Health Care Use and Costs Associated With High vs Low HEDIS Asthma Medication Ratio

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INTRODUCTION

- The Healthcare Effectiveness Data and Information Set (HEDIS) was developed by the National Committee for Quality Assurance as a process measure of health care quality.[1]
- One measure of quality of care in asthma is the asthma medication ratio (AMR), a ratio of asthma controller medications (controllers) in the total number of asthma medications.[1]
- High AMR indicates good asthma control practices and means that most of the medications a patient with asthma uses are controller medications.
- AMR ≥0.5 was reported to predict better asthma outcomes and lower emergency hospital utilization than AMR <0.5.[2]
- Costs of care associated with high versus low AMR have not been studied.

OBJECTIVE

- To characterize health care use and costs associated with high versus low AMR.

METHODS

Study Population

- Data from a commercial claims database including >10 million covered lives were used for this study (January 1, 2008–December 31, 2012).
  - 2 years of data were required for the HEDIS asthma measures: baseline year (2010) and measurement year (2011).
- A validated algorithm was used to identify patients with persistent asthma for the HEDIS asthma measures. Patients were required to meet the HEDIS 2012 denominator criteria.[3]
- We enrolled patients 5–64 years of age with persistent asthma by the following:
  - Inclusion criteria
    - Met ≥1 of the 4 criteria for the HEDIS definition of persistent asthma in both the baseline and measurement years
      - ≥1 emergency department (ED) visit with asthma as the primary diagnosis
      - ≥1 inpatient hospitalization with asthma as the primary diagnosis
      - ≥4 outpatient asthma visits and ≥2 asthma medication dispensing events
      - ≥4 asthma medication dispensing events
        - If leukotriene modifiers were the sole asthma medication dispensed in that year, the patient also was required to have ≥1 diagnosis of asthma, in any setting, in the same year the leukotriene was dispensed
  - Exclusion criteria
    - Not 5–64 years of age by December 31, 2011
    - >1 gap in enrollment of >45 days in the baseline or measurement years
  - Patients with emphysema, chronic obstructive pulmonary disease, cystic fibrosis, or acute respiratory failure were included.

Study Measures

- AMR was calculated using the following formula:

$$AMR = \frac{Units\ of\ controllers}{Units\ of\ controllers + units\ of\ relievers}$$

- Patient characteristics were stratified by high versus low AMR; AMR <0.5 was defined as low AMR.
- The number of asthma-related office visits was reported.
- Evidence of poor asthma control included inpatient hospitalization with a primary diagnosis of asthma, asthma-related ED visit(s), ≥2 oral corticosteroid (OCS) bursts (≤15-day supply), and ≥6 short-acting beta-agonist prescription fills in 1 year.

Study Outcomes

- Total health care costs, including medication and nonmedication (inpatient hospitalization and ED visit) costs.
- Health care resource use (any cause and asthma related): number of inpatient hospitalizations, ED visits, and office visits.

Statistical Analyses

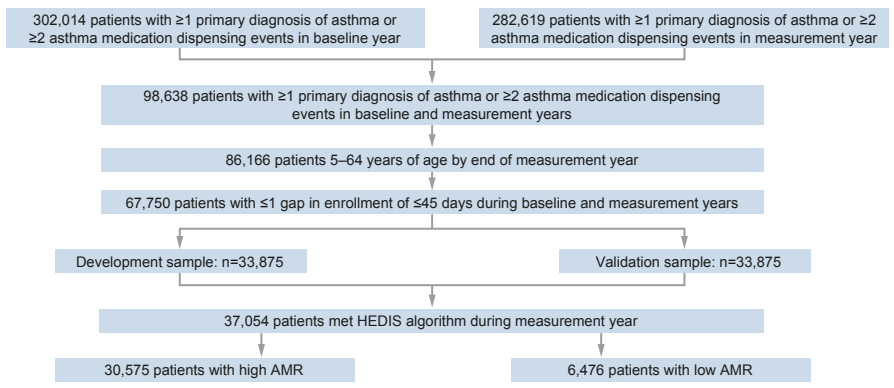
- Descriptive statistics were reported for all measures whenever possible.
- Costs and utilization between the high and low AMR groups were compared using chi-square tests, *t* tests, or log-sum tests as appropriate.
- To adjust for demographics (age, sex, region) and Charlson Comorbidity Index (CCI) score we used regression models for continuous variables (ie, costs, number of office visits, number of OCS bursts) and negative binomial models for annual incidence rate (inpatient hospitalizations and ED visits).
- All tests were 2-sided with significance level of 0.05.
- All data transformations and statistical analyses were performed using SAS® version 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Patient Characteristics

- We identified 67,750 patients who met all inclusion criteria (**Figure 1**).
- A total of 37,054 patients met the study inclusion criteria: high AMR group, n=30,575; low AMR group, n=6,479 (**Table**).
  - The mean age of patients with high AMR was greater than that of patients with low AMR.
  - More female patients belonged to the high AMR group than to the low AMR group.

Figure 1. Patient Identification



AMR, asthma medication ratio; HEDIS, Healthcare Effectiveness Data and Information Set.

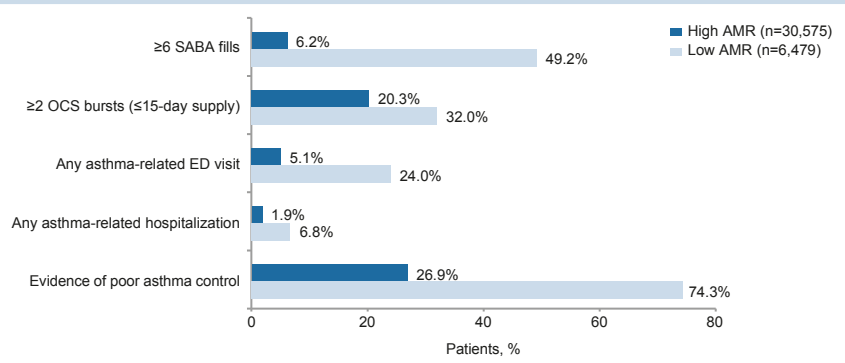
Table. Baseline Patient Demographics

Parameter	High AMR n=30,575*	Low AMR n=6,479†	All Patients N=37,054	*P* Value
Mean (SD) age, y	35.2 (20.5)	30.1 (18.3)	34.3 (20.2)	<0.001
Female, n (%)	17,482 (57.2)	3,411 (52.6)	20,893 (56.4)	<0.001
Region, n (%)				0.004
Midwest	8,303 (27.2)	1,643 (25.4)	9,946 (26.8)	
Northeast	3,842 (12.6)	814 (12.6)	4,656 (12.6)	
South	13,949 (45.6)	2,985 (46.1)	16,934 (45.7)	
West	4,481 (14.7)	1,037 (16.0)	5,518 (14.9)	

AMR, asthma medication ratio. *82.5%; †17.5%.

- Mean CCI score was 1.4 across all groups.
- Patients with low AMR had worse asthma control compared with those with high AMR (74.3% vs 26.9%, respectively; *P*<0.001; **Figure 2**).

Figure 2. Poor Asthma Control Events Stratified by AMR

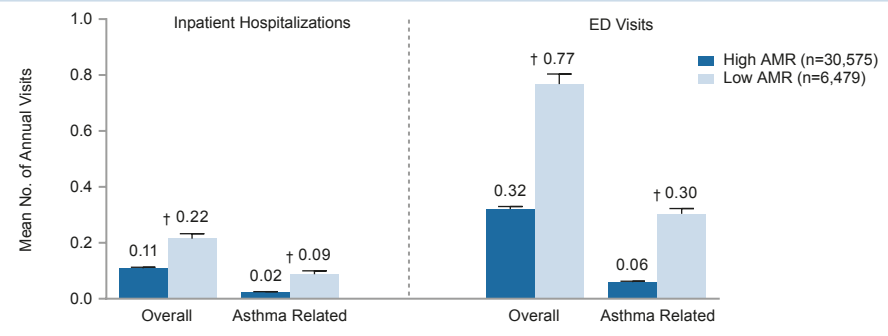


AMR, asthma medication ratio; ED, emergency department; OCS, oral corticosteroid; SABA, short-acting beta agonist. *P*<0.001 for all comparisons.

Adjusted Annual Costs and Utilization

- OCS bursts were lower in the high AMR group (0.83 vs low AMR group, 1.33; *P*<0.001).
- Patients with high AMR had more overall office visits than patients with low AMR (14.13 vs 11.00, respectively; *P*<0.001). No difference in the number of asthma-related office visits was noted between the 2 groups (2.18 vs 2.24, respectively; *P*=0.275).
- Patients with high AMR had fewer overall (*P*<0.001) and asthma-related inpatient hospitalizations and ED visits (*P*<0.001) than patients with low AMR (**Figure 3**).

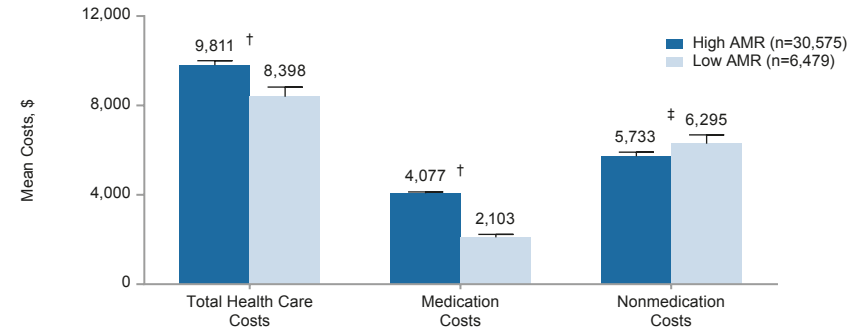
Figure 3. Adjusted* Annual Number of Inpatient Hospitalizations and ED Visits



AMR, asthma medication ratio; ED, emergency department. *Adjusted by age, sex, region, and Charlson Comorbidity Index score; †*P*<0.001.

- Total health care costs were higher in the high AMR group (increased costs were driven by medication expenditures), while nonmedication costs were lower (**Figure 4**).

Figure 4. Adjusted* Total Annual Health Care Costs



AMR, asthma medication ratio. *Adjusted by age, sex, region, and Charlson Comorbidity Index score; †*P*<0.001; ‡*P*=0.011.

CONCLUSIONS

- Although patients with high AMR had increased medication costs and higher nonemergency (office) visits compared with patients with low AMR, their care was marked by fewer OCS bursts (indicating instances of poor asthma control) and lower emergency (such as inpatient hospitalizations and ED visits) health care use than that of low AMR patients.
- Nonmedication costs of patients with high AMR were lower than such costs of low AMR patients.

REFERENCES

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