

## The Pharmaceutical Care in Asthma

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### ABOUT THE STUDY

Asthma is a chronic respiratory illness characterized by exacerbation of severe bronchospasm and marked airway inflammation. In the United States alone, about 20 million people have been diagnosed with asthma, and about half are children. Asthma and asthma-related mortality and morbidity in the United States increased significantly between 1980 and 1998, as reported by the Centers for Disease Control (CDC). The annual cost of asthma in the US healthcare system has increased to \$ 6.2 billion. Estimated cost in 1990 doubled by 3 years. Total cost of emergency room and hospitalization for asthma patients seems to have decreased somewhat, but the cost of drugs to treat asthma has increased significantly in recent years. As a future practitioner, it is important for Pharm D students to understand not only the pathophysiology and treatment of asthma, but also the personal, medical and financial burden of asthma on society.

In the Pharm D program at South University, students face asthma at some point in the curriculum. Time for detailed information on the etiology and pathophysiology of asthma is provided to students in the second pharmacology of asthma drugs followed by 4,444 asthma treatment students. The Integrated Sequence (IS) begins in the second quarter of the first year of the survey and runs through the ninth quarter (third year of employment). Each IS module focuses on diseases associated with a particular organ system and contains 4,444 medicinal chemistry, pharmacology, and therapeutic materials for drugs used in those diseases. The specialized courses presented here focus primarily on the pharmacology of asthma treatment. Selected areas of asthma treatment, such as asthma, are deepened and expanded with an integrated Sequence VI when

students deal with the topic of intensive care medicine. Medicinal chemistry, pharmacology, and treatment of the major classes of drugs used to treat asthma, such as adrenaline agonists and corticosteroids, have also been improved in several other parts of the curriculum. Significant advances in the overall understanding of the etiology of asthma at the molecular and immunological levels should significantly increase the number of targets available for asthma drug therapy in the near future. An important factor in chronic asthma that needs to be addressed with new therapies is to prevent or reverse airway remodeling. Pathological changes that occur in patients with chronic asthma are usually irreversible and, if they do occur, indicate a poor long-term prognosis.

The drugs currently used for asthma can also be prescribed or modified to improve pharmacokinetics, improve efficacy and reduce potential side effects. For example, inhaled corticosteroids currently used at high doses still have some systemic absorption and can cause significant side effects. The development of so-called synthetic "soft" steroids is an active area of research. These synthetic steroids can come in the form of inert ester prodrugs that are converted to their active form in the respiratory tract. One of these drugs, ciclesonide (Alvesson), received FDA preliminary approval in 2003 and is still in extensive clinical trial. Long-term studies with these agents on the use of corticosteroids in the treatment of asthma have shown the side effects of airway remodeling in chronic asthma may not be completely prevented [27]. There is a need for a better understanding of the processes involved in asthma-related airway remodeling. One substance, endothelin, has been shown to induce airway smooth muscle proliferation and fibrosis, which may be a potential future target for preventing asthma-induced remodeling.

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