

### Introduction

Sleeping is important for our bodies and minds. It helps us learn better, fight disease and avoid stress.

Many people sleep less than the 8 hours their bodies need. This creates sleep debt. The body eventually demands repayment of the lost hours of sleep. Sleep debt can be due to sleep problems or lifestyle habits. When you don't sleep enough, it can interfere with work, driving and social activities. It can cause obesity, diabetes and heart problems. It can also change how well and fast we learn.



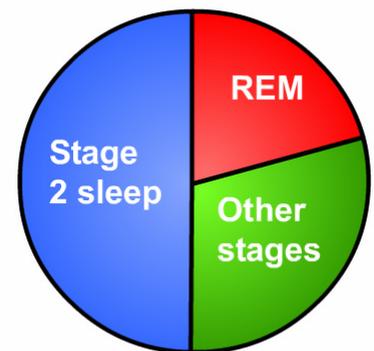
This reference summary focuses on sleep problems that are caused by lifestyle habits and not those caused by diseases or sleep disorders. It lists the role of sleep in healthy living and the risks of not sleeping well. The reference summary also provides tips for healthy sleeping.

### The Biology of Sleep

Sleep impacts how well we function in our everyday lives. It is important for our physical and mental health. There are lots of things scientists do not understand about sleep. But our knowledge keeps growing as research continues to advance.

People usually cycle through 5 stages of sleep:

1. Stage 1 - Drowsiness.
2. Stage 2 - Light Sleep.
3. Stage 3 - Deep Sleep.
4. Stage 4 - Slow-Wave Deep Sleep.
5. Stage 5 - Rapid Eye Movement, or REM.



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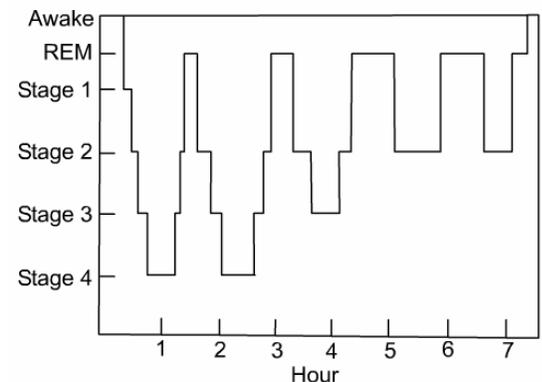
We spend almost half of our sleep time in stage 2 sleep, about 20% in REM sleep, and the remaining 30% in the other stages.

During stage 1, we drift in and out of sleep and can be awakened easily. Our eyes move slowly, even though the eyelids are generally shut, and our muscle activity slows. Often a sensation of falling or starting to fall happens before generalized muscle contractions that are called hypnic myoclonia.

In stage 2 sleep, eye movement stops and brain waves slow. Brain waves are electric signals in the brain cells. They can be picked up by specialized electrodes attached to the scalp. In stages 3 and 4, extremely slow brain waves appear. It is difficult to wake someone up during stages 3 and 4, which together are called deep sleep. There is no eye movement or muscle activity. People who are awakened during deep sleep do not adjust right away. They may feel groggy and disoriented for several minutes after they wake up.

During REM, also known as Rapid Eye Movement sleep, our breathing gets faster, irregular and shallow. Our eyes, as the name of this stage implies, jerk rapidly in different directions. During REM, parts of our body, like our arms and legs, become relaxed. Our heart rate increases, our blood pressure rises and males develop penile erections. When people wake up during REM sleep, they often describe vivid dreams.

A complete sleep cycle takes between 90 and 110 minutes. The first sleep cycles of the night contain short REM periods and long periods of deep sleep. As the night progresses, REM sleep increases in length while deep sleep decreases. By morning, nearly all sleep time is in stages 1, 2, and REM.



## Sleep Requirements

The amount of sleep each person needs depends on many factors, including age. Babies generally need about 16 hours a day, while teenagers need about 9 hours a day.

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For most adults, 7 to 8 hours a night is the ideal amount of sleep. Each person is different, though, and some people only need 5 hours, while others need as many as 10 hours. Older people do not need less sleep but often get less sleep.

A person needs more sleep if he or she has not gotten enough sleep in previous nights. The lack of sleep creates a "sleep debt" which is much like charging on a credit card. Eventually, your body will demand that the debt be repaid.

People do not successfully adapt to sleeping less than needed. Although people can get used to a sleep-deprived schedule, their judgment, reaction time, and other functions will be hurt. When you don't get enough sleep, it is called sleep deprivation.



Sleep deprivation is dangerous. Sleep-deprived people who are tested with a driving simulator or hand-eye coordination tasks perform as poorly as or worse than people who are intoxicated. Sleep deprivation also makes the effects of alcohol worse. A tired person who drinks will become much more impaired than someone who is well rested.

## **Benefits of Sleeping Well**

Sleeping improves our learning, memory and insight. Students who have trouble grasping new information or learning new skills are often advised to "sleep on it." Sleeping reduces stress and puts us in a good mood. That is why people report being irritable, even unhappy, when they lack sleep.



At one time or another, all of us have experienced the mental and emotional effects of not getting enough sleep. Let's examine the benefits of sleep that we may not notice.

Sleep gives your heart and vascular system a much-needed rest. Overall, sleep reduces your heart rate and blood pressure by about 10%.

Deep sleep triggers the release of more growth hormones, which fuels growth in children. Sleeping affects the release of sex hormones, which encourages puberty and fertility.

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Deep sleep helps with the repair of cells and tissues. This is why doctors recommend rest and sleep when a person is sick. Many body cells regenerate during deep sleep. They grow and repair damage caused by stress and ultraviolet rays. This is why deep sleep may truly be "beauty sleep."

## Risks of Sleep Debt

Sleep is necessary to survive. For example, rats normally live for 2 to 3 years. But in studies, those deprived of REM sleep survive only about 5 weeks. Rats deprived of all sleep stages live only about 3 weeks!

Too little sleep leaves us drowsy and unable to concentrate. It also leads to memory problems, clumsiness and a decreased ability to think. If sleep deprivation continues, hallucinations and mood swings may develop.



Sleep deprivation has harmful effects on the immune system. It causes our body to heal slower and may contribute to losing a battle against germs that invade our body. The immune system is also essential for fighting cancerous growth in our body.

If you do not sleep well, you are more likely to experience strokes, chest pain, an irregular heartbeat, heart attacks and congestive heart failure. Congestive heart failure is a condition in which fluid builds up in the body because the heart is not pumping well enough.

Sleep has a big impact on appetite, energy use and weight control. Studies find that the less people sleep, the more likely they are to be overweight or obese. They are also more likely to prefer eating foods that are higher in calories and carbohydrates.



## Driver Drowsiness

Sleep debt causes drowsiness while driving. Driver drowsiness is responsible for around 100,000 motor vehicle accidents and 1,500 deaths each year in the US alone. Do not drive if you are sleepy. If you are driving and you become sleepy, stop somewhere safe and take a short nap.

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Here are some signs of driver drowsiness:

- You can't remember the last few miles driven.
- Wandering or disconnected thoughts.
- Difficulty focusing, keeping your eyes open or keeping your head up.
- Drifting from your lane.
- Yawning repeatedly.
- Tailgating or missing signs.
- Jerking your car back into your lane.



## Sleep Thieves

Here are 10 sleep thieves. These rob us of our sleep.

1. Alcohol. Alcohol prevents the deep, quality sleep our body needs. You are more likely to sleep lighter and wake up in the middle of the night when the effects of alcohol wear off.
2. Coffee. Coffee contains a stimulant that affects our nervous system. Caffeine is the substance in coffee that is stimulating. It is also present in tea, cola beverages and chocolate. It can take as long as 6 to 8 hours for the effects of caffeine to wear off completely.
3. Hot temperature. In general, people sleep better if the temperature in the bedroom is kept on the cool side. A hot and humid temperature can wake you up.
4. Large dinners. Large meals just before bedtime can make it harder to fall asleep.
5. Hunger. Being hungry before bed can keep you from sleeping your best. Being too hungry can wake you up at night.
6. Medicine. Certain commonly used prescription and over-the-counter medicines contain ingredients that can keep you awake. These include decongestants and steroids. Many pain relievers taken by headache sufferers contain caffeine. Heart and blood pressure medications known as "beta blockers" can cause difficulty falling asleep and increase the number of times you wake up during the night.
7. Pets. Pets in the house can wake you up at night if they are kept loose and next to windows or glass doors. For instance, dogs may bark at night if they sense other animals around the house.



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8. **Smoking.** Tobacco contains nicotine, a highly addictive substance. Nicotine is another stimulant that can keep you awake. Nicotine also leads to lighter than normal sleep. Heavy smokers also tend to wake up too early because of nicotine withdrawal.
9. **Stress.** Psychological stress also takes its toll on sleep, making it more difficult to fall asleep or stay asleep.
10. **TV, computers, and mobile phones.** Some of the entertainment and communication devices we love can rob us of sleep. Phones that beep at night, computers that buzz in the evening and TVs left turned on as we sleep can keep us from sleeping well. Clear your bedroom of any potential sleep distractions that make noise or have lights.

## Tips for Sleeping Well

Here are some tips for sleeping well:

- **Stick to a sleep schedule.** Go to bed and wake up at the same time each day. Our bodies do not easily adjust to changes in our sleeping patterns.
- **Exercise regularly.** Regular exercise is great for your body and mind. It has been shown to help fight insomnia.
- **Avoid caffeine and nicotine.** Coffee, colas, certain teas and chocolate contain the stimulant caffeine. Its effects can take as long as 8 hours to wear off fully. Therefore, a cup of coffee in the late afternoon can make it hard for you to fall asleep at night.
- **Nicotine is also a stimulant,** often causing smokers to sleep only lightly. In addition, smokers often wake up too early in the morning because of nicotine withdrawal.
- **Avoid alcoholic drinks before bed.** You may think that having an alcoholic “nightcap” will help you sleep, but alcohol robs you of deep sleep. It keeps you in the lighter stages of sleep. You also tend to wake up in the middle of the night when the effects of the alcohol have worn off.
- **Avoid large meals and beverages late at night.** A light snack is a good idea if you’re hungry. But a large meal can cause indigestion that interferes with sleep. Drinking too many fluids at night can cause you to wake up a lot at night to go to the bathroom.



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- If possible, avoid medicines that delay or disrupt your sleep. Some commonly prescribed heart, blood pressure or asthma medications, as well as some over-the-counter and herbal remedies for coughs, colds, or allergies, can disrupt sleep patterns. If you have trouble sleeping, talk to your health care provider or pharmacist to see if any drugs that you're taking might be contributing to your insomnia.
- Don't take late naps. Naps can help make up for lost sleep, but late afternoon naps can make it harder to fall asleep at night.
- Relax before bed. Don't over-schedule your day so that no time is left for unwinding. A relaxing activity, such as a hot shower, reading or listening to music, should be part of your bedtime ritual.
- Have a good sleeping environment. Get rid of anything that might distract you from sleep, such as noises, bright lights, an uncomfortable bed or warm temperatures.
- You may sleep better if the temperature in your bedroom is kept on the cool side.



## Summary

Sleeping is important for our bodies and minds. It helps us learn better, fight disease and avoid stress. For most adults, 7 to 8 hours a night is the best amount of sleep. Each person is different, though, and some people may need only 5 hours or as many as 10 hours each night.

A person needs more sleep if they have not gotten enough sleep on previous nights. This lack of sleep creates a "sleep debt," which is much like charging on a credit card. When you don't sleep enough, it can interfere with work, driving and social activities. It can cause obesity, diabetes and heart problems. It can also change how well and how fast we learn.

Sleeping has a lot of benefits. It improves our memory, learning and insight. It also reduces stress and helps the body repair itself and relax. There are many things that could interfere with sleep. You can help maintain a healthy sleep pattern by sticking to a schedule, avoiding stimulants, adjusting when you take certain medicines and making your sleeping environment as comfortable and calm as possible.



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