

Sleep is essential to health Academy of Sleep Medicine statement

Kannan Ramar, MD, Raman K. Malhotra, MD, Kelly A. Carden, MD, Fariha Abbasi-Feinberg, MD, R. Nisha Aurora, MD, MHS, V. Eric J. Olson, MD, Carol L. Rosen, MD, James A. Rowley, MD, Lynn Marie Trotti, MD, MSc

Published Online: October 1, 2021 • <https://doi.org/10.5664/jcsm.100000>



ABSTRACT

Sleep is a biological necessity, and insufficient sleep is detrimental for health, well-being, and public safety. We outline several sleep-related objectives with the goal to improve health, quality of life, and safety by helping people get adequate sleep duration, healthy sleep requires good quality, appropriate timing, regularity, and the absence of sleep disorders. It is the position of the American Academy of Sleep Medicine (AASM) that sleep is essential to health. There is a significant need for greater emphasis on sleep health in education, clinical practice, inpatient and long-term care, public health promotion, and the workplace. More sleep and circadian research is needed to further elucidate the importance of sleep for public health and the contributions of insufficient sleep to health disparities.

CITATION: Ramar K, Malhotra RK, Carden KA, et al. Sleep is essential to health: an American Academy of Sleep Medicine position statement. *J Clin Sleep Med*. 2021;17(10):[2115–2119](#).

INTRODUCTION

Sleep is vital for health and well-being in children, adolescents, and adults.¹⁻³ Healthy sleep is important for cognitive functioning, mood, mental health, and cardiovascular, cerebrovascular, and metabolic health.⁴ Adequate quantity and quality of sleep also play a role in reducing the risk of accidents and injuries caused by sleepiness and fatigue, including workplace accidents and motor vehicle crashes.⁵⁻⁷ Short-term sleep deprivation, long-term sleep restriction, circadian misalignment, and untreated sleep disorders can have a profound and detrimental impact on physical health, mental health, mood, and public safety. Chronic insufficient sleep is associated with an increased risk of mortality and contributes to both the individual risk and societal burden associated with several medical epidemics, including cardiovascular disease, diabetes, obesity, and cancer.⁸ Emerging data suggest that extending the nightly sleep duration of people who habitually get insufficient sleep is associated with health benefits.⁹⁻¹²

Healthy sleep requires adequate sleep duration, appropriate timing, regularity, the absence of sleep disorders, and good quality, which can be indicated by both self-rating and objective sleep continuity variables.¹³⁻¹⁴ While individual sleep needs vary, the American Academy of Sleep Medicine (AASM) and Sleep Research Society (SRS) recommend that the average adult should sleep 7 or more hours per night on a regular basis to promote optimal health,¹⁴ and the National Sleep Foundation (NSF) provides similar consensus recommendations of 7 to 9 hours of sleep for adults and 7 to 8 hours of sleep for older adults.¹⁵ Consensus recommendations for pediatric populations vary by age range.^{15,16} These recommendations provide benchmarks for the Healthy People 2030 objectives to increase the proportion of children, high school students, and adults in the U.S. who get enough sleep.¹⁷ Baseline data from surveys conducted by the Centers for Disease Control and Prevention (CDC) and the Maternal and Child Health Bureau (MCHB) show that 34.1% of children, 74.6% of high school students, and 32.5% of adults fail to get a sufficient duration of sleep on a regular basis, making sleep duration an important target for health improvement.¹⁸⁻²⁰ Other Healthy People 2030 sleep objectives are to reduce the rate of motor vehicle crashes due to drowsy driving and to increase the proportion of the following: adults with sleep apnea symptoms who get evaluated by a health care provider, infants who are put to sleep on their backs, infants who are put to sleep in a safe sleep environment, and secondary schools with a start time of 8:30 am or later.

POSITION

It is the position of the AASM that sleep is essential to health. Because of sleep's

significant and multifaceted connections to health and chronic disease, sleep education should have a prominent place in K-12 and college health education, medical school and graduate medical education, and educational programs for other health professionals. Clinicians should routinely inquire about sleep habits and symptoms of sleep and circadian rhythm sleep-wake disorders during patient encounters, and hospitals and long-term care facilities should optimize sleep conditions. Healthy sleep should be targeted by public health and workplace interventions to improve health-related outcomes, and behaviors that help people attain healthy sleep should be actively promoted. More sleep and circadian research is needed to further elucidate the importance of sleep for public health and the contributions of insufficient sleep to health disparities.

DISCUSSION

Although the importance of sleep is widely recognized, as evidenced by the inclusion of sleep objectives in Healthy People 2030 (and its predecessor, Healthy People 2020), there is still a significant need for greater emphasis on sleep health in education, clinical practice, inpatient and long-term care, public health promotion, and the workplace.

K-12 health education

The CDC advises schools to add sleep education to the K-12 curriculum to help children and adolescents learn why sleep is important and to provide education on healthy sleep habits.²¹ As teachers implement the National Health Education Standards,²² sleep should be considered an essential topic, especially in relation to Standard 1, “Students will comprehend concepts related to health promotion and disease prevention to enhance health,” and Standard 7, “Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.” While the methods and effectiveness of sleep health education programs vary,^{23,24} a school-based program can improve children’s sleep and academic performance.²⁵ An important public health intervention for increasing sufficient sleep among adolescents is to delay school start times, which has the potential for widespread population impact.²⁶ It is the position of the AASM that middle school and high school start times should be 8:30 am or later.²⁷

College health education

Sleep problems such as insufficient sleep duration, irregular sleep timing, and insomnia are common among college students, and these problems are associated with anxiety and depression symptoms.²⁸ Sleep disturbances also are a significant, independent

predictor of academic problems; however, approximately three-fourths of college students report never receiving information about sleep from their university.²⁹ As part of its Healthy Campus initiative, the American College Health Association established student objectives reflecting the major public health concerns impacting college students in the U.S. One of these objectives is to, “Reduce the proportion of students who report that their academic performance was adversely affected by sleep difficulties in the past 12 months.”³⁰ Data suggest that psychological interventions for improving sleep are efficacious among college students.³¹

Medical school and graduate medical education

There is a lack of instruction and education on sleep and sleep disorders in medical school curricula and graduate medical education. A multinational survey of medical schools found that the average amount of time spent on sleep education is just under 2.5 hours, with 27% responding that their medical school provides no sleep education.³² Similarly, a survey of pediatric residency program directors in 10 countries found that the average amount of time spent on sleep education is 4.4 hours, with 23% responding that their program provides no sleep education.³³ While awareness of this deficit dates back at least four decades,³⁴ and competency-based goals for sleep and chronobiology in medical education have been developed,³⁵ there has been minimal progress in addressing this glaring need. However, a positive development has been the inclusion of fatigue mitigation in the common program requirements of the Accreditation Council for Graduate Medical Education (ACGME).³⁶ A proposal also has demonstrated how sleep medicine education can be incorporated across a four-year medical school curriculum.³⁷

Primary care

Due to the lack of sleep-related medical education and training, it is understandable that primary care providers do not routinely screen patients for common symptoms of sleep disorders, despite the availability of validated questionnaires.³⁸ While widely recognizing the importance of sleep, primary care providers report having lower comfort levels for discussing, diagnosing, treating, and managing sleep disorders.³⁹ For example, a lack of clinical knowledge and skills are among the most common barriers to the recognition of insomnia in family practice.⁴⁰ Sleep-specific continuing education can help equip internists, family physicians, obstetrician-gynecologists, geriatricians, and pediatricians to address the sleep problems encountered in clinical practice.

Specialty care

Sleep is a multidisciplinary field, as board-certified sleep medicine physicians have diverse backgrounds such as internal medicine (including pulmonology and critical care medicine), neurology, psychiatry, pediatrics, otolaryngology, family medicine, and anesthesiology. However, the relevance of sleep is not limited to these specialties. Because sleep is foundational to health and is closely intertwined with other diseases—including obesity, cardiovascular disease, stroke, type 2 diabetes, and Alzheimer disease—education about sleep, sleep disorders, and circadian rhythm sleep-wake disorders is vital for all physician specialists.^{41–45} Improved sleep education among specialists also is important for the development of collaborative care models for sleep disorders such as obstructive sleep apnea (OSA).⁴⁶

Health professionals education

Basic education about sleep and sleep disorders also is necessary for health professionals who regularly encounter patients with sleep problems and may be involved in evaluation and treatment. This sleep education is lacking in curricula for nurses, who are key frontline providers of care.⁴⁷ Currently, there is no formal training or certification in sleep medicine specifically for nurses, physician assistants, or advanced practice registered nurses.⁴⁸

Sleep disturbances such as insomnia commonly co-occur with mental health and mood problems such as depression and anxiety. Furthermore, behavioral and cognitive-behavioral interventions, which are most commonly provided by licensed clinical psychologists, are the recommended first-line approaches for the treatment of bedtime problems and nighttime awakenings in young children,⁴⁹ and for insomnia disorder in adults.^{50–52} However, a survey found that only 6% of clinical psychology programs offer formal didactic courses in sleep medicine, with only 31% of programs offering training in the treatment of sleep disorders.⁵³ Furthermore, a survey found that actively practicing clinical psychologists in the U.S. and Canada reported a median of 10.0 hours of didactic sleep training across their training or career, and 95% of respondents reported no clinical sleep training during graduate school, internship, or postdoctoral fellowship.⁵⁴

Snoring, OSA, and sleep-related bruxism are common sleep problems. Oral appliance therapy is a recommended treatment option for select patients with OSA, when prescribed by a medical provider.⁵⁵ While the majority of dental schools report the inclusion of some dental sleep education in their predoctoral dental programs, the average teaching time of 3 to 4 educational hours is insufficient to achieve competency in screening for sleep-related breathing disorders and providing custom-fabricated oral appliances.^{56,57}

Hospitals & long-term care facilities

An understanding of sleep and circadian biology is also important for the provision of patient-centered care in institutional settings, including hospitals and long-term care facilities. While sleep is essential for healing, the hospital environment can be detrimental to patients' sleep duration and sleep quality.⁵⁸ Interventions to reduce noise, optimize lighting, and consolidate interruptions necessary for patient monitoring can be beneficial to patients' sleep, mood, and well-being.^{59,60} Physical, psychosocial, and environmental factors can contribute to poor sleep in residents of nursing homes and other long-term care facilities.⁶¹ A variety of interventions, including the optimization of daytime and nighttime lighting, have the potential to improve residents' sleep.⁶²

Public health promotion programs

Significant amounts of public and private resources are invested annually in efforts to promote healthy nutrition and regular exercise and to reduce risk behaviors such as smoking. In contrast, programs that promote healthy sleep are lacking,^{63,64} despite evidence of sleep's importance to public health outcomes, especially heart health. For example, a prospective cohort study in the Netherlands found that during 10 to 14 years of follow-up, the risk of cardiovascular disease was further reduced when sufficient sleep duration was added to the four traditional lifestyle factors (ie, sufficient physical activity, a healthy diet, moderate alcohol consumption, and nonsmoking).⁶⁵ Similarly, a study evaluated sleep's relationship to the American Heart Association's "Life's Simple 7," seven cardiovascular risk factors that people can improve through lifestyle changes (ie, smoking status, physical activity, weight, diet, blood glucose, cholesterol, and blood pressure). Results show that cardiovascular health scores that include sleep were more strongly associated with cardiovascular disease prevalence and incidence than the traditional Life's Simple 7 score.⁶⁶ Another study examined relationships between 10 self-reported healthy lifestyle behaviors and seven self-reported chronic diseases or death. The study found the behaviors that most significantly affected future outcomes were low-fat diet, aerobic exercise, nonsmoking, and adequate sleep, with sleep being more significant than other commonly promoted healthy behaviors such as eating a daily breakfast.⁶⁷ Finally, a cross-sectional study investigated the associations between sleep, physical activity, and dietary factors as predictors of mental health and well-being in young adults.⁶⁸ Results show that sleep quality was the strongest predictor of depressive symptoms and well-being, followed by sleep quantity and physical activity.

Workplaces

The CDC advises that employers can help their employees get adequate sleep and better sleep quality through evidence-based workplace health programs.⁶⁹ Suggested strategies to promote healthy sleep in the workplace include providing a sleep education program for all employees, permitting short naps during work breaks, establishing fatigue risk management systems, referring workers with sleep problems to a health care provider or accredited sleep center, and modifying environmental factors to promote worker well-being and alertness.⁷⁰ In addition to improving sleep and reducing fatigue, workplace interventions may be associated with reduced absenteeism and presenteeism, improved performance, and better overall quality of life.⁷¹

FUTURE DIRECTIONS

The mechanisms mediating the associations between sleep and health are complex and multifactorial.⁷² Therefore, there is a need for more research to address the health and societal impact of sleep deficiency and circadian dysfunction. Specifically, research is needed to evaluate intervention strategies assessing the impact of improved sleep and circadian alignment on physiological functioning, behavior, health, and well-being throughout the lifespan.⁷³ Research on sleep health disparities also may identify common causal pathways, including sleep and circadian mechanisms, that contribute to health disparities.^{74,75}

CONCLUSIONS

Sleep is essential to health. While significant resources have been invested in individual and population-level interventions to address health-related lifestyle factors such as nutrition, exercise, and smoking, programs focusing on sleep health have been notably rare. To promote public health and safety, widespread support is needed to increase sleep education, improve sleep disorders screening, optimize sleep conditions for inpatients and residents of long-term care facilities, optimize sleep health through public health and workplace interventions, and expand sleep health research.

DISCLOSURE STATEMENT

The authors report no conflicts of interest and are the 2020 – 2021 members of the AASM board of directors.

REFERENCES

1. Matricciani L, Paquet C, Galland B, Short M, Olds T. Children's sleep and health: A meta-review. *Sleep Med Rev.* 2019;46:136–150.

[Crossref](#)

[Google Scholar](#)

2. Bruce ES, Lunt L, McDonagh JE. Sleep in adolescents and young adults. *Clin Med (Lond).* 2017;17(5):424–428.

[Crossref](#)

[Google Scholar](#)

3. Foster RG. Sleep, circadian rhythms and health. *Interface Focus.* 2020;10(3):20190098.

[Crossref](#)

[Google Scholar](#)

4. Watson NF, Badr MS, Belenky G, et al.. Joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society on the recommended amount of sleep for a healthy adult: methodology and discussion. *J Clin Sleep Med.* 2015;11(8):931–952.

[Link](#)

[Google Scholar](#)

5. Hillman DR, Lack LC. Public health implications of sleep loss: the community burden. *Med J Aust.* 2013;199(S8):S7–S10.

[Crossref](#)

[Google Scholar](#)

6. Philip P, Chaufton C, Orrriols L, et al.. Complaints of poor sleep and risk of traffic accidents: a population-based case-control study. *PLoS One.* 2014;9(12):e114102.

[Crossref](#)

[Google Scholar](#)

7. Czeisler CA, Wickwire EM, Barger LK, et al.. Sleep-deprived motor vehicle operators are unfit to drive: a multidisciplinary expert consensus statement on drowsy driving. *Sleep Health.* 2016;2(2):94–99.

[Crossref](#)

[Google Scholar](#)

8. Luyster FS, Strollo PJ, Zee PC, Walsh JK; Boards of Directors of the American Academy of Sleep Medicine and the Sleep Research Society. Sleep: a health imperative. *Sleep.* 2012;35(6):727–734.

[Crossref](#)

[Google Scholar](#)

9. Stock AA, Lee S, Nahmod NG, Chang AM. Effects of sleep extension on sleep duration, sleepiness, and blood pressure in college students. *Sleep Health*. 2020;6(1):32–39.

[Crossref](#)

[Google Scholar](#)

10. Henst RHP, Pienaar PR, Roden LC, Rae DE. The effects of sleep extension on cardiometabolic risk factors: A systematic review. *J Sleep Res*. 2019;28(6):e12865.

[Crossref](#)

[Google Scholar](#)

11. Al Khatib HK, Hall WL, Creedon A, et al.. Sleep extension is a feasible lifestyle intervention in free-living adults who are habitually short sleepers: a potential strategy for decreasing intake of free sugars? A randomized controlled pilot study. *Am J Clin Nutr*. 2018;107(1):43–53.

[Crossref](#)

[Google Scholar](#)

12. Pizinger TM, Aggarwal B, St-Onge MP. Sleep extension in short sleepers: an evaluation of feasibility and effectiveness for weight management and cardiometabolic disease prevention. *Front Endocrinol (Lausanne)*. 2018;9:392.

[Crossref](#)

[Google Scholar](#)

13. Ohayon M, Wickwire EM, Hirshkowitz M, et al.. National Sleep Foundation's sleep quality recommendations: first report. *Sleep Health*. 2017;3(1):6–19.

[Crossref](#)

[Google Scholar](#)

14. Watson NF, Badr MS, Belenky G, et al.. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. *J Clin Sleep Med*. 2015;11(6):591–592.

[Link](#)

[Google Scholar](#)

15. Hirshkowitz M, Whiton K, Albert SM, et al.. National Sleep Foundation's updated sleep duration recommendations: final report. *Sleep Health*. 2015;1(4):233–243.

[Crossref](#)

[Google Scholar](#)

16. Paruthi S, Brooks LJ, D'Ambrosio C, et al.. Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. *J Clin Sleep Med*. 2016;12(6):785–786.

[Link](#)

[Google Scholar](#)

17. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2030. Sleep. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/sleep>. Accessed May 25, 2021.

[Google Scholar](#)

18. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2030. Increase the proportion of children who get sufficient sleep – EMC-03. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/children/increase-proportion-children-who-get-sufficient-sleep-emc-03>. Accessed May 25, 2021.

[Google Scholar](#)

19. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2030. Increase the proportion of high school students who get enough sleep – SH-04. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/sleep/increase-proportion-high-school-students-who-get-enough-sleep-sh-04>. Accessed May 25, 2021.

[Google Scholar](#)

20. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2030. Increase the proportion of adults who get enough sleep – SH-03. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/sleep/increase-proportion-adults-who-get-enough-sleep-sh-03>. Accessed May 25, 2021.

[Google Scholar](#)

21. Centers for Disease Control and Prevention. Sleep and health. What schools can do. <https://www.cdc.gov/healthyschools/sleep.htm>. Reviewed May 29, 2019. Accessed May 25, 2021.

[Google Scholar](#)

22. Centers for Disease Control and Prevention. National Health Education Standards. A look at the health standards. <https://www.cdc.gov/healthyschools/sher/standards/index.htm>. Reviewed March 27, 2019. Accessed May 25, 2021.

[Google Scholar](#)

23. Blunden S, Rigney G. Lessons learned from sleep education in schools: a review of dos and don'ts. *J Clin Sleep*

Med. 2015;11(6):671–680.

[Link](#)

[Google Scholar](#)

24. Gruber R. School-based sleep education programs: A knowledge-to-action perspective regarding barriers, proposed solutions, and future directions. *Sleep Med Rev.* 2017;36:13–28.

[Crossref](#)

[Google Scholar](#)

25. Gruber R, Somerville G, Bergmame L, Fontil L, Paquin S. School-based sleep education program improves sleep and academic performance of school-age children. *Sleep Med.* 2016;21:93–100.

[Crossref](#)

[Google Scholar](#)

26. Wheaton AG, Ferro GA, Croft JB. School start times for middle school and high school students - United States, 2011-12 school year. *MMWR Morb Mortal Wkly Rep.* 2015;64(30):809–813.

[Crossref](#)

[Google Scholar](#)

27. Watson NF, Martin JL, Wise MS, et al.. Delaying middle school and high school start times promotes student health and performance: an American Academy of Sleep Medicine position statement. *J Clin Sleep Med.* 2017;13(4):623–625.

[Link](#)

[Google Scholar](#)

28. Becker SP, Jarrett MA, Luebbe AM, Garner AA, Burns GL, Kofler MJ. Sleep in a large, multi-university sample of college students: sleep problem prevalence, sex differences, and mental health correlates. *Sleep Health.* 2018;4(2):174–181.

[Crossref](#)

[Google Scholar](#)

29. Hartmann ME, Prichard JR. Calculating the contribution of sleep problems to undergraduates' academic success. *Sleep Health.* 2018;4(5):463–471.

[Crossref](#)

[Google Scholar](#)

30. American College Health Association. Healthy campus. Student objectives. Health impediments to academic performance. AI-1.2. https://www.acha.org/HealthyCampus/HealthyCampus/Student_Objectives.aspx. Accessed May 25, 2021.

[Google Scholar](#)

31. Saruhanjan K, Zarski AC, Bauer T, et al.. Psychological interventions to improve sleep in college students: A meta-analysis of randomized controlled trials. *J Sleep Res.* 2021;30(1):e13097.

[Crossref](#)

[Google Scholar](#)

32. Mindell JA, Bartle A, Wahab NA, et al.. Sleep education in medical school curriculum: a glimpse across countries. *Sleep Med.* 2011;12(9):928–931.

[Crossref](#)

[Google Scholar](#)

33. Mindell JA, Bartle A, Ahn Y, et al.. Sleep education in pediatric residency programs: a cross-cultural look. *BMC Res Notes.* 2013;6(1):130.

[Crossref](#)

[Google Scholar](#)

34. Orr WC, Stahl ML, Dement WC, Reddington D. Physician education in sleep disorders. *J Med Educ.* 1980;55(4):367–369.

[Google Scholar](#)

35. Strohl KP, Veasey S, Harding S, et al.. Competency-based goals for sleep and chronobiology in undergraduate medical education. *Sleep.* 2003;26(3):333–336.

[Crossref](#)

[Google Scholar](#)

36. Accreditation Council for Graduate Medical Education. Common program requirements (residency). <https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRResidency2020.pdf>. Revised February 3, 2020. Effective July 1, 2020. Accessed May 25, 2021.

[Google Scholar](#)

37. Salas RME, Strowd RE, Ali I, et al.. Incorporating sleep medicine content into medical school through neuroscience core curricula. *Neurology.* 2018;91(13):597–610.

[Crossref](#)

[Google Scholar](#)

38. Senthilvel E, Auckley D, Dasarathy J. Evaluation of sleep disorders in the primary care setting: history taking compared to questionnaires. *J Clin Sleep Med.* 2011;7(1):41–48.

[Link](#)

[Google Scholar](#)

39. Klingman KJ, Morse A, Williams N, Grandner MA, Perlis ML. Assessing sleep disorders in primary care: a provider survey about the importance of sleep health. *Sleep*. 2020;43(suppl_1):A448.

[Google Scholar](#)

40. Ogeil RP, Chakraborty SP, Young AC, Lubman DI. Clinician and patient barriers to the recognition of insomnia in family practice: a narrative summary of reported literature analysed using the theoretical domains framework. *BMC Fam Pract*. 2020;21(1):1.

[Crossref](#)

[Google Scholar](#)

41. St-Onge MP. Sleep-obesity relation: underlying mechanisms and consequences for treatment. *Obes Rev*. 2017;18(Suppl 1):34–39.

[Crossref](#)

[Google Scholar](#)

42. St-Onge MP, Grandner MA, Brown D, et al.; American Heart Association Obesity, Behavior Change, Diabetes, and Nutrition Committees of the Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular Disease in the Young; Council on Clinical Cardiology; and Stroke Council. Sleep duration and quality: impact on lifestyle behaviors and cardiometabolic health: a scientific statement from the American Heart Association. *Circulation*. 2016;134(18):e367–e386.

[Crossref](#)

[Google Scholar](#)

43. Khot SP, Morgenstern LB. Sleep and Stroke. *Stroke*. 2019;50(6):1612–1617.

[Crossref](#)

[Google Scholar](#)

44. Ogilvie RP, Patel SR. The epidemiology of sleep and diabetes. *Curr Diab Rep*. 2018;18(10):82.

[Crossref](#)

[Google Scholar](#)

45. Irwin MR, Vitiello MV. Implications of sleep disturbance and inflammation for Alzheimer's disease dementia. *Lancet Neurol*. 2019;18(3):296–306.

[Crossref](#)

[Google Scholar](#)

46. Rosen IM, Rowley JA, Malhotra RK, Kristo DA, Carden KA, Kirsch DB; American Academy of Sleep Medicine Board of Directors. Strategies to improve patient care for obstructive sleep apnea: a report from the American Academy of Sleep Medicine Sleep-Disordered Breathing Collaboration Summit. *J Clin Sleep Med*. 2020;16(11):1933–1937.

[Link](#)[Google Scholar](#)

47. Ye L, Smith A. Developing and testing a sleep education program for college nursing students. *J Nurs Educ.* 2015;54(9):532–535.

[Crossref](#)[Google Scholar](#)

48. Colvin L, Cartwright A, Collop N, et al.. Advanced practice registered nurses and physician assistants in sleep centers and clinics: a survey of current roles and educational background. *J Clin Sleep Med.* 2014;10(5):581–587.

[Link](#)[Google Scholar](#)

49. Meltzer LJ, Mindell JA. Systematic review and meta-analysis of behavioral interventions for pediatric insomnia. *J Pediatr Psychol.* 2014;39(8):932–948.

[Crossref](#)[Google Scholar](#)

50. Qaseem A, Kansagara D, Forcica MA, Cooke M, Denberg TD; Clinical Guidelines Committee of the American College of Physicians. Management of chronic insomnia disorder in adults: a clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2016;165(2):125–133.

[Crossref](#)[Google Scholar](#)

51. Mysliwiec V, Martin JL, Ulmer CS, et al.. The management of chronic insomnia disorder and obstructive sleep apnea: synopsis of the 2019 U.S. Department of Veterans Affairs and U.S. Department of Defense clinical practice guidelines. *Ann Intern Med.* 2020;172(5):325–336.

[Crossref](#)[Google Scholar](#)

52. Edinger JD, Arnedt JT, Bertisch SM, et al.. Behavioral and psychological treatments for chronic insomnia disorder in adults: an American Academy of Sleep Medicine clinical practice guideline. *J Clin Sleep Med.* 2021;17(2):255–262.

[Link](#)[Google Scholar](#)

53. Meltzer LJ, Phillips C, Mindell JA. Clinical psychology training in sleep and sleep disorders. *J Clin Psychol.* 2009;65(3):305–318.

[Crossref](#)[Google Scholar](#)

54. Zhou ES, Mazzenga M, Gordillo ML, Meltzer LJ, Long KA. Sleep education and training among practicing clinical psychologists in the United States and Canada [published online ahead of print, 2020 Dec 18]. *Behav Sleep Med.* 2020;1-10. doi: 10.1080/15402002.2020.1860990

[Google Scholar](#)

55. Ramar K, Dort LC, Katz SG, et al.. Clinical practice guideline for the treatment of obstructive sleep apnea and snoring with oral appliance therapy: an update for 2015. *J Clin Sleep Med.* 2015;11(7):773-827.

[Link](#)

[Google Scholar](#)

56. Simmons MS, Pullinger A. Education in sleep disorders in US dental schools DDS programs. *Sleep Breath.* 2012;16(2):383-392.

[Crossref](#)

[Google Scholar](#)

57. Sheats RD, Essick GK. Sleep medicine education in US and Canadian dental schools: a report of the inaugural dental educators conference at the University of North Carolina School of Dentistry. *J Dent Sleep Med.* 2014;1(1):53-65.

[Google Scholar](#)

58. Wesseliuss HM, van den Ende ES, Alsmá J, et al.. Quality and quantity of sleep and factors associated with sleep disturbance in hospitalized patients. *JAMA Intern Med.* 2018;178(9):1201-1208.

[Crossref](#)

[Google Scholar](#)

59. DuBose JR, Hadi K. Improving inpatient environments to support patient sleep. *Int J Qual Health Care.* 2016;28(5):540-553.

[Crossref](#)

[Google Scholar](#)

60. Tóth V, Meytlis M, Barnaby DP, et al.. Let Sleeping Patients Lie, avoiding unnecessary overnight vitals monitoring using a clinically based deep-learning model. *NPJ Digit Med.* 2020;3(1):149.

[Crossref](#)

[Google Scholar](#)

61. Kim DE, Yoon JY. Factors that influence sleep among residents in long-term care facilities. *Int J Environ Res Public Health.* 2020;17(6):1889.

[Crossref](#)

[Google Scholar](#)

62. Capezuti E, Sagha Zadeh R, Pain K, Basara A, Jiang NZ, Krieger AC. A systematic review of non-pharmacological interventions to improve nighttime sleep among residents of long-term care settings. *BMC Geriatr.* 2018;18(1):143.

[Crossref](#)

[Google Scholar](#)

63. Perry GS, Patil SP, Presley-Cantrell LR. Raising awareness of sleep as a healthy behavior. *Prev Chronic Dis.* 2013;10:E133.

[Crossref](#)

[Google Scholar](#)

64. Bonuck KA, Blank A, True-Felt B, Chervin R. Promoting sleep health among families of young children in Head Start: protocol for a social-ecological approach. *Prev Chronic Dis.* 2016;13:E121.

[Crossref](#)

[Google Scholar](#)

65. Hoevenaar-Blom MP, Spijkerman AM, Kromhout D, Verschuren WM. Sufficient sleep duration contributes to lower cardiovascular disease risk in addition to four traditional lifestyle factors: the MORGEN study. *Eur J Prev Cardiol.* 2014;21(11):1367–1375.

[Crossref](#)

[Google Scholar](#)

66. Makarem N, Castro-Diehl C, St-Onge MP, et al.. The role of sleep as a cardiovascular health metric: does it improve cardiovascular disease risk prediction? Results from The Multi-Ethnic Study of Atherosclerosis. *Circulation.* 2020;141(Suppl_1):A36.

[Crossref](#)

[Google Scholar](#)

67. Byrne DW, Rolando LA, Aliyu MH, et al.. Modifiable healthy lifestyle behaviors: 10-year health outcomes from a health promotion program. *Am J Prev Med.* 2016;51(6):1027–1037.

[Crossref](#)

[Google Scholar](#)

68. Wickham SR, Amarasekara NA, Bartonicek A, Conner TS. The big three health behaviors and mental health and well-being among young adults: a cross-sectional investigation of sleep, exercise, and diet. *Front Psychol.* 2020;11:579205.

[Crossref](#)

[Google Scholar](#)

69. Centers for Disease Control and Prevention. CDC Workplace Health Resource Center. Sleep: an important health and safety concern at work. <https://www.cdc.gov/workplacehealthpromotion/initiatives/resource-center/pdf/WHRC-Brief-Sleep-508.pdf>. Accessed May 25, 2021.

[Google Scholar](#)

70. Redeker NS, Caruso CC, Hashmi SD, Mullington JM, Grandner M, Morgenthaler TI. Workplace interventions to promote sleep health and an alert, healthy workforce. *J Clin Sleep Med*. 2019;15(4):649–657.

[Link](#)

[Google Scholar](#)

71. Hafner M, Stepanek M, Taylor J, Troxel WM, Van Stolk C. *Why sleep matters – the economic costs of insufficient sleep: a cross-country comparative analysis*. RAND Corporation: Santa Monica, CA; 2016., https://www.rand.org/pubs/research_reports/RR1791.html

[Crossref](#)

[Google Scholar](#)

72. Buysse DJ. Sleep health: can we define it? Does it matter? *Sleep*. 2014;37(1):9–17.

[Crossref](#)

[Google Scholar](#)

73. Zee PC, Badr MS, Kushida C, et al.. Strategic opportunities in sleep and circadian research: report of the Joint Task Force of the Sleep Research Society and American Academy of Sleep Medicine. *Sleep*. 2014;37(2):219–227.

[Crossref](#)

[Google Scholar](#)

74. Jackson CL, Walker JR, Brown MK, Das R, Jones NL. A workshop report on the causes and consequences of sleep health disparities. *Sleep*. 2020;43(8):zsaa037.

[Crossref](#)

[Google Scholar](#)

75. Billings ME, Cohen RT, Baldwin CM, et al.. Disparities in sleep health and potential intervention models: a focused review. *Chest*. 2020;S0012-3692(20)34840–34846.

[Google Scholar](#)

[← Previous Article](#)

[Next Article >](#)

[Current](#)

[Archive](#)

[Accepted Papers](#)

[RSS Feed](#)

COLLECTIONS

[Practice Standards](#)

[REM: Residents/Fellows](#)

[COVID-19](#)

[15-Year Anniversary](#)

[Sleep Health Disparities](#)

[AASM Foundation](#)

[Hypoglossal Nerve Stimulation](#)

SUBMIT

[Author Benefits](#)

[Submission Guidelines](#)

INFO

[About JCSM](#)

[Editorial Board](#)

[Earn CME](#)

[Reprints & Permissions](#)

[Reviewers](#)

[Advertisers](#)

[Journal Policies](#)

[Subscribe](#)

 [RSS](#)

 [Twitter](#)



©2024 American Academy of Sleep Medicine
[Terms of Use](#)