# Pharmacoeconomics of Biologic Therapy

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**KEYWORDS**

• Severe asthma • Biologic therapy • Pharmacoeconomics • Health care resource use • Oral corticosteroid • Personalized medicine

**KEY POINTS**

- Pharmacoeconomics in immune therapy with biologics involves comparing the costs of an intervention with the change in health status to establish value of an intervention.
- Accurate assessments require measuring all disease costs before and after the intervention, including direct disease costs, costs of related comorbidities, and indirect costs.
- Indirect costs include absenteeism, presenteeism, and quality of life of the patient and family/caregivers.
- Proper policy decisions demand that the cost of the intervention be compared with the cost of the lack of the intervention or alternative interventions.
- Costs of lack of the intervention or alternative therapies include both direct and indirect costs, and the direct costs should include the costs of complications of uncontrolled disease and long-term side effects medications such as corticosteroids.

*The good physician treats the disease; the great physician treats the patient who has the disease.*

*—Sir William Osler*

## INTRODUCTION

Recent years have witnessed tremendous progress in the therapeutic approach to immune-related diseases, such as rheumatoid arthritis, psoriasis, inflammatory bowel disease, and asthma. The introduction of novel biologic agents, including antibodies

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and cytokine inhibitors, has allowed clinicians to achieve improved outcomes for their patients. An important factor that has affected the utilization of novel therapies is their acquisition costs, which far exceed those for older drugs. Nevertheless, these are serious chronic conditions, which can cause substantial morbidity and accelerated mortality for affected individuals. Alternative therapeutic choices often involve the use of agents such as systemic corticosteroids with potentially costly side effects. Both undertreatment with uncontrolled disease and treatment with alternative therapies have severe economic consequences to patients and their families as well as to society. Therefore, appropriate pharmacoeconomic analyses demand we take into account all relevant costs, not only of the treatments but also of the disease itself and that of alternative treatments. In this way, the value of therapies can be correctly estimated.

Previous articles have emphasized the clinical burden of severe asthma. The authors summarize the pharmacoeconomic data obtained for biologic agents in patients with inadequately controlled severe persistent allergic asthma despite high-dose inhaled corticosteroids (ICSs) plus a long-acting β-agonist (LABA) and discuss the cost-effectiveness evidence published for biologic agents in this patient population. Although there is a great deal of evidence highlighting the health, economic, and societal burden of asthma, the evidence is highly skewed toward patients with severe uncontrolled asthma, particularly when asthma is inadequately controlled. In patients who do not respond to traditional therapy but do respond to biologic therapy, the cost-effectiveness of biologics often compares well with other treatments for chronic illness in the long terms of costs.

Costs are a measure of resources consumed. By assessing costs, pharmacoeconomic studies complement studies of efficacy and safety, helping to determine the relationships of treatment and outcome. Costs are divided into 3 categories: direct costs, or costs attributable to the intervention; indirect costs, or costs resulting from reduced productivity; and intangible costs, which are incurred from pain and emotional suffering. Insurance companies, patients, doctors, and society each have different perspectives with respect to costs. The authors review different types of cost analyses and their use in studies of asthma as a model. Cost studies influence clinicians', policy makers', and third-party payers' decisions regarding the implementation of particular therapies or programs. Collection of all relevant cost data needs to be facilitated and evaluated along with clinical trials to facilitate these decisions.

This article attempts to provide a more clinically useful perspective on the pharmacoeconomics of new biologics in the treatment of immune diseases, particularly in the area of asthma. Biologics are a cornerstone of personalized medicine but are inherently costly. Therefore—especially for those with the greatest economic burden—a cost-sensitive approach to improve the health of persons who have or are at the highest risk for uncontrolled asthma and other immune disorders must be developed.

Pharmacoeconomic evaluation encompasses a collection of methods that assesses the costs and consequences of comparative health care interventions. **Table 1** summarizes types of pharmacoeconomic evaluation. Evaluating the health and economic impacts of these interventions has been a topic of long-standing interest among clinicians.[1] Such evaluation involves a variety of issues and methods and additionally has major policy implications. This review discusses the main types of pharmacoeconomic evaluation used to assess the use of biologics in asthma and immune disease and will be achieved by analyzing studies to demonstrate how pharmacoeconomic evaluation has been used for asthma care strategies using biologics. Also discussed are the challenges in the practical application of pharmacoeconomic evaluation and related policy implications. This review is designed for clinicians caring for