- FVC is the total volume of air the patient forcibly exhales in one breath.
- The FEV_1:FVC ratio expressed as a percentage.
- $FEV_{25–75}$ is the average speed of the air exhaled during the middle portion of expiration and is a measure of small airways function.
- In patients with severe COPD, the FEV_6 can be used as a surrogate for FVC if the patient cannot attain a plateau.

To avoid reversibility, spirometry is best performed postbronchodilator (eg, 400 µg salbutamol); by definition, the airflow obstruction in COPD is progressive and not usually reversible.

Good clinical practice: spirometry

- Measure the patient's standing height
- Explain the procedure and demonstrate the manoeuvres
- Sit the patient comfortably so that they are looking ahead with erect trunk and neck
- Ask the patient to take a big, deep breath and then blow as hard as possible into the mouthpiece attached to the spirometer until there is no breath left to expel and ensuring that their lips are sealed tightly around the mouthpiece
- Allow a 15–30 sec break between (up to eight) repeated manoeuvres, to ensure maximal performance and avoid hyperventilation
- Repeat this procedure until three manoeuvres meet the criteria for reproducibility (FVC values within a range of 100–150 mL or 5% of each other)

Table 2.3 FEV_1, forced expiratory volume in 1 sec; FVC, forced vital capacity.

Who to test?

- Spirometry is used to confirm the diagnosis, measure the severity of airflow obstruction and monitor progression of disease.
- Spirometry should be performed in patients who are >35 years, current smokers or exsmokers and have a chronic cough or are breathless on exertion.

- Also consider spirometry in patients with chronic bronchitis because a significant proportion of these individuals will go on to develop airflow limitation.
- Consider spirometry in patients >35 years who have uncontrolled asthma and are current smokers or exsmokers.

Classification of airflow obstruction

- FEV_1 is always reduced in COPD, but progressively greater reductions are observed as the disease advances (Table 2.4).
- The FVC is initially normal but is reduced (proportionately less than the FEV_1) as the disease progresses.
- In COPD, the FEV_1:FVC ratio is always less than the predicted value and decreases further as the disease progresses.
- Staging provides valuable information on the degree of impairment of lung function and is an indicator of prognosis, but it has limited value in predicting the development of symptoms, such as breathlessness.

Role of the GP

- All health professionals managing patients with COPD should have access to properly performed spirometry by appropriately

Spirometric staging of COPD: GOLD guidelines

Grade	Severity	Characteristics
I	Mild	FEV_1 ≥80% of predicted value FEV_1 : FVC <70%
II	Moderate	FEV_1 ≥50% and <80% of predicted value FEV_1 : FVC <70%
III	Severe	FEV_1 ≥30% and <50% of predicted value FEV_1 : FVC <70%
IV	Very severe	FEV_1 <30% of predicted value or <50% of predicted value plus chronic respiratory failure FEV_1 : FVC <70%

Table 2.4 COPD, chronic obstructive respiratory disease; FEV_1, forced expiratory volume in 1 sec; FVC, forced vital capacity; GOLD, Global Iniative for Obstructive Lung Disease.