

## **Economic evaluation of treating chronic obstructive pulmonary disease: The effects of early initiation of inhaled corticosteroids on exacerbation risks, utilization and costs**

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**Abstract:** Chronic obstructive pulmonary disease (COPD) is a slowly progressive disease of airway obstruction. Current treatment guidelines recommend a stepwise increase in drug treatment depending on disease severity. Inhaled corticosteroids (ICS) should augment regular bronchodilators for patients with advanced disease and repeated exacerbations.

This dissertation examined the timing and impact of ICS on exacerbation risks, utilization and costs among COPD patients in a large managed care database. A propensity-score-matching approach was used to compare patients who initiated ICS within three months of beginning bronchodilators with those who initiated ICS thereafter. A fixed-effects model approach was used to assess benefits of ICS augmenting regular bronchodilators. Medication persistence and adherence were used to measure ICS exposure level and its association with treatment outcomes.

Early initiation of ICS was associated with a 7%-reduction in exacerbation risks, an 8%-reduction in all-cause medical costs, and a 23%-reduction in COPD-related medical costs. Reduction in medical costs was more than the increase in pharmacy costs indicating early ICS initiation achieved an overall cost reduction. The potential benefit of ICS also depended on the timing of therapy initiation. A six-month delay in ICS initiation was, on average, associated with cost increase of \$306 overall or \$51 per month for COPD-related services. The magnitude of cost reduction varied by age, and the oldest population had largest benefits. Access to specialist care and patient understanding of disease and treatment may be key factors to improving medication persistence and adherence. Patients with better persistence and adherence may have lower risks of inpatient admissions or emergency department visits, and treatment costs. However, observed associations were relatively small and inconsistent across various exposure and outcome measures.

In conclusion, the findings consistently support that early ICS initiation, concomitant with bronchodilators rather than in response to exacerbations uncontrolled by bronchodilators, is an important treatment strategy to achieve better symptom control and reduce overall treatment costs. Additional studies are required to address potential time-variant confounders, estimate longer-term outcomes and examine ICS effects among Medicare beneficiaries and patients with severe COPD symptoms.

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