

Higher Healthcare Resource Utilization and Costs Among Patients With Idiopathic Hypersomnia Compared With Matched Controls

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Introduction

- Idiopathic hypersomnia is a chronic neurologic sleep disorder characterized primarily by excessive daytime sleepiness, severe sleep inertia, and long, unrefreshing naps^{1,2}
- The literature describing healthcare resource utilization (HCRU) and medical costs in patients with idiopathic hypersomnia is limited

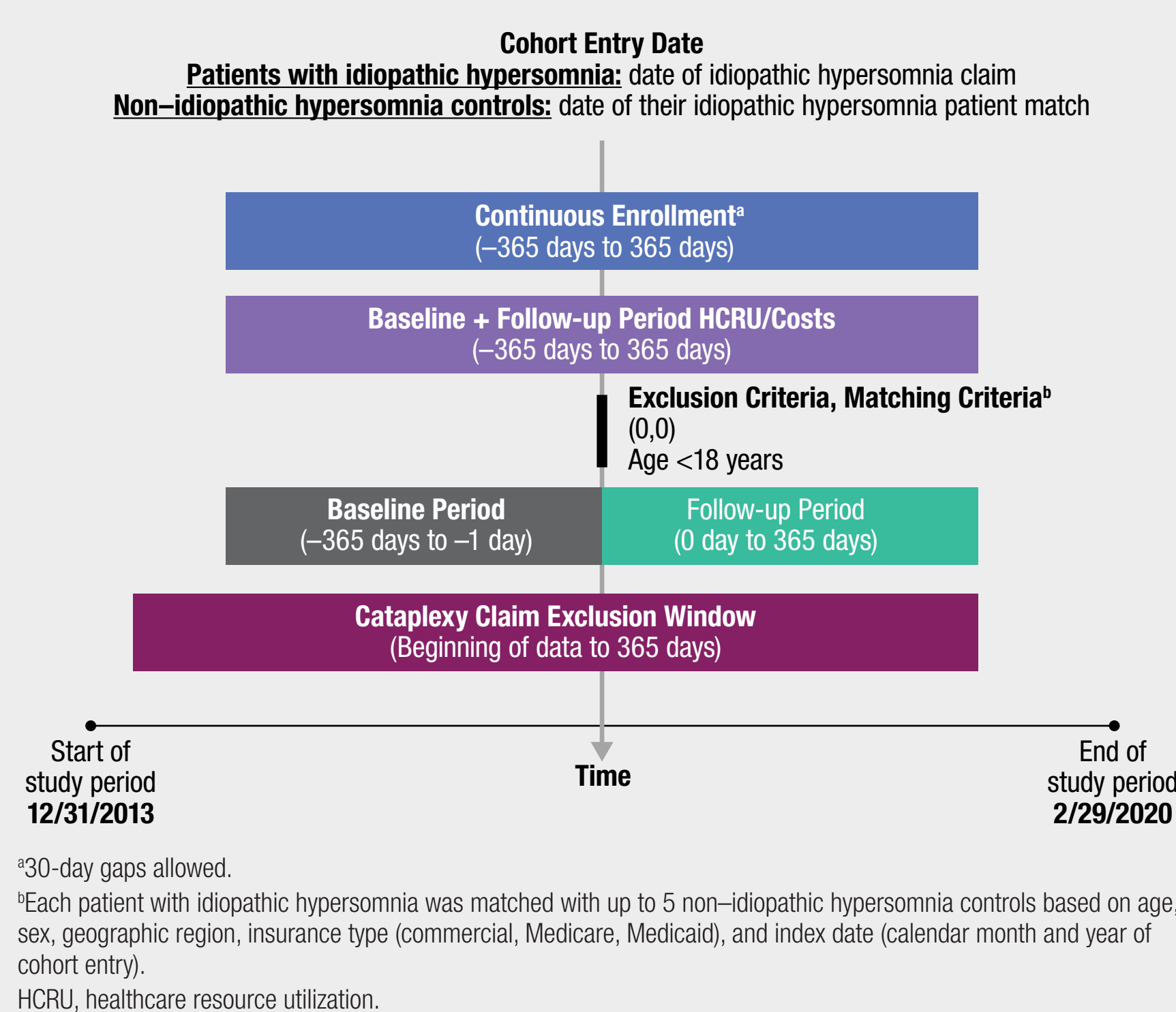
Objective

- To compare HCRU and medical costs between patients with idiopathic hypersomnia and matched non-idiopathic hypersomnia controls

Methods

- Merative MarketScan administrative claims were analyzed (study period, December 31, 2013 to February 29, 2020; index period, December 31, 2014 to March 1, 2019)

Figure 1. Study Design



- Eligible patients were ≥ 18 years of age, had 365 days of continuous medical coverage (≤ 30 -day gaps allowed) before and after the index date, and were without a history of cataplexy
- Patients with idiopathic hypersomnia entered the cohort on receipt of their earliest medical claim with a diagnosis for idiopathic hypersomnia (*International Classification of Diseases, Ninth Revision, Clinical Modification* [ICD-9-CM], 327.11, 327.12; *Tenth Revision, Clinical Modification* [ICD-10-CM], G47.11, G47.12) in any position
- Each patient with idiopathic hypersomnia was matched with up to 5 non-idiopathic hypersomnia controls on age, sex, geographic region, insurance type (commercial, Medicare, Medicaid), and index date (calendar month and year of cohort entry)
- HCRU and medical costs were identified and described for both cohorts, assessed over a 2-year period (365 days before and after cohort entry)
- HCRU costs were reported by care setting (inpatient, outpatient, emergency department) and provider type (pulmonary specialist, neurology specialist, psychiatry specialist) and were presented as percentages and per patient per year (PPPY); medical costs and out-of-pocket medical costs were reported in total and by care setting and presented PPPY
- For HCRU, binary outcomes were assessed with logistic regression, and count outcomes were assessed with negative binomial models to determine odds ratios (OR, 95% CI)
- For medical costs, a linear regression model with an identity link function was used to calculate regression coefficients

Results

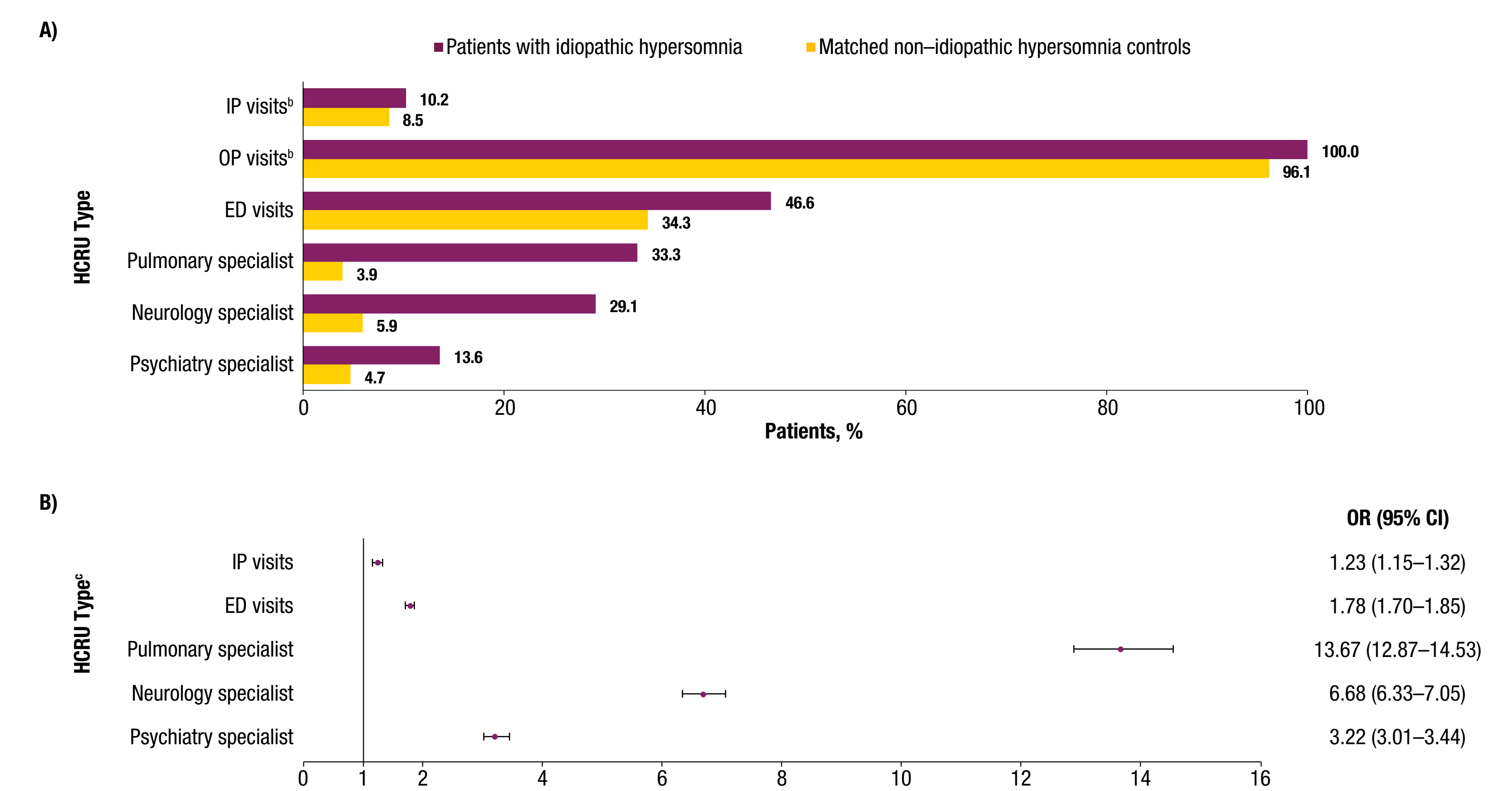
Table 1. Baseline Characteristics of Patients With Idiopathic Hypersomnia and Matched Non-Idiopathic Hypersomnia Controls

	Patients With Idiopathic Hypersomnia	Non-Idiopathic Hypersomnia Controls
Patients, n	11,412	57,058
Age, years		
Mean (SD)	44.3 (14.0)	44.7 (14.1)
Median [IQR]	45.0 [34.0, 55.0]	45.0 [34.0, 55.0]
Sex, n (%)		
Male	3992 (35.0)	19,970 (35.0)
Female	7420 (65.0)	37,088 (65.0)
US geographic region,^a n (%)		
Northeast	1075 (9.4)	5380 (9.4)
North Central	2351 (20.6)	11,754 (20.6)
South	4700 (41.2)	23,490 (41.2)
West	943 (8.3)	4719 (8.3)
Unknown/missing	2343 (20.5)	11,715 (20.5)
Insurance type, n (%)		
Commercial	8557 (75.0)	42,785 (75.0)
Medicare	528 (4.6)	2638 (4.6)
Medicaid	2322 (20.3)	11,610 (20.3)
Commercial and Medicare	5 (0.0)	25 (0.0)

^aAs sourced directly from Merative MarketScan Detail Enrollment table and reported on cohort entry date. IQR, interquartile range; SD, standard deviation.

- In total, 11,412 patients with idiopathic hypersomnia and 57,058 matched non-idiopathic hypersomnia controls were included in the analysis
- Most patients were female (65.0%) and from the US South (41.2%) and had commercial insurance (75.0%)

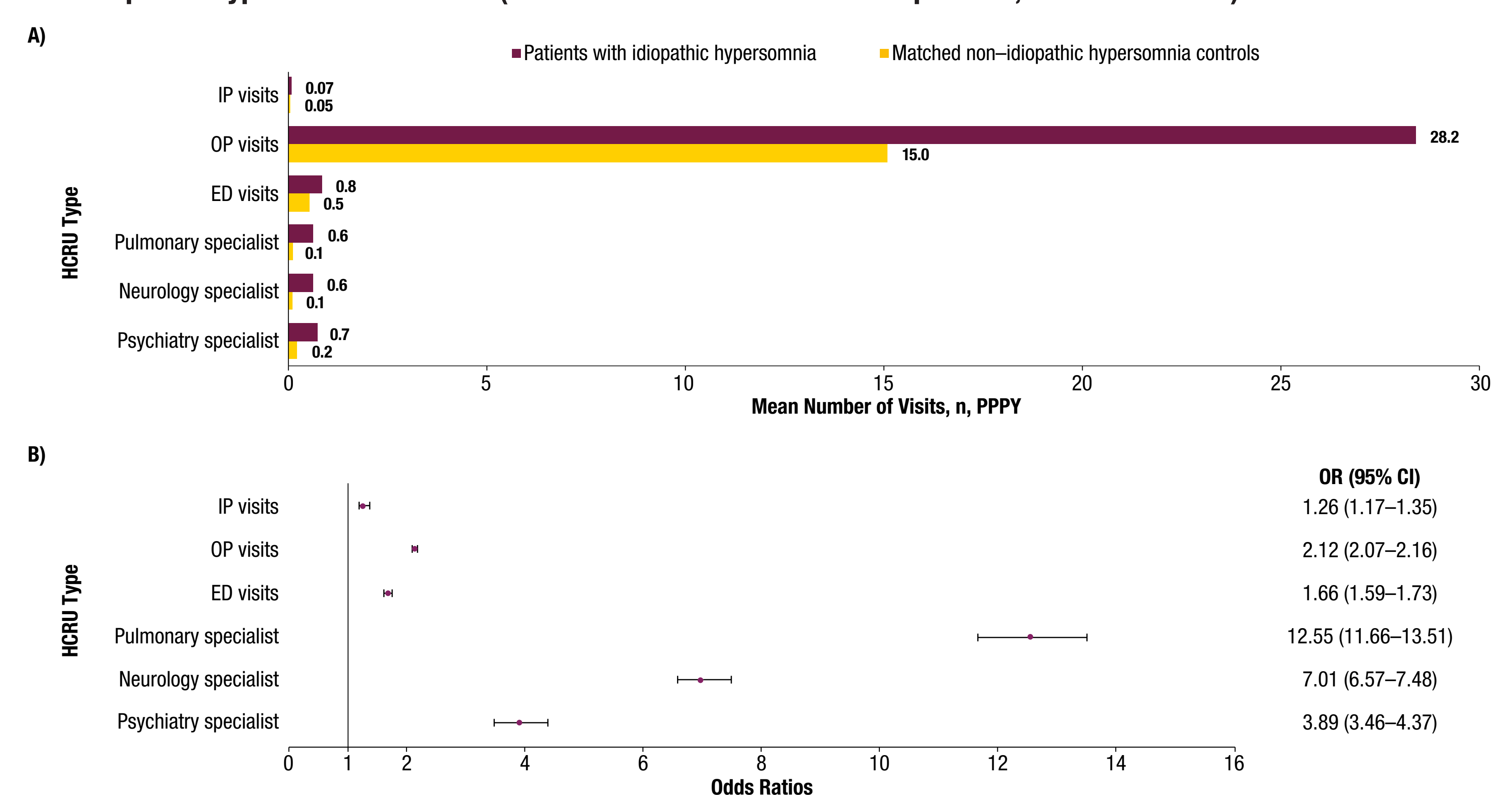
Figure 2. (A) Percentage of Patients With ≥ 1 HCRU Visit and (B) Odds Ratios: Idiopathic Hypersomnia and Matched Non-Idiopathic Hypersomnia Controls^a (Combined Baseline and Follow-up Period, Binary Outcomes)



^aAll binary outcomes (eg, "N [%] of patients with a visit") were assessed with logistic regression. All matching variables (age, sex, geographic region, insurance type, index date) and idiopathic hypersomnia status were included as covariates in the model. To account for the matched nature of the data, cluster robust variance estimates were calculated with the sandwich estimator.
^bIP or OP visit required for idiopathic hypersomnia diagnosis.
^cOP visits were removed from regression analyses because of extreme estimated coefficients and were not estimable because of complete separation of covariate by outcome (100% of patients in idiopathic hypersomnia cohort had an outpatient claim).
CI, confidence interval; ED, emergency department; HCRU, healthcare resource utilization; IP, inpatient; OP, outpatient; OR, odds ratio.

- Patients with idiopathic hypersomnia were more likely to have medical visits across care settings and provider types, compared with matched non-idiopathic hypersomnia controls
- Almost all patients in both cohorts had ≥ 1 outpatient visit over the 2-year period, and fewer than half had ≥ 1 emergency department visit
- The odds of having a medical visit with a pulmonary (OR, 13.67), neurology (OR, 6.68), or psychiatry (OR, 3.22) specialist are higher for patients with idiopathic hypersomnia than for matched non-idiopathic hypersomnia controls

Figure 3. (A) Mean (SD) Number of HCRU Visits and (B) Odds Ratios: Patients With Idiopathic Hypersomnia and Matched Non-Idiopathic Hypersomnia Controls^a (Combined Baseline and Follow-up Period, Count Outcomes)



^aAll counts were assessed with negative binomial models. All matching variables (age, sex, geographic region, insurance type, index date) and idiopathic hypersomnia status were included as covariates in the model. To account for the matched nature of the data, cluster robust variance estimates were calculated with the sandwich estimator.
CI, confidence interval; ED, emergency department; HCRU, healthcare resource utilization; IP, inpatient; OP, outpatient; OR, odds ratio; SD, standard deviation.

- Patients with idiopathic hypersomnia had a higher mean number of medical visits PPPY across care settings and across provider types, compared with matched non-idiopathic hypersomnia controls
- The mean number of outpatient visits among patients with idiopathic hypersomnia (28.2 visits PPPY) was approximately double the mean number of outpatient visits among matched non-idiopathic hypersomnia controls (15.0 visits PPPY)
- The odds of having more medical visits to a pulmonary (OR, 12.55), neurology (OR, 7.01), or psychiatry (OR, 3.89) specialist PPPY was higher for patients with idiopathic hypersomnia than for matched non-idiopathic hypersomnia controls

Table 2. Medical Costs for Patients With Idiopathic Hypersomnia and Matched Non-Idiopathic Hypersomnia Controls^a (Combined Baseline and Follow-up)

	Patients With Idiopathic Hypersomnia	Non-Idiopathic Hypersomnia Controls
Median [IQR] medical costs, US\$		
Total	4854 [2040, 11,354]	1348 [360, 4787]
OP	4005 [1789, 8409]	1026 [297, 3176]
ED	0 [0, 860]	0 [0, 248]
Median [IQR] out-of-pocket medical costs, US\$		
Total	822 [162, 1754]	242 [23, 877]
OP	702 [141, 1493]	194 [18, 669]
ED	0 [0, 44]	0 [0, 0]

^aFor both cohorts, median [IQR] IP costs and IP out-of-pocket costs were \$0 [\$0, \$0]. ED, emergency department; IP, inpatient; IQR, interquartile range; OP, outpatient.

- Median total medical costs PPPY and out-of-pocket medical costs PPPY were higher for patients with idiopathic hypersomnia than for non-idiopathic hypersomnia controls
- Mean outpatient costs and mean out-of-pocket outpatient costs constituted the highest proportions of total costs (71% in patients with idiopathic hypersomnia, 65% in matched non-idiopathic hypersomnia controls) and total out-of-pocket costs (85%, 79%)

Conclusions

- This study found that, compared with matched non-idiopathic hypersomnia controls, patients with idiopathic hypersomnia have higher HCRU and medical costs
- As seen with narcolepsy, high HCRU and medical costs may place a significant economic burden on patients with idiopathic hypersomnia³
- The higher HCRU and medical costs seen in patients with idiopathic hypersomnia, compared with non-idiopathic hypersomnia controls, may be associated with a higher number of comorbidities, as seen in patients with narcolepsy⁴

References: 1. *International Classification of Sleep Disorders – Third Edition* (ICSD-3). Darien, IL: American Academy of Sleep Medicine; 2014. 2. Trotti LM. *Sleep Med Clin*. 2017;12(3):331-344. 3. Black J, et al. *Sleep Med*. 2014;15(5):522-529. 4. Black J, et al. *Sleep Med*. 2017;33:13-18.

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Disclosures: R Saad, P Lillaney, and D Profant are former full-time employees of Jazz Pharmaceuticals who, in the course of this employment, received stock options exercisable for, and other stock awards of, ordinary shares of Jazz Pharmaceuticals, plc. DS Fuller, E Poole, M Whalen, W Macfadden, and W Ni are full-time employees of Jazz Pharmaceuticals who, in the course of this employment, have received stock options exercisable for, and other stock awards of, ordinary shares of Jazz Pharmaceuticals, plc. T Alvord, P Prince, and S Desai are full-time employees of Aetion, Inc. and hold stock options or equity in Aetion. J Black is a part-time employee of Jazz Pharmaceuticals and shareholder of Jazz Pharmaceuticals, plc.



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