Healthcare Utilization Following Hypoglossal Nerve Stimulation Implantation: A 10-Year, 651-Patient Analysis

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Introduction

- Hypoglossal nerve stimulation (HGNS) is an established alternative to PAP for CPAP-intolerant patients with moderate-to-severe obstructive sleep apnea (OSA), with durable improvements in sleepiness and quality of life[1]
- HGNS is not a one-time intervention: it **requires longitudinal postoperative management**[1]
- Longitudinal care is poorly characterized, yet it directly affects resource allocation, staffing, and equitable access

OBJECTIVE

Quantify the longitudinal HCU burden after HGNS and identify patient and systems-level factors associated with greater utilization to inform risk-stratified, patient-centered follow-up models.

Methods

- Single-center retrospective cohort of adults undergoing HGNS implantation from 2014-2024
- Postoperative sleep surgery encounters were manually reviewed by modality and provider type
- Utilization was modeled with multivariable regression accounting for observation duration; effects were reported as incidence rate ratios (IRRs).
- Covariates included age, sex, BMI, insurance, preoperative AHI/O nadir/ESS, and surgical response.

STUDY COHORT

649 adults

- Mean age 62.2 years
- 66.0% male
- Mean BMI 28.9 kg/m^2

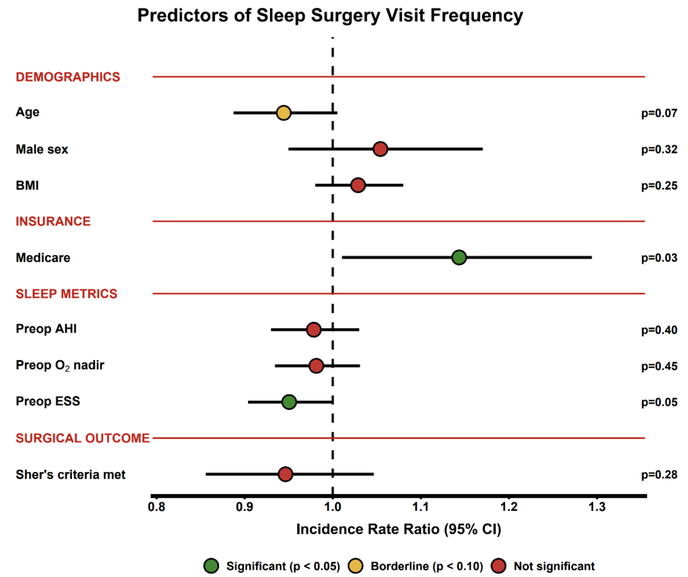
Results

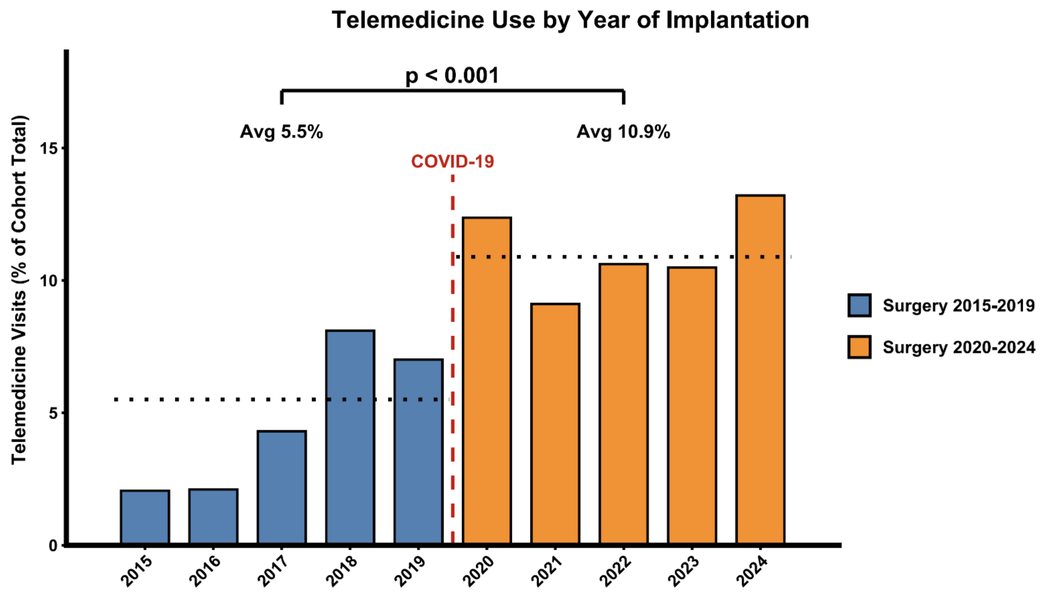
4,473
POSTOPERATIVE VISITS

6.9 visits
PER PATIENT

5.7% ➡ 10.9%
TELEMEDICINE VISITS

- **Medicare beneficiaries completed significantly more visits** than privately insured patients (p=0.007)
- Older age showed a trend toward greater utilization (p=0.07); preoperative AHI, ESS, BMI, and surgical response did not reach significance
- An **APP was hired** to address visit burden, with the proportion of visits managed by an APP increasing from 2.2% to 9.8% (p<0.001)
- Telemedicine use decreased with increasing age (13.5% of visits in patients <40 vs 6.3% in patients >70), although this trend was not significant (p=0.16)





Discussion

- Each HGNS procedure generates nearly 7 postoperative visits, a sustained longitudinal care burden that grows as HGNS adoption expands
- This cumulative burden will continue to increase over time, given the need for at least annual long-term follow-up
- Greater utilization among Medicare beneficiaries highlights the need to account for differences in longitudinal resource requirements across patient populations
- Post-pandemic telemedicine growth offers an efficiency lever, but lower utilization among older patients warrants further study of potential barriers to remote care
- APP integration effectively offloads attending visits and is a scalable staffing solution to meet rising demand.

References

1. Lenze NR, Alazawi D, Dailey M, Brown C, Hoff PT, Goldstein CA. Evaluating changes in hypoglossal nerve stimulator use over time and long-term adherence. *Sleep Breath*. 2025;29(4):249. doi:10.1007/s11325-025-03415-y