

## The Need for Sleep

### Wake up to the Risks of Shortened Slumber

Do you toss and turn at night, or have problems falling asleep or staying asleep? Do you have trouble staying awake and alert during the day? If so, you may be one of the estimated 50-70 million Americans who have a sleep disorder. Experts estimate that about one-third of adult Americans will experience some sort of sleep disorder in their life time. And, while many sleep disorders can be treated, most of them go undiagnosed.

nucleus, he says, operates as the master biological clock. It orchestrates what Twery calls a “symphony” of **hormones** and other changes that prepare our body for sleep.

It’s clear that our body needs this sleep, because of what happens when we don’t get enough of it.

“Too little sleep or not enough restorative sleep can seriously affect the way we think, behave, form memories and perform at work and school,” explains Dr. Merrill Mitler, program director for sleep research at NIH’s National Institute of Neurological Disorders and Stroke.

“A continued lack of sleep also puts us at risk for mood disorders such as depression and can lead to poor concentration and poor judgment, social problems, greater risk of car crashes and increased risk of substance abuse.”

There is also what Twery calls the “unseen side” of inadequate sleep. Because the timing of sleep is linked to a symphony of chemical reactions throughout the body, Twery explains, it’s also linked to our health in more subtle ways. “When these chemical reactions become misaligned,” he says, “they can contribute to problems with our metabolism and our



Why we sleep remains something of a mystery. Dr. Michael Twery, director of the National Center on Sleep Disorders Research at NIH’s National Heart, Lung and Blood Institute, says, “Sleep originates with the timing of our biological clock. The biological clock operates in almost all of our tissues.” A particular region of the brain called the suprachiasmatic



### Definitions

#### Cardiovascular

The system of heart and vessels that circulates blood throughout the body.

#### Diabetes

A disease in which the body has problems producing or using insulin, a hormone needed to convert sugar, starches and other food into energy. In time, diabetes can lead to serious problems including heart disease, blindness, kidney failure and nerve damage.

#### Hormones

Molecules sent through the bloodstream to signal another part of the body to grow or react a certain way.

**cardiovascular** system, and can eventually lead to increased risk of disease.”

Twery recounts one set of experiments in which otherwise healthy young adults developed resistance to insulin after a few nights of only 4 hours of sleep. Insulin is a hormone needed to convert sugar, starches and other food into energy. When the body can’t use insulin properly, **diabetes** can develop. After the

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## Wise Choices

### Tips to Getting a Good Night's Sleep

- Keep a regular sleep and wake schedule.
- Avoid caffeine and cigarettes in the late afternoon and don't drink alcohol to help you sleep.
- Avoid going to bed on either a full or an empty stomach.
- Use your bedroom primarily for sleeping. Sleep in a dark, quiet, well-ventilated space with a comfortable temperature.
- Relax before going to bed. Take a warm bath, listen to soothing music, meditate or try relaxation or breathing exercises.
- Face your clock away from the bed to avoid focusing on time if

you awake before morning.

- If you can't fall asleep within 20 minutes of going to bed or wake early and can't get back to sleep, get out of bed and try a relaxing activity such as reading until you become drowsy.
- Regular exercise can help improve certain sleep disorders. However, don't exercise within 2 hours of bedtime.
- Avoid household chores, paperwork or other stimulating activities for at least 2 hours before bedtime.
- Use over-the-counter or prescription sleep aids only for short periods of time and under the direction of your doctor. Some sleep aids can make you drowsy during the day and cause other side effects.

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researchers allowed the young adults to go back to 8-hour sleep periods, the problem reversed within days.

Other studies have found that people who get less sleep tend to have higher rates of obesity, heart disease, high blood pressure and diabetes. A great deal of research is now focused on understanding the underlying links between sleep and these health factors.

How much sleep do we need? Adults usually need at least 7-8 hours of sleep a night to feel fully rested when they are awake. School-aged

children and teens need at least 9 hours. Children in preschool need between 10 and 12 hours a day, and newborns need 16-18 hours.

Many people unfortunately consider sleep a low priority and try to stay awake as much as they can to do more work, watch some TV or fit other things into their busy days. But others can't sleep because of an underlying problem. In fact, there are more than 70 different types of sleep disorders.

Diagnosing a particular sleep disorder can be difficult, but Mitler



## Web Sites

- [www.ninds.nih.gov/disorders/sleep\\_apnea/detail\\_sleep\\_apnea.htm](http://www.ninds.nih.gov/disorders/sleep_apnea/detail_sleep_apnea.htm)
- [www.nhlbi.nih.gov/health/public/sleep/healthy\\_sleep.htm](http://www.nhlbi.nih.gov/health/public/sleep/healthy_sleep.htm)
- [www.nhlbi.nih.gov/health/dci/Browse/Sleep.html](http://www.nhlbi.nih.gov/health/dci/Browse/Sleep.html)
- [starsleep.nhlbi.nih.gov](http://starsleep.nhlbi.nih.gov)
- [www.nhlbi.nih.gov/about/ncsdr](http://www.nhlbi.nih.gov/about/ncsdr)

says that new tools are giving scientists a better understanding of sleep and sleep-deprived states. One key tool is functional imaging, which provides real-time images of brain activity during sleep and the sleep-wake stages to learn which areas of the brain may be involved in sleep disorders.

NIH researchers continue to explore the causes and consequences of sleep problems such as insomnia, chronic sleep deprivation and obstructive sleep apnea (which you can read about in the following story). Even if all these disorders aren't fully understood, however, many of them can be treated.

If you frequently experience excessive daytime sleepiness or have problems sleeping, talk to your doctor or a sleep specialist. Mitler recommends that, before you go, you keep a sleep diary of when you usually go to bed, how long it takes you to fall asleep, when and how many times you wake during the night, and when you wake in the morning. The diary should also include what you ate that day, drinks you had at night containing caffeine or alcohol, use of medicines, smoking and exercise you've done. The records may show a pattern or give the doctor other clues to better diagnose your condition. ■

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**Editor:** Harrison Wein, Ph.D.

[wein@od.nih.gov](mailto:wein@od.nih.gov)

Tel: 301-435-7489 Fax: 301-496-0019

**Assistant Editor:**

Vicki Contie

**National Institutes of Health**

Office of Communications

& Public Liaison

Building 31, Room 5B38

Bethesda, MD 20892-2090

**Contributors:** Vicki Contie, Margaret Georgiann (illustrations), Paul Girolami and Harrison Wein

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# The Thief of Sleep

## Sounding the Alarm About Sleep Apnea

If you were at the doctor's office and suddenly stopped breathing for 20 seconds, they'd call an ambulance. During sleep, the more than 12 million Americans estimated to have obstructive sleep apnea may stop breathing 10 or more times an hour. When sleep is regularly disrupted throughout the night, the consequences can be dire, from dangerously sleepy driving to higher risks of diabetes and heart disease.

Sleep apnea, or sleep disordered breathing, brings repetitive periods of difficulty breathing and sleeping. According to Dr. Michael Twery, director of the National Center on Sleep Disorders Research at NIH's National Heart, Lung and Blood Institute, sleep apnea is often caused by a temporary obstruction to the airway opening at the back of the mouth. In children, it

could be large tonsils; in adults, the tongue. Or it could stem from weight gain, as the airway passage narrows because of thickened fat pads. The muscles that normally keep the airway stiff and open while awake may relax during sleep, causing the airway to narrow or even close.

For people with a less common condition called central sleep apnea, the brain, for unknown reasons, occasionally fails to send signals to the muscles telling them to breathe.

Whatever the cause, when your breathing stops or becomes very shallow, the oxygen level in your blood goes down. Your brain senses an emergency and takes action to wake you up, doing whatever it takes to get air into your lungs and restore your breathing.

Trying to force air past an airway obstruction can cause loud snoring. In fact, one of the most common ways people discover they have sleep apnea is that their bed partner complains about the noise. Some people may also gasp for air. Most disturbing, however, may be the silence when there is no breathing during the apnea.

Anyone—including children—can have sleep apnea. If someone in your family has sleep apnea, you're more likely to develop it than someone without a family history of the condition. It's more common in African Americans, Hispanics and Pacific Islanders than in Caucasians. The reasons for these differences are unknown, and NIH is currently funding studies to understand why.

See your doctor if you suspect

you have sleep apnea. Treatment includes making lifestyle changes, such as sleeping on your side instead of your back and losing weight if you are overweight. These might be enough if your sleep apnea is mild. For adults with moderate or severe sleep apnea, continuous positive airway pressure (CPAP) is the most common treatment. For CPAP, you wear a mask over your nose or mouth during sleep that blows air into your throat at a



pressure level just high enough to prevent airway obstruction. Other treatments are also available.

You might have to try different treatments or methods for a time, but remember that sleep apnea is a treatable condition. Your doctor can recommend which treatments may help you after determining the cause of your apnea. ■



### Wise Choices Signs and Symptoms of Sleep Apnea

The most common signs of sleep apnea are:

- Loud, chronic snoring
- Choking or gasping during sleep
- Fighting sleepiness during the day when you thought you'd gotten enough sleep the night before

Others signs may include:

- Morning headaches
- Memory or learning problems
- Feeling irritable
- Not being able to concentrate on your work
- Mood swings or personality changes; perhaps feeling depressed
- Dry throat when you wake up

If you or someone close to you notices these symptoms, discuss them with your doctor. There are several effective treatments for sleep apnea.



### Web Sites

- [www.nhlbi.nih.gov/health/dci/Diseases/SleepApnea/SleepApnea\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/SleepApnea/SleepApnea_WhatIs.html)
- [www.ninds.nih.gov/disorders/sleep\\_apnea/sleep\\_apnea.htm](http://www.ninds.nih.gov/disorders/sleep_apnea/sleep_apnea.htm)

## Health Capsules

### What Causes Addiction?

Substance abuse, including tobacco addiction, affects people of all ages, contributing to more than 500,000 deaths each year in the U.S. Why do some people become addicted, while others don't? How do drugs affect the brain? How can addiction be prevented and treated? The answers to these questions can be found in a new 30-page booklet called *Drugs, Brain and Behavior: The Science of Addiction*. The booklet, published by NIH's National Institute on Drug Abuse, offers easy-to-understand explanations of what scientists have discovered about drug addiction, its prevention and treatment.

Addiction can change the structure

of the brain and how it works. That's why scientists say that drug addiction is a brain disease and not simply a lack of willpower. Researchers have shown that people with drug addiction can have changes in brain regions that are important for judgment, decision-making, memory and controlling behavior. These changes can be long-lasting.



#### Web Sites

- [www.drugabuse.gov/scienceofaddiction](http://www.drugabuse.gov/scienceofaddiction)
- [www.drugabuse.gov](http://www.drugabuse.gov)

Like other chronic diseases, drug addiction can be successfully treated. As researchers have discovered more about how drugs affect the brain and behavior, they've also developed more effective treatments and prevention plans. Scientists have learned that the teenage years are a critical time for preventing drug addiction.

You can read *The Science of Addiction* online at [www.drugabuse.gov/scienceofaddiction](http://www.drugabuse.gov/scienceofaddiction). You can also request a free copy by email at [information@nida.nih.gov](mailto:information@nida.nih.gov) or by calling the National Clearinghouse for Alcohol and Drug Information at 1-800-729-6686. ■

### Greenery, Groceries and Children's Weight

Where a child lives—the greenery of the landscape and the distance to supermarkets—is related to the risk for excess pounds, according to a recent study.

In a study of more than 7,000 children, NIH-funded researchers found that children living in urban areas were less likely to be overweight if their neighborhood had more greenery. Children in suburban regions had less risk for excess weight if they lived closer to major supermarkets.

The findings suggest that access to green spaces may encourage physical activity and that access to major food stores may enable

healthier diets.

Although previous studies have found that adults living closer to fast-food chains and convenience stores are at greater risk for being overweight, the current study found no evidence that the same holds true for children.

"As a pediatrician, I hope this study will encourage neighborhood organizations, community activists and others to bring more opportunities for physical activities and healthy food choices to the places where children live," said the study's lead investigator, Dr. Gilbert C. Liu of Indiana University School of Medicine. ■



#### Web Sites

- [win.niddk.nih.gov/publications/child.htm](http://win.niddk.nih.gov/publications/child.htm)
- [wecan.nhlbi.nih.gov](http://wecan.nhlbi.nih.gov)
- [www.nih.gov/news/research\\_matters/july2006/07142006community.htm](http://www.nih.gov/news/research_matters/july2006/07142006community.htm)



#### Featured Web Site A Healthy Mouth for Your Baby

[www.nidcr.nih.gov/HealthInformation/DiseasesAndConditions/ChildrensOralHealth/HealthyMouth](http://www.nidcr.nih.gov/HealthInformation/DiseasesAndConditions/ChildrensOralHealth/HealthyMouth)

As soon as a baby's grin shows its first sign of tiny teeth, it's time to start taking care of them. This site has basic information about protecting babies' teeth, with tips about cleaning teeth and feeding kids healthy food. Also available in Spanish. From NIH's National Institute of Dental and Craniofacial Research.

**1. Protect Your Baby's Teeth with Fluoride**  
Fluoride is like fluorapatite, a natural substance that helps harden the enamel.  
• Fluoride is in the drinking water of some towns and cities.  
Ask your dentist or doctor if you can have fluoride in a toothpaste or toothbrush for your baby.

**2. Check and Clean Your Baby's Teeth**  
Check your baby's teeth.  
Healthy teeth should be checked at one visit. If you see white or black spots on the teeth, take your baby to your dentist.  
Clean your baby's teeth.  
As soon as they come in with a tooth, soft cloth or a child's toothbrush. Clean the teeth at least once a day. It's best to clean from right to left.

**3. Feed Your Baby Healthy Food**  
Choose foods that will have a lot of sugar in them. One year old baby and toddlers like instead of candy and cookies.