four or five patients but they are often not well tolerated and there is a risk of multiple drug interactions. Finally, inhaled corticosteroids can be tried in patients with severe COPD who have frequent exacerbations requiring antibiotics and oral corticosteroids. However, prescription of an inhaler should always be reassessed three to six months after onset of treatment.

Oral corticosteroids (except during acute exacerbation) should

not be used, given that adverse systemic effects largely exceed the benefits.

The place of pulmonary rehabilitation

As the respiratory disease progresses, systemic complications develop and patients become prisoners of deconditioning, which has major effects on quality of life. There is irrefutable proof that pulmonary rehabilitation programmes improve dyspnea and exercise tolerance as well as quality of life, and reduce hospital service utilisation among these patients regardless of age or severity of the disease. A physician should refer a patient to such a programme as soon as the person suffering from COPD has reduced activity levels and remains short of breath despite optimal bronchodilator treatment.

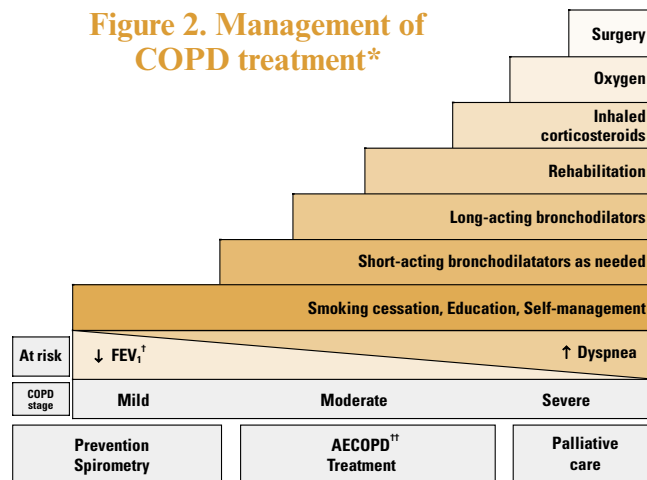
Acute exacerbations

Acute exacerbations of COPD (AECOPD) are defined as sustained worsening of dyspnea, cough or sputum production leading to an increase in the use of maintenance medications and/or supplementation with additional medications. They are the main cause of medical visits, hospitalisations and death among patients with COPD and are associated with short-term mortality rates of 10% to 20%. When admitted to intensive care with acute respiratory failure, survival rates now range from 75% to 90%, due to the use of non-invasive ventilation in selected patients. However, the one-year mortality can be as high as 46%. AECOPD patients with purulent sputum are treated differently, based on the risk factors associated with COPD (Table 2).

Other therapies

In patients with chronic hypoxemia while stable (PaO₂ ≤ 55 mm Hg or < 60 mm Hg with polycythemia or cor pulmonale), domiciliary oxygen therapy will improve quality of life and increase survival. Surgery can be considered for certain

Figure 2. Management of COPD treatment*



* Canadian Thoracic Society

† Forced expiratory volume in 1 second

†† Acute exacerbations of Chronic Obstructive Pulmonary Disease

types of patients for whom medical treatment is optimal. Bullectomy, lung volume reduction surgery (LVRS) and lung transplantation should be considered on a case-by-case basis.

End-of-life care

Several factors associated with increased risk of acute respiratory failure and morbidity have been identified: advanced age, low body mass index (BMI less than 19kg/m²), severe dyspnea and disability, gas exchange abnormalities, FEV₁ less than 40% of the predicted value, recurrent AECOPD, need for ventilatory support and comorbidities (cardiac, psychiatric etc.). However, it is impossible to accurately predict when the next episode of acute respiratory failure will occur. End-of-life issues should be discussed at an appropriate time, especially with patients who have survived an ICU admission. It is important that the physician discuss the prognosis and possible circumstances of death with the patient and his or her family so that the patient can be offered the most appropriately adapted care before another admission is required. Fear, panic, anxiety, and depression are some of the psychological factors that can also hinder treatment and further reduce quality of life. In addition to optimising therapies described above, a variety of agents can also be used to treat symptoms such as dyspnea, cough and retained secretions at the end of life. Options to consider include opioids, benzodiazepines, various anticholinergic agents and noninvasive ventilation.

In conclusion, it is now possible to avoid suffering from COPD by abstaining from smoking, to identify early patients suffering from COPD and to treat them so that they can have a better quality of life and increased survival. It is important to provide continuous follow-up of patients, including end-of-life care.

Resources

- **The Lung Association:**
<http://www.lung.ca>
- **Guidelines**
Executive Summary. Canadian Thoracic Society Recommendations for Management of Chronic Obstructive Pulmonary Disease – 2003
www.copdguidelines.ca
- **Global initiative for chronic obstructive lung disease. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease:** www.goldcopd.com
- **Quebec asthma and COPD network**
<http://www.rqam.ca>
- **Living well with COPD™** is a self-management education programme developed to help patients with chronic obstructive pulmonary disease (COPD) and their families manage the disease.
<http://www.livingwellwithcopd.com>
Password: COPD, or contact the Quebec asthma and COPD network.
Tel. (418) 650-9500; e-mail: info@rqam.ca
- **Le tabagisme - Cesser de fumer**
<http://www.santepub-mtl.qc.ca/tabagie/index.html>

Table 2. Treatment recommendations for purulent acute exacerbations of COPD*

Group failure	Basic clinical state	Symptoms and risk factors	Probable pathogens	First choice	Second choice
Simple	COPD without risk factors	Increased cough and sputum, sputum purulence, and increased dyspnea	<i>Haemophilus influenzae</i> , and other species of <i>Haemophilus moraxella catarrhalis</i> , <i>Streptococcus pneumoniae</i>	Amoxicillin, doxycycline, trimethoprim-sulfamethoxazole, 2 nd or 3 rd generation cephalosporins, extended spectrum macrolides	Beta-lactam / Beta-lactamase inhibitor; fluoroquinolone
Complicated	COPD with risk factors	As in simple plus at least one of the following: <ul style="list-style-type: none"> • FEV₁[†] < 50% predicted • ≥ 4 exacerbations / year • Ischemic heart disease • Use of home oxygen • Chronic oral steroid use • Antibiotic use in the past three months 	As in simple plus <ul style="list-style-type: none"> • <i>Klebsiella</i> species and other Gram-negatives • Increased probability of beta-lactam resistance 	Beta-lactam / beta-lactamase inhibitor; fluoroquinolone (Antibiotics for uncomplicated patients combined with oral steroids may suffice)	May require IV therapy; Consider referral to a specialist or hospital

* Canadian Thoracic Society † Forced expiratory volume in 1 second

Characteristics of the action plan required for the prevention of AECOPD

- The plan should be simple, written and adapted to the patient's need.
- If it is prescribed, the physician or nurse can teach it to the patient.
- Access to a resource person (physician or nurse) to begin early treatment safely, to provide follow-up of treatment response, and to reduce emergency room visits and hospitalisations. Access to home care and services could help some patients avoid hospitalisation in case of severe exacerbations that can potentially put their lives in danger.
- Specific measures to take if dyspnea, sputum production or purulent secretions increase:
 - increase use of inhaled bronchodilators;
 - antibiotics depending on severity of COPD and known regional antibiotic resistance;
 - for patients with increased dyspnea, oral corticosteroids such as 25 mg to 50 mg/day of prednisone for 7 to 14 days will help respiratory functions improve more rapidly and result in a shorter hospital stay if one is required (treatment lasting more than 2 weeks does not add therapeutic benefits but does increase the risks of many adverse effects: electrolytic imbalance, fluid retention, hyperglycaemia and diabetes, muscle weakness and myopathy, osteoporosis and vertebral fractures, etc.);
 - follow-up (telephone or home visit) will be provided by Health and Social Services Centre (CSSS) nurses, from either CLSCs or SRSADs. Frequency of follow-up varies depending on stage of the disease. The patient's state of health can be verified and important elements of his or her action plan can be reinforced during follow-up.

“Intervenants pivot-réseau” in COPD (For information on resources)

Hôpital Maisonneuve-Rosemont	252-3400 # 5211
Centre hospitalier de l'Université de Mtl	890-8000 # 14266
Montreal Chest Institute	934-1934 # 32486
Lakeshore General Hospital	630-2225 # 2209
Centre hospitalier de Verdun	362-1000 # 2847
Hôpital du Sacré-Cœur de Montréal	230-5610 (pagette)

COPD education and pulmonary rehabilitation centres Montréal Region General and specialised care hospital				
Institution	Telephone	Fax	EC*	PR**
Montreal General Hospital McGill University Health Centre (MUHC) 1650 Cedar avenue Montréal (Quebec) H3G 1A4	514-934-1934 #42374	514-934-8226 514-934-8405	yes	no
Lakeshore General Hospital 160 Stillview Pointe-Claire (Quebec) H9R 2Y2	514-630-2225 Poste 1816	514-843-2070	yes	no
Hôpital Jean-Talon 1385 Jean-Talon East Montréal (Quebec) H2E 1S6	514-495-6767 #6354	514-495-6788	yes	no
Hôpital Maisonneuve-Rosemont 5415 de l'Assomption Blvd. Montréal (Quebec) H1T 2M4	514-252-3400 #2197	514-252-3848	yes	no
Mount Sinai Hospital Centre 5690 Cavendish Blvd. Montréal (Quebec) H4W 1S7	514-369-2222 #2202	514-369-2225	no	yes
Hôpital Notre-Dame Centre Hospitalier de l'Université de Montréal (CHUM) 1560 Sherbrooke East Montréal (Quebec)	514-890-8000 #14266	514-412-7123	no	yes
Hôpital du Sacré-Cœur de Montréal 5400 Gouin Blvd. West Room H-5140 Montréal (Quebec) H4J 1C5	514-338-3131 option #2	514-338-3699	yes	yes
Montreal Chest Institute MUHC, 3650 St-Urbain Street Montréal (Quebec) H2X 2P4	514-934-1934 #32377	514-843-2070	yes	yes

* EC: Education centre, no medical referral needed** PR: Pulmonary Rehabilitation, medical referral required

Regional home-care services for chronic pulmonary patients (SRSAD): Hôpital Maisonneuve-Rosemont 5415 de l'Assomption Blvd., Montréal (Quebec) H1T 2M4 Service offering specialised care for adults living on Montréal Island and suffering from severe pulmonary diseases (follow-up at home by a nurse, inhaled therapy, oxygen therapy). Medical referral required.	514-252-3433
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Montréal regional COPD education centres All CLSCs offer personal education services. It is preferable to refer the patient to the person who will be providing follow-up. CLSCs also offer group education services (medical referral required)		
Organisation	Telephone	Fax
CLSC LaSalle CSSS de LaSalle et du Vieux Lachine 8550 Newman Blvd. LaSalle (Quebec) H8N 1Y5	514-364-2572 #2650	514-364-2336
CLSC du Vieux Lachine CSSS de LaSalle et du Vieux Lachine 1900 Notre-Dame Street Lachine (Quebec) H8S 2G2	514-639-0650 #302	514-639-0666
CLSC/CHSLD Pte-aux-Trembles/ Montréal-Est CSSS de la Pointe-de-l'île 13926 Notre-Dame East Montréal (Quebec) H1A 1T5	514-642-4015	514-642-5438
CLSC St-Louis du Parc CSSS Jeanne-Mance 155 St-Joseph Blvd. East Montréal (Quebec) H2T 1H4	514-286-2600 #804	514-286-2910
CLSC Verdun / Côte St-Paul CSSS du Sud-Ouest-Verdun 400 de l'Église Verdun (Quebec) H4G 2M4	514-766-0546 #2271	514-766-7443

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3. O'Donnell DE et al. Executive Summary - Canadian Thoracic Society recommendations for management of chronic obstructive pulmonary disease - 2003. Can Respir J 2003;10(Suppl A):11A-65A.
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