

Otolaryngology -- Head and Neck Surgery

<http://oto.sagepub.com/>

Sleep Medicine Clinical and Surgical Training during Otolaryngology Residency : A National Survey of Otolaryngology Residency Programs

Tianjie Shen, Erika Shimahara, Jing Cheng and Robson Capasso
Otolaryngology -- Head and Neck Surgery published online 26 July 2011
DOI: 10.1177/0194599811416765

The online version of this article can be found at:
<http://oto.sagepub.com/content/early/2011/07/22/0194599811416765>

Published by:



<http://www.sagepublications.com>

On behalf of:



[American Academy of Otolaryngology- Head and Neck Surgery](http://www.aao-hns.org)

Additional services and information for *Otolaryngology -- Head and Neck Surgery* can be found at:

P<P

Published online 26 July 2011 in advance of the print journal.

Email Alerts: <http://oto.sagepub.com/cgi/alerts>


Subscriptions: <http://oto.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Sleep Medicine Clinical and Surgical Training during Otolaryngology Residency: A National Survey of Otolaryngology Residency Programs

Tianjie Shen, MD¹, Erika Shimahara, MEd¹, Jing Cheng, PhD², and Robson Capasso, MD¹

Otolaryngology–
 Head and Neck Surgery
 XX(X) 1–6
 © American Academy of
 Otolaryngology–Head and Neck
 Surgery Foundation 2011
 Reprints and permission:
sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0194599811416765
<http://otojournal.org>


No sponsorships or competing interests have been disclosed for this article.

Abstract

Objective. The authors sought to assess the otolaryngology residency training experiences in adult sleep medicine and sleep surgery in the United States.

Study Design. Internet survey.

Setting. US academic otolaryngology residency programs.

Subjects and Methods. This Internet survey was emailed to the program directors of 103 US Accreditation Council for Graduate Medical Education (ACGME)–approved otolaryngology residency programs in 2010.

Results. A total of 47 program directors responded, representing 46% of programs surveyed. In 59% of these programs, there was at least 1 faculty member with clinical practice dedicated to adult medicine. Most commonly, these clinicians spent less than 50% of their clinical time on adult sleep medicine. While most otolaryngology residents were reported being well trained in commonly performed procedures such as septoplasty and uvulopalatopharyngoplasty (UPPP), the training on hypopharyngeal or multilevel surgeries, such as partial glossectomy, tongue base resection, hyoid or tongue suspension, or genioglossus advancement, was considered less frequent. The overall exposure to education regarding the interpretation of original data of laboratory-based sleep studies or portable home monitoring devices was infrequent. A significant portion of respondents indicated that they would like to expand their residents' exposure to adult sleep medicine and sleep surgery.

Conclusion. This survey provides a starting point to further assess the rigor of sleep medicine/sleep surgery training in US residency programs. Continued assessment and strengthening of the current curriculum are crucial to keep residents up to date with this evolving field. This result calls attention to the importance of bolstering sleep medicine and surgery curriculum to meet the academic requirements of otolaryngology training.

Keywords

sleep medicine, sleep surgery, otolaryngology residency program, resident education, residency training

Received April 16, 2011; revised June 2, 2011; accepted June 22, 2011.

More than one-third of all adults and children with sleep disorders present initially to an otolaryngologist for diagnosis and treatment.¹ As experts on the management of upper airway disorders, otolaryngologists are commonly consulted to manage sleep-disordered breathing, an entity that includes obstructive sleep apnea (OSA) and primary snoring. The prevalence of moderate or severe OSA is estimated to be at least 6% for US adults; moreover, 17% of adults are estimated to have mild or worse OSA.² Patients with heart disease, hypertension, morbid obesity, or adult-onset diabetes have more than a 30% chance of having OSA.²⁻⁴ The cumulative effects of OSA have been associated with a wide range of deleterious health consequences, including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke.²⁻⁴

In the recent past, some otolaryngologists have expanded their scope of practice beyond the surgical management of OSA to disease evaluation and medical management of sleep disorders.⁵ The complexity and frequent comorbidity of OSA require that otolaryngologists who wish to be actively involved in the care of such patients have a comprehensive knowledge of diagnosis, testing, and medical

¹Department of Otolaryngology–Head and Neck Surgery, Stanford University Medical Center, Stanford, California, USA

²Department of Preventive and Restorative Dental Science, University of California at San Francisco, School of Dentistry, San Francisco, California, USA

Corresponding Author:

Tianjie Shen, MD, Department of Otolaryngology–Head and Neck Surgery, Stanford University Medical Center, 801 Welch Road, Stanford, CA 94305-5739

Email: tshen@stanford.edu

and surgical treatments of this condition.⁶ Meanwhile, sleep medicine has developed into a full-grown specialty with rapid expansion of its professional clinical practice, becoming an independent specialty approved by both the Accreditation Council of Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS) in 2005.^{7,8} Until 2011, physicians who have not completed formal training in sleep medicine have been eligible for board certification through an alternate practice experience pathway. However, after 2011, the eligibility for certification by the American Board of Sleep Medicine will require the completion of a sleep medicine fellowship accredited by the ACGME.^{9,10}

The American Board of Otolaryngology (ABOTO) seems to recognize the importance of adequate learning exposure in sleep medicine within residency as it has mandated an extensive curriculum in sleep medicine.⁹⁻¹² Given the increasing emphasis on sleep medicine in the modern practice of otolaryngology, residency training should reflect these trends.¹³ It seems highly relevant and important to assess whether US residency training in the field is in fact keeping up with these curriculum standards and developments.

Subjects and Methods

Study Design and Setting

This study was determined to be exempt from the institutional review board at Stanford University. The authors developed a survey of 15 multiple-choice questions about the residency education of adult sleep medicine and sleep surgery through a survey design Internet program (SurveyMonkey). Because the underlying pathophysiological mechanisms, adverse effects, diagnostic criteria, and recommended treatment options for OSA are different in children from those in adults, we decided to focus on the training in adult sleep medicine.

The survey addressed program demographics, faculty-teaching resources available within the residency program, and educational time dedicated to adult sleep medicine and sleep surgery training. It focused on 5 areas: (1) residency program characteristics (number of residents and faculty), (2) faculty characteristics (presence of board certification and percentage of time dedicated to sleep medicine of faculty members), (3) scope of resident training in surgical perspective of sleep medicine, (4) resident education in clinical perspective of sleep medicine and (5) overall perception and satisfaction level with adult sleep medicine and sleep surgery training reported by program directors.

The survey data were collected from October 25, 2010, to November 15, 2010. A list of all 103 otolaryngology residency programs in the United States was obtained from the ACGME Web site. The email contact addresses of program directors or program coordinators were collected from the same Web site. This survey was then emailed to the program directors or coordinators of these programs. We also requested the survey be forwarded to a faculty member who was more knowledgeable about the sleep medicine curriculum, if it was deemed more appropriate. The responses were kept anonymous, and respondents were given no compensation for the completion of the

Table 1. Residency Program Characteristics

	n	%
No. of residents in each postgraduate year		
1-2	16	34.8
3-4	27	58.7
5-6	3	6.5
No. of clinical faculty members		
0-5	1	2.2
6-10	16	34.8
11-15	14	30.4
16-20	4	8.7
>20	11	23.9
Is the sleep medicine division a part of otolaryngology department		
Yes	2	4.4
No	38	84.4
Do not have a sleep medicine division	5	11.1
Setting of resident adult sleep medicine/surgery practice		
University hospital	41	95.3
Veterans hospital	20	46.5
Private hospital	12	27.0

survey. The responses were then entered into a Microsoft Excel database. Frequency data were tabulated, and frequencies were used for descriptive statistics.

Statistical Analysis

To address the goals of this study, descriptive statistics were calculated to describe survey responses. Relative frequencies, medians, and means were used to assess the distribution of study variables. We collated and subsequently input the data into Microsoft Excel 2010, without any respondent identifiers, for final analysis. Data were herein presented as the mean \pm the standard deviation. To examine if there was any association between total training time in sleep medicine/sleep surgery and the respondents' perception of the program, the Spearman correlation coefficient was computed and tested.

Results

From a total of 103 contacted otolaryngology programs in the United States, 47 program directors responded, representing 45.6% of programs surveyed. Of the respondents, 3 programs did not complete the entire survey or declined to participate in the study.

Demographics of the Residency Programs

Demographics of the responding otolaryngology residency program, including the number of residents per year and the number of clinical faculty, are summarized in **Table 1**. The vast majority of respondents (84%) reported that the sleep medicine division was distinct from the otolaryngology department, and a minority (11%) reported that there was

Table 2. Characteristics of Faculties Who Were Actively Involved in Resident Training in Sleep Medicine

	n	%
Any faculty member who has clinical time dedicated to adult sleep medicine/surgery		
Yes	27	58.7
No	19	41.3
No. of faculty members who have clinical time dedicated to adult sleep medicine/surgery		
0	19	41.3
1	17	37.0
2	6	13.0
3	3	6.5
4	0	0
5	1	2.2
Any faculty member who spends >50% time on adult sleep medicine/surgery		
>75% time	5	10.9
50%-75% time	6	13.0
25%-50% time	5	10.9
<25% time	11	23.9
Do not have sleep medicine/surgery faculty	19	41.3
No. of faculty members who are board certified in sleep medicine by the American Board of Medical Specialties		
0	14	53.8
1	10	38.5
2	1	3.8

no sleep medicine division within their practice setting. Most (95%) of the resident teaching on adult sleep medicine and sleep surgery was reported to take place at the university hospital, an academic setting. Sleep medicine training in private hospital settings was reported by 27% of respondents.

Characteristics of Faculty Mentors Involved in Sleep Medicine Education

Table 2 summarizes the characteristics of faculty who were actively involved in resident training in sleep medicine. Of responding programs, 59% of programs had at least 1 faculty member who had some clinical time dedicated to adult sleep medicine/surgery. A total of 24% of responding programs had faculty members who spent more than 50% of their clinical time on sleep medicine and sleep surgery (11% spent more than 75% of time, 13% spent between 50% and 75% of time). Among all the reporting programs with adult sleep medicine and sleep surgery faculty, more than half (54%) did not have any faculty who were board certified in sleep medicine by the ABMS.

Of the respondents who reported having at least 1 physician who practiced adult sleep medicine and surgery, they also divided their clinical, research, or teaching time with other subspecialties. **Figure 1** lists the subspecialties with

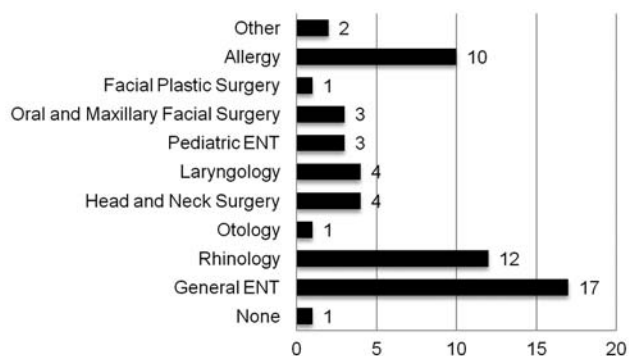


Figure 1. The subspecialties with which the sleep faculty members shared their practice time.

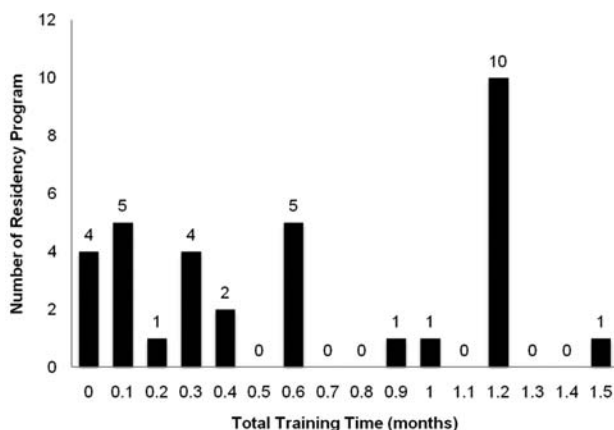


Figure 2. Cumulative resident training time in adult sleep medicine/surgery during the entire residency.

which the sleep faculty members shared their practice time. The most common shared subspecialty was general otolarngology (63%), with rhinology and allergy as the other common practicing disciplines.

Resident Training on Adult Sleep Medicine/ Sleep Surgery

Figure 2 delineates the total resident training time on sleep medicine and sleep surgery during the entire residency. Cumulative experience was calculated from the 2 data points provided in the survey: the number of months that residents were exposed to adult sleep surgery or sleep clinic and the percentage of exposure during these months. The total training time demonstrated a multimodal distribution. A small percentage of programs (35%) had a total training time of more than 1 month during the entire residency dedicated to sleep medicine education. More tellingly, the vast majority of programs (65%) had a total training time of less than 0.6 months. Of all respondents, only 16% reported having more than 5 hours of educational didactics per year dedicated to adult sleep medicine or sleep surgery, whereas most programs (84%) had fewer than 5 hours (data not shown).

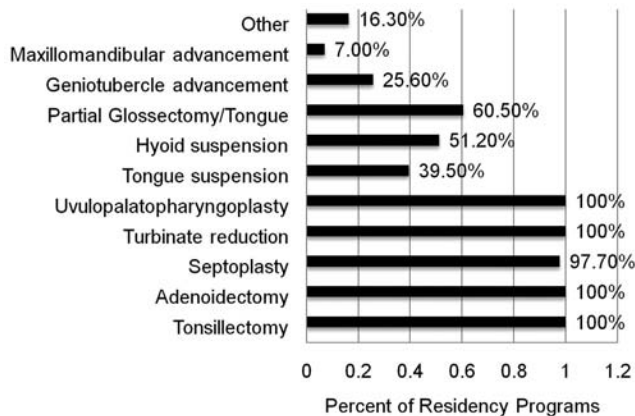


Figure 3. Adult sleep surgery procedures that residents were expected to perform by the time of their graduation.

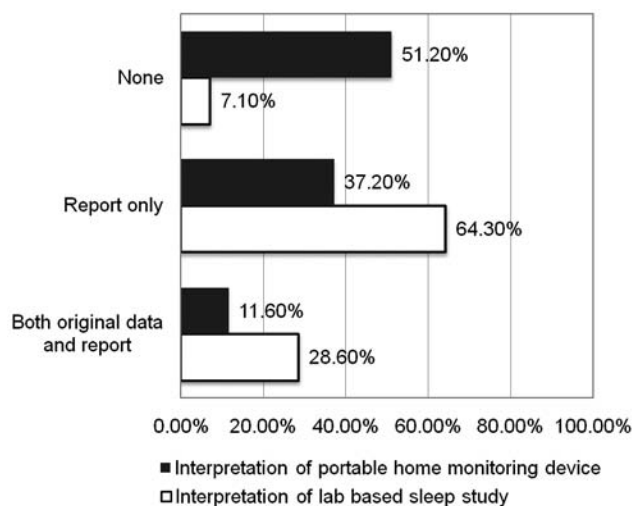


Figure 4. Resident education in both the interpretation of the study report provided by the sleep laboratory and the original polysomnogram data.

Figure 3 summarizes the sleep surgical procedures that residents were expected to perform by the time of their graduation. Almost all programs trained their residents to perform tonsillectomy, adenoidectomy, septoplasty, turbinate reduction, and uvulopalatopharyngoplasty. While most residents were reportedly well prepared in these commonly performed procedures for OSA, the training on hypopharyngeal or multilevel surgeries such as hyoid suspension (51%), tongue suspension (40%), geniotubercle advancement (26%), and maxillomandibular advancement (7%) were less frequent.

Resident Training on the Interpretation of Sleep Studies

Sleep studies, including polysomnograms (PSG) or portable monitoring devices (PMD), are frequently obtained in the evaluation of snoring and OSA. They are valuable in the

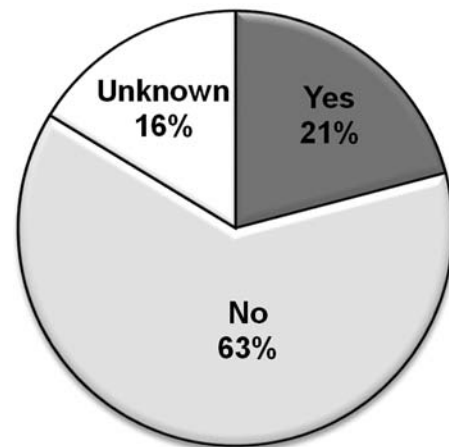


Figure 5. Resident training in analyzing the compliance and the efficacy data from continuous positive airway pressure devices.

management of sleep-disordered breathing. The interpretation of laboratory-based PSG results was more frequently taught than that of home sleep study PMD results (**Figure 4**). A total of 29% of programs educated their residents on both the interpretation of the study report provided by the sleep laboratory and the original PSG data. However, most programs (64%) reported that residents had training on the former only. Moreover, despite the fact that PMDs are commonly used by otolaryngology practices, very few (12%) programs trained their residents to interpret the original data obtained from the home sleep study devices. Furthermore, residents in about half (51%) of the programs had no exposure to portable home sleep study devices at all. Nonsurgical treatments for OSA, such as continuous positive airway pressure (CPAP), are often recommended by otolaryngologists. In our survey of the respondents, residents in only 21% of the programs were trained to analyze the compliance and the efficacy data from CPAP devices (**Figure 5**).

Overall Program Satisfaction with Current Residency Sleep Medicine Education

The overall satisfaction level with residents' exposure and education in sleep medicine and sleep surgery was rated. The respondents were asked to choose from *superior*, *adequate*, *fair*, or *inadequate*. Only 2% of programs felt that they provided "superior" education in sleep medicine and sleep surgery. Close to half (49%) indicated that their resident trainings in sleep medicine and sleep surgery were "adequate," and 44% of all programs considered their quality "fair," suggesting the perceived needs for improvement (**Figure 6**).

Discussion

Sleep medicine is an emerging interdisciplinary field. Although the current ABOTO residency curriculum standards require extensive knowledge in sleep medicine, it is perhaps less clear what these standards actually mean. In an

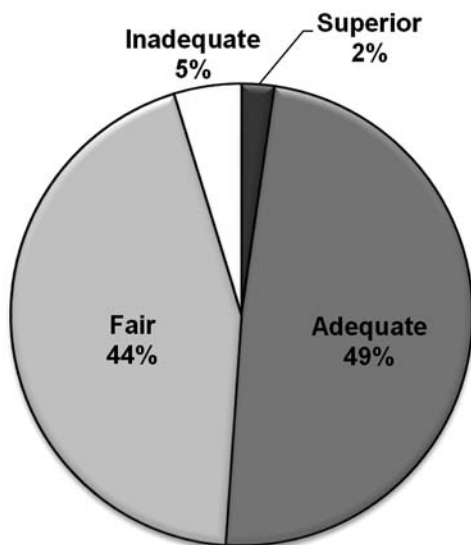


Figure 6. Program directors' perception of overall satisfaction with current residency sleep medicine education.

attempt to identify strengths and weaknesses of current otolaryngology training, a national survey of otolaryngology program directors was conducted in late 2010. The goal of this cross-sectional study was to assess broadly the current resident experience in sleep medicine education.

The authors theorize that the availability of faculty and mentors with appropriate scientific and clinical expertise can directly influence the quality of resident training in any given otolaryngology subspecialty. By implication, faculty with dedicated clinical time in sleep medicine and sleep surgery can be pivotal in addressing the gaps in residency training. Our results showed that 59% of programs had at least 1 faculty member who had some clinical time dedicated to adult sleep medicine/surgery. Among all the reporting programs with adult sleep medicine and sleep surgery faculty, 46% responded that they had a board-certified individual. However, we cannot comment on whether this rate was due to the inclusion of non-otolaryngology interdepartmental faculty certified in sleep medicine by ABMS reported by our respondents.

Our results suggested that the training in hypopharyngeal surgeries such as hyoid suspension, tongue suspension, and genioglossus advancement is not as frequent as the investigators expected, raising possible issues about trainees' competence in performing tongue-base sleep surgery procedures and their confidence in doing so.^{13,14} This may help explain why in a national survey of otolaryngologists in various practice settings, 92% of the respondents indicated that while they actively treat OSA, only a minority perform procedures to target retroglottal obstruction.¹⁵ Our survey data may also help explain a very similar trend demonstrated in a recent review by Kezirian et al of surgical practices for OSA in the United States. They observed that 75% of all procedures performed were isolated palate surgery.^{16,17} Given the current concept that multilevel

surgery offers a better chance for the surgical management of OSA, this finding is of concern.

The authors believe that knowledge of sleep study interpretation is not simply useful but fundamental to the care of sleep-disordered breathing. Without this skill, the otolaryngologist has limited alternatives and an insufficient base in which to provide the highest quality patient care. The data collected through this survey demonstrated that the overall training in the analysis of laboratory-based sleep studies or portable home sleep study monitoring devices was infrequent.

Of responding residency program directors, a significant portion of them indicated that they would like to improve their residents' exposure to adult sleep medicine and sleep surgery procedures. Interestingly, the level of satisfaction in the sleep medicine training reported by program directors was uncorrelated with any of the other evaluated variables, namely, total training time on sleep medicine/sleep surgery and the training on either the interpretation of laboratory-based PSG or portable home sleep study PMD (data not shown). For programs with total training time ≥ 1.2 months, the overall satisfaction had a similar pattern as the programs with total training time < 0.6 months. The Spearman correlation coefficient between total training time and respondents' perception was 0.17 ($P = .33$), suggesting that there was no significant correlation between total training time and perception of the quality of sleep medicine/sleep surgery residency (data not shown).

As with most surveys, this one was not without limitations. The response rate was 46%, which limits generalization of results and their implications, although this response rate is consistent with the typical response rate for surveys of this type. Hence, our result may not reflect the overall quality of training in sleep medicine among residency programs nationwide. Clinical responsibilities and time constraints of respondents were likely inevitable contributing factors to the low response rate. This survey was also limited because the results were solely derived from a single representative at a residency program, rather than multiple sources, including senior residents or residency alumni. Program directors and coordinators were selected for the survey because they were considered arguably the most knowledgeable and qualified to assess residents' training, education, exposure, and experience in sleep medicine and related surgical experience. Nevertheless, we feel that our survey has at least shed some light into residents' sleep medicine exposure in this growing field.

In this survey, we sought to get a general sense of the scope of sleep medicine and surgery training in residency programs, so we designed questions that were broad and valuable for its descriptive information. Because of the complexity of the clinical rotation structures among different residency programs, it was also difficult to measure the total sleep medicine training time versus a dedicated rotation. However, lacking objective metrics, the evaluation of the quality of the residency training in sleep medicine and surgery is riddled with challenges. The ability to extrapolate our data obtained from a descriptive survey was also much limited. Therefore, the analytic implications of our questionnaire

as an accurate instrument to measure the quality of the residency training in sleep medicine and surgery are a matter of further investigation. However, our data can serve only as a starting point for a more comprehensive assessment of sleep medicine and surgery education in the future. Future work could focus on how different variables, such as sleep surgery key indicators, total sleep surgery/sleep medicine training time, or in-service scores, achieved at the portion of sleep medicine, correlated to the quality of residency training in sleep medicine.

A variety of factors may explain a possible deficiency of sleep medicine education in otolaryngology residency programs in the United States. We are aware of the competing education demands of multiple specialties in our particular field. However, sleep medicine training, which is covered by multiple subspecialties outside of otolaryngology (pulmonary, cardiac, neurology, psychiatry, etc), needs to be kept in the context of otolaryngology training for it to be relevant. Finally, we understand that increasing educational time in one specialty area necessarily decreases time spent in another. Nevertheless, this survey's results suggest that training and exposure to sleep medicine need to receive more attention in many residency programs to graduate otolaryngologists who are competent in treating sleep disorders.

We hope that this survey acts as a stimulus to reevaluate sleep medicine education in otolaryngology residency. To keep otolaryngology residents up to date with the care of sleep disorders, changes in sleep medicine training are recommended to meet the high standards expected of our specialty and ultimately to provide the best possible care for our patients.

Conclusion

This article suggests that current otolaryngology training in many residency programs is lagging behind the advances in sleep medicine and sleep surgery. In addition, to improve their knowledge in surgical interventions for sleep disorders, otolaryngology residents should also be competent in their knowledge of diagnosis and other important nonsurgical treatment modalities. The results from this study will hopefully aid otolaryngology residency programs in assessing, modifying, and strengthening their current sleep medicine curriculum.

Author Contributions

Tianjie Shen, corresponding author, study designer, data collector, data analysis, writer; **Erika Shimahara**, study designer and reviser for important content; **Jing Cheng**, statistical analysis, data interpretation; **Robson Capasso**, study designer, data analysis, and writer.

Disclosures

Competing interests: None.

Sponsorships: None

Funding source: None.

References

1. Kathleen Yaremchuk PAW. *Sleep Medicine*. San Diego, CA: Plural; 2010.
2. Young T, Palta M, Dempsey J, et al. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med*. 1993;328:1230-1235.
3. Partinen M. Epidemiology of obstructive sleep apnea syndrome. *Curr Opin Pulm Med*. 1995;1:482-487.
4. Young T, Peppard PE, Taheri S. Excess weight and sleep-disordered breathing. *J Appl Physiol*. 2005;99:1592-1599.
5. Parthasarathy S, Haynes PL, Budhiraja R, et al. A national survey of the effect of sleep medicine specialists and American Academy of Sleep Medicine Accreditation on management of obstructive sleep apnea. *J Clin Sleep Med*. 2006;2:133-142.
6. Friedman M, Ibrahim H, Bass L. Clinical staging for sleep-disordered breathing. *Otolaryngol Head Neck Surg*. 2002;127:13-21.
7. Pevernagie D, Stanley N, Berg S, Krieger J, et al. European guidelines for the certification of professionals in sleep medicine: report of the task force of the European Sleep Research Society. *J Sleep Res*. 2009;18:136-141.
8. Quan SF. Sleep medicine and graduate medical education—prospects for the future. *J Clin Sleep Med*. 2009;5:497.
9. ACGME Program Requirements for Graduate Medical Education in Sleep Medicine. 2008 [updated 2008; cited]. http://www.acgme.org/acWebsite/downloads/RRC_progReq/520_sleep_medicine_06012004_1-YR_u_04122008.pdf.
10. Davidson TM. Sleep medicine for surgeons. *Laryngoscope*. 2008;118:915-931.
11. American Board of Otolaryngology Head and Neck Surgery Comprehensive Core Curriculum. 2007 [updated 2007; cited]. <http://www.aboto.org/Curriculum%2010-19-07%20final.pdf>.
12. Rosen R, Mahowald M, Chesson A, et al. The Taskforce 2000 survey on medical education in sleep and sleep disorders. *Sleep*. 1998;21:235-238.
13. Gupta VK, Reiter ER. Current treatment practices in obstructive sleep apnea and snoring. *Am J Otolaryngol*. 2004;25:18-25.
14. Kezirian EJ, Maselli J, Vittinghoff E, et al. Obstructive sleep apnea surgery practice patterns in the United States: 2000 to 2006. *Otolaryngol Head Neck Surg*. 2010;143:441-447.
15. Woodson BT, Naganuma H. Comparison of methods of airway evaluation in obstructive sleep apnea syndrome. *Otolaryngol Head Neck Surg*. 1999;120:460-463.
16. Riley RW, Powell N, Guilleminault C. Current surgical concepts for treating obstructive sleep apnea syndrome. *J Oral Maxillofac Surg*. 1987;45:149-157.
17. Kezirian EJ, Weaver EM, Yueh B, et al. Risk factors for serious complication after uvulopalatopharyngoplasty. *Arch Otolaryngol Head Neck Surg*. 2006;132:1091-1098.