



# Weighing in on Sleep

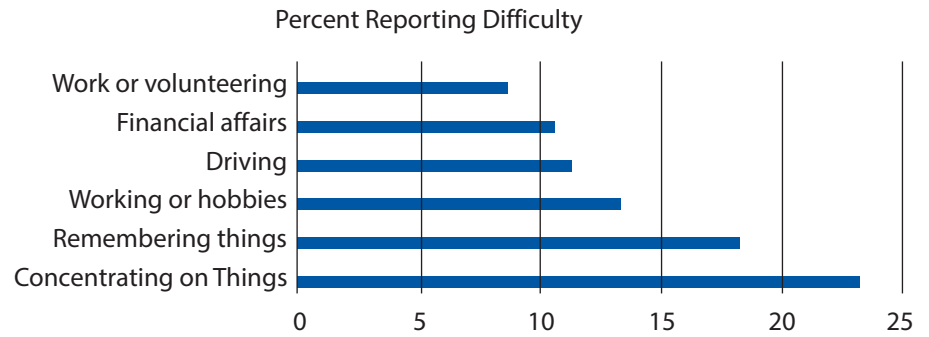
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**A** good night's sleep is as important as physical activity or healthy eating to maintain a healthy weight and optimum well-being. Sleep allows us to relax, restore, and revitalize our bodies and minds every night. We spend a third of our lives in sleep. Sleep affects physical and mental health. Sleep impacts dramatically how we think, perform, learn, remember, and feel while we are awake. Research over the last decade has advanced understanding about the importance of sleep to maintaining a healthy weight.

Sleep insufficiency is recognized as an important public health issue in the United States. People who aren't getting enough good quality sleep are more likely to suffer from chronic diseases such as hypertension, diabetes, depression, and obesity. They also are at increased risk of cancer, infectious diseases, increased mortality, and reduced quality of life and productivity.

### Self-Reported Sleep-Related Difficulties Among Adults 20 Years and Older, 2005-2008



Poor sleep can double or even triple your risk for the common cold. The National Health and Nutrition Examination Survey introduced the Sleep Disorders Questionnaire in 2005. This survey found the following self-reported difficulties associated with sleep quality or quantity. The chart above shows the percentage of adults reporting sleep related difficulties among those getting less than seven hours of sleep per night. Adults getting seven to nine hours of sleep per night report significantly less difficulty concentrating on things.

The pace of modern life has taken a toll on our sleep habits. An estimated 50 to 70 million adults in the United States have chronic sleep disorders. According to data from the National Health Interview Survey, nearly 30 percent of adults report averaging less than six hours sleep per night. Only 31 percent of high school students report getting at least eight hours of sleep on an average school night. Centers for Disease Control data from the Behavioral Risk Factor Surveillance System show that Kentucky is consistently one of the most sleep deprived states in the nation.

More than 50 studies from around the world document that those who regularly sleep less than six hours a night are at increased risk of obesity. Short sleep duration appears to be associated with weight gain, particularly among younger age groups. Those who get insufficient sleep are at greater risk for weight gain even if they exercise regularly and generally eat a healthy diet. When we are tired and sleep deprived, we often try to maintain our energy



## Research Spotlight

A recent two-week study examined the effects of five days of insufficient sleep (less than five hours per night) to mimic a five-day workweek. The 16 individuals in the study increased energy expenditure by about 5 percent but had a greater than 5 percent energy intake despite signals from hunger-related hormones indicating fullness. People getting insufficient sleep tend to eat smaller breakfasts, consume higher amounts of carbohydrates, and eat more throughout the day and after dinner. This eating pattern is associated with weight gain. Transitioning to an adequate sleep schedule decreased energy intake and resulted in weight loss.

—from Markwald 2013

level with high sugar or high carbohydrate food (such as cookies, doughnuts, candy bars) for fast energy. We also tend to eat when we are actually sleepy, because we think fatigue is a sign of hunger.

Studies in animals and humans suggest that sleep duration is an important regulator of metabolism. Not getting enough sleep appears to affect the hormones that regulate feeling full (leptin) and hunger

(ghrelin) so that we tend to eat too much with sleep loss. Feeling sleep deprived can keep you from being motivated to participate in physical activity or prepare a healthy meal. Recent studies suggest that short sleep duration increases energy intake and decreases energy expenditure.

Chronic sleep loss has other effects on the body. Inadequate sleep is linked to decreased levels of growth hormone that is released during deep sleep. Reduced levels of growth hormone seem to encourage weight gain. Chronic sleep debt also prompts the body to create excess insulin and disrupts glucose metabolism. Excess insulin promotes the storage of body fat and contributes to the development of obesity, hypertension, and Type 2 diabetes. Adults who report having diabetes, heart disease, and hypertension are more likely to report sleep problems or be diagnosed with sleeping disorders than those who have not been diagnosed with those diseases. If you are overweight or obese and have a sleep disorder, such as obstructive sleep apnea, losing as little as 10 percent of your weight will improve your sleep.

## What is good sleep?

Each sleep cycle takes about 90 minutes and is composed of two parts, non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. Each has special functions. A good night's sleep includes four to five cycles.

When it is time to sleep, the brain begins to slow down, our bodies relax, and within minutes, we begin to fall asleep in stages. Stages 1 through 4 are known as non-rapid eye movement (NREM) or slow wave sleep.

**Stage 1** is the lightest stage of sleep. Brain activity is characterized by alpha waves. Often this is described like being in the twilight zone.

**Stage 2** is where brain activity continues to slow and the body relaxes further.

**Stages 3 and stage 4**, often combined now and called N3, are when delta waves occur. These are our lowest frequency and highest voltage waves; the high voltage is due to the synchronous firing of cortical neurons. Stage 3 and 4 appear to be our most restful and restorative sleep phases (when we are barely aware of any outside stimulation) and typically take 20 to 40 minutes to reach in that first 90-minute sleep cycle.

More than 50 studies from around the world document that those who regularly sleep less than six hours a night are at increased risk of obesity.

*“As a nation we are not getting enough sleep,” said Wayne Giles, M.D., director of CDC’s Division of Population Health. “Lifestyle changes such as going to bed at the same time each night; rising at the same time each morning; and turning off or removing televisions, computers, mobile devices from the bedroom, can help people get the healthy sleep they need.”*

**What happens during deep (NREM) sleep?**

- ▶ Muscles are relaxed
- ▶ Blood pressure drops
- ▶ Pulse and breathing slow down
- ▶ Body temperature decreases to conserve energy
- ▶ Digestion and metabolism are slowed to allow for physical repair
- ▶ Memory benefits, especially memory of learned information
- ▶ The brain uses this time to flush away toxic waste products
- ▶ Growth hormone and other hormones are released to promote tissue growth and repair

Next we begin REM sleep, when we experience most of our dreams. This is a very active state where breathing, blood pressure, pulse rate, and blood flow to brain increases or becomes more erratic. At the same time, a message is sent to our muscles to keep them from moving as we experience our dreams.

**What happens during REM sleep?**

- ▶ Memory benefits, especially related to motor skills
- ▶ Brain chemicals called neurotransmitters are replenished
- ▶ Ideas are organized and new ideas may be generated
- ▶ Problems are resolved
- ▶ Neural circuits are stimulated and developed
- ▶ Good mental and emotional stability are maintained



Let your health care provider know if you snore or have ever been told you stop breathing during sleep. This may indicate a sleep disorder that can be treated and help you achieve adequate restful sleep.

**Do you get enough sleep?**

To prevent obesity, getting enough sleep is especially important for young adults ages 27 to 40 years old. A longitudinal study in Switzerland followed almost 500 young adults from age 19 and found an association between short sleep durations and being overweight. This association diminished after age 40. Studies consistently find a stronger relationship between lack of sleep and excess weight in younger people versus older adults.

Individuals differ in their needs for sleep, but the following table lists good ranges for the vast majority of people.

**Recommended hours of sleep by age**

Age	Hours
Infants	16–18
1–2 years old	14–15
3–5 years old	10–13
6–18 years old	10
19–65 years and older	7–8

Create a calm routine just before bedtime that does not include using electronics. Take a bath, read a novel, listen to music.



### **Tips for a healthy sleep routine**

- ▶ Go to bed at the same time each night and rise at the same time each morning.
- ▶ Avoid caffeine, alcohol, and large meals close to bedtime.
- ▶ Create a calm routine just before bedtime that does not include using electronics. Take a bath, read a novel, listen to music.
- ▶ Make sure your pillow and mattress are comfortable and provide good support.
- ▶ Your bedroom should be cool, dark, and comfortable.
- ▶ Avoid sleeping with pets.

It can be easy to habitually sleep less than seven to nine hours a night. Eventually this sleep debt will need to be repaid, often on a weekend at the expense of recreational activities. This kind of “make-up” sleep is not as healthy since it disrupts our normal biological rhythms (called circadian rhythms) Therefore, a regular routine of waking and sleeping fosters optimal physical and mental health, allowing you to perform daily activities to the best of your ability. Set a goal of going to bed at a certain time and do so for at least several weeks to establish a new habit.

For more information about programs that promote health and well-being, contact your county Extension office.

*This publication provides information about wellness. Readers are encouraged to use it for education, but not as a substitute for professional medical advice.*

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