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Abstract

Objectives: To quantify trends and characteristics of sleep studies performed for Medicare beneficiaries in the United States.

Study Design: Retrospective longitudinal study of the Centers for Medicare & Medicaid Services' Part B National Summary Data and Medicare Provider Utilization and Payment Data from 2000 to 2014.

Methods: Sleep study data were analyzed according to type of study performed, total expenditure amount, provider specialty, and geographic location.

Results: In 2014, 845,569 sleep studies were completed by 1.4% of Medicare beneficiaries for a total of 189 million dollars. Since 2010, annual expenditures for sleep studies have declined, while the number of studies performed has increased by 9.1%. In 2014, polysomnography, split-night polysomnography, and unattended home sleep studies accounted for 40%, 48%, and 12%, respectively, of total sleep studies. This represents a dramatic growth in the number of unattended sleep studies performed since 2000, when they represented only 0.9%. Pulmonologists, independent diagnostic testing facilities, and neurologists are the top specialties that bill for sleep studies. Sleep medicine is a growing specialty and ranked fifth among providers while Otolaryngologists ranked eighth.

Conclusions: The healthcare burden of administering sleep studies is substantial, although the annual cost is declining. Unattended sleep studies contribute to decreasing costs and should be considered for patients who meet the correct indications.

Introduction

Obstructive sleep apnea (OSA) is estimated to affect 15% of men and 5% of women in North America and is increasing in prevalence.¹⁻³ The direct consequences of obstructive sleep apnea including daytime sleepiness, impaired cognitive function, and increased number of motor vehicle accidents, while untreated OSA is associated with increased morbidity and mortality.⁴⁻⁵

Full night polysomnography (PSG), split-night studies (PSG-CPAP; polysomnography followed by administration of continuous positive airway pressure in the same night), and home sleep tests (HST) are objective tests necessary to diagnose OSA. In 2007, the Portable Monitoring Task Force of the American Academy of Sleep Medicine published guidelines for the use of unattended portable monitors (PM), or home sleep tests, in the diagnosis of OSA.

The prevalence and cost burden of sleep studies performed in the United States have not been quantified. The objectives of this study were to determine the prevalence and economic burden of sleep studies performed for Medicare beneficiaries in the United States and to identify trends in the types of sleep studies performed, reimbursement rates, and the health care specialties billing for sleep studies.

Methods

National sleep study data were analyzed using public data from the Centers for Medicare and Medicaid Services (CMS) website. Data sources include: 1) CMS Part B National Summary Data File, which provides aggregated national data from 2000 – 2014, 2) Medicare State/HCPSC Aggregate Table which includes data organized by state and Healthcare Common Procedure Coding System (HCPSC) code from 2012 – 2014, and 3) CMS Medicare Provider Utilization and Payment Data: Physician and Other Supplier Public Use File which contains data organized by provider from 2012 – 2014. Each data set censors aggregated information for services provided to 10 or fewer Medicare beneficiaries.

HCPSC codes were categorized as 1) HST, 2) PSG, or 3) split PSG-CPAP. Sleep studies were evaluated nationally and by provider specialty. The number and percentage of unique Medicare beneficiaries receiving sleep studies were analyzed by state. Results from each year were compared longitudinally to evaluate trends. Google Sheets, Microsoft Excel 2016 and pivot tables were used to analyze the data.

Table 1. Top 10 Providers Ordering Sleep Studies, 2014

Provider	2014 Sleep Studies Performed	% of Total Sleep Studies Ordered
Pulmonary Disease	339,998	42.6%
Independent Diagnostic Testing	147,178	18.4%
Neurology	122,643	15.4%
Internal Medicine	71,954	9.0%
Sleep Medicine	27,204	3.4%
Critical Care (Intensivists)	22,691	2.8%
Family Practice	16,594	2.1%
Otolaryngology	15,926	2.0%
Cardiology	11,248	1.4%
Psychiatry	11,080	1.4%

Results

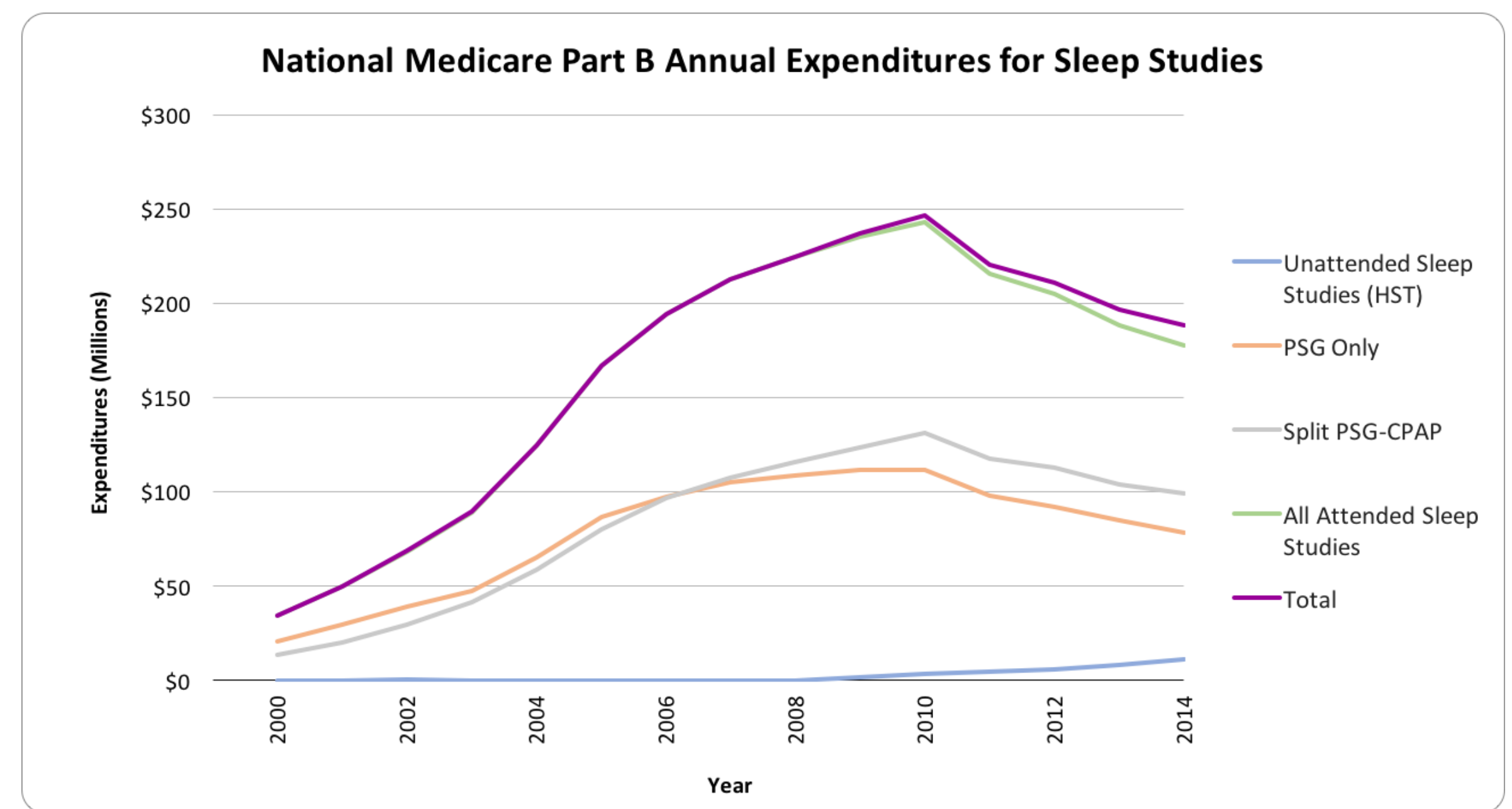


Figure 1. National Medicare Part B Annual Expenditures for Sleep Studies

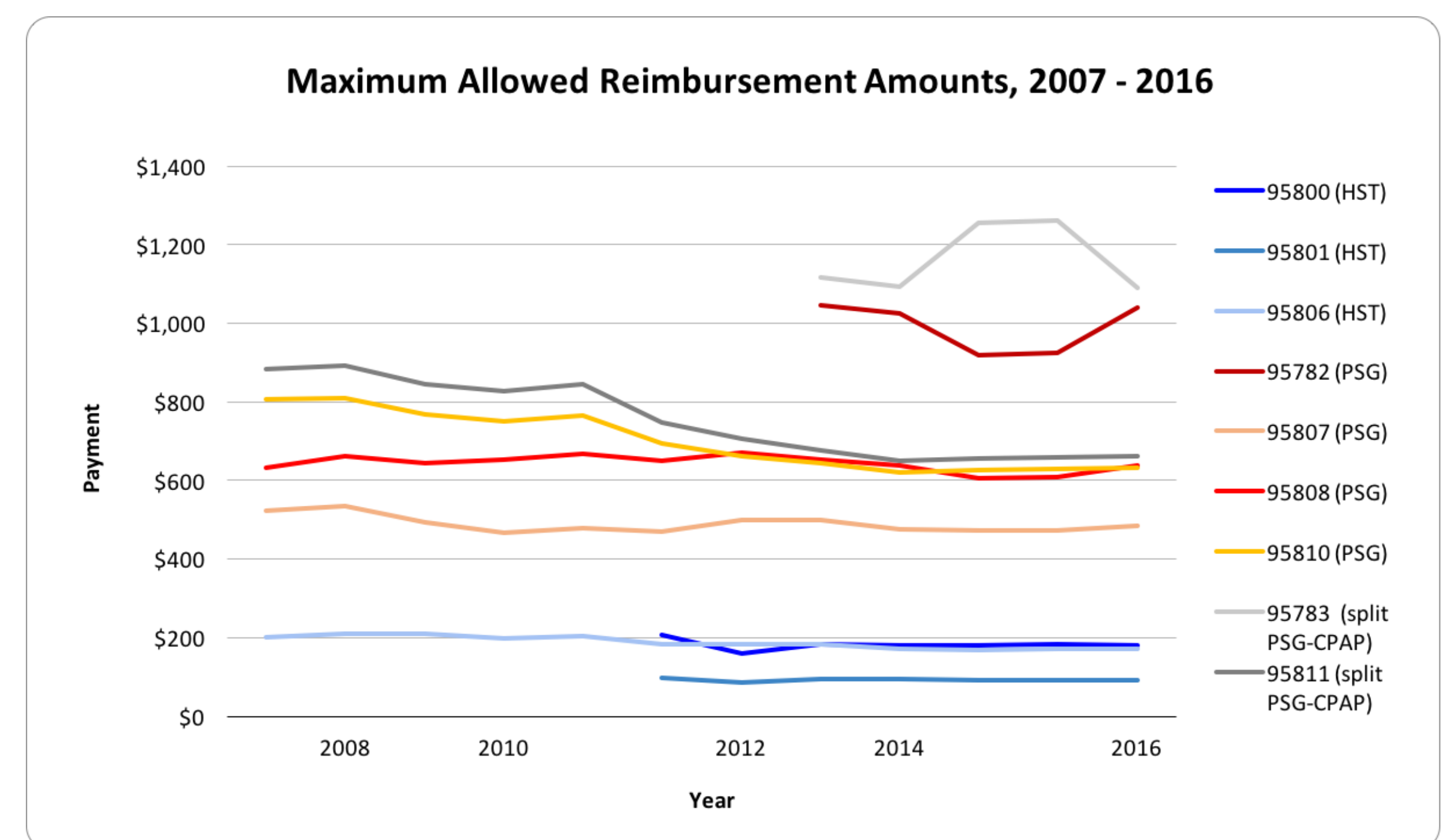


Figure 2. Maximum Allowed Reimbursement Amounts, 2007 - 2016

Discussion

As of 2014, 845,569 sleep studies were completed by 1.4% of Medicare beneficiaries for a total of 189 million dollars. Compared to 2010, the 2014 data represents a 23.5% decline in spending despite a 9.1% increase in the number of studies being performed. HST represented 12% of all sleep studies ordered for Medicare beneficiaries (n=103,071) and 6% of total expenditures (n=\$11,043,694). It has grown dramatically since 2000, when it accounted for 0.9% of all sleep studies reimbursed by Medicare.

In August 2016, the AASM released two commissioned reports estimating the national economic impact of OSA.⁶ It estimates that 80%, or 23.5 million individuals, remain undiagnosed. HST is generally less expensive, offers convenience to patients, and has been demonstrated to be non-inferior to PSG.⁷⁻⁹ Therefore, HST should be considered for qualified patients as an alternative to PSG to identify underdiagnosed individuals.

Among medical and surgical specialties that order sleep studies, pulmonologists, independent diagnostic testing facilities, and neurologists are consistently the top 3 specialties that order sleep studies. Sleep medicine is a growing specialty, most recently ranking 5th among providers, providing 3.4% of sleep studies in 2014. As the specialty continues to grow, exposure to the specialty can be offered during residency training. This includes subspecialty training in Otolaryngology, which provides both surgical and non-surgical interventions in diagnosing and treating OSA. Currently, training and exposure is limited in residency.¹⁰ Opportunities to provide exposure to sleep medicine in residency can be enhanced by offering additional training time in the specialty of sleep medicine as well as working with board certified and or fellowship-trained sleep medicine physicians.

Conclusions

In 2014, 845,569 sleep studies were completed by Medicare beneficiaries for a total of 189 million dollars. Since 2010, the number of sleep studies performed annually has continued to increase, while total spending declines. Sleep medicine is a growing specialty and ranked 5th among providers providing sleep studies in 2014. Unattended sleep studies contribute to decreasing costs and should be considered for patients who meet the correct indications.

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