

# Analysis of Costs for a Chronic Disease with Acute High Cost Episodes

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## **Abstract**

Many chronic diseases are associated with acute episodes of illnesses that require increased therapeutic interventions. Thus, although a stable pattern of the incidence of costs over time may appear for a large population in the aggregate, closer analysis of the costs as they impact an individual might reveal a different pattern. Acute care episodes, such as hospitalizations, occur randomly and create cost spikes in utilization from one year to the next. Modeling to account for these random events will provide good estimates of future costs and provide an estimate of their variability. Knowledge of this potential uneven and unpredictable occurrence of utilization, and potential cost, would be beneficial in the design of insurance programs or for disease management programs.

A Bayesian statistical model is used to predict the incidence and cost of hospitalizations for individuals with cystic fibrosis (CF), a life-threatening, autosomal recessive genetic disease that causes intestinal malabsorption and malnutrition in young children along with chronic lung disease as the patient ages. A two-part statistical model is defined that separately models the utilization and cost of hospitalization. Individual demographic characteristics are included as well as a simple biological severity classification system to adjust for the severity of disease between individuals. This model provides a first step in the analysis of the cost of care for those with CF.

While the prevalence of CF in the population is low as compared to the prevalence of heart disease, cancer and other leading chronic diseases, analysis of utilization of health care services for children with CF will provide a useful approach to modeling costs from these other diseases.