Chapter 15
Example of Breathing Illnesses, Asthma and COPD Using MEPS Data

INTRODUCTION

Asthma and COPD (chronic obstructive pulmonary disease) require maintenance and emergency medication. We want to examine the use of the required medications, as well as to examine the need for emergency treatment when the treatment medications are not effective. In order to do this, we examine the medications used by patients, and also investigate the emergency and inpatient treatments required for patients. In particular, we want to see if there are certain medications that require more emergency department visits, and we want to see the extent to which patients will switch medications. We also take patient compliance into consideration when investigating the relationship to the emergency department.

BACKGROUND

We first use a list of asthma medications, and also a list of COPD medications. There are three types of medications to control asthma, long-term control medications, and quick relief medications for allergy-induced asthma. The drugs, fluticasone, budesonide, triamcinolone, flunisolide, qvar, montelukast, and beta-2 agonists such as salmeteral and formoterol are used to treat persistent asthma. These medications reduce bronchial inflation and open the airways. The drugs, cromolyn and nedocromil, are used to decrease the allergic reaction, and Theophyl-
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line is a daily pill that opens airways and relaxes the muscles around them. Quick-relief medications are used during an asthma attack. A short-acting beta-2 agonist, such as albuterol, is given for easy breathing by temporarily relaxing airway muscles. The drug, ipratropium, is also given for immediate relief to allow breathing. The drugs, prednisone and methylprednisolone, are given to treat acute asthma attacks, but those drugs may cause serious side effects if they are used in the long term. Anti-igE monoclonal antibodies such as xolair reduce the patient’s immune system’s reactions to allergens. It is given by injections every two to four weeks. (Staff, 2009)

COPD, or chronic obstructive pulmonary disease, usually results from smoking. It includes chronic bronchitis and emphysema. The lungs are more continually constricted when compared to asthma, which is usually the most serious during an attack. There are additional medications for COPD. Medications generally come in two classes, bronchodilators to open the airways and corticosteroids to reduce inflammation. These include salbutamol, terbutaline, and genoterol as well as salmeterol and formoterol. In that respect, the medications are very similar to those for asthma maintenance. Corticosteroids include fluticasone, budesonide, and beclomethasone as well as combination medications such as Advair® (fluticasone and salmeterol) and Symbicort® (budesonide and formoterol). (anonymous-COPD, 2009)

Compliance is a major issue in the treatment of asthma, especially six months after diagnosis. (Kaya, et al., 2009; Schonberger, et al., 2004; van Gruensven, et al., 2000) Various studies have introduced interventions in order to improve compliance. (Chapman, Walker, Cluley, & Fabbri, 2000; Crompton & Crompton, 2004; Juniper & Juniper, 2003) Interventions are also considered after a visit to the emergency department. (M. D. Brown, et al., 2006; Edmonds, et al., 2002)

In addition, while there are many studies that examine the cost effectiveness in the treatment of asthma, few examine the cost of non-compliance with treatment. (Akazawa, Stempel, Akazawa, & Stempel, 2006; D’Silva, et al., 2008; Oba, Salzman, Oba, & Salzman, 2004; Shelledy, et al., 2009; Shih, et al., 2007; Stallberg, et al., 2008; Sullivan & Turk, 2008) However, one study examine the cost-effectiveness of a series of in-home visits to enhance compliance and to reduce the need for emergency visits. (Shelledy, et al., 2009)

METHODS

We first isolate the asthma medications under investigation, and find the patients who take these medications. We also want to see if they have a diagnosis of asthma or COPD. Therefore, the first step is to filter the medications to the list of those for asthma or COPD. We then examine the issue of patient compliance to see how patients are using the medications. Step two is to merge this dataset with the emergency department dataset so that we can examine the relationship between the two. We want to see if patient compliance is related to a reduced the use of the emergency department for treatment.

Maintenance medication is usually prescribed daily, so we want to see how many prescriptions in a year each patient has. We also want to determine whether the diagnosis that accompanies the medication is related to either asthma or to COPD. We will concentrate on the most commonly prescribed medications.

Then we will use a left join with the emergency department data to determine the relationship between compliance and use of emergency.

RESULTS

We start by identifying the medications and the number of prescriptions that will be used in this analysis (Table 1). There are a total of 7558 prescriptions in the database.