Inhaled Corticosteroid Claims and Outpatient Visits After Hospitalization for Asthma Among Commercially Insured Children

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ABSTRACT

OBJECTIVE: To determine rates of inhaled corticosteroid (ICS) claims and outpatient follow-up after asthma hospitalization among commercially insured children.

METHODS: We conducted a retrospective cohort analysis of children hospitalized for asthma using 2013 national Truven MarketScan data. Covariates included age, sex, region, length of stay, and having an ICS claim within 35 days before hospitalization. Outcome variables were a claim for any ICS-containing medication and outpatient visit within 30 days after discharge. Multivariable analysis used logistic regression.

RESULTS: A total of 5471 children aged 2 to 17 were included; 61% were boys, and mean age was 6.8 years. Forty-one percent had a claim for an ICS and 76% had an outpatient visit within 30 days after hospital discharge. In multivariable analysis, children who had an ICS claim within 35 days before the hospitalization were more likely to have an ICS claim within 30 days after discharge (relative risk [RR] 1.3, 95% confidence interval [CI] 1.2–1.5). The strongest predictor of an ICS claim within 30 days after discharge was attendance at an outpatient appointment (RR 1.4, 95% CI 1.3–1.6). Children aged 2 to 6 were more likely to attend an outpatient appointment (RR 1.1, 95% CI 1.1–1.2). Children with an ICS claim before admission were also more likely to attend an outpatient appointment (RR 1.1, 95% CI 1.004–1.1).

CONCLUSIONS: In this national sample of commercially insured children with asthma, rates of ICS claims after hospitalization are low despite high rates of outpatient visits. Both inpatient and outpatient physicians must play a role in increasing ICS adherence in this high-risk population of children with asthma.

KEYWORDS: asthma; controller medications; hospital follow-up; transitions

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WHAT'S NEW

Less than half of commercially insured children with an asthma hospitalization receive inhaled corticosteroids despite high rates of outpatient visits within 30 days of hospital discharge. Patients who attend outpatient visits are 40% more likely to receive these guideline-recommended medications.

ASTHMA IS THE most common chronic condition affecting children, and the incidence of asthma-related emergency department visits and hospitalizations continues to be high.[1,2] Inhaled corticosteroids (ICS), when used regularly, can reduce the symptoms of asthma, improve patient-reported quality of life, and prevent costly emergency department visits and hospitalizations.[3–6] However, these evidence-based, guideline-recommended medications remain underutilized.[6–8] The transition from hospital to home is a particularly vulnerable time for children, including those with asthma.[7,9–12] Inpatient physicians must determine the appropriate home medication regimen and communicate this effectively to both the family and the primary care physician. One strategy to minimize risk and improve continuity of care during this high-risk time is to recommend outpatient follow-up at the time of hospital discharge.[13] Attendance at an outpatient appointment shortly after hospital discharge for asthma provides additional opportunities for ICS prescribing, reinforcement of the importance of controller medications in the long-term management of asthma, and for providers to address parental questions and concerns regarding medication management. Recent evidence suggests that improved hospital to home care transitions can increase medication adherence in the post-hospitalization period.[14]

Unfortunately, this model of care does not appear to be achieving acceptable rates of ICS adherence among publicly insured children with asthma.[7,15] In 2011 we found

among a statewide population of Medicaid-insured children that only 52% had a pharmacy claim for an ICS within 60 days of hospital discharge, and only 48% attended an outpatient appointment in this same time frame.[7] Publicly insured children face significant barriers to both outpatient appointment attendance and medication adherence, largely due to lack of a medical home, lack of transportation, inflexible work schedules, and perceived financial barriers.[16–19] Less is known about commercially insured children's barriers and resultant utilization behavior during this high-risk transition from hospital to home after asthma exacerbation. Previous studies suggest that commercially insured families are more likely to have a medical home, are more likely to fill written prescriptions for asthma medications, and have overall higher rates of asthma controller medication adherence compared to publicly insured children.[20–22]

The objective of this study was to determine rates of ICS claims and outpatient follow-up appointment attendance among a national sample of commercially insured children hospitalized with acute asthma exacerbation. We also aimed to determine predictors of ICS claims that may inform future interventions to improve medication adherence in children with asthma. Consistent with the current literature, we hypothesized that rates of both ICS claims and outpatient appointment attendance in this commercially insured population would be higher than the previously published rates in publicly insured patients as a result of the presence of fewer socioeconomic barriers.

PATIENTS AND METHODS

DATA

We conducted a retrospective analysis using 2012–2014 Truven MarketScan claims data. These data represent over 19 million commercially insured children from the 100 largest commercial insurers in the United States. Patients aged 2 to 17 years with a hospitalization with a primary diagnosis of asthma in 2013 were identified using International Classification of Diseases, 9th Revision (ICD-9), codes 493.XX. For patients with multiple admissions for asthma in the same year, we analyzed the first admission only. Claims for ICS-containing medications were identified using NDC codes and drug names. The initial list of ICS-containing medications was reviewed by 2 authors (KS and AA) for completeness; drugs were included regardless of mode of administration (eg, metered dose inhaler, nebulizer solution). The MarketScan database includes exact dates of dispensing; therefore, we were able to determine the exact number of days between hospital discharge and any medication dispensing. Outpatient visits were identified using Current Procedural Terminology (CPT) codes 99201 to 99205 and 99211 to 99215. Visit dates were compared to hospital discharge date to identify visits that occurred within 30 days after discharge. Any outpatient visit, regardless of ICD-9 code, was included. 2012 data were used to identify prehospitalization ICS claims for those patients with hospitalizations in the first 34 days of 2013, and 2014 data were used to identify outpatient appointment attendance and ICS claims within 30 days after hospitalization for those hospitalized in December 2013.

VARIABLES

Patient-specific variables included age in years, sex, geographic region, time of year of admission, hospital length of stay, and whether or not the patient had a claim for an ICS-containing medication within the 35 days before the hospitalization (we chose 35 days rather than 30 days here to allow a bit of flexibility in refill time and to capture more patients who had recently filled an ICS). Race/ethnicity is not available in the MarketScan database. Consistent with previous studies, and because of differences in disease phenotype by age, age was categorized into 3 groups: 2- to 6-year-olds (preschool/kindergarten), 7- to 12-year-olds (school age), and 12- to 17-year-olds (adolescents).[8,23] Geographic region, as defined in the MarketScan database, is categorized into 5 groups: Northeast, North Central, South, West, and unknown. On the basis of our calculated mean and median length of stay, for the purpose of this analysis, length of stay was dichotomized into $\leq$2 days and $>$2 days. Additionally, any patient with a length of stay of $>$7 days was excluded from our analysis, as they were thought not to represent the typical asthma hospitalization. These patients made up less than 0.6% of our total population. In order to determine if time of year of admission (which may correspond to whether or not families have met their deductible) is associated with ICS claims or outpatient visit rates, we included the quarter of admission in our analysis. This variable may also help elucidate any link between peak flu/respiratory virus season or seasonal allergies and ICS claims.

Our primary outcome variables were the presence of a pharmacy claim for any ICS-containing medication and the presence of a claim for an outpatient visit within 30 days of hospital discharge. We also analyzed a combined outcome of having both an ICS claim and an outpatient visit within 30 days after hospital discharge. Secondary analysis extended the outcome time period to 60 days after hospital discharge. This strategy helped account for the fact that a patient might receive an ICS-containing medication during the hospitalization and that this would not show up as an individual pharmacy claim; rather, it might be bundled with the hospitalization claim. Using a 60-day outcome window allows patients in this situation additional time to fill their first outpatient prescription as well as additional time to attend an outpatient follow-up appointment.

ANALYSIS

All statistical analyses were performed by SAS 9.4 (SAS Institute, Cary, NC). We first determined overall rates of ICS claims and outpatient appointment attendance in both the 30-day outcome window and the 60-day outcome window. Because the vast majority of