

# SLEEP DISORDERS AND SLEEP DEPRIVATION: AN UNMET PUBLIC HEALTH PROBLEM

It is estimated that 50 to 70 million Americans chronically suffer from a disorder of sleep and wakefulness, hindering daily functioning and adversely affecting their health and longevity. The cumulative effects of sleep loss and sleep disorders represent an under-recognized public health problem and have been associated with a wide range of health consequences including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke. Almost 20 percent of all serious car crash injuries in the general population are associated with driver sleepiness. Hundreds of billions of dollars a year are spent on direct medical costs related to sleep disorders such as doctor visits, hospital services, prescriptions, and over-the-counter medications.

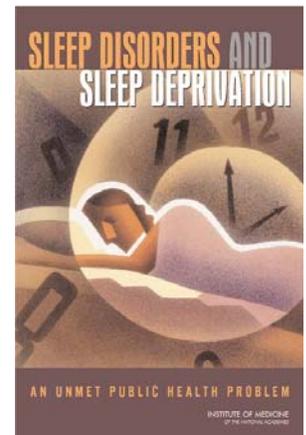
Recognizing the health consequences of sleep disorders and sleep deprivation, the American Academy of Sleep Medicine, the National Center on Sleep Disorders Research at the National Institutes of Health, the National Sleep Foundation, and the Sleep Research Society requested that the Institute of Medicine review the public health significance of sleep, sleep loss, and sleep disorders; examine gaps in research, education, and training in the public health system and academia; and provide a comprehensive plan for enhancing sleep medicine and research.

*Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem* concluded that although scientific opportunities and clinical activities in the field are expanding, the available human resources and infrastructural capacity to improve patient care and expand scientific research are insufficient. The report also concluded that increased awareness among the general public and health care professionals is required, and that a coordinated strategy is needed to ensure continued advances.

## STRATEGIES TO ADVANCE SLEEP MEDICINE AND RESEARCH

The Committee recognized that along with the continued leadership of the National Center on Sleep Disorders Research, a coordinated strategy is required to ensure continued scientific and clinical advances. There must be incremental growth in the capacity of the field to meet the public health and economic burden caused by sleep loss and sleep disorders. This strategy will require concurrent commitment to the following activities:

- Increase awareness of the burden of sleep loss and sleep disorders among the general public by developing a multimedia, comprehensive education campaign on the health and economic impact of sleep loss and sleep disorders.



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- Expand awareness among health care professionals through education and training.
- Establish the workforce required to meet the clinical and scientific demands of the field.
- Develop and validate new and existing diagnostic and therapeutic technologies.
- Expand accreditation criteria to emphasize treatment, long-term patient care, and chronic disease management strategies.
- Increase the investment in interdisciplinary sleep programs in academic health centers that emphasize long-term clinical care, training, and research.
- Create a national research network that connects individual investigators, research programs, and research centers.

### **A NEED FOR PUBLIC AND PROFESSIONAL AWARENESS**

A well-coordinated, multimedia public education and awareness campaign should be established to target those individuals and organizations that educate the public at national, state, local, and community levels, including: elementary, middle, and high school students, as well as undergraduate college health education programs.

Academic health centers should integrate the teaching of somnology and sleep medicine into baccalaureate and doctoral health sciences programs, as well as residency and fellowship training and continuing professional development programs.

### **IMPROVE ACCESS TO TECHNOLOGY**

Most American communities do not have adequate health care resources to meet the clinical demands to provide adequate prevention and management of sleep disorders. These individuals suffering from sleep disorders endure delays in diagnostic tests due to wait lists that can be as long as 10 weeks, which increases their chance for injury. As the public's awareness of sleep deprivation and sleep disorders increases, demand for treatment will multiply and require improved access to sleep diagnostic services. To increase the diagnostic and therapeutic capacity, the Committee recognizes the need to validate and develop existing and new diagnostic and therapeutic technologies, especially portable technologies.

### **STRENGTHEN THE RESEARCH COMMUNITY**

Investment in sleep-related research and training programs has grown dramatically over the past 10 years; however, it has not kept up with the rapid pace of scientific advances in Sleep Medicine. To strengthen the interdisciplinary aspect of the field, it is not only important to attract new investigators, but also to expand the number of trained scientists in related disciplines who focus on sleep-related research. Bolstering opportunities for education and training in Somnology and Sleep Medicine should attract a new pool of clinicians and scientists interested in the field.

#### **Increase Research Training Programs**

In 2004, there were only 151 researchers involved primarily in clinical sleep research, 126 investigators focusing primarily on basic research projects, and only 54 individuals received doctorates with a focus on Somnology or Sleep Medicine. To strengthen the research community and capitalize on the field's potential, the National Institutes of Health and private foundations must increase investment in interdisciplinary sleep-related research training and mentoring activities.

**TABLE 1.** Attributes of Interdisciplinary Type I, II, and III Academic Sleep Programs

Interdisciplinary Sleep Programs	Focus	Attributes
Type I	Clinical care specialties	<p>Increases awareness of sleep medicine among health care professionals.</p> <p>Requires educational programs for medical students and residents in primary care.</p> <p>Includes representation from internal medicine, neurology, psychiatry, otolaryngology, pediatrics, and nursing.</p>
Type II	Clinical, training, research	<p>Provides optimal education, training, and research in Somnology and Sleep Medicine.</p> <p>Accredited fellowship program in Sleep Medicine.</p> <p>Basic or clinical research program.</p>
Type III	Regional comprehensive centers	<p>Serves as a center for public health education, training for clinical care and research, basic research, patient-oriented research, translational research, and clinical care.</p> <p>Regional coordinator for the proposed National Somnology and Sleep Medicine Research and Clinical Network for education, training, mentoring, clinical care, research, clinical research studies, and large-scale population genetics studies.</p>

### **Establish Interdisciplinary Sleep Programs in all Academic Health Centers**

By its very nature, research and clinical practice in sleep is at the interface of many medical and scientific disciplines and is an example of an interdisciplinary field. This includes, but is not limited to, pulmonology, neurology, geriatrics, psychiatry, psychology, cardiology, otolaryngology, pediatrics, nursing, endocrinology, neuropsychopharmacology, neuroscience, epidemiology, and dentistry. However, the limited investment and organization of sleep programs in academic health centers do not favor interdisciplinary research efforts and continued advances in clinical care.

In response, the committee recommends a 3-tier model for interdisciplinary sleep programs, which lays the guiding principles for their organization in all academic health centers—progressing from programs that emphasize clinical care and education, to programs with a considerable capacity for research, advanced training, and public education (Table 1). All academic sleep programs should conform to the guidelines of at least a Type I Interdisciplinary Sleep Program. In addition, all private and academic sleep laboratories should be an accredited sleep center that ensures long-term patient care and chronic disease management.

### **Establish a National Somnology and Sleep Medicine Research and Clinical Network**

The committee believes that the field of sleep medicine is now sufficiently mature for the development of a National Somnology and Sleep Medicine Research and Clinical Network. As the cornerstone of this network, Somnology and Sleep Medicine Research Centers would provide the interdisciplinary environment that is essential to accelerate the development of future advances in treating chronic sleep loss and sleep disorders. In addition, it would facilitate interactions between basic, clinical, and population-focused scientists that emphasize the close association between research, clinical care, and education.

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### **FOR MORE INFORMATION...**

Copies of *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem* are available from the National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, <http://www.nap.edu>. The full text of this report is available at <http://www.nap.edu>.

This study was supported by funds from the American Academy of Sleep Medicine, the National Center on Sleep Disorders Research of the National Institutes of Health, the National Sleep Foundation, and the Sleep Research Society. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the organizations or agencies that provided support for the project.

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