

Eosinophilic esophagitis-related healthcare resource utilization and associated costs for payers and patients: a retrospective cohort study of US health insurance claims data

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Introduction

- EoE is a chronic immune-mediated disease characterized by eosinophilic infiltrate in the esophagus and symptoms of esophageal dysfunction (e.g. dysphagia).¹
- The incidence and prevalence of EoE are increasing globally²⁻⁴ and the prevalence of EoE in the USA was recently estimated to be 147.4 per 100,000 individuals.²
- EoE-related healthcare costs are also increasing and were predicted to be \$1.32 billion in the USA in 2024, representing a substantial burden on healthcare systems; however, the financial burden on patients is understudied.⁴

Aim

- To assess EoE-related HCRU and costs for patients with EoE in the USA from the perspective of payers and patients.

Methods

- This was a retrospective, observational cohort study conducted to examine US health insurance claims data from the Merative MarketScan Commercial, Medicare Supplemental and Medicaid databases over a 3-year study period (July 1, 2020 – June 30, 2023).
- Patients were included in this analysis if they had ≥ 1 inpatient or outpatient insurance claim containing the diagnosis code for EoE (ICD-10-CM: K20.0) (**full analysis set**).
– The first claim for EoE during the selection window (July 1, 2021 – June 30, 2022) was defined as the index date.
- Patients were also required to have ≥ 12 months of continuous health plan enrollment before the index date (baseline period) and after the index date (follow-up period).
- A sensitivity analysis was performed for patients with EoE with ≥ 2 inpatient or outpatient insurance claims containing the diagnosis code for EoE on two distinct dates (**sensitivity analysis set**).
– This was included to provide a more conservative definition of an EoE diagnosis and address concerns around potential misclassification.
- Patients with a diagnosis of eosinophilic gastritis/gastroenteritis (ICD-10-CM: K52.81) at any time after the index date were excluded.
- Patient demographics were reported for the index date, and EoE-related HCRU and healthcare costs (payer + patient) were reported for the baseline and follow-up periods. All-cause total healthcare costs are also reported for context.
– For outpatient claims, HCRU and healthcare costs were considered EoE-related if the claim was associated with a diagnosis of EoE (primary or secondary), an EoE-related condition (primary or secondary) or an EoE medication. For inpatient claims, HCRU and healthcare costs were considered EoE-related if the claim was associated with a primary diagnosis of EoE or a primary diagnosis for an EoE-related condition.
– Costs were reported for all patients (i.e. averaged across the analysis set irrespective of whether they had a claim for the specified healthcare resource) and for those who had ≥ 1 claim for the specified healthcare resource.
– The first approach provided an estimate of the costs for all patients in the analysis set, whereas the second approach helped to highlight the mean costs for a particular healthcare resource for those who used it.
– Costs were updated to 2023 US\$ using the medical care component of the Consumer Price Index; all costs presented herein are in US\$.

Results

Study population and demographics

- Overall, 19,169 and 9141 patients with EoE were identified in the database for the full and sensitivity analysis sets, respectively (Table 1).

EoE-related HCRU during the baseline and follow-up periods

- For the full analysis set, EoE-related HCRU (proportion of patients with EoE who had ≥ 1 claim for the specified healthcare resource) increased slightly from the baseline period to the follow-up period for most visit types.
– However, utilization was higher during the baseline period than during the follow-up period for ED visits (17.1% vs 14.1%) and urgent care visits (2.1% vs 1.7%) (Table 2).
- The median number of claims per patient in the full analysis set for most visit types was the same during the baseline and follow-up periods, except for the number of prescription claims, which was slightly higher during the follow-up period (4 vs 5) (Table 2).
- In general, the sensitivity analysis showed similar findings (Supplementary Table 1).
- EoE-related HCRU (proportion of patients who had ≥ 1 claim for the specified healthcare resource) was generally higher overall for the sensitivity analysis set than for the full analysis set (Supplementary Table 1 and Table 1, respectively).

Table 1. Demographics at the index date for patients in the full and sensitivity analysis sets.

Demographic	Full analysis set (N = 19,169)	Sensitivity analysis set (N = 9141)
Age, years, mean (SD)	35.8 (18.5)	31.9 (18.4)
Median (min, max)	38.0 (1.0, 96.0)	32.0 (1.0, 91.0)
Sex		
Male	11,561 (60.3)	5662 (61.9)
Female	7608 (39.7)	3479 (38.1)
Payer type		
Commercial	14,137 (73.7)	6551 (71.7)
Medicaid	4571 (23.8)	2454 (26.8)
Medicare	461 (2.4)	136 (1.5)
Health plan type		
Preferred provider organization	7101 (37.0)	3152 (34.5)
Health maintenance organization	4680 (24.4)	2481 (27.1)
High-deductible or consumer-driven health plan	3800 (19.8)	1818 (19.9)
Comprehensive	2323 (12.1)	1098 (12.0)
Point of service	988 (5.2)	463 (5.1)
Other	117 (0.6)	60 (0.7)
Missing/unknown	160 (0.8)	69 (0.8)
Geographic region^a		
South	6209 (32.4)	2858 (31.3)
North central	3922 (20.5)	1748 (19.1)
West	2365 (12.3)	1088 (11.9)
Northeast	2086 (10.9)	986 (10.8)
Missing/unknown	4587 (23.9)	2461 (26.9)
Race^b		
White	2876 (15.0)	1529 (16.7)
Black	628 (3.3)	348 (3.8)
Hispanic	287 (1.5)	143 (1.6)
Other	309 (1.6)	168 (1.8)
Missing/unknown	15,069 (78.6)	6953 (76.1)
EoE diagnosis during baseline period^c		
Yes	6209 (32.4)	4146 (45.4)
No	12,960 (67.6)	4995 (54.6)

Data are reported as n (%) unless otherwise stated. ^aAvailable for patients in the Commercial and Medicare databases only. ^bAvailable for patients in the Medicaid database only; the categories are as reported in the database. ^cPatients with the answer 'Yes' to this question likely had established EoE (i.e. before the index date), whereas those with the answer 'No' were likely to be incident cases. Diagnosis was defined as a patient having ≥ 1 insurance claim containing the diagnosis code for EoE (ICD-10-CM: K20.0).

EoE-related healthcare costs during the baseline and follow-up periods

Costs among all patients with EoE

- For the full analysis set, the annual mean (SD) total EoE-related healthcare cost per patient (payer + patient), was \$3362 (\$8235) during the baseline period; this increased to \$5328 (\$10,215) during the follow-up period (Figure 1).
– For payers, annual mean (SD) costs increased from \$2656 (\$6756) to \$4259 (\$8608).
– For patients, annual mean (SD) costs increased from \$706 (\$3790) to \$1069 (\$4368).
- Overall costs were higher for the sensitivity analysis set than for the full analysis set (Supplementary Figure 1).
- See Figure 1 and Supplementary Figure 1 for changes in costs by visit type.

Costs among patients with EoE who had ≥ 1 claim for the specified healthcare resource

- For patients in the full and sensitivity analysis sets who had ≥ 1 claim in the specified healthcare resource, the annual mean (SD) total EoE-related healthcare cost (payer + patient) increased from the baseline period to the follow-up period (Table 2 and Supplementary Table 1, respectively).
– See Table 2 and Supplementary Table 1 for changes in cost by visit type.
- Cots for patients with ≥ 1 claim for the specified healthcare resource (Table 2 and Supplementary Table 1) were higher than the costs for all patients (Figure 1 and Supplementary Figure 1), particularly for some healthcare resources such as inpatient stays.

Comparison between all-cause and EoE-related healthcare costs

- In the full analysis set, the annual mean (SD) all-cause total healthcare cost (payer + patient) per patient among all patients was \$15,120 (\$37,774) during the baseline period and \$18,636 (\$42,862) during the follow-up period.
– EoE-related costs accounted for 22.2% of all-cause healthcare costs during the baseline period and 28.6% during the follow-up period.

EoE imposes a substantial healthcare burden in the USA, with an estimated overall disease-related healthcare cost of ~\$2.7 billion over a 12-month period. Although EoE-related costs increased overall after diagnosis, those related to ED and urgent care decreased.

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Table 2. EoE-related HCRU and associated healthcare costs during the baseline and follow-up periods among patients in the full analysis set who had ≥ 1 claim for the specified healthcare resource.

Healthcare resource	EoE-related HCRU (N = 19,169)		EoE-related healthcare costs (US\$ per patient/year), mean (SD)				
	Baseline	Follow-up	Payer	Patient	Baseline	Follow-up	
Visit type							
Inpatient	≥ 1 admission, n (%)	57 (0.3)	120 (0.6)		17,650 (21,660)	15,503 ↓ (20,163)	3392 (12,389)
	Number of admissions, median (min, max)	1 (1, 3)	1 (1, 3)				
	Length of stay, days, median (min, max)	3 (1, 16)	2 (1, 16)				
Ambulatory surgical center	≥ 1 visit, n (%)	1826 (9.5)	4601 (24.0)		1326 (1659)	1437 (1684)	541 (1018)
	Number of claims, median (min, max)	1 (1, 7)	1 (1, 9)				
ED	≥ 1 visit, n (%)	3280 (17.1)	2710 (14.1) ↓		1220 (2370)	1191 ↓ (2167)	359 (1104)
	Number of claims, median (min, max)	1 (1, 37)	1 (1, 44)				
Urgent care	≥ 1 visit, n (%)	409 (2.1)	334 (1.7) ↓		131 (120)	131 (147)	46 (72)
	Number of claims, median (min, max)	1 (1, 3)	1 (1, 6)				
Outpatient hospital	≥ 1 visit, n (%)	7977 (41.6)	10,619 (55.4)		2588 (5266)	3267 (5493)	709 (1695)
	Number of claims, median (min, max)	2 (1, 77)	2 (1, 55)				
Physician office	≥ 1 visit, n (%)	11,609 (60.6)	15,185 (79.2)		348 (1308)	411 (258)	123 (278)
	Number of claims, median (min, max)	2 (1, 207)	2 (1, 259)				
EoE-related specialty physician office	≥ 1 visit, n (%)	4847 (25.3)	7253 (37.8)		–	–	–
	Number of claims, median (min, max)	1 (1, 47)	1 (1, 34)				
Allergy/immunology	≥ 1 visit, n (%)	981 (5.1)	2232 (11.6)		–	–	–
	Number of claims, median (min, max)	1 (1, 47)	1 (1, 34)				
Gastroenterology	≥ 1 visit, n (%)	4048 (21.1)	5670 (29.6)		–	–	–
	Number of claims, median (min, max)	1 (1, 26)	1 (1, 10)				
Otolaryngology	≥ 1 visit, n (%)	410 (2.1)	402 (2.1)		–	–	–
	Number of claims, median (min, max)	1 (1, 7)	1 (1, 14)				
Home	≥ 1 visit, n (%)	730 (3.8)	789 (4.1)		5519 (9156)	5695 (14,479)	2933 (15,833)
	Number of claims, median (min, max)	9 (1, 365)	9 (1, 365)				
Telemedicine	≥ 1 visit, n (%)	1631 (8.5)	2099 (10.9)		240 (452)	197 ↓ (324)	61 (140)
	Number of claims, median (min, max)	1 (1, 103)	1 (1, 48)				
Other outpatient or ambulatory care	≥ 1 visit, n (%)	3643 (19.0)	5098 (26.6)		322 (2295)	328 (2303)	83 (315)
	Number of claims, median (min, max)	1 (1, 365)	1 (1, 366)				
Total medical costs^a	≥ 1 claim, n (%)	14,774 (77.1)	19,131 (99.8)		2556 (6132)	3097 (6516)	812 (4010)
	Number of prescriptions, n (%)	13,823 (72.1)	15,383 (80.2)		952 (4116)	1455 (5763)	110 (1606)
Total costs^b	≥ 1 claim, n (%)	17,283 (90.2)	19,158 (99.9)		2946 (8610)	4261 (3984)	783 (1069)

Data are reported for patients who had ≥ 1 claim for the specified healthcare resource; therefore, the sum of components for each parameter may not equate