

Clinical and Economic Burden of Patients with Uncontrolled Severe Asthma with Low Blood Eosinophil Levels

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Introduction

Approximately 5-10% of asthma patients have severe asthma,¹ of which 20-50% are uncontrolled.² Whereas biologic treatments lower exacerbations among eosinophilic asthma (defined by blood eosinophil count [BEC] ≥ 300 cells/ μ L),³ there are limited effective treatment options for patients with low BEC (<300 cells/ μ L), who are estimated to make up approximately 50% of severe uncontrolled asthma.⁴ There are limited data on the disease control and associated cost of non-eosinophilic asthma.⁵

This study examined the continued real-world burden of severe asthma among commercially- and Medicare-insured patients in the United States with low BEC untreated with biologics.

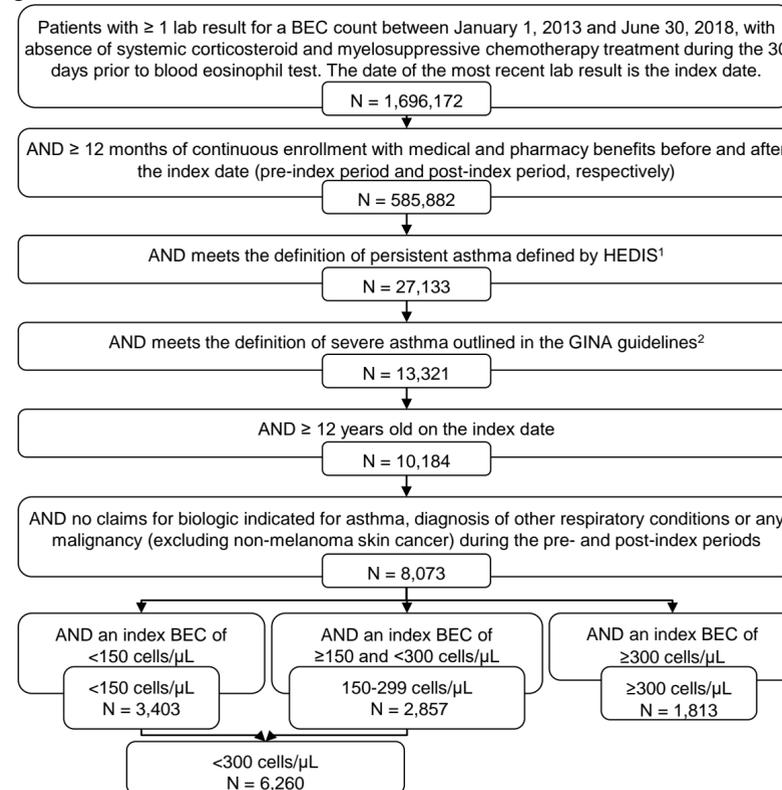
Methods

- Retrospective cohort study of severe asthma patients with BEC <300 cells/ μ L (earliest use=index date) selected from the MarketScan database between 1/1/2013-6/30/2018. (Figure 1)
 - Patients with BEC <300 cells/ μ L comprise the primary study cohort
 - Patients with BEC ≥ 300 cells/ μ L comprise an exploratory cohort
- Asthma exacerbation, level of disease control, treatment characteristics and healthcare costs were reported during the 12-month post-index period.
- Asthma exacerbation was captured via asthma-related mechanical ventilation claim, inpatient admission, OR ED/outpatient (OP) visit with systemic corticosteroid (SCS) burst within 7 days (1 dose of injectable corticosteroids or oral corticosteroids for ≥ 3 days).
- Level of asthma control based on healthcare claims was assigned hierarchically into mutually exclusive categories* using the following components:

- Uncontrolled**
 - ≥ 1 asthma-related inpatient admission with or without mechanical ventilation, OR
 - ≥ 2 asthma-related ED/OP visits with a SCS burst within 7 days
- Suboptimally controlled**
 - exactly 1 asthma-related ED/OP visit with an SCS burst within 7 days, OR
 - ≥ 4 claims for short-acting beta agonist
- Controlled**
 - none of the above

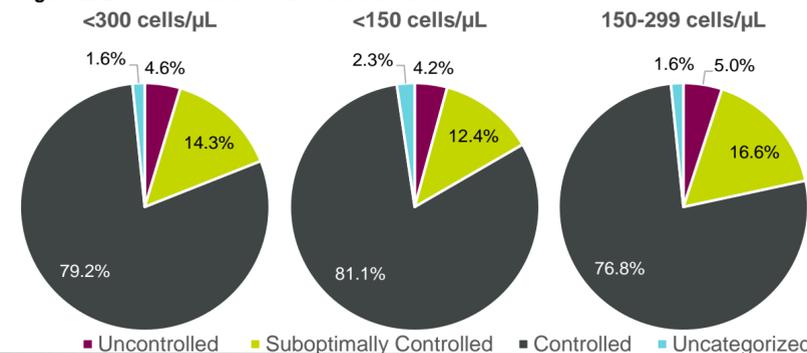
*Patients were excluded when SCS burst for exacerbation treatment could not be distinguished from maintenance SCS used in daily control.

Figure 1. Patient selection



¹ ≥ 1 of the following during both the pre- and post-index periods: A) ≥ 1 inpatient admission or ER visit with a principal diagnosis of asthma; B) ≥ 4 asthma medication dispensing events; C) ≥ 4 non rule-out claims on different days with an asthma diagnosis in any position and ≥ 2 asthma medication dispensing events
² ≥ 1 of the following during the pre-index period: A) at least two claims for medium to high dose ICS/LABA combination; B) at least two claims for medium to high dose ICS with additional controllers; or C) at least 180 cumulative days' supply of oral corticosteroids.

Figure 2. Level of asthma control classification



Results – Study Sample and Level of Asthma Control

- Among 8,073 severe asthma patients, 6,260 (78%) presented with BEC <300 cells/ μ L: 42% with <150 and 35% with 150-299 cells/ μ L. (Figure 1)
- The mean age was 55 (± 14) years; 64% female.
- 18% of patients had ≥ 1 asthma exacerbation.
- 79% of patients were categorized as having controlled asthma, 14% suboptimally controlled, and 5% uncontrolled. (Figure 2)

Table 1. Treatment characteristics

	BEC cells/ μ L			Level of Asthma Control ¹		
	<300	<150	150-299	Uncontr	Subopt	Contr
Asthma-related medications² (%)	6,260	3,403	2,857	286	896	4,955
Systemic corticosteroids (SCS) ³	69%	71%	67%	99%	95%	62%
≥ 180 days' supply of SCS	22%	27%	16%			
ICS/LABA	64%	58%	71%	82%	79%	60%
Leukotriene receptor antagonists	35%	34%	36%	64%	50%	30%
Short-acting beta2-agonists	21%	19%	24%	58%	52%	13%
Tiotropium	11%	11%	11%	14%	14%	10%
Inhaled corticosteroids	10%	11%	10%	22%	15%	9%

Contr, Controlled; ICS/LABA, Inhaled corticosteroids/long-acting beta2-agonist; Subopt, Suboptimally controlled; Uncontr, Uncontrolled
¹ Reported among BEC <300 cells/ μ L; 98 patients were excluded.
² Long-acting muscarinic antagonist /long-acting beta2-agonist and mast cell stabilizers were used by less than 1% of patients and are not reported in the table.
³ Includes any injectable and oral corticosteroid use (e.g. use during exacerbations).

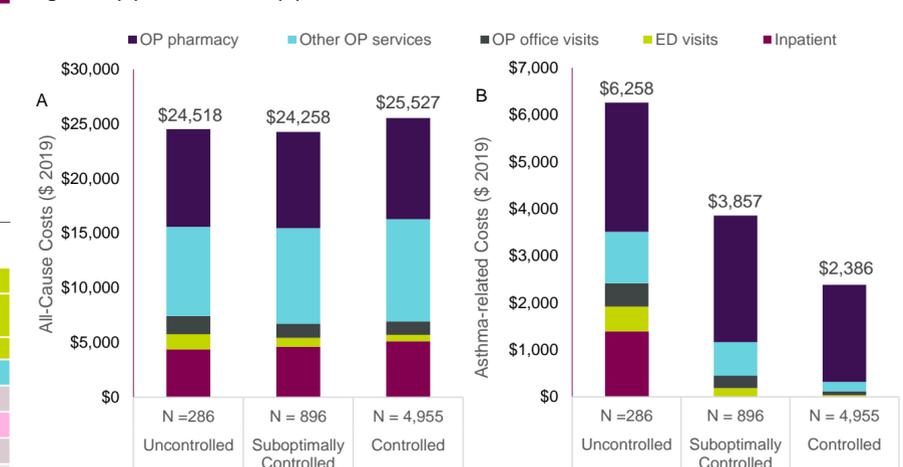
Results – Treatment Characteristics

- The most used asthma-related medications were SCS (69%), ICS/LABAs (64%), and leukotriene receptor antagonists (35%). (Table 1)
- 22% of patients had maintenance SCS use defined as ≥ 180 days' supply. (Table 1)
- 99% and 95% of uncontrolled and suboptimally controlled patients had at least one outpatient claim for SCS compared to 62% of controlled patients. (Table 1)

Results – Healthcare Cost

- The mean (SD) 12-month all-cause and asthma-related total healthcare costs were \$25,845 (\$43,896) and \$2,802 (\$3,965), respectively.
- All-cause costs were higher but asthma-related costs similar for patients w/ BEC <150 cells/ μ L (\$27,879 and \$2,659) vs 150-299 cells/ μ L (\$23,423 and \$2,973).
- Patients with suboptimal and uncontrolled asthma spent \$1,471 and \$3,872 more, respectively, on asthma-related claims compared to patients with controlled asthma. (Figure 3)

Figure 3. (A) All-cause and (B) asthma-related healthcare costs



Results – Exploratory Cohort ≥ 300 cells/ μ L

- Proportion with asthma exacerbation and uncontrolled disease was higher among patients with BEC ≥ 300 cells/ μ L (26% and 8%, respectively) compared to patients with BEC <300 cells/ μ L (18% and 5%, respectively).
- Patients with BEC ≥ 300 cells/ μ L presented lower all-cause costs but higher asthma-related costs (\$21,293 [\$38,142] and \$3,229 [\$3,244], respectively), compared to patients with BEC <300 cells/ μ L.
- Among this entire severe asthma population (BEC <300 and ≥ 300 cells/ μ L), 67% of uncontrolled disease, 81% of all-cause costs, and 75% of asthma-related costs are attributable to patients with BEC <300 cells/ μ L.

Conclusions

- Majority of severe asthma patients identified in this study had BEC <300 cells/ μ L and 19% were suboptimally controlled, demonstrating an unmet need among patients with no biologic use and lower BEC.
- Among patients on biologics with BEC <300 cells/ μ L and uncontrolled asthma, 1-year mean all-cause and asthma-related healthcare costs exceeded \$24,500 and \$6,200, respectively.

References

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