



# Asthma & COPD:

## Clearing the Air

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Asthma and chronic obstructive pulmonary disease (COPD) are the two most common obstructive airway diseases in Canada and are common reasons for patient presentation to the general practitioner's office. The pathophysiology, management and treatment goals for these two diseases are different (Table 1), thus we must be clear as to which condition our patient has in order to modify our treatment and advice for maximal patient benefit.

Chronic respiratory disease plays a role in the health of many Canadians and is involved in up to 20% of visits to family physicians in Canada. COPD and asthma are conditions whose prevalence are increasing in North America. COPD is currently the fifth most common cause of death and this is estimated to be the third most common cause by 2010. The management of the two conditions involve some similar principles, but as the pathophysiology of each condition is different, the goals of treatments will be different.

### Pathophysiology



The pathophysiology of asthma involves an eosinophilic inflammation, often involving the allergic cascade. The main mediator recognized is histamine. Alveolar remodeling occurs chronically. COPD is a neutrophilic

### John's case

- John, 28, is a roofer who presents with a wheezing cough and dyspnea on exertion.
- He has smoked 1-1/2 packs of cigarettes daily (at least) since the age of 14.
- He presents to the office with worsening cough and a "cold."
- His girlfriend claims he has asthma and wonders if they should get rid of her cat.



For John's diagnosis, turn to page 91.



Table 1<sup>1</sup>

## COPD or Asthma

	Asthma	COPD
Age of onset	Usually < 40 years	Usually > 40
Smoking history	Not casual	Usually > 10 packs/years
Sputum production	Infrequent	Often
Allergies	Often	Infrequent
Disease course	Stable (with exacerbations)	Progressive worsening (with exacerbations)
Spirometry	Often normalizes	Never normalizes
Clinical symptoms	Intermittent and variable	Persistent

inflammation involving a T-cell response. The main mediator involved is tumour necrosis factor (TNF)-alpha. Alveolar dilatation occurs in COPD.

- The central problem in asthma is inflammation, which is something that we attempt to reverse with treatment.
- COPD is a respiratory disorder largely caused by smoking, which is characterized by progressive, partially reversible airway obstruction, systemic manifestations, and increasing frequency and severity of exacerbations.

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## Diagnosis



The diagnosis of these conditions involves having a patient with symptoms and the absence of a different cause, all correlated with spirometry. Both conditions will have obstruction at some point in their illness. Asthma is a variable disease, depending on environmental issues *etc.*, and at some points the spirometry may be normal. The hallmark of asthma is obstruction, which reverses by 12% to 15%. Alternate diagnostic measures include bronchoprovocation studies to assess pulmonary hyperactivity.

COPD is by definition a condition with chronic obstruction (*i.e.*, there is persistent obstruction with a forced expiratory volume in one second (FEV<sub>1</sub>)/forced vital capacity (FVC) ratio of < 70% and a postbronchodilator FEV<sub>1</sub> of < 80%). Some slight reversal may occur with bronchodilators, but cannot be reversed to normal.

## Treatment



The treatment goals of COPD are to:

- prevent further lung damage,
- manage exacerbations and
- optimize current lung function.

The treatment goals of asthma are to:

- achieve and maintain control of symptoms,
- prevent asthma exacerbations,
- maintain pulmonary function as close to normal levels as possible,
- maintain normal activity levels, including exercise,
- avoid adverse effects from asthma medications,
- prevent development of irreversible airflow limitation and
- prevent asthma mortality.

### Management



Management of these conditions will reflect the goals and thus expectations.

The first step after diagnosis and education for both conditions are to modify the environment. In COPD, this involves smoking cessation and avoidance of other respiratory irritants. The Fletcher-Peto curve (Figure 1) shows the reality that smoking cessation slows the continued loss of lung function.

In asthma, smoking cessation is also very important, but environmental control also includes irritants as well as allergic triggers. Allergy testing to evaluate what the triggers are should be considered, which is likely unnecessary in COPD.

Non-pharmacologic therapy is otherwise less important in Asthma management; pharmacologic therapy to treat inflammation is much more important. In COPD, the pharmacologic goal is bronchodilation for relief of symptoms (Figure 2), and the non-pharmacologic therapy is much more important. Important issues include adequate nutrition, pulmonary rehabilitation, vaccination and oxygen therapy later on. Surgical therapies are also occasionally indicated for certain specialized cases, such as lung reduction surgery.

Pharmacologic therapy in asthma is to treat the inflammation with inhaled steroids (or leukotriene receptor antagonists [LTRAs] if patients decline corti-

### John's diagnosis

- John's spirometry shows that he has moderate obstruction with a forced expiratory volume in one second (FEV<sub>1</sub>) of 70%.
- His allergy testing shows that he is not allergic to cats.
- He does not have reversibility of the FEV<sub>1</sub> with bronchodilators.
- A trial of two months of inhaled steroids made no difference to his FEV<sub>1</sub> or his symptoms.
- Our diagnosis is COPD and we reiterate the need for smoking cessation.

**Read how John is managed on page 92.**

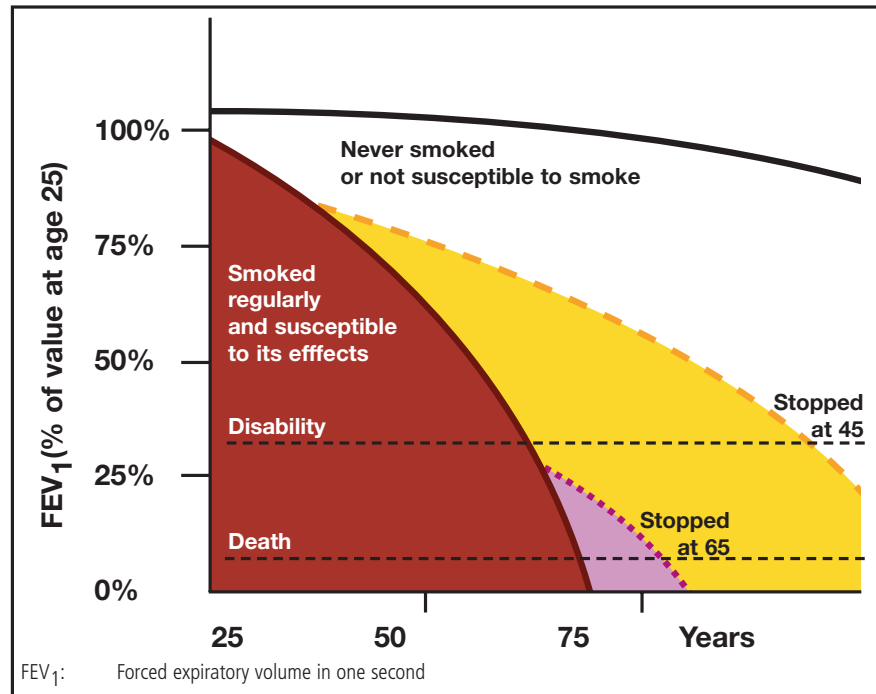


Figure 1. Fletcher Peto curve showing the effect of smoking continuation or discontinuation on the decrease in Forced Expiratory Volume at one second over time.

## John's management

- John is encouraged to exercise and make lifestyle changes.
- He does not need continued inhaled steroids, but needs bronchodilators, as required, and exercise.
- He agrees to quit smoking and takes a further appointment to review methods to make it easier for him.
- He also agrees to wear a mask when roofing and is considering an occupation change.

costerooids) with bronchodilation for symptom control or with long-acting beta agonists together with inhaled steroids to work synergistically for asthma control (Figure 3).

In COPD, bronchodilators are sequentially added for symptom control. Inhaled steroids are only added in patients with moderate to severe disease and frequent exacerbations.

Systemic steroids are used for exacerbations in both diseases, but generally for a longer period of time in asthma to control the longer-term inflammation in the asthmatic.

## Prognosis



COPD is a progressive disease that ends in death, as lung function progressively fails. As such, end-of-life decision-making is a definite issue to be discussed in patients with more severe COPD. Though, COPD is a terminal disease, asthma needn't be. **Dx**

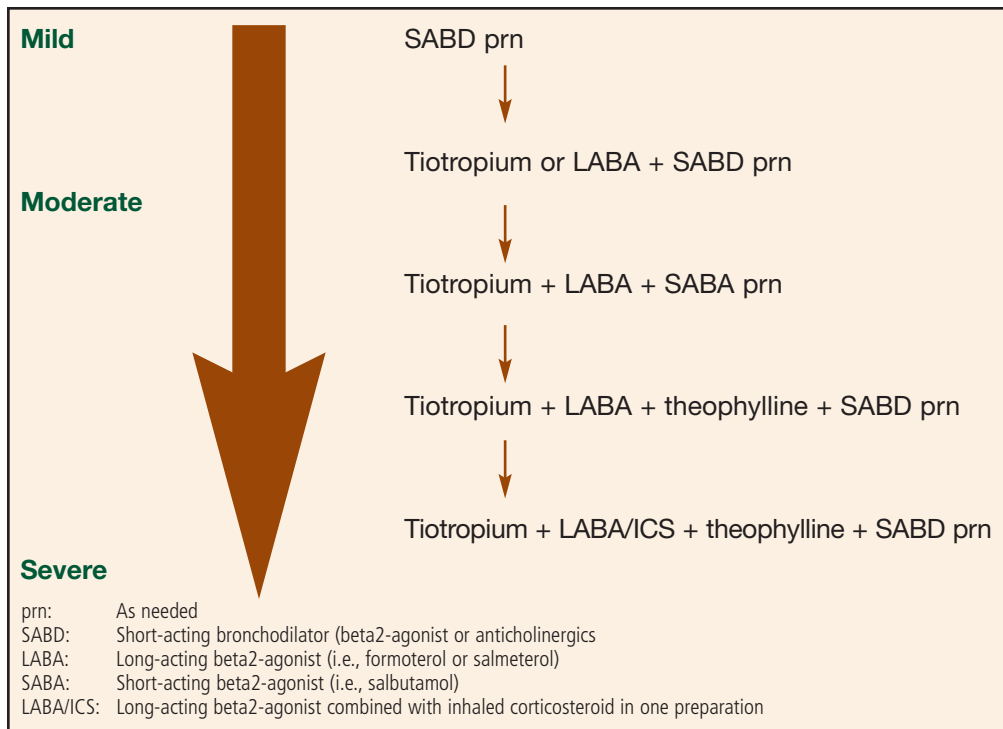


Figure 2. Pharmacologic treatment of COPD based on increasing symptoms and disability.

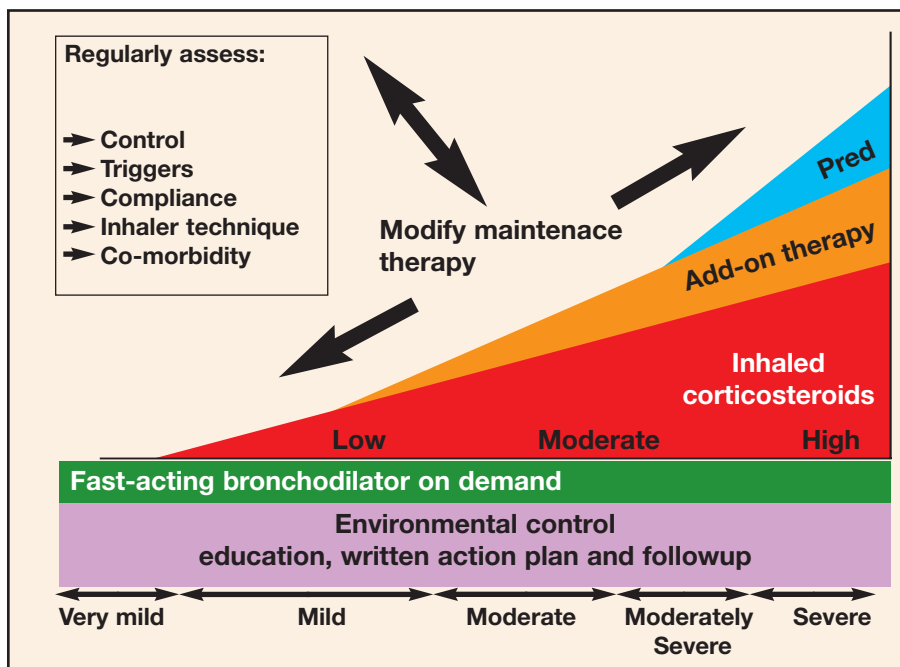


Figure 3. Canadian asthma continuum<sup>2</sup>.

Reference

1. O'Donnell DE, Hernandez P, Aaron et al: Canadian Thoracic Society COPD Guidelines: Summary of highlights for family doctors. *Can Respir J* 2003; 10(4):183-5.
2. Summary of recommendations from the Canadian Asthma Consensus Guidelines, 2003 and Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004). *CMAJ* 2005; 173(6 suppl):S1-S56. Reference