

sufficiently conclusive to show that pharmacotherapy can reduce the rate of FEV1 decline.⁽⁸⁸⁵⁻⁸⁸⁹⁾ However, a systematic review combining data from 9 studies demonstrated a reduction in the rate of FEV1 decline of 5.0 mL/year in active treatment arms compared with placebo arms.⁽⁸⁹⁰⁾ The difference between long-acting bronchodilator containing treatment arms and placebo arms was 4.9 mL/year. The difference between inhaled corticosteroid containing treatment arms and placebo arms was 7.3 mL/year. Although we need to be aware of the potential benefit of pharmacotherapy in reducing the rate of lung function decline, further research is needed to know which patients are likely to benefit.

The classes of medications commonly used to treat COPD are shown in **Figure 3.18**. The choice within each class depends on the availability and cost of medication, and the clinical response balanced against side effects. Each treatment regimen needs to be individualized as the relationship between severity of symptoms, airflow obstruction, and severity of exacerbations can differ between patients. The WHO has defined a minimum set of interventions for the management of stable COPD in primary care.⁽⁸⁹¹⁾

Bronchodilators

Bronchodilators are medications that increase FEV1 and/or change other spirometric variables (**Figure 3.19**). They act by altering airway smooth muscle tone and the improvements in expiratory flow reflect widening of the airways rather than changes in lung elastic recoil. Bronchodilators tend to reduce dynamic hyperinflation at rest and during exercise,^(306,892) and improve exercise performance. The extent of these changes, especially in patients with severe and very severe COPD, is not easy to predict from the improvement in FEV1 measured at rest.^(893,894)

Bronchodilator dose-response (FEV1 change) curves are relatively flat with all classes of bronchodilators.⁽⁸⁹⁵⁻⁹⁰¹⁾ Increasing the dose of either a beta₂-agonist or an anticholinergic by an order of magnitude, especially when given by a nebulizer, appears to provide subjective benefit in acute episodes⁽⁹⁰²⁾ but is not necessarily helpful in stable disease.⁽⁹⁰³⁾ Bronchodilator medications in COPD are most often given on a regular basis to prevent or reduce symptoms. Toxicity is also dose-related (**Figure 3.18**). Use of short acting bronchodilators on a regular basis is not generally recommended.