activate adenylate cyclase and convert adenosine monophosphate (AMP) to cyclic AMP (cAMP). The increased cAMP enhances binding of intracellular calcium to the cell membrane, reducing the availability of calcium and thus allowing smooth muscle to relax. Other effects of the drug help stabilize mast cells to prevent release of mediators. Most β-adrenergics used in asthma therapy affect predominantly the β_2-receptors, which help eliminate bronchospasm. β_1-receptor effects, such as increased heart rate and gastrointestinal disturbances, have been minimized. Albuterol is given orally (liquid or pill) or via a nebulizer or inhaler. Levalbuterol is given via nebulizer or MDI. Terbutaline is given orally, via nebulizer, subcutaneously, or intravenously. The inhaled drugs have a more rapid onset of action than oral forms. Inhalation also reduces troublesome systemic side effects, including irritability, tremor, nervousness, and insomnia.

Salmeterol (Serevent) is a LABA (bronchodilator) that is used twice a day (no more frequently than every 12 hours). This drug is added to antiinflammatory therapy and used for long-term prevention of symptoms, especially nighttime symptoms, and EIB. Salmeterol can be used with children from 4 years old and older, and it is not used to treat acute symptoms or exacerbations. LABA (e.g., salmeterol) should be added to a low- or medium-dosage inhaled corticosteroid among children with persistent asthma not controlled with inhaled corticosteroid treatment alone, in order to decrease asthma symptoms and the need for a short-acting β_2-agonist (Miraglia del Giudice, Matera, Capristo, et al, 2013). LABAs can only be used as an adjuvant therapy in patients who are currently receiving but are not adequately controlled on a long-term asthma control medication. LABAs can increase the risk of severely worsening asthma symptoms, potentially leading to hospitalizations and death (US Food and Drug Administration, 2011).

Theophylline is a methylxanthine drug used for decades to relieve symptoms and prevent asthma attacks; however, it is now used primarily in the ICU when the child is not responding to maximum therapy (Dalabih, Harris, Bondi, et al, 2012). Adding theophylline to inhaled glucocorticoids can be more effective than increasing the steroid dose alone. Therapeutic levels should be obtained with this drug because it has a narrow therapeutic