



Sleep disorders are on the rise. It is estimated that nearly 75 percent of adult Americans experience sleep disorder symptoms at least a few nights per week. As many as 25 to 30 percent of infants and children also experience some form of sleep disturbance. Sleep loss has a detrimental effect on your quality of life and virtually all of your organ systems. You don't need to suffer with poor quality sleep or daytime sleepiness. The first step toward a better night's sleep is a comprehensive evaluation by a sleep disorders specialist.

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#### USING THIS GUIDE

**Please use this guide as a resource as you learn about the different types of sleep disorders, diagnosis and treatment options. As a patient, you have the right to ask questions and seek a second opinion.**

#### CHOOSING YOUR CARE

At Cleveland Clinic's Sleep Disorders Center, our multidisciplinary program is dedicated to the diagnosis and treatment of sleep disorders in adults and children.

Our team approach unites adult neurologists, internal medicine, family medicine and pediatric sleep experts, pulmonary and critical care medicine specialists, psychologists, psychiatrists and otolaryngologists, under one roof. Together, they will work with you to uncover the cause of your sleep problems and tailor the treatment that is best for you and your lifestyle. Cleveland Clinic's Sleep Disorders Center is accredited by the American Academy of Sleep Medicine. The center is part of our Neurological Institute, with neurology and neurosurgery services for adults and children top-ranked in Ohio by *U.S. News & World Report*. Cleveland Clinic is also consistently ranked as one of the top hospitals in the nation.



## Did you know?

### Hours of sleep needed per night:

Ages 5 – 12  
10 to 11 hours

Ages 13 – 18  
8.5 to 9.25 hours

Adults  
7 to 9 hours

## WHAT ARE SLEEP DISORDERS?

Sleep disorders can affect the quality and quantity of sleep or can cause difficulty maintaining normal wakefulness — both of which can cause impaired daytime functioning and a host of medical, psychiatric and psychosocial problems. There are more than 80 different types of sleep disorders that afflict about 70 million Americans.

## WHAT ARE THE DIFFERENT TYPES OF SLEEP DISORDERS?

Here is a look at some of the most common conditions:

### SLEEP APNEA

Sleep apnea is a potentially serious sleep disorder that occurs when a person's breathing is interrupted during sleep. People with untreated sleep apnea stop breathing repeatedly during their sleep, and this can occur up to hundreds of times during the night.

There are two types of sleep apnea: obstructive and central. Obstructive sleep apnea (OSA) is more common, and is caused by episodes of complete or partial airway blockage during sleep. This usually happens when the soft tissue in the back of the throat collapses during sleep. In central sleep apnea (CSA), the airway is not blocked, but the brain fails to signal the muscles to breathe. This is caused by instability in the respiratory control center in the central nervous system.

### What are the symptoms of sleep apnea?

Often the first signs of OSA are recognized not by the patient, but by the bed partner. They may include snoring, daytime sleepiness or fatigue, restlessness during sleep, sudden awakenings with gasping or choking, dry mouth or sore throat upon awakening, trouble concentrating, forgetfulness, irritability, night sweats, sexual dysfunction and headaches. Those with CSA more often report recurrent awakenings or insomnia, although they also may experience choking or gasping with sudden awakenings.

In children, the signs may not be as obvious and include poor school performance, hyperactivity, lack of focus, sleepiness, daytime mouth breathing, inward movement of the rib cage when inhaling, unusual sleeping positions, excessive nighttime sweating, learning and behavioral disorders, and bedwetting.

### How is sleep apnea diagnosed?

A physician will take a medical and sleep history and conduct a physical exam. An overnight sleep study, or polysomnogram (PSG), is required to make the diagnosis and grade its severity. Studies are tailored to address the individual's symptoms and bedtimes. Sleep testing can be performed at



the home of patients with high probability of moderate to severe obstructive sleep apnea and who do not have problems affecting the heart, lungs and/or nervous system. (See sidebar on HST for details.)

### **How is sleep apnea treated?**

Conservative treatment may be all that is needed for milder cases of sleep apnea. Lifestyle changes may include losing weight (if overweight), avoiding alcohol and sleeping pills, sleeping on your side, using nasal sprays or breathing strips, and avoiding sleep deprivation. Continuous positive airway pressure (CPAP) therapy is often necessary for those with OSA. Special appliances that are placed in the mouth can help those with mild-to-moderate sleep apnea. These appliances prevent the tongue from blocking the throat and help move the lower jaw forward during sleep.

Other non-CPAP methods of obstructive sleep apnea treatment include nasal expiratory positive airway pressure therapy and oral pressure therapy. Nasal expiratory therapy consists of mechanical valves placed at the nares. This allows for a low resistance when inhaling and a high resistance when exhaling, which ultimately keeps the airway clear. Oral pressure therapy uses a light oral vacuum that brings the throat tissues forward and stabilizes the tongue to open the airway.

In some patients, surgical procedures effectively reduce sleep apnea in those who have too much soft tissue or malformed tissue that blocks the airflow through the nose or throat. Surgical options can range from nasal surgery to improve breathing to help adjust to CPAP, restructuring of the throat tissue to lessen collapse, or even a nerve stimulation implant to open the airway.

The nerve stimulation treatment involves a small, minimally invasive, implanted pacemaker-like system that monitors breathing while sleeping and delivers mild stimulation to certain airway muscles to keep the airway open. It is controlled via a handheld remote and consists of three implanted components: a small generator, which is implanted in the right chest area; a breathing sensor, which is placed in the thoracic region; and a stimulation lead, which is placed along a branch of the hypoglossal nerve. Of the patients that meet strict inclusion and exclusion criteria, this therapy has shown to reduce the severity of OSA and improve quality of life and daytime functioning.

### **What is CPAP?**

With continuous positive airway pressure (CPAP), patients wear a mask over their nose and/or mouth and an air blower forces air through the airway. The air pressure is constant and continuous, and adjusted so that it is just enough to prevent the upper airway tissues from collapsing during sleep.

## Home Sleep Testing (HST)

HST is a diagnostic test that helps confirm the presence of moderate-to-severe OSA. The testing is done in the comfort of your home, instead of a sleep laboratory, using a portable sleep monitor. Importantly, this test is not recommended in patients with sleep disorders other than OSA or in patients with serious heart or lung disorders who require a more comprehensive overnight study in a sleep laboratory.

Once home sleep testing has been ordered, you will be scheduled for an appointment with one of our technologists to learn how to operate the device. The portable sleep monitor is easy to activate. It includes a recording device, sensors and belts and is powered by AA batteries. It records information, including your airflow, breathing effort, blood oxygen levels and snoring during your sleep. You will have the opportunity to practice applying the device with one of our sleep technologists so you are more comfortable using the equipment on your own. You will return the monitor the day after your study and the results will be sent to your referring physician within a week.



CPAP prevents airway closure while in use, but apnea episodes return when CPAP is stopped or it is used improperly. Many types and styles of devices are available.

Some patients are not able to adhere to CPAP due to pressure intolerance. Patients who cannot tolerate CPAP

may benefit from other types of pressure delivery devices. The Cleveland Clinic Sleep Disorders Center offers additional services including PAP Naps and SAM clinics for patients having challenges getting adjusted to PAP therapy.

### What are some advancements in the diagnosis and treatment of OSA available at Cleveland Clinic?

- **Sleep Apnea Management (SAM) Clinic:** SAM is an innovative and interactive approach to healthcare that brings patients with common needs together with healthcare providers such as a nurse, nurse practitioner, physician and/or durable medical equipment (DME) representative, in one room to provide the most efficient service.

The SAM Clinic is dedicated to helping patients successfully use PAP therapy and is designed to give patients who are beginning PAP therapy quick access to one-on-one help for any questions or problems that could interfere with them regularly using their therapy on a nightly basis at home.



## Good sleeping habits:

### Before getting into bed –

- Establish a routine for bedtime
- Create a positive sleep environment
- Relax before getting into bed
- Avoid alcohol, smoking and caffeine for at least a few hours before bedtime
- Do not go to bed unless you are sleepy
- Reduce exposure to electronics (e.g., smartphones, tablets) within one hour of bedtime; it's best to keep these out of the bedroom

### While in bed –

- Turn your clock around and use your alarm, if needed
- If you can't fall asleep in 20 minutes, get out of bed and do something relaxing until you are sleepy
- Use your bed for sleep only

### In the morning and daytime –

- Wake up at the same time each morning, even on weekends
- Avoid daytime naps
- Avoid caffeine, especially in the late afternoon and evening
- Exercise regularly, but not within four hours of bedtime



It is our goal to help patients feel comfortable and confident using PAP. While experience may vary, successful use of PAP therapy can greatly reduce sleepiness, fatigue and irritability while increasing energy level, alertness and mood within a week. PAP therapy is proven to reduce the long-term risks of heart attack, stroke, high blood pressure and diabetes.

- **Positive Airway Pressure (PAP) Nap:** PAP Nap is one tool used to help patients effectively use PAP therapy. A PAP Nap is a daytime study for patients who have anxiety about starting PAP therapy, are claustrophobic, or are having difficulty tolerating PAP therapy for their sleep-related breathing disorder. The patient works one-on-one with a sleep technologist, using relaxation, deep breathing and desensitization techniques to try to become more comfortable with PAP therapy.

During the PAP Nap, patients have individual coaching and counseling by a sleep technologist to overcome any fears or discomforts they have about PAP therapy and to make them more comfortable with the mask and pressure sensations. Minimal bioelectrodes are used during these studies.

## INSOMNIA

Insomnia is a sleep disorder in which people have difficulty falling asleep, staying asleep, early morning awakening or unrefreshing sleep in the setting of an adequate opportunity for sleep. About 50 percent of adults experience occasional bouts of insomnia, and one in 10 suffers from chronic insomnia. It is twice as common in women as men, and is more common in older than younger people.

### There are two kinds of insomnia:

**Primary insomnia** – sleep problems not associated with other health problems

**Comorbid insomnia** – sleep problems due to another health condition, pain, medicine or substance abuse

### What are the symptoms of insomnia?

Insomnia can cause sleepiness during the day, general tiredness, irritability and problems with concentration or memory.

Insomnia varies in how long it lasts and how often it occurs. It may be short-term (acute) or long-term (chronic). Insomnia is considered chronic when it occurs at least three nights a week for a month or longer. Psychophysiological (mind-body) insomnia is a disorder in which people cannot sleep because their minds or bodies are not relaxed.

### How is insomnia diagnosed?

Insomnia is diagnosed by a clinical evaluation, including a physical exam, medical history and sleep history. You may be asked to keep a sleep diary for a week or two, and your doctor may want to ask your partner about the quantity and quality of your sleep. In some cases, you may be referred to a sleep laboratory for special tests.

### How is insomnia treated?

Insomnia is treated by practicing good sleep habits and cognitive behavioral strategies with or without the use of short-term sleep aids.

In addition to treating comorbid health problems that you also may be experiencing, the most effective treatment for chronic insomnia is cognitive behavioral therapy. Cognitive behavioral therapy for insomnia (CBT-I) is a multi-component treatment that addresses your thoughts and behaviors related to sleep. The behavioral aspects of treatment consist of two well-developed and research-supported treatment components — sleep restriction therapy and stimulus control therapy — which are aimed at improving sleep quality and quantity. The cognitive component of the treatment focuses on restructuring or changing sleep-related thoughts. These can include thoughts that increase arousal and beliefs that may interfere with insomnia treatment.

Most of the evidence supporting CBT-I is from studies by expert practitioners who have worked with patients over a specific number of sessions. Research also supports the effectiveness of CBT-I when administered in a group setting. Cleveland Clinic's Sleep Disorders Center is one of only a few sleep centers across the United States that provides CBT-I in a group setting. The Sleep Skills Group is a form of treatment designed to provide sleep knowledge and effective coping skills to help you sleep as soundly as possible. The group meets weekly for four weeks and many people begin seeing improvements within the initial two to three weeks of treatment.



Recently, web-based treatment programs have incorporated the principles of CBT-I, providing greater accessibility to this treatment. Cleveland Clinic's Sleep Disorders Center has partnered with Cleveland Clinic's Wellness Institute to develop a six-week online program, which is designed for patients who are experiencing short-term insomnia or those with episodic insomnia (with more frequent sleeplessness at times of higher stress levels). The **GO!® to Sleep Program** follows a similar treatment plan to those used in our own sleep clinic, but allows patients to improve sleep from the comfort and privacy of their own homes. Some people with insomnia need face-to-face treatment with a therapist, but online treatment programs can be an effective treatment strategy for many patients. For information about the **GO!® to Sleep Program**, visit [clevelandclinicwellness.com/sleep](http://clevelandclinicwellness.com/sleep).

## RESTLESS LEGS SYNDROME

Restless legs syndrome (RLS) is a sleep disorder causing an intense, often irresistible urge to move your legs. RLS is brought on by lying down or sitting for long periods of time. Although RLS can occur at any age, it is more common in older adults and affects women more than men.

Several medical problems can contribute to developing RLS, including iron deficiency, Parkinson's disease, renal (kidney) disease, diabetes, rheumatoid arthritis (RA) and peripheral neuropathy (nerve pain, tingling or loss of feeling in the extremities). Pregnant women, dialysis patients, and those taking antidepressants, sedating antihistamines or anti-nausea medications may develop RLS.

### What are the symptoms of RLS?

The urge to move your legs is often accompanied by tingling, pulling, creeping or uncomfortable sensations. This condition, which typically occurs in the evening, is partially or completely relieved by stretching, walking or exercising the affected muscles. RLS can cause problems falling asleep, staying asleep, daytime tiredness, irritability and concentration problems.

### How is RLS diagnosed?

Your physician will take a medical and sleep history, and perform a full physical and neurological exam to check for nerve damage or blood vessel problems. Blood tests may be ordered to rule out medical disorders associated with RLS. Sleep studies are not required to diagnose RLS but may be indicated if other sleep disorders are suspected, such as sleep apnea.

### How is RLS treated?

RLS is treated in different ways, depending on the intensity of the symptoms. In some cases, RLS is temporary and resolves when other conditions are treated. RLS is either primary (inherited or genetic) or secondary. If secondary causes cannot be treated (like in renal failure or peripheral neuropathy), medications to manage RLS symptoms are prescribed.

Several types of medications are effective for treatment of RLS including new treatments recently FDA approved. Treatment should be tailored to meet the individual's needs and timed in accordance with symptom onset. Lifestyle changes include avoiding caffeine, alcohol and tobacco. Massage, warm baths and leg stretches also may be helpful.

## CIRCADIAN RHYTHM DISORDERS

Circadian rhythm disorders are disruptions in the circadian rhythm — a name given to the “internal body clock” that regulates the roughly 24-hour cycle of biological processes in animals and plants. The term “circadian” comes from Latin, meaning “around a day.”

There are several types of circadian rhythm disorders, including delayed sleep phase disorder, advanced sleep phase disorder, jet lag from traveling between time zones, and shift work sleep disorders caused by irregular sleep schedules.



### What are the symptoms of circadian rhythm disorders?

In circadian rhythm disorders, there is a continuous or occasional disruption of sleep patterns. This disruption is either a malfunction of the internal body clock, or a mismatch between the internal clock and the external environment regarding timing and length of sleep. As a result, those with circadian rhythm disorders experience insomnia at certain times and excessive sleepiness at other times. This causes problems functioning at work, school or in social activities.

### How are circadian rhythm disorders diagnosed?

Diagnosing a circadian rhythm disorder is challenging and often requires consultation with a sleep specialist, who will help rule out other sleep and medical disorders. Some circadian rhythm disorders are prone to be misdiagnosed as narcolepsy or co-exist with insomnia or sleep apnea. You may be asked to keep a detailed sleep diary for several weeks. Overnight and daytime sleep studies also may be needed.

### How are circadian rhythm disorders treated?

Treatment options vary based on the type of disorder and how severely it is affecting your quality of life. Options include:

- **Behavior therapy:** includes standardizing sleep times, getting regular exercise, and avoiding caffeine and stimulating activities before bedtime
- **Bright light therapy:** 30- to 60-minute treatments to reset the circadian clock
- **Medications:** such as melatonin, wake-promoting agents and short-term sleep aids
- **Chronotherapy:** adjusting sleep times by one to two hours per day to shift the sleep cycle

### What is an example of a circadian rhythm disorder?

Shift work sleep disorder (SWSD) affects people who frequently rotate shifts or work at night. These schedules (usually between 10 p.m. and 6 a.m.) go against the body's natural circadian rhythm, and cause difficulty adjusting to different sleep and wake schedules.

### What are the symptoms of SWSD?

The most common symptoms are insomnia and excessive sleepiness. Others include difficulty concentrating, headaches and lack of energy. Not every shift worker suffers from SWSD, but it is important to seek treatment if you are affected to avoid driving accidents, work-related errors, increased sick leave and mood problems.

### How is SWSD diagnosed?

If you are a shift worker and experience any of these symptoms, you should talk to your doctor. He or she will take a medical and sleep history, conduct a physical exam and determine if a sleep study, or other testing, is needed.

### How is SWSD treated?

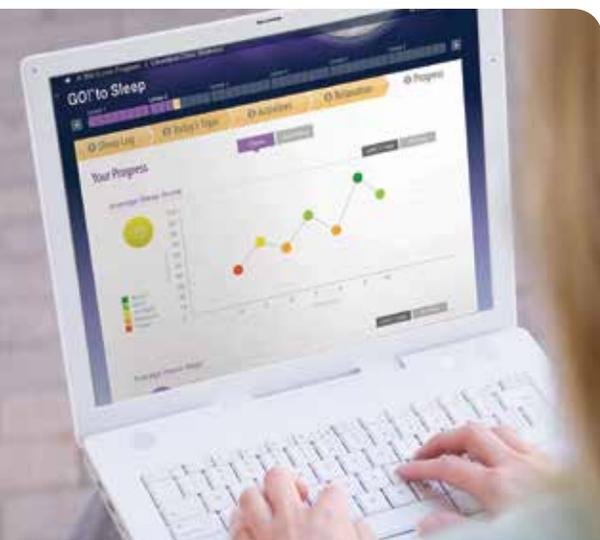
Shift workers should be educated on the importance of prioritizing time for sleep. There are many strategies to help you sleep even during the day time such as:

- Follow regular bedtime rituals
- Keep a regular schedule even on weekends
- Get seven to eight hours of sleep daily
- Ask your family to create a quiet environment during your sleep time
- Put a "Do Not Disturb" sign on your door.
- Turn your mobile device off

## PARASOMNIAS

These disruptive sleep-related disorders arise from rapid eye movement (REM) sleep or arousals from non-rapid eye movement (NREM) sleep.

They are characterized by undesirable physical or emotional experiences, such as walking or talking in association with specific sleep stages or sleep wake transitions.



# GO!® to Sleep Program

Cleveland Clinic's Go! to Sleep Program provides six weeks' worth of effective sleep therapy without leaving home. Participants will receive:

- An online sleep log to help determine their daily sleep score and daily recommendations to improve their sleep
- Activities to help them sleep better
- Daily emails from the program coach
- Daily articles to help them get the most from the program
- Personal progress charts
- Six specially crafted relaxation practices
- Motivational tips
- A mobile app for easy sleep-tracking

## What are the symptoms of parasomnias?

There are many different types of parasomnias, including:

**Nightmares:** Vivid dreams that can cause feelings of fear, terror and/or anxiety. Usually, the person is abruptly awakened from REM sleep and can recall details of their nightmare. Illness, anxiety, loss of a loved one or medications can cause nightmares.

**Sleep terrors/night terrors:** Abruptly arousing from a deep sleep in a terrified state. The person may appear awake, but is confused and unable to communicate. Lasting for about 15 minutes, the individual usually lies down and falls asleep afterwards, not remembering the event the next morning. Sleep terrors or night terrors are common in children between the ages of 4 to 12 years old, and may affect adults. Sleep terrors/night terrors are sometimes caused by emotional tension, and alcohol can increase their occurrence.

**Sleepwalking:** Occurs when a person appears to be awake, with eyes open, but the person is actually in a deep sleep. Sleepwalking is common in children between the ages of 6 to 12 years old, as well as in older adults. The length of episodes varies, and individuals have little or no memory of their actions.

**Confusional arousals:** Occurs when a person is awakened from deep sleep during the first part of the night. It involves an exaggerated slowness or trouble comprehending upon waking.

**Sleep eating:** Characterized by abnormal eating patterns during the night without full awareness.

**REM sleep behavior disorder (RBD):** Acting out dramatic and/or violent dreams during REM sleep. RBD usually occurs in men who are 50 years or older, but it may occur in women and younger people.

**Sleep enuresis (bedwetting):** When a person is unable to maintain urinary control while asleep. Bedwetting may be primary (from infancy onward) or secondary (new onset condition) caused by medical conditions or psychiatric disorders.

## How are parasomnias diagnosed?

Frequent episodes that are disturbing to sleep or affect the household or cause injury require evaluation by a sleep expert. Primary care providers can diagnose and manage straightforward cases.

## How are parasomnias treated?

Many parasomnias are more common in children and do not require treatment, as they tend to resolve them in time. However, some parasomnias,



such as RBD and confusional arousals in adults, may require treatment such as medications. Enuresis is treated with behavioral modification, alarm devices and medications.

## NARCOLEPSY

Narcolepsy is a neurological disorder that has been linked to reduced amounts of a neuropeptide called hypocretin in a specific part of the brain that is important in regulating the sleep-wake cycle. People with narcolepsy experience excessive daytime sleepiness and uncontrollable episodes of falling asleep during the day despite adequate sleep. These sudden sleep “attacks” may occur during any type of activity and at any time of day.

### What are the symptoms of narcolepsy?

Those who suffer from narcolepsy experience excessive daytime sleepiness. Other symptoms may include episodes of sudden loss of muscle tone or weakness (cataplexy), a temporary inability to move during sleep-wake transitions (sleep paralysis), as well as sleep-related hallucinations and disturbed nighttime sleep.

### How is narcolepsy diagnosed?

The diagnosis of narcolepsy is made after performing a detailed medical and sleep history and physical exam. Two sleep lab tests that are usually required include a polysomnogram (PSG) and multiple sleep latency test (MSLT).

A PSG is an overnight study that takes continuous measurements to document sleep cycle abnormalities such as rapid eye movement (REM) disturbances. The MSLT is a daytime test of five short naps that are scheduled two hours apart, which measures a person’s tendency to fall asleep. The MSLT determines whether isolated elements of REM sleep intrude at inappropriate times during the waking hours.

### How is narcolepsy treated?

Treatment is aimed at improving alertness during the desired time of day, based on your needs and lifestyle. It is possible to maximize your quality of sleep by following good sleep habits, including:

- maintaining a regular sleep-wake schedule
- not staying up late on weekends
- avoiding alcohol and other central nervous system depressants
- modifying work and school schedules
- taking short naps to avoid unintentional sleep attacks
- using moderate amounts of caffeine to stay alert as needed



# 10,000+

More than 10,000 sleep studies are performed in our laboratories each year.



## What is a sleep study?

A sleep study or overnight polysomnogram (PSG) is a test that records sleep and the bioelectrical signals coming from the body during sleep. Respiratory monitoring during the PSG allows sleep specialists to rule out the presence of sleep apnea as a cause for the disrupted sleep and excessive muscle activity.

- operating motor vehicles and heavy equipment with extreme caution and only when approved by your doctor.

Medications are used to treat daytime sleepiness, cataplexy, sleep-related hallucinations and disturbed nocturnal sleep.

### SLEEP DISORDERS AND COMORBID MEDICAL CONDITIONS

Sleep disorders and other medical conditions often coexist. Some medical conditions may cause sleep disorders. Sleep disorders also can lead to other medical conditions. Treating both the sleep disorder and the other medical condition simultaneously improves the likelihood of getting both conditions under better control.

#### What are some of the different types of coexisting disorders?

**Cardiovascular disease and OSA:** Heart attack, high blood pressure and heart arrhythmias, such as atrial fibrillation, have been associated with OSA. The pauses in breathing throughout the night that occur with OSA can lead to intermittent increases in heart rate and blood pressure as well as decreases in oxygen levels, which, over time, can damage the heart and blood vessels. Appropriate treatment of OSA can reduce the risk of cardiovascular disease. Patients who already have a history of high blood pressure may have improvement in blood pressure control once their OSA is appropriately treated. Atrial fibrillation also may be better controlled or resolve once OSA has been treated.

**Obesity and OSA:** Obesity is defined as a body mass index (BMI) > 30. Excess weight leads to more collapsibility of the airway at nighttime, increasing the risk of the pauses in breathing that occur with OSA. Bariatric surgery, or weight loss surgery, is becoming more common for the treatment of obesity, especially in patients with a BMI > 40. Bariatric surgery patients appear to have a higher risk of complications, including death, during their surgery when OSA also is present and goes untreated. It is important for patients being evaluated for bariatric surgery to also be evaluated for OSA so that they can be appropriately treated prior to undergoing surgery. Weight loss can sometimes eliminate OSA, but even with significant weight loss, OSA does not always completely resolve due to other risk factors for OSA (including gender, family history, increasing age and airway anatomy). OSA is rarely treated with weight loss alone. Usually other methods, including PAP therapy, oral appliance, positional therapy or airway surgery are also used.

**Peripheral neuropathy and RLS:** Peripheral neuropathy is a medical condition that causes pain, numbness or tingling in the legs and/or arms due to nerve damage in the limbs. Peripheral neuropathy is commonly associated with diabetes mellitus, hypothyroidism, autoimmune disease and vitamin deficiencies, and it can also cause restless legs syndrome.



(RLS). Leg symptoms are often times described as more painful (rather than uncomfortable or annoying sensations) in patients with RLS due to peripheral neuropathy. Patients with RLS due to peripheral neuropathy may respond better to medications that are used to treat neuropathy, rather than some of the other typical RLS medications. A thorough sensory exam of the legs should be done in every patient with RLS symptoms to evaluate for peripheral neuropathy. Certain labs also may need to be performed to look for a possible cause of peripheral neuropathy.

**Other neurological disorders and hypersomnia:** OSA, insomnia and other sleep disorders coexist with a variety of common neurological conditions including epilepsy, stroke, Parkinson's disease, multiple sclerosis, traumatic brain injury and dementia that can cause hypersomnia or excessive daytime sleepiness. The hypersomnia may be due to medication side effects, damage to the areas of the brain that regulate wakefulness, or a combination of both. Multiple sclerosis and traumatic brain injury have additionally been shown to

cause narcolepsy, a neurological disorder associated with hypersomnia due to a decrease in hypocretin. Imaging of the central nervous system, lab work and sleep testing may be needed to help to further assess symptoms. Treatment for hypersomnia may include the use of wake promoting agents and ensuring appropriate treatment of the underlying neurological disorder.

**Psychiatric disorders and insomnia:** Patients with depression often report experiencing low mood, impaired concentration, loss of interest in previously enjoyed activities, lack of motivation, appetite changes and sleep disturbances. Sleep disturbances that frequently accompany depression are difficulties falling asleep, difficulties staying asleep, early morning awakenings and unrefreshing sleep. Patients with anxiety disorders have feelings of nervousness, difficulties relaxing and uncontrolled tension. Insomnia, in the form of difficulty falling asleep or difficulty staying asleep or nocturnal panic attacks, accompanies half of patients with anxiety. People who abuse alcohol or illicit drugs also frequently experience sleep issues.

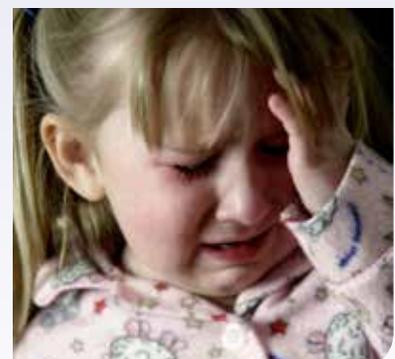
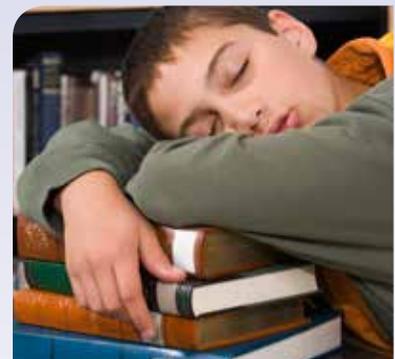
## What are the most common pediatric sleep disorders?

### Younger children

- Bedtime struggles
- Night awakenings
- Sleepwalking
- Sleep terrors
- Nightmares
- Head banging
- Sleep apnea
- Bedwetting
- Narcolepsy
- Movement disorders like restless legs syndrome (RLS)
- Circadian (biological clock) rhythm disorders
- Nocturnal seizures

### Older children/teens

- Insufficient sleep
- Circadian (biological clock) rhythm disorders
- Insomnia
- Snoring
- Sleep apnea
- Narcolepsy
- Movement disorders, like restless legs syndrome (RLS)
- Sleepwalking
- Bedwetting





They may use alcohol or drugs to try to treat insomnia, but these substances are not effective. Substance abuse can ultimately lead to serious health and performance problems. Proper evaluation includes seeing both sleep and psychiatry/psychology experts. Further testing with an overnight sleep study may be needed. Treatment for the insomnia includes treating the underlying problem, often times with medications. Cognitive behavioral therapy for insomnia also may be helpful.

## PEDIATRIC SLEEP DISORDERS

Children spend a substantial part of their lives asleep. In fact, in infancy and early childhood, the developing brain seems to need more time asleep than awake. This underscores the importance of sleep to the overall well-being of a child. Children with sleep disorders may suffer from lack of adequate sleep time or experience poor sleep quality, or both.

### **What are the symptoms of pediatric sleep disorders?**

Sleep disorders may lead to an inability to get up in time for school, daytime moodiness, irritability, lack of focus in class, and significant behavioral and learning problems. In older children and teens, drug and alcohol abuse and school absenteeism may result. Some sleep disorders are serious enough to cause adverse cardiovascular and metabolic effects. Children may be misdiagnosed with mood, attention or motivational problems, which entirely miss the true underlying sleep problem.

### **How are pediatric sleep disorders diagnosed?**

If your child has difficulty sleeping, discuss the matter with your pediatrician. Your child may benefit from a referral to a pediatric sleep doctor to further investigate the problem. A sleep specialist will obtain a thorough medical and sleep history, as well as conduct a physical exam to identify any medical problems. In some cases it may be necessary to observe your child overnight in a sleep laboratory while a polysomnogram is conducted. This test records brain activity, eye movements, muscle activity, tissue oxygen, carbon dioxide, oro-nasal (mouth and nose) airflow and breathing patterns during sleep.

Children may also undergo a MSLT (multiple sleep latency test), a series of five daytime naps at two-hour intervals, to diagnose possible narcolepsy. Other tests may include sleep logs and actigraphy (in which a small motion detector is worn on the wrist to assess sleep-wake rhythms). Occasionally, blood and urine tests, spinal fluid analysis, and genetic tests are recommended.

### **How are pediatric sleep disorders treated?**

Treatment depends on the type of disorder and its severity. Some sleep disorders, such as night terrors or sleep walking, are developmental and usually resolve with time—only requiring intervention if they are alarming or dangerous in nature.

Other sleep disorders can be treated in a variety of ways, including the use of continuous positive airway pressure (CPAP) for obstructive sleep apnea, tonsil and adenoid surgery, bright light therapy or medication. Behavioral techniques and adjustment of sleep schedules can be helpful in managing many sleep disorders. Psychosocial factors may be either the cause of sleep disorders or the result of sleep disorders. Therefore, it is not surprising that psychological, cognitive and behavioral interventions, with or without medications, can be beneficial in some cases.

## SLEEP DISORDERS IN THE ELDERLY

As you age, there are general changes in sleep patterns, including spending more time in light sleep, having more disrupted nighttime sleep, having more health conditions that negatively affect sleep quality and quantity, sleeping less, and taking more daytime naps that can cause an irregular sleep-wake cycle. However, sleep disorders, such as insomnia, sleep apnea, restless legs syndrome (RLS), and REM behavior disorder, also are associated with aging.

### **What are the common causes of sleep problems in older adults?**

Common causes of sleep problems in older adults include poor sleep habits, medical illness, medicines,



psychological stress or psychiatric disorders, and retirement.

## SLEEP AND AGING

### How do I know if I'm getting enough sleep?

To check if you have a sleep problem, ask yourself about the quality of your time awake. If you are getting less sleep than when you were younger, but still feel rested and energetic during the day, it may be that you now need less sleep. Every person's sleep needs are different.

However, if you are noticing your lack of sleep is affecting your daytime activities, you should try to determine the cause of your sleeplessness and take steps to get better rest. Consult a sleep expert if you have concerns about your sleeping patterns or the possibility of having a sleep disorder. He or she will conduct a medical and sleep history, physical exam and may order an overnight sleep study, called a polysomnogram, or other additional testing.

## SLEEP STUDIES

More than 10,000 sleep studies are performed in our laboratories each year.

### What is a sleep study?

A sleep study or overnight polysomnogram (PSG) is a test that records sleep and the bioelectrical signals coming from your body during sleep. Respiratory (breathing) monitoring during the PSG allows sleep specialists to rule out breathing problems during sleep as the reason for the disrupted sleep and excessive muscle activity.

### What is PAP?

With positive airway pressure (PAP), patients wear a mask over their nose and/or mouth and an air blower that provides a constant flow of pressure into the upper airway. Different types of pressure delivery are available based on the individual's needs to prevent the upper airway tissues from collapsing during sleep. PAP prevents airway closure while in use, but apnea episodes return when PAP is stopped or if it is used improperly. Many types and styles of devices are available.

### What is a PAP Titration Study?

A Positive Airway Pressure (PAP) Titration study is an overnight study that is done after a diagnosis of sleep apnea has been made. The purpose is to determine the appropriate pressure setting of the PAP machine that will effectively treat the sleep apnea. The pressure that is delivered through the PAP mask is gradually increased while the patient is sleeping until the pauses in breathing that occur with sleep apnea are under control.

### What is a PAP Nap?

A PAP Nap is a daytime study for patients who have anxiety about starting PAP therapy, are claustrophobic, or are having difficulty tolerating PAP therapy. The patient works one-on-one with a sleep technologist, using relaxation, deep breathing and desensitization techniques to try to become more comfortable with PAP therapy. The session lasts for up to several hours with the expectation that the patient will become comfortable enough with the PAP therapy to fall asleep. Minimal bioelectrical electrodes are used during these studies.

### What is a MSLT Study?

A Multiple Sleep Latency Test (MSLT) is a daytime sleep study that consists of five short nap trials that are scheduled two hours apart. The study measures a person's tendency to fall asleep. MSLTs determine whether isolated elements of REM sleep intrude at inappropriate times during the waking hours. MSLTs are generally used to evaluate for narcolepsy or other forms of hypersomnia.

### What is a MWT Study?

A Maintenance of Wakefulness Test (MWT) is a daytime sleep study that consists of four nap trials that are scheduled two hours apart. They test a patient's ability to stay awake. MWTs are used to determine effectiveness of wake promoting medications and response to PAP therapy in patients with sleep apnea who also have hypersomnia.



# 1978

**Cleveland Clinic's Sleep Disorders Center, established in 1978, was among the first in the nation dedicated to the diagnosis and treatment of sleep disorders in people of all ages.**

## READY TO MAKE AN APPOINTMENT?

Call **216.636.5860** or toll-free **866.588.2264** to make an appointment with any of our experts in Cleveland Clinic's Sleep Disorders Center.

To speak with a sleep technologist after hours (5 p.m. to 8 a.m.), please call **216.444.8536** or toll-free, **800.223.2273, ext. 48536**.

For more information, call **216.444.2165** or visit [clevelandclinic.org/sleep](https://clevelandclinic.org/sleep).

## Need a second opinion but cannot travel to Cleveland?

Our **MyConsult** service offers secure online second opinions for patients who cannot travel to Cleveland. Through this service, patients enter detailed health information and mail pertinent test results to us. Then, Cleveland Clinic experts render an opinion that includes treatment options or alternative recommendations regarding future therapeutic considerations. To learn more about **MyConsult**, please visit [clevelandclinic.org/myconsult](https://clevelandclinic.org/myconsult).

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# Locations

**Cleveland Clinic's Sleep Disorders Center offers services at multiple locations throughout Northeast Ohio:**

## **The Cleveland Clinic Sleep Disorders Center at Fairhill**

11203 Stokes Blvd.  
Cleveland, OH 44104

- Adult and pediatric sleep laboratory
- Outpatient clinic
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Beachwood**

Fairfield Inn & Suites by Marriott  
3750 Orange Place  
Beachwood, OH 44122

- Routine overnight sleep studies for patients age 8 and older
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Hillcrest**

Hillcrest Hospital  
6780 Mayfield Road  
Mayfield Hts., OH 44124

- Routine overnight sleep studies for patients age 8 and older
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Independence**

Courtyard Marriott  
5051 West Creek Road  
Independence, OH 44131

- Routine overnight sleep studies for patients age 8 and older

## **The Cleveland Clinic Sleep Disorders Center at Lutheran**

Lutheran Hospital  
1730 West 25th St.  
Cleveland, OH 44113

- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Medina**

Motel 6  
3122 Eastpointe Drive  
Medina, OH 44256

- Routine overnight sleep studies for patients age 8 and older
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Mentor**

Holiday Inn Express  
5785 Heisley Road  
Mentor, OH 44060

- Routine overnight sleep studies for patients age 8 and older
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at North Olmsted**

The Courtyard by Marriott  
Airport/North  
24901 Country Club Blvd.  
North Olmsted, OH 44070

- Routine overnight sleep studies for patients age 8 and older

## **Cleveland Clinic Superior Medical Sleep Center**

1959 Cooper Foster Park Road  
Lorain, OH 44053

- Routine overnight sleep studies for patients age 8 and older
- Home sleep testing

## **The Cleveland Clinic Sleep Disorders Center at Twinsburg**

The Hilton Garden Inn  
8971 Wilcox Drive  
Twinsburg, OH 44087

- Routine overnight sleep studies for patients age 8 and older

## **The Cleveland Clinic Sleep Disorders Center at Weston, Florida**

2950 Cleveland Clinic Blvd.  
Weston, FL 33331

- Adult and pediatric sleep laboratory
- Outpatient clinic



**Every life deserves world class care.**

9500 Euclid Ave., Cleveland, OH 44195

Cleveland Clinic is a nonprofit, multispecialty academic medical center integrating clinical and hospital care with research and education for better patient care. More than 3,200 staff physicians and researchers in 120 medical specialties provide services through 27 patient-centered institutes. Cleveland Clinic's health system comprises a main campus, eight regional hospitals and more than 90 outpatient locations, with 18 family health centers in northern Ohio, and medical facilities in Florida, Nevada, Toronto and Abu Dhabi. Cleveland Clinic is consistently ranked among the top five hospitals in America (*U.S. News & World Report*).  
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