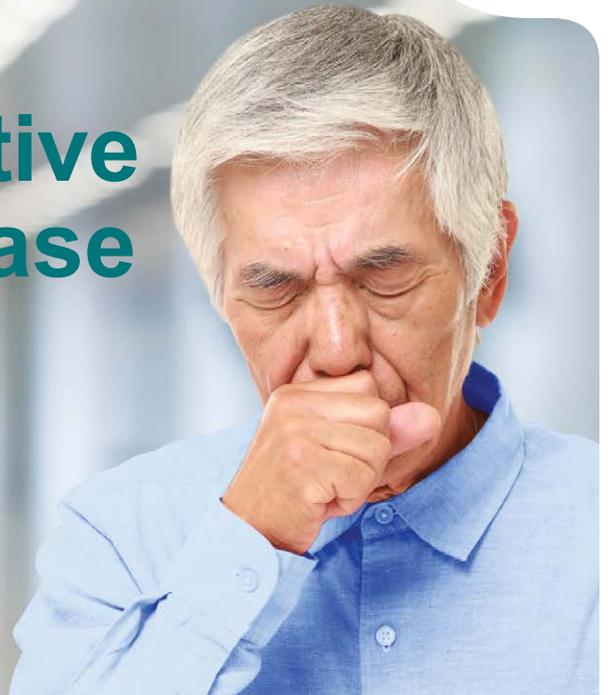




# Diagnosing chronic obstructive pulmonary disease

## A systematic approach



### Key messages

- 1 Establish smoking history in all patients. In current and ex-smokers, check for respiratory symptoms.
- 2 Consider COPD in all patients 40 and older with risk factors and symptoms.
- 3 Confirm all suspected COPD cases with spirometry.

### COPD is often under-recognised and underdiagnosed

COPD is a preventable, chronic, and progressive respiratory condition where airflow limitation is persistent.<sup>1</sup>

COPD is underdiagnosed worldwide—and primary care doctors play an important role in detecting it.

Not diagnosing COPD means missed intervention opportunities, including counselling to quit smoking, or pharmacotherapy.



Globally, including Singapore, up to

**80%** of people with COPD have not been diagnosed.<sup>2,3</sup>

## Diagnosing COPD

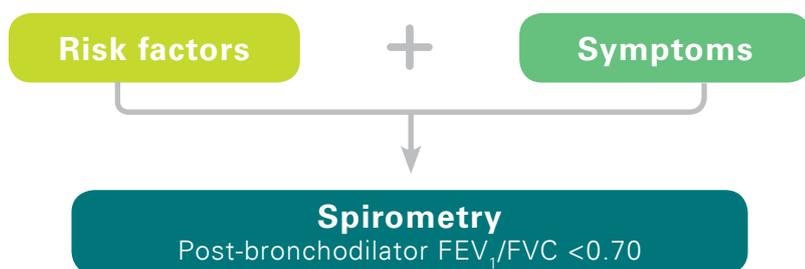
COPD diagnosis involves all of the following (Figure 1):

- Related risk factors;
- Relevant symptoms; and
- Concordant spirometry findings.

COPD cannot be reliably diagnosed based on risk factors and symptoms alone.

All three elements are central in systematic assessment to differentiate COPD from other similar conditions, including asthma.

Figure 1. Establishing COPD diagnosis



FEV<sub>1</sub>/FVC: Ratio between the forced expiratory volume in one second (FEV<sub>1</sub>) and forced vital capacity (FVC)

### Assessment of risk factors and symptoms

In practice, smoking assessments are not routine and both patients and doctors often overlook clinical features of COPD. Patients may not report symptoms because they attribute them to ageing, smoker's cough, or other disorders. Doctors may not associate recurrent respiratory tract infections with COPD.

Taking a good history of risk factors and symptoms is important in establishing COPD diagnosis (Figure 2).

### Spirometry confirms COPD diagnosis

Once COPD is suspected, spirometry is required to confirm the diagnosis. Spirometry is underutilised and in Singapore, only 2% of COPD diagnoses were confirmed using spirometry.<sup>4</sup>

Spirometry helps in making the correct diagnosis. A missed diagnosis would deprive a patient of treatment benefits, while an incorrect diagnosis leads to unnecessary or inappropriate treatment, side effects, or delays in treating the actual underlying conditions.

Perform spirometry in all patients with suspected COPD, except for patients with active tuberculosis, angina, or other contraindications to the test.<sup>4,5</sup>

Airflow limitation is defined as spirometry value of FEV<sub>1</sub>/FVC <0.70. **Post-bronchodilator FEV<sub>1</sub>/FVC <0.70, in patients with pertinent risk factors and symptoms, confirms COPD.**<sup>1,4</sup>

## Differential diagnosis of COPD

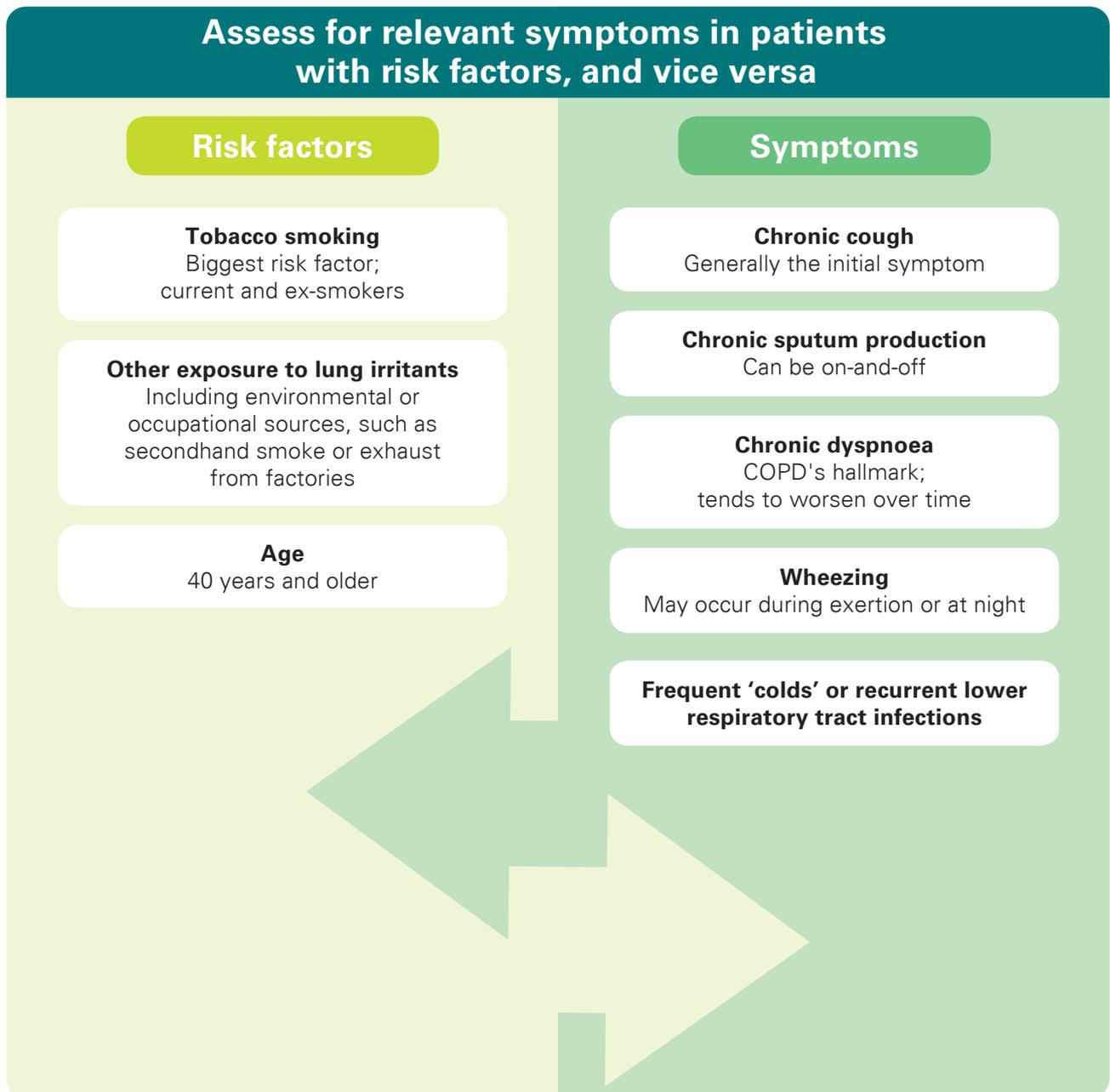
COPD may be misdiagnosed as one of the following:<sup>1</sup>

- Asthma;
- Congestive heart failure;
- Bronchiectasis;
- Tuberculosis;
- Obliterative bronchiolitis; and
- Diffuse panbronchiolitis.

To assess comorbidities or exclude alternative diagnoses, consider further investigations such as chest X-ray.<sup>1</sup>

## Suspecting COPD

Consider COPD in all patients with related risk factors and relevant symptoms. See Figure 2.

Figure 2. COPD risk factors and symptoms<sup>1,4</sup>

## Spirometry

Spirometry may be performed at pulmonary function laboratories or in clinics using HSA-approved portable office spirometers.

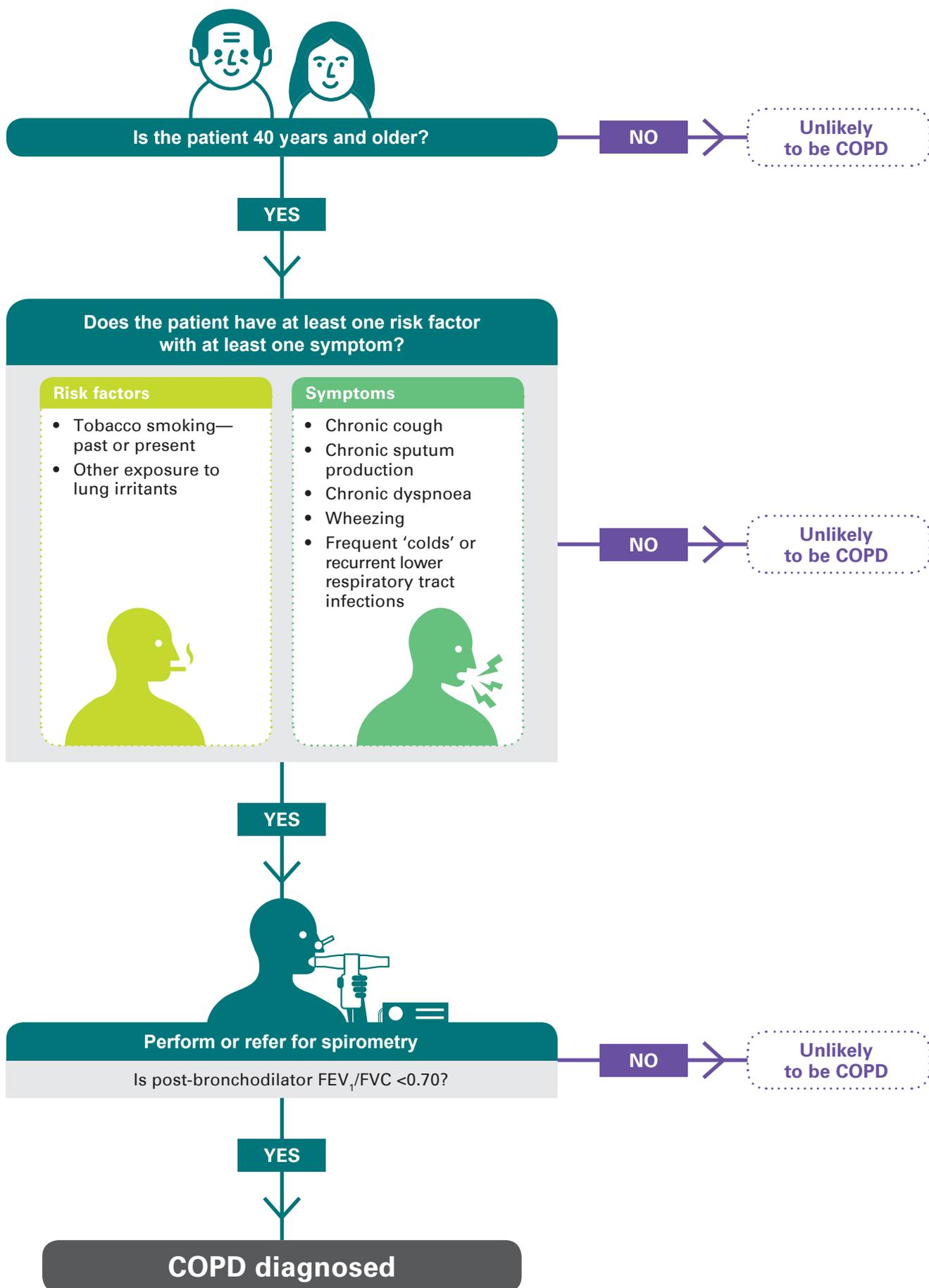
Peak flow meters or microspirometers should not be used to diagnose COPD.

If spirometry is not available onsite, refer to the list of open-access spirometry at [www.ace-hta.gov.sg](http://www.ace-hta.gov.sg).

Scan to find out more



Figure 3. Algorithm for COPD diagnosis



$FEV_1/FVC$ : Ratio between the forced expiratory volume in one second ( $FEV_1$ ) and forced vital capacity (FVC)

## Differentiating between COPD and asthma

It is not always easy to tell whether the diagnosis is COPD or asthma. For example, a study found that up to 2 in 5 patients with a prior asthma diagnosis could have had COPD, while some patients diagnosed with COPD might have had asthma.<sup>6</sup> To ensure appropriate treatment choices and optimal patient outcomes, it is important to differentiate them. COPD treatment is centred on using inhaled bronchodilators (beta<sub>2</sub>-agonists and antimuscarinics), and inhaled corticosteroids play a limited role.<sup>1</sup> In contrast, controller therapy in asthma is anchored on inhaled corticosteroids.<sup>7</sup>

In most cases, a detailed history (including smoking or other lung irritant exposure), and objective test results can separate COPD from asthma (Table 1).

**Knowing if a patient has more asthma or COPD features increases diagnostic accuracy.<sup>7</sup>**

Table 1. Features that, if present, favour COPD or asthma<sup>7</sup>

Feature	More likely to be COPD	More likely to be asthma
<b>Age of onset</b>	<input type="checkbox"/> >40 years	<input type="checkbox"/> <20 years, but can manifest at any age
<b>Pattern of respiratory symptoms</b>	<input type="checkbox"/> Symptoms persist despite treatment <input type="checkbox"/> Good and bad days but consistent daily symptoms and exertional dyspnoea <input type="checkbox"/> Chronic cough and sputum precede onset of dyspnoea, unrelated to triggers	<input type="checkbox"/> Symptoms may vary over minutes, hours, or days <input type="checkbox"/> Symptoms worse at night or early morning <input type="checkbox"/> Symptoms often triggered by exercise, emotions (including laughter), dust, or allergen exposure
<b>Past history or family history</b>	<input type="checkbox"/> Previously diagnosed with COPD, chronic bronchitis, or emphysema by a doctor <input type="checkbox"/> Exposure to risk factors such as tobacco smoke or biomass fuels	<input type="checkbox"/> Previously diagnosed with asthma by a doctor <input type="checkbox"/> Family history of asthma and other allergic conditions (allergic rhinitis or eczema)
<b>Time course</b>	<input type="checkbox"/> Symptoms slowly worsening over time (progressive course over years) <input type="checkbox"/> Rapid-acting bronchodilator treatment provides only limited relief	<input type="checkbox"/> Symptoms do not worsen progressively; they vary seasonally, or from year to year <input type="checkbox"/> May improve spontaneously or have an immediate response to bronchodilator or to inhaled corticosteroids over weeks
<b>Lung function</b>	<input type="checkbox"/> Record of post-bronchodilator FEV <sub>1</sub> /FVC <0.70	<input type="checkbox"/> Record of variable airflow limitation (spirometry, peak flow)
<b>Lung function between symptoms</b>	<input type="checkbox"/> Abnormal	<input type="checkbox"/> Normal
<b>Chest X-ray</b>	<input type="checkbox"/> Severe hyperinflation	<input type="checkbox"/> Normal

In some patients, distinguishing between COPD and asthma is particularly challenging. It is increasingly recognised that some patients have asthma-COPD overlap (ACO).<sup>7</sup>

### Specialist referral

Reasons for referring to a specialist include: diagnostic uncertainty (such as possible ACO); unusual symptoms (such as haemoptysis); severe COPD; onset of cor pulmonale; bullous lung disease; age <40 years old; and frequent chest infections.<sup>8</sup>

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*This ACG has been adapted with permission from the Global Initiative for Chronic Obstructive Lung Disease (GOLD), Global Strategy for the Diagnosis, Management, and Prevention of COPD (2018) and the Global Initiative for Asthma (GINA), Global Strategy for Asthma Management and Prevention (2018).*

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The Agency for Care Effectiveness (ACE) is the national health technology assessment agency in Singapore residing within the Ministry of Health (MOH). ACE develops evidence-based "Appropriate Care Guides" or ACGs to guide a specific area of clinical practice. ACGs are aimed at complementing MOH Clinical Practice Guidelines when these are available, by providing additions and updates as reflected in the evidence at the time of development, and incorporating cost-effectiveness considerations where relevant. The ACGs are not exhaustive of the subject matter. When using the ACGs, the responsibility for making decisions appropriate to the circumstances of the individual patient remains with the healthcare professional. This ACG will be reviewed 3 years after publication, or earlier, if new evidence emerges that requires substantive changes to the recommendations.

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