

Healthcare Costs Among Commercially-Insured Patients with Hereditary Angioedema Managed with Long-Term Prophylaxis: A Retrospective US Claims Database Analysis

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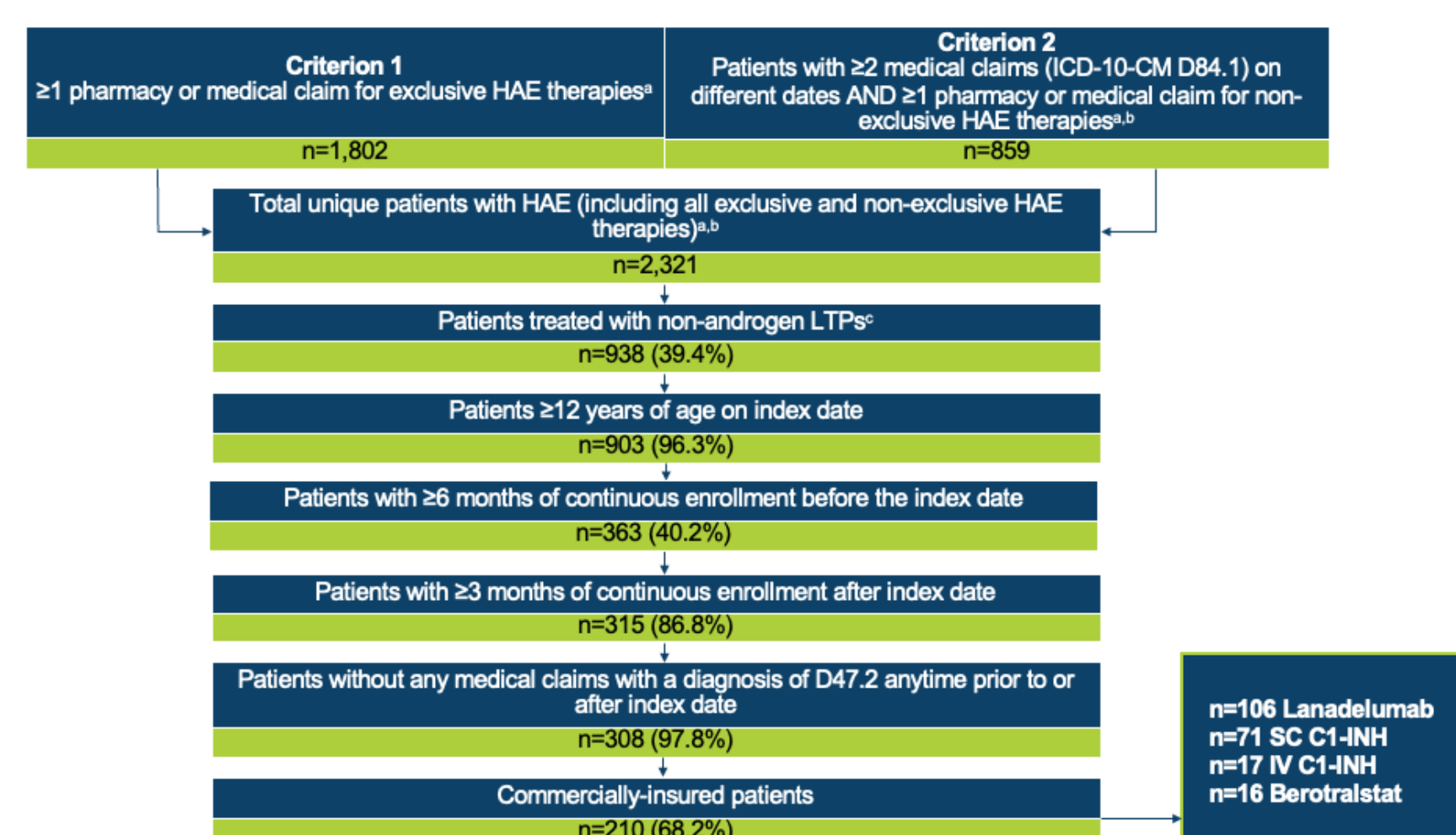
Background

- Hereditary angioedema (HAE) is a rare genetic disease associated with unpredictable, painful, and debilitating attacks of tissue swelling in various locations of the body that can be life-threatening depending on the location(s) affected
- Management of HAE consists of lifestyle management, on-demand treatment, and, for appropriate patients, the addition of long-term prophylaxis (LTP)
- Although reductions in frequency of HAE attacks have been demonstrated with LTP, most patients continue to experience attacks requiring on-demand treatment¹
- Given the increasing number of patients receiving non-androgen LTP and the limited data on related real-world healthcare costs in the US, we estimated these costs using a large retrospective insurance claims database

Methods

- We conducted a retrospective study using the IQVIA PharMetrics[®] Plus Database (April 1, 2017—March 31, 2022)
- As there are no HAE-specific International Classification of Diseases diagnosis codes, we used a claims-based algorithm² to identify potential patients, which required either ≥1 claim for exclusive HAE therapies or ≥2 claims with HAE-related codes with ≥1 claim for other HAE medications
- Patients were ≥12 years old at index, commercially insured, had ≥6 months of continuous enrollment before and ≥3 months following index
 - Index date = date of first claim for a non-androgen LTP therapy
 - Follow-up period: patients were followed from index date until the earliest of health plan disenrollment or end of data availability
- This analysis examined outcomes among commercially-insured patients receiving non-androgen LTP (lanadelumab, berotralstat, intravenous [IV] and subcutaneous [SC] C1 inhibitor [C1-INH])
 - Patients may have been treated with more than one LTP during study period; given the small sample size, the outcomes of each cohort were described based on the index treatment
- Statistical analyses included descriptive measures such as mean ± standard deviation (SD), frequency, and percentage distributions
- HAE-related healthcare costs associated with outpatient visits, inpatient admissions, emergency room visits (ER), and home healthcare visits were described per patient per year (PPPY) with 95% confidence intervals (CI) for patients with ≥1 claim in each domain

Figure 1. Analytic Cohort Selection of Commercially-Insured Patients Receiving Non-Androgen LTPs



References

- Busse PJ, Christiansen SC, Riedl MA, et al. *J Allergy Clin Immunol Pract.* 2021;9(1):132-150.e3. doi:10.1016/j.jaip.2020.08.046
- Tachdjian R, et al. *Allergy Asthma Proc.* 2020;41(3):172-182

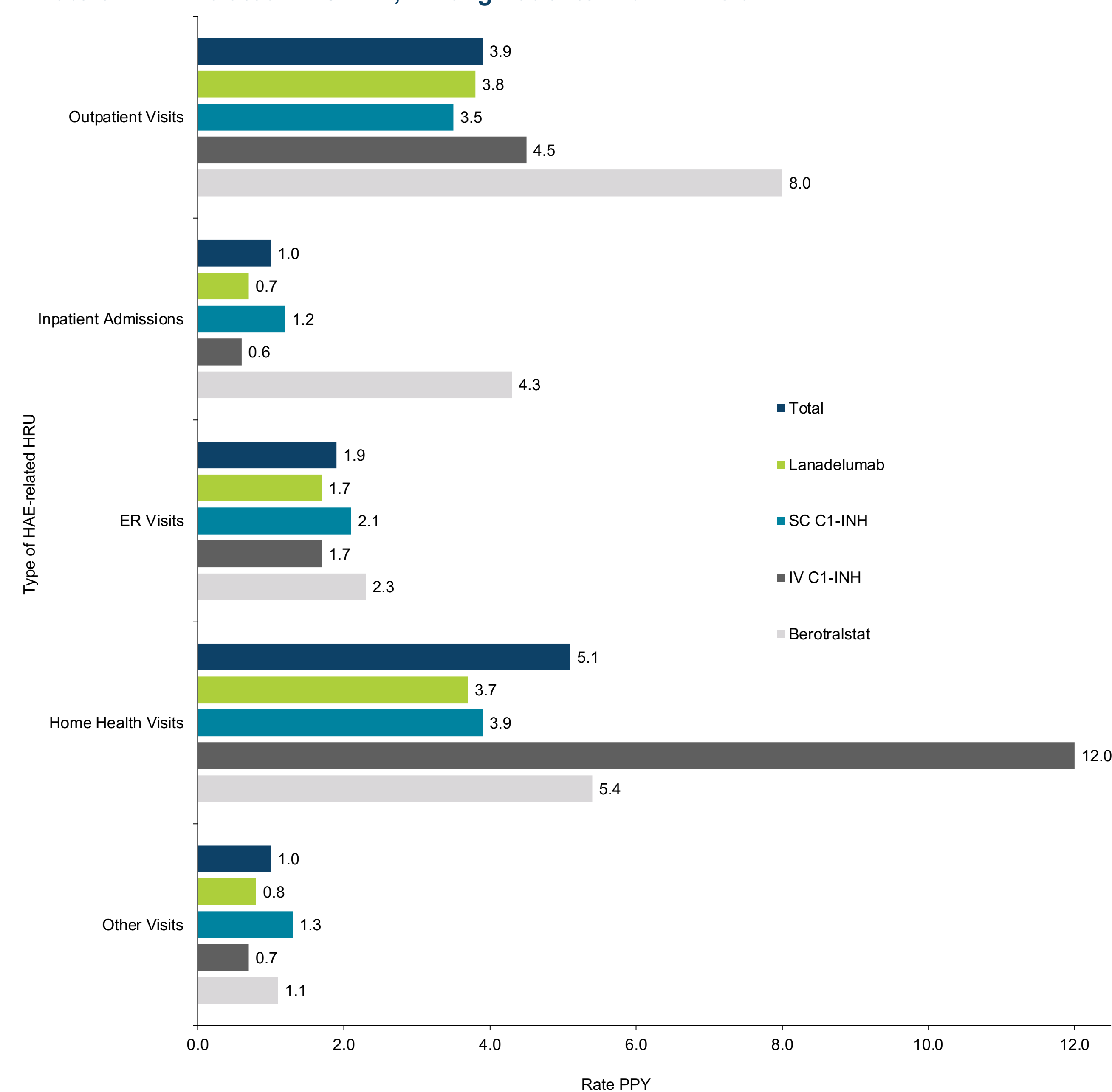
Results

Table 1. Analytic Cohort Patient Characteristics

	Total (N=210)	Lanadelumab (n=106)	SC C1-INH (n=71)	IV C1-INH (n=17)	Berotralstat (n=16)
Age on Index Date (years)					
Mean ± SD	40.9 ± 14.1	42.1 ± 14.4	40.1 ± 13.4	35.5 ± 13.1	43.0 ± 15.5
Median (IQR)	41.7 (30.1, 52.1)	43.8 (30.2, 52.4)	39.7 (30.8, 51.1)	35.1 (26.0, 44.3)	49.9 (30.3, 53.1)
Female, n (%)	152 (72.4)	76 (71.7)	50 (70.4)	16 (94.1)	10 (62.5)
Geographic Region, n (%)					
South	100 (47.6)	54 (50.9)	33 (46.5)	8 (47.1)	5 (31.3)
Midwest	43 (20.5)	22 (20.8)	12 (16.9)	5 (29.4)	4 (25.0)
West	44 (21.0)	17 (16.0)	20 (28.2)	1 (5.9)	6 (37.5)
Northeast	22 (10.5)	12 (11.3)	6 (8.5)	3 (17.6)	1 (6.3)
Unknown/missing	1 (0.5)	1 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)
Year of Index, n (%)					
2017 ^a	10 (4.8)	0 (0.0)	3 (4.2)	7 (41.2)	0 (0.0)
2018	59 (28.1)	20 (18.9)	32 (45.1)	7 (41.2)	0 (0.0)
2019	55 (26.2)	42 (39.6)	12 (16.9)	1 (5.9)	0 (0.0)
2020	26 (12.4)	15 (14.2)	10 (14.1)	0 (0.0)	1 (6.3)
2021	60 (28.6)	29 (27.4)	14 (19.7)	2 (11.8)	15 (93.8)
Top 5 Comorbidities, n (%)					
Gastrointestinal disorders	68 (32.4)	39 (36.8)	19 (26.8)	5 (29.4)	5 (31.3)
Anxiety or depression	53 (25.2)	32 (30.2)	12 (16.9)	6 (35.3)	3 (18.8)
Hypertension	40 (19.0)	19 (17.9)	12 (16.9)	4 (23.5)	5 (31.3)
Cardiovascular diseases	37 (17.6)	21 (19.8)	11 (15.5)	2 (11.8)	3 (18.8)
Autoimmune diseases	32 (15.2)	14 (13.2)	10 (14.1)	3 (17.6)	5 (31.3)

Abbreviations: C1-INH, C1 inhibitor; ER, emergency room; HAE, hereditary angioedema; HRU, healthcare resource utilization; IV, intravenous; PPPY, per patient year; SC, subcutaneous

Figure 2. Rate of HAE-Related HRU PPPY, Among Patients with ≥1 Visit



Abbreviations: C1-INH, C1 inhibitor; ER, emergency room; HAE, hereditary angioedema; HRU, healthcare resource utilization; IV, intravenous; PPPY, per patient year; SC, subcutaneous

- During a median 16-month follow-up, nearly all patients (95%) had ≥1 all-cause outpatient visit, and most (90%) had HAE-related outpatient visits; allergists were the most commonly seen specialists (69%)
- Approximately one-third of patients had ≥1 HAE-related ER visits during follow-up (33%), and nearly one-quarter (22%) had ≥1 HAE-related home health visit
- The highest rate of HAE-related HRU was observed for home health visits (among patients with ≥1 visit: 5.1 PPPY, 95% CI 4.7, 5.6) (Figure 2)

Table 2. HAE-Related Healthcare Costs Among Commercially-Insured Patients Treated with Non-Androgen LTP

	Total (N=210)	Lanadelumab (n=106)	SC C1-INH (n=71)	IV C1-INH (n=17)	Berotralstat (n=16)
Total Healthcare Costs, Mean Costs PPPY (95% CI)	\$641,166 (\$561,682, \$736,853)	\$588,755 (\$518,477, \$676,818)	\$718,374 (\$527,344, \$955,253)	\$698,343 (\$420,001, \$1,055,464)	\$585,030 (\$466,017, \$708,281)
Pharmacy Costs, Mean Costs PPPY (95% CI)	\$579,585 (\$508,662, \$664,653)	\$573,719 (\$504,731, \$662,329)	\$630,592 (\$451,076, \$860,339)	\$415,580 (\$222,327, \$642,922)	\$566,354 (\$447,902, \$692,069)
Outpatient Costs, Patients with ≥1 visit, Mean Costs PPPY (95% CI)	\$3,297 (\$1,263, \$6,914)	\$3,995 (\$749, \$11,600)	\$1,371 (\$800, \$2,059)	\$7,178 (\$1,614, \$15,424)	\$3,312 (\$421, \$7,317)
Inpatient Costs, Patients with ≥1 Visit, Mean Costs PPPY (95% CI)	\$30,061 (\$11,708, \$55,763)	\$18,140 (\$3,222, \$38,836)	\$41,127 (\$10,614, \$92,733)	\$3,873 (\$3,873, \$3,873)	\$42,673 (\$42,673, \$42,673)
Emergency Room Costs, Patients with ≥1 Visit, Mean Costs PPPY (95% CI)	\$25,606 (\$4,085, \$56,763)	\$2,394 (\$1,310, \$3,729)	\$67,947 (\$6,637, \$158,046)	\$4,077 (\$820, \$8,360)	\$4,517 (\$1,403, \$8,323)
Home Health Costs, Patients with ≥1 Visit, Mean Costs PPPY (95% CI)	\$207,784 (\$92,170, \$366,674)	\$53,253 (\$12,130, \$103,232)	\$220,455 (\$38,325, \$535,451)	\$581,046 (\$172,967, \$1,088,598)	\$63,583 (\$56, \$188,171)

- Total HAE-related healthcare care costs (\$718,374), pharmacy costs (\$630,592), and emergency room costs (\$67,947) were highest for patients treated with SC C1-INH (Table 2)
- Patients using IV C1-INH experienced the highest outpatient costs (\$7,178) and home health costs (\$581,046) in patients that had ≥1 outpatient or home visit, respectively
- Inpatient costs were highest for the berotralstat cohort (\$42,673) in patients that had ≥1 inpatient visit

Conclusions

- This large retrospective insurance claims database study revealed that HAE-related resource utilization and costs were substantial, despite the use of LTP treatments
- Most (90%) patients had HAE-related outpatient visits and approximately one-third of patients had ≥1 HAE-related emergency room visit
- Home health visits were the most frequently used HAE-related HRU for patients with ≥1 visit
- Total HAE-related healthcare care costs, pharmacy costs, and emergency room costs were highest for patients treated with SC C1-INH

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