

SLEEP

a pillar of good health



Sleep researchers are tackling some of the most prevalent health problems facing humanity today, because the cumulative long-term effects of sleep loss and sleep disorders are associated with a range of serious health issues, including an increased risk of type 2 diabetes, obesity, depression, hypertension, heart attacks and stroke.

“Developing a mechanistic understanding of the threat posed by sleep deficiency and circadian disturbance to health, healthy equity, and health disparities is an urgent challenge.”

2011 National Institutes of Health (NIH) Sleep Disorders Research Plan

Sleep loss hampers our ability to concentrate, reduces motivation and creativity, and increases irritability. Insufficient sleep jeopardizes our personal health, our workplace productivity, and the well-being of our communities.

In the United States, working days lost due to insufficient sleep and sleep disorders, account for \$411 billion in economic losses and represent 2.28 percent of our country’s GDP annually.¹

The National Academy of Medicine (NAM) has described the rising trend of insufficient sleep as “*an unmet public health problem.*”² Thanks to breakthroughs in the field of sleep research, we are now beginning to understand the fundamental importance of sleep.

While the Sleep Research Society (SRS) and the American Academy of Sleep Medicine (AASM) recommend a minimum of seven hours of sleep per night for adults, as many as 56 percent of US adults report that they receive less sleep than needed on weeknights. Only 44 percent say that they get a good night’s sleep every night.³ The connection between poor sleep and poor health is even more startling — evidenced by the fact that 67 percent of those who reported poor quality sleep also reported ‘poor’ or ‘only fair’ health.⁴

sleep research MATTERS



Sleep has intrigued the human mind for millennia, but sleep research is a relatively recent field of inquiry. What we do know about sleep we have learned from intrepid researchers, intent on unlocking mysteries and finding answers. Over the past fifty years, sleep research has advanced our understanding of the basic biology and physiology of sleep and circadian rhythms as well as the pathophysiology of sleep disorders. For example:

Cognitive Aging and Dementia

While we have known for many years that sleep quality and quantity in older adults influences cognitive function, we are now starting to understand how and why. Slow Wave Sleep serves as a critical link between brain atrophy and memory, helping to clear toxins from the brain related to amyloid beta and tau, the two pathologies related to Alzheimer's disease. Diminished slow wave sleep in older individuals may contribute to the development of these disorders.

Obesity

It has become clear in recent years that sleep loss and the inappropriate timing of eating lead to endocrine abnormalities (e.g., changes in insulin levels and regulation) and appetite changes that ultimately contribute directly to obesity, demonstrating that proper sleep and circadian rhythms have a role to play in combating the obesity epidemic.

Childhood learning

Sleep is vital for appropriate learning. We now know sleep plays a key role in memory consolidation at all stages in life. This has critical implications for the role of sleep health in childhood learning and intellectual development. As an example, data show delaying school start times in older kids to better match their natural circadian rhythms reduces absenteeism and may lead to increased grades and performance on standardized tests.

Sleep and cancer

Altered timing in the sleep-wake cycle contributes to cancer risk. Cancer, as well as cancer treatments, in turn, cause sleep and circadian disruptions. Recent research shows we can improve sleep and quality of life by treating insomnia in patients and survivors of cancer. Exciting, cutting-edge research is demonstrating how we can use circadian rhythms to optimize the timing of cancer treatments to ultimately provide better outcomes with fewer side effects.



And, while we know that individuals differ in how they respond to sleep loss, shift work, and other sleep/circadian disruptions, we do not yet know how to predict those differences, or how to use them to decrease health and occupational risks and increase productivity. Sleep research matters, and it is vital that we continue to probe and investigate if we are to unlock these mysteries and so many more.

MAINTAINING *our momentum*



While there is no shortage of innovative thinking and ideas in the field of sleep research, there is a shortage of investigators to spearhead sleep-related research projects, specifically early-career investigators.

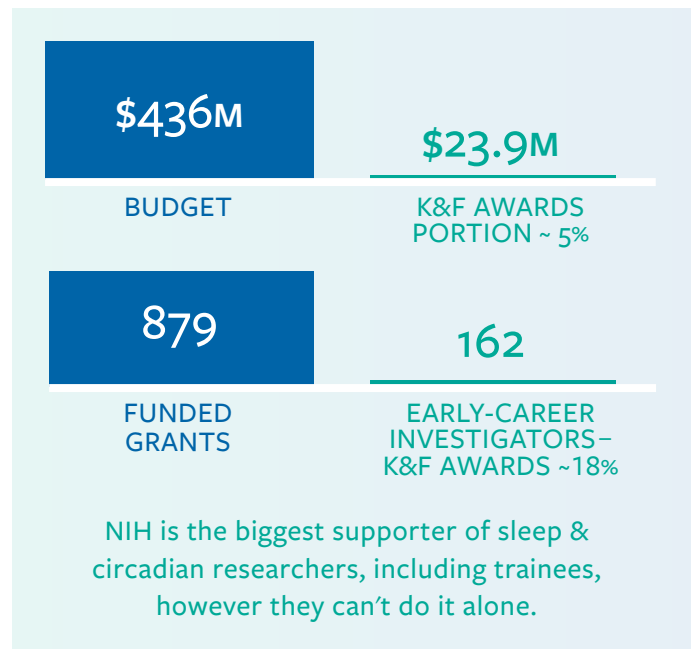
As in any scientific field, a pipeline of young investigators is crucial in order to maintain a robust research infrastructure. For sleep research, this challenge is even more daunting, in part due to the limited number of new scientists and clinician/scientists entering and remaining in the field.

This is not a new challenge. As far back as 2006, the Institute of Medicine (IoM), now the National Academy of Medicine, highlighted the “critical paucity of sleep investigators in the training pipeline.”⁵ In 2011, as the NIH Sleep Disorders Research Plan was being developed, it was again acknowledged that “the current workforce of appropriately trained researchers is not adequate to address future research priorities.”⁶ And as the current baby boom generation of senior researchers move toward retirement, the cultivation and retention of early-career investigators will become even more imperative.

The opportunities for sleep researchers have never been greater — or the need for their research more urgent. New directions and possibilities for sleep and circadian research have exploded over the last decade, involving genetics, molecular biology, physiology, epidemiology, and clinical research. Today, opportunities for research training exist in all areas of sleep and circadian biology. Experimental approaches and state-of-the-art technologies combine to make this a particularly exciting time for the field.

The alarming rise of sleep and circadian disturbances underscores the urgent need for ongoing sleep research. A recent update from the National Center on Sleep Disorders Research indicates that 31 successful new sleep Career Development Awards (K) and Individual Research Fellowships (F) are needed annually to maintain momentum in the field of sleep research.⁷

NIH'S 2019 SLEEP RESEARCH



We have a timely and unprecedented opportunity to make a difference – we have the technology, the biomedical methodologies, but most of all a pressing need. We simply need more early-career investigators in the research pipeline.

References & Further Reading

1 Hafner, Marco, Martin Stepanek, Jirka Taylor, Wendy M. Troxel and Christian Van Stolk. *Why sleep matters — the economic costs of insufficient sleep: A cross-country comparative analysis*. Santa Monica, CA: RAND Corporation, 2016.

 rand.org/pubs/research_reports/RR1791.html

2 Colten, H. R., & Altevogt, B. M. (2006). *Sleep disorders and sleep deprivation: an unmet public health problem*. Washington, DC: Institute of Medicine.

3 2013 *International Bedroom Poll*. National Sleep Foundation.

 sleepfoundation.org/sites/default/files/RPT495a.pdf

4 *Sleep Health Index 2014 – Highlights*. National Sleep Foundation.

 sleepfoundation.org/sleep-health-index-2014-highlights

5 Colten, H. R., & Altevogt, B. M. (2006). *Sleep disorders and sleep deprivation: an unmet public health problem*. Washington, DC: Institute of Medicine.

6 2011 *National Institutes of Health Sleep Disorders Research Plan*.

 nhlbi.nih.gov/health-pro/resources/sleep/nih-sleep-disorders-research-plan-2011

7 NIH RePORT (Research Portfolio Online Reporting Tools), Data Downloaded 4/8/2021.

 report.nih.gov/