

# Characteristics of Treated Asthma Patients Experiencing Exacerbations in a US Database

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## Background

- The National Heart, Lung, and Blood Institute (NHLBI) Guidelines for the Diagnosis and Management of Asthma recommend a stepwise approach to asthma management with the goals of maintaining asthma control and reducing the risk of exacerbations.
- Although asthma treatments reduce the frequency of exacerbations, they still occur among the treated asthma population.

## Objectives

- To characterize the treated US adult asthma population, including those who experienced an exacerbation, with respect to demographics, clinical characteristics and healthcare resource utilization, overall and by NHLBI step.

## Methods

### Study Design:

- Retrospective cohort study of treated asthma patients during 2013-2014 in the Optum Clinformatics™ Data Mart commercial claims database.

### Inclusion Criteria:

- Continuous enrollment (medical and pharmacy benefits) between 01 January 2013 through 31 December 2014.
- Age ≥18 years on 01 January 2014 (index date).
- ≥1 diagnosis code for asthma (ICD-9: 493.xx) between 01 January 2013 and 31 December 2013 (baseline period).
- ≥2 asthma medication dispensings during the baseline (2013), with ≥1 asthma medication dispensed in the 90-days prior to index date.

### Exclusion Criteria:

- ≥1 diagnosis code for COPD, cystic fibrosis, acute respiratory failure or lung cancer during the study period (2013-2014).

### Analysis:

- Demographics, comorbidities, clinical characteristics (e.g. eosinophil counts), and healthcare utilization during the baseline year were described for asthma patients overall and for the subgroup who had ≥1 exacerbation during the follow-up (2014).
- Exacerbations, healthcare resource utilization, and associated costs were described during 2014 (follow-up period).
- Exacerbations were defined as an asthma-related emergency room visit, hospitalization, or oral corticosteroid treatment (asthma claim within +/- 14 days of OCS dispensing).
- Healthcare resource utilization (HCRU) and costs were described for the overall population and subgroup with an exacerbation.

## Results

- 72,156 asthma patients met the study inclusion/exclusion criteria, of which 10,590 (14.7%) patients had ≥1 exacerbation during the year of follow-up (2014).
- Approximately 44% of patients were classified as NHLBI Steps 1-2, 41% as NHLBI Steps 3-4, and 11% as Steps 5-6. (Table 1)
- Among patients with an exacerbation, there were higher proportions of patients with allergic rhinitis, blood eosinophil counts ≥300 cells/μL and asthma-related healthcare encounters (outpatient, ER visits, hospitalizations) during the baseline period compared to the overall population. (Table 1)

**Table 1. Demographics, clinical characteristics, and baseline healthcare resource utilization (2013)**

Variable <sup>1</sup>	Overall Population (N=72,156)	≥1 Exacerbation during Follow-Up (N=10,590)
Age, mean (SD)	49.9 (16.2)	49.0 (15.4)
18-44 years	26,999 (37.4)	4,140 (39.1)
45-64 years	30,223 (41.9)	4,633 (43.7)
65+ years	14,934 (20.7)	1,817 (17.2)
Female	46,143 (64.0)	7,326 (69.2)
Comorbid conditions		
Allergic Rhinitis	28,931 (40.1)	4,913 (46.4)
Hyperlipidemia	27,454 (38.1)	3,709 (35.0)
Hypertension	27,301 (37.8)	3,899 (36.8)
Diabetes	9,953 (13.8)	1,358 (12.8)
Obesity	9,096 (12.6)	1,526 (14.4)
Eosinophil measurement		
Eosinophil Count <sup>2</sup>		
<300 cells/μL	9,275 (60.4)	1,146 (54.0)
≥300 cells/μL	6,074 (39.6)	976 (46.0)
NHLBI Treatment Step		
Step 1	15,710 (21.8)	2,163 (20.4)
Step 2	15,761 (21.8)	1,931 (18.3)
Step 3	10,221 (14.2)	1,280 (12.1)
Step 4	19,401 (26.9)	3,121 (29.5)
Step 5	7,941 (11.0)	1,641 (15.5)
Step 6	252 (0.4)	66 (0.6)
Unclassifiable	2,870 (4.0)	388 (3.7)
Asthma-related HCRU		
≥1 Emergency room visit	2,642 (3.7)	848 (8.0)
≥1 Inpatient hospitalization	593 (0.8)	175 (1.7)
≥1 Outpatient visit	37,814 (52.4)	6,656 (62.9)

<sup>1</sup> Variables are presented as n (%) unless otherwise specified

<sup>2</sup> Eosinophil count assessed in the subset of patients with laboratory data and a valid blood eosinophil value

## Results (cont.)

### Characteristics by NHLBI Step

- Percent of patient with comorbid allergic rhinitis, eosinophils ≥300 cells/μL, and asthma-related HCRU increased with NHLBI step. (Table 2)
- Except for allergic rhinitis, baseline clinical characteristics tended to be similar among patients within steps 1-3 and steps 4-5, respectively.

**Table 2. Demographics, clinical characteristics, and HCRU by NHLBI Step (2013)**

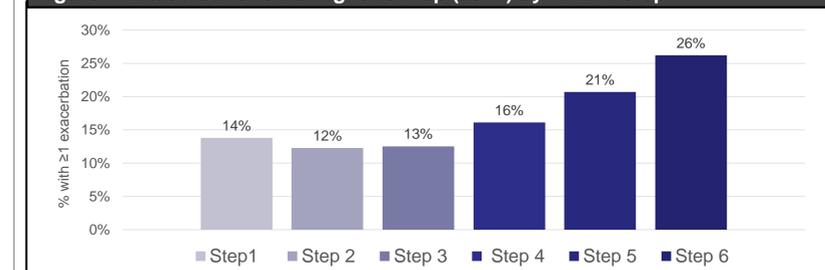
Variable <sup>1</sup>	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Age, mean (SD)	46.0 (16.3)	49.9 (16.2)	50.4 (16.6)	50.9 (15.8)	51.7 (14.8)	54.1 (12.9)
Female	9,619 (61.2)	11,101 (70.5)	6,306 (61.7)	12,077 (62.3)	4,833 (60.9)	158 (62.7)
Allergic Rhinitis	4,244 (27.0)	7,812 (49.6)	3,872 (37.9)	8,355 (43.1)	3,608 (45.4)	132 (52.4)
Eosinophil measurement	3,108 (19.8)	3,612 (22.9)	1,958 (19.2)	4,090 (21.1)	1,646 (20.7)	66 (26.2)
Eosinophils <sup>2</sup> ≥300 cells/μL	1,200 (38.6)	1,237 (34.3)	782 (39.9)	1,778 (43.5)	745 (45.3)	36 (54.5)
Asthma-related HCRU						
≥1 ER visits	825 (5.3)	375 (2.4)	276 (2.7)	713 (3.7)	321 (4.0)	21 (8.3)
≥1 IP hospitalization	105 (0.7)	101 (0.6)	61 (0.6)	186 (1.0)	88 (1.1)	8 (3.2)
≥1 Outpatient visit	7,086 (45.1)	7,592 (48.2)	5,556 (54.4)	11,137 (57.4)	4,928 (62.1)	183 (72.6)

<sup>1</sup> Variables are presented as n (%) unless otherwise specified

<sup>2</sup> Eosinophil count assessed in the subset of patients with laboratory data and a valid blood eosinophil value  
IP- Inpatient; ER- Emergency room

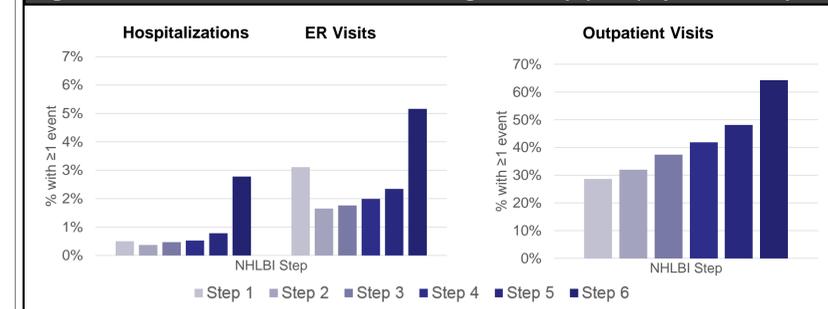
- Exacerbation frequency during 2014 increased with NHLBI step. (Figure 1)

**Figure 1. Exacerbations during follow-up (2014) by NHLBI Step**



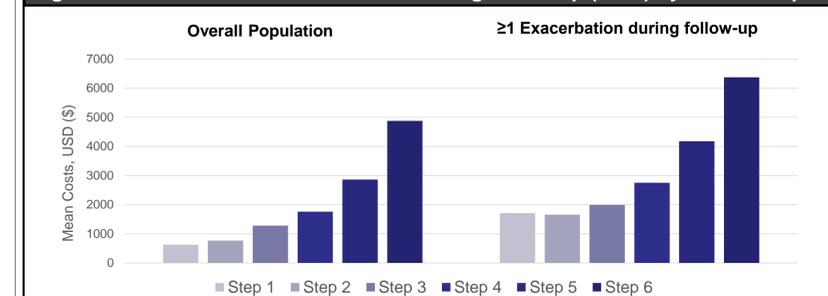
- Consistent with the exacerbation trend, asthma-related HCRU also increased by NHLBI step during the follow-up, with notable increases among those classified as Step 6. (Figures 2 and 3)
- Asthma-related ER admissions were more frequent among Step 1 patients than Steps 2-3.

**Figures 2 & 3. Asthma-Related HCRU during follow-up (2014) by NHLBI Step**



- Mean cost during the follow-up increased by NHLBI step and were higher among those with an exacerbation relative to the overall population. (Figure 4)

**Figure 4. Mean Asthma-Related Costs during follow-up (2014) by NHLBI Step**



## Conclusions

- Exacerbations were observed among patients classified at each of the NHLBI steps, which is a proxy for disease severity, and were more frequent with increasing step.
- Exacerbations and asthma-related healthcare utilization highlight continued unmet need in the US asthma population.
- Additional research and strategies to address the multifactorial drivers of this continued burden, such as adherence to medications, are needed.

## References

- 2007 Guidelines for the Diagnosis and Management of Asthma (EPR-3). National Institutes of Health: National Heart, Lung, and Blood Institute.

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