What Are Sleeping Pills?

Most sleeping pills are “sedative hypnotics.” That’s a specific class of drugs used to induce and/or maintain sleep. Sedative hypnotics include benzodiazepines, barbiturates, and various hypnotics.

SLEEPING PILL ABUSE: ITS SIGNS AND SYMPTOMS

A number of people underestimate the powerful grip sleeping pills like Ambien or Sonata can have over someone’s life and the dangers of abusing these drugs.
Many people abusing sleeping pills experience memory and concentration problems.

Some of the signs of sleeping pill abuse include:
- Slurred speech
- Uncoordinated movements
- Unsteady gait
- Inability to focus
- Impaired memory
- Unusual euphoria.

SLEEPING PILLS: ITS MAIN DANGERS

Both the immediate and long-term dangers of sleeping pill abuse are enough for most people to exercise caution when using them. However, many people aren’t aware of the dangers of these medications. The dangerous effects of sleep medications range from seizures to depressed breathing. Some people also experience allergic reactions from sleeping pills that can cause difficulty breathing, chest pain, nausea and swelling.

Though rare, people who use sleeping pills may even develop parasomnias. Parasomnias are defined as sleep disorders that include behaviors like sleep-walking, sleep-eating, sleep-sex, sleep-driving and other potentially dangerous sleep-related activities.

The immediate dangers of sleeping pills range from minor fatigue to coma. Some of these side effects can even lead to deadly overdoses, casting light on the true dangers of sleeping pills.

Common symptoms of sleeping pill abuse are:
- Dizziness
- Dry mouth
- Difficulty with coordination
- Daytime drowsiness
- Memory loss
- Unusual dreams
- Itching and swelling
• Lightheadedness
• Depressed breathing rate.

The people who use sleeping pills over a long period of time are likely to experience intensified side effects. As they continue taking these pills over time, the substance builds up in their body and produces unwanted side effects. These effects may include high blood pressure, irregular heartbeat and depression.

One side effect that most chronic sleeping pill users experience is “rebound insomnia,” or the resurgence of sleeping troubles once the user stops taking the drug. Often, this kind of insomnia is worse than the original insomnia. Rebound insomnia might even cause bizarre and disturbing dreams that can lead to panic attacks and increased anxiety upon waking.

Rebound insomnia is a withdrawal symptom from an addiction to a sleeping pill and should not be considered a reason to continue use. Rebound insomnia is often the cause of relapse for those trying to recover. This can create a dangerous cycle of abuse.

**Recognizing a Sleeping Pill Addiction**

Sleeping pills pose a serious threat of dependence, as they are oft-prescribed and commonly abused. Several people who develop an addiction to sleeping pills have reported increasing their dose after the effects had diminished. Over time, they developed a tolerance that turned into an addiction. The first step in overcoming this powerful addiction is recognizing that there’s a problem.

The Diagnostic and Statistical Manual of Mental Disorders outlines the full criteria for clinically diagnosing an addiction. These criteria include behavioral and physical symptoms that result from prolonged drug use. Those who become addicted to their sleep medication may exhibit symptoms such as:

• Needing larger doses to fall asleep
• Trying and failing to quit more than once
• Ignoring social, professional and familial obligations
• Seeming confused or frequently detached.
Intervention and Next Steps

If someone you care about exhibits the signs and symptoms of having an addiction to sleeping pills, whether it’s Lunesta, Sonata or Ambien, it’s time to talk to them about getting help. Staging an intervention is one of the best ways to show an addicted person that you are on their side and that it’s okay to get help.

The objective of intervention is to get the addicted person in treatment immediately. Some families hire an intervention specialist for help managing the situation. Specialists can also help you figure out what to say to your loved one and outline consequences if they refuse to get help.

Withdrawal and Treatment

Those who have taken sleeping pills frequently over a long period of time will experience withdrawal symptoms when quitting. These symptoms may last for over a month depending on the user. These symptoms can be damaging and are best managed through a professional medical detox. These withdrawal symptoms are caused by the body’s dependence on sleeping pills to create a physical and mental equilibrium. Symptoms include anxiety, sweating, and, sometimes, seizures. Rebound insomnia is also particularly hard to overcome for many people, but it can be managed through proper treatment.

A trained medical professional can help you overcome your sleeping pill addiction without the symptoms of quitting “cold turkey.”

SLEEPING PILLS AND THE ALTERNATIVES

More than 10 million prescriptions for sleeping pills are given each year in England, but medication only offers short-term relief.

Non-drug treatments have been under-used, but sleep experts say they offer the best long-term solutions to chronic insomnia. Professor Kevin Morgan of Loughborough University’s Sleep Research Centre says that sleeping tablets treat the symptoms of
insomnia, not its causes. He has been researching psychological treatments for insomnia, focusing on behavioural change and self-help to promote better sleeping patterns.

It was always assumed that if people had insomnia alongside a more serious condition, then curing that illness would cure the insomnia. Nowadays, however, insomnia is generally treated as a separate illness.

Before your GP can make a diagnosis, you may be asked to keep a sleep diary, in order to record bedtimes, wake times, hours slept and quality of sleep each morning.

“Sleep diaries are an invaluable insight into the patient’s sleeping habits. If continued during therapy, they’re a useful way of monitoring the outcome of treatment,” says Professor Morgan.

If insomnia is diagnosed, the main treatments are:

**Sorting out ‘sleep hygiene’**

Lifestyle, especially your sleeping habits, have a big impact on your quality of sleep. Addressing so-called “sleep hygiene” should be the first step in any insomnia treatment. Sleep hygiene is a list of lifestyle dos and don’ts. It has proved to be effective in stopping insomnia from getting worse, and making it easier to benefit from further treatment.

“It’s a useful first step in treatment, and sends the important message that behaviour and lifestyle choices can influence sleep quality,” says Professor Morgan.
Habits such as drinking too many caffeine-based drinks (including coffee, tea and some energy drinks) or exercising too close to bedtime will affect your sleep.

“If you have a sleep problem, it’s worth looking at your personal habits. It could be that your sleep is being ruined by your regular espresso before bed,” says Professor Morgan.

“Sleep is fragile,” he says. “You’ve got to look after it.”

**Cognitive behavioural therapy (CBT)**

Once sleep hygiene has been addressed, and there’s no improvement in your insomnia, CBT is the next step. It’s a package of treatments that usually includes sleep restriction, stimulus control, cognitive therapy and relaxation techniques.

- **Sleep restriction:** Some people with insomnia may benefit from a sleep restriction programme that allows only a few hours of sleep during the night, at first. Gradually, the time is increased until you achieve a more regular night’s sleep.
- **Stimulus control:** This therapy rebuilds the association between the bedroom and sleep by limiting the amount of time you spend awake in bed. “The environment can stimulate behaviour,” says Professor Morgan.
- **Cognitive therapy:** Thought-blocking therapies are used to reduce anxiety about not falling asleep. Professor Morgan says: “Cognitive therapy can help break this vicious circle by teaching you a different way of worrying. Do your worrying at a different time, write down your fears and discipline yourself not to worry about things around bedtime.”
- **Relaxation therapy:** There are specific effective techniques that can reduce or eliminate anxiety and body tension. As a result, the person’s mind stops racing, the muscles relax and restful sleep can follow.

**Sleeping tablets**

GPs are advised to turn to hypnotic drug therapy only after considering non-drug therapies, such as those outlined above.
Benzodiazepines (such as Temazepam or Loprazolam) and the newer “Z medicines” (such as Zopiclone or Zolpidem) are the preferred drugs for insomnia.

Both types of drugs work in a similar way. If one doesn’t work, swapping to the other is unlikely to have a different effect.

“These drugs are very effective sleep inducers,” says Professor Morgan. “They work immediately, they’re not toxic and they’ve been shown to be safe in overdose.”

However, they’re only recommended for the short-term treatment of insomnia – up to four weeks.

“Very few insomnia cases only last four weeks,” says Professor Morgan. “Most clinical insomnias are chronic, so most of these drugs are prescribed for longer than they should.”

In any case, the drugs lose their effectiveness over time because the body gets used to them. By that stage, the person has become psychologically dependent on them.

**SLEEPING PILLS COULD SHORTEN YOUR LIFE**

For over 35 years a person worked to assess the risks of sleeping pills. He has learned that sleeping pills are associated with significantly increased mortality.

He first became interested when he saw the work of Dr. E. Cuyler Hammond at the American Cancer Society. In 1975, he went to visit The American Cancer Society, starting a collaboration which lasted for many years. American Cancer Society data from over 1 million people showed that use of sleeping pills was associated with more deaths within 6 years, but insomnia by itself was not associated with any death risk.

As of January, 2012, there were 24 published studies of the mortality risks of sleeping pills. Of the 22 studies which reported either greater or lesser mortality associated with sleeping pills, 21 studies showed that people taking sleeping pills died sooner. (The 22nd study found no mortality risk of sleeping pills but did find sleeping pill usage associated with increased cancer deaths.)
It has been published now a new study of over 10,000 patients who took sleeping pills and over 20,000 matched patients who did not take sleeping pills. The patients who took sleeping pills died 4.6 times as often during follow-ups averaging 2.5 years. Patients who took higher doses (averaging over 132 pills per year) died 5.3 times as often. Even those patients who took fewer than 18 pills per year had very significantly elevated mortality, 3.6 times that of patients who took no hypnotics.

The illustrations above show the hazard ratios for mortality (above) and cancer incidence (below) for the control non-users of
Sleeping Pills: An Introduction

hypnotics (doses/year = NONE, in green) and for three groups of users of hypnotics with increasing numbers of doses/year prescribed. Hazard ratios above 1.0 are estimates of how many times the mortality or cancer incidence of hypnotics users exceeded that of controls. The heavy black bars show the statistical 95% confidence limits of the hazard estimates, that is, statistically the hazard ratio of the sample is 95% likely to be within the bars above and below the vertical black lines. However, unknown biases in the samples could produce true risks outside the confidence limits.

It appears very likely that the sleeping pills were causing early death for many of the patients. Besides, those who averaged over 132 sleeping pills per year were 35% more likely to develop a new cancer. They went to great pains and effort to match the patients taking sleeping pills with those not taking sleeping pills for age, sex, smoking history, and various measures of poor health, so it seemed to be a fair comparison.

Nevertheless, it is true that showing that sleeping pill use is associated with early death does not prove that the sleeping pills are causing the deaths. Theoretically, there could be confounding factors or biases in the selection of patients which caused these deaths without involving sleeping pills. It can only be said that it was found almost no evidence of such biases. Although there was definitely at least a small amount of confounding, it seemed to us unlikely that biases could entirely explain all of these excess deaths and cancers. Some readers will remember when the cigarette companies claimed that the fact that cigarette smoking is associated with cancer and early death did not prove that cigarettes cause cancer. Cigarette manufacturers have by now given up on that argument. The risks are very similar with sleeping pills. For solid proof, we would need large randomized controlled trials of cigarettes or sleeping pills, but nobody is going to do such trials. If the cigarette companies believed that such trials would prove cigarettes were safe, they would have done such controlled trials decades ago. How about the sleeping pill companies? Of course, now that we know that particular sleeping pills are associated
with excess mortality, it would perhaps be unethical to do such a controlled trial, so for those particular sleeping pills, we will probably never have absolute proof whether they cause mortality or not. The kind of data we gathered is probably about as good as one could get.

The particular sleeping pills we studied were zolpidem (e.g., Ambien), temazepam (e.g., Restoril), eszopiclone (e.g., Lunesta), zaleplon (e.g., Sonata), other benzodiazepines such as triazolam (e.g., Halcion) and flurazepam (e.g., Dalmane), barbiturates, and sedative antihistamines such as diphenhydramine (e.g., Benadryl). Most of the patients in this study were taking zolpidem or temazepam. We had only minimal data about the other drugs. However, all of the sleeping pills studied were significantly associated with excess mortality. Due to the way the study was done and its limited size, we could not say that one sleeping pill is safer than another. These results do not necessarily apply to any sleeping pill which was not included in our study, except perhaps zopiclone (because zopiclone is half eszopiclone). Zopiclone is a sleeping pill popular outside the United States.

**New sleeping pills can cause cancer in animals**

Were the epidemiologic studies just statistical accidents, or do sleeping pills really cause cancer? Many years ago, the Food and Drug Administration (FDA) started making available on the internet some of their documents about the review of those newer sleeping pills approved for marketing in the United States since 1998. You can find these documents yourself through the US Food & Drug Administration’s Online Service, Drugs@FDA.

To my great surprise, we learned that rats and mice given high doses of zaleplon (Sonata), eszopiclone (Lunesta) as part of zopiclone, and ramelteon (Rozerem) developed cancer. The information available was a little vague to be certain, but it seems that these new sleeping pills all caused cancer in animals. We are no expert on experiments of this type, but FDA reviewers thought some of the results were worrisome. One of the reasons we are
not sure we understand these results is that we cannot find that
the companies have ever published the details in the medical
literature. It is conceivable that the manufacturers do not want
these cancer experiments understood. These drugs also broke
chromosomes, which is a well-known specific chemical mechanism
by which drugs cause cancer. There was also some older and
confusing information about zolpidem (Ambien). Although one
of the old records seemed to say that animals given zolpidem
developed three kinds of cancer, and FDA reviewers were
concerned about these hints of carcinogenicity, the new labeling
approved for the extended release version of zolpidem (Ambien
CR) says no evidence of carcinogenic potential was observed in
either mice or rats. We would like to know how the company
figures they do not owe people a warning.

Sleeping pills can cause cancer in people

In 2005 and 2006, several new sleeping pills were introduced
into the U.S. market. The industry was hoping to increase hypnotics
sales by several billion dollars a year. Because the companies
wanted Food and Drug Administration (FDA) approval to market
their drugs for long-term consumption, they did larger studies of
long-term use than ever had been done before. Summaries of the
data from these randomizing controlled trials can be found at the
FDA internet site for zaleplon (Sonata), eszopiclone (Lunesta), and
ramelteon (Rozerem). It turned out that because zaleplon was
compared to zolpidem as well as to placebo, there was a bit of
zolpidem data available also.

We have to admit that it is hard to understand the details of
these controlled trials from the data which FDA has made available,
but fortunately, we persuaded the FDA to review their files.
According to the FDA, there were 9 new skin cancers and four
other cancers among study participants randomized to the sleeping
pills, but no new cancers among those who only received placebo.
Even considering that there was over 2 times as much exposure
to the sleeping pills, it looks like this indicates that new sleeping
The Effortless Sleep Method: Cure for Insomnia...

pills caused cancer. The best estimate would be that the cancer rate for participants randomized to sleeping pills was several times that of the luckier volunteers who received placebo. Because these data come from randomizing comparisons, they appear to be proof that new sleeping pills (as a group) cause cancer. However, the controlled trial data were not sufficient to prove that any specific sleeping pill or brand causes cancer. Let’s put together the epidemiologic data, the animal data, and the data from combining these controlled trials for 4 drugs. The evidence is that a patient who takes any of the sleeping pills listed in the box above is increasing his or her risk of getting cancer. We feel that my patients should be warned about this risk.

We do not have clear evidence that one sleeping pill has more cancer risk than another. In our epidemiologic study, we only demonstrated statistically significant cancer risks for zolpidem and temazepam, the most popular drugs in that study, but none of the drugs for which we had less data were clearly better or worse. For patients prescribed over 132 sleeping pills per year, there was a 35% increased risk of developing cancer within an average of 2.5 years.

From Taiwan a new study has come, based on a representative national health insurance data base. These authors studied zolpidem, which was the most popular hypnotic in Taiwan, as zolpidem has also been for several years in the United States in both brand-name and generic versions. With over 8 years of follow-up, the Taiwan authors found a considerably larger mortality hazard associated with zolpidem than we had observed with shorter follow-up. There were also wide differences in methodology of the Taiwan study compared to ours and the populations differed. The makers of zolpidem have been quoted in the New York Times as claiming that a longer study is better for cancer detection. There was also a little of evidence that benzodiazepine use (e.g., temazepam) was associated with cancer, but this was not analyzed in detail. I expect that as time goes on, there will be several more studies confirming the conclusion of our study that mortality and
cancer are associated with sleeping pills usage. So far, no information has appeared leading me to doubt any part of our study.

**Sleeping pills: More lethal risks**

As a young medical student in my first year of training, one of the first things we learned in our student laboratory was that the kindest way to “put an animal to sleep” permanently was to administer a barbiturate such as pentobarbital. After sometime, we learned that pentobarbital was being prescribed almost automatically as a sleeping pill for patients in the hospital (in a sublethal dose, hopefully.) Related drugs are used to execute the death penalty. Any medical student knows that these drugs can kill. Doctors have a wonderfully complete understanding of how sleeping pills such as pentobarbital kill animals. These drugs bind with protein molecules called GABA receptors on the surface of nerve cells. The same protein receptor molecules bind at the same time with a neurotransmitter chemical called GABA, which gives them their name. Barbiturates and other sleeping pills accentuate the action of GABA, which is to cause the receptor molecule to allow chloride ions to enter the nerve cells. Since the chloride ions are negatively charged, they make the inside the nerve cell more negatively polarized, which in turn, makes the nerve cells less likely to fire (to generate nerve activity).

When the nerve cells which stimulate the muscles of breathing are inhibited from firing action potentials by GABA and by sleeping pills, the animal stops breathing. When breathing stops, the animal dies within a few minutes from lack of oxygen in the lungs. No doubt these same mechanisms explain how barbiturates kill people who take too high a dosage, either accidentally or with suicidal intention. In the 1970’s, a new group of sleeping pills became popular, molecules which chemically are named benzodiazepines. The first sold as tranquilizers were chlordiazepoxide (Librium) and diazepam (Valium). Soon, the benzodiazepine flurazepam (Dalmane) was marketed as a sleeping pill, and flurazepam soon
dominated the market. The main advantage of benzodiazepines is that they are less likely to produce acute overdose deaths than barbiturates. For the last 15 years, most new sleeping pills have been benzodiazepine agonists, which means that the chemical molecules may not be classed as benzodiazepines but they act at the same receptors. All of these newer drugs seem to have less overdose risk than barbiturates, but it is still possible that single doses of these newer sleeping pills are sometimes lethal. There is certainly evidence that large doses of these drugs by themselves or modest doses combined with alcohol and other drugs can be sometimes lethal. There is an age-old belief that sleeping pills might help depressed people, but sleeping pill manufacturers’ controlled trials prove that sleeping pills can cause depression. In fact, the sleeping pills examined in one study seemed to double the rate of new depressions. Suicide, accidental overdose and cancer are probably not the most common ways in which sleeping pills kill, but the other ways are more poorly understood and less well documented. Here are some of the other possible mechanisms.

All of the sleeping pills can cause “hangover,” that is, they not only reduce the action potentials of our brain cells during sleep, but they can also reduce brain cell activity during the day. This can make us sleepy, less alert, confused, and weak during the day. We will discuss psychological consequences of this hangover later, but here I mention the impairments of survival. Falls are much more common among elderly people who are taking hypnotics. Of patients given Lunesta, 10% had accidents as compared to 6% given placebo in one study, and falls were specifically more common with Lunesta. Because several studies show that people who are responsible for automobile accidents are unusually likely to have sleeping pills in their blood, it is thought that hangover may often cause automobile accidents, as well as other fatal accidents. The recent publicity about Ambien zombies driving like sleep walkers provides some extremely vivid examples.

In the last 20 years, physicians have become concerned about sleep apnea, a condition where there are pauses of breathing
during sleep. Physicians suspect that sleep apnea can cause deaths during sleep. Not all studies are in agreement, but several studies have found that when a person with sleep apnea takes sleeping pills, there are more pauses in breathing and the pauses last longer, which could be dangerous. I was surprised to learn in the FDA data how well-documented it is that zolpidem makes sleep apnea worse. Because sleeping pills risk making apnea worse, many experts recommend that people with apnea should not be given sleeping pills.

The problem is that almost everybody above age 40 has some sleep apnea, and the majority of people over 65 would meet commonly-used criteria for a diagnosis of sleep apnea. Therefore, a large proportion of people taking sleeping pills must be making their apnea worse. Over a period of many years, anything which makes sleep apnea worse would be expected to cause high blood pressure, and therefore, to increase the risk of heart attacks, heart failure, and strokes. A final concern regarding to mortality is how people care for themselves. Because sleeping pills, like tranquilizers, reduce worry about possible threats and risks in our lives, it is possible that the hangover effects of sleeping pills would reduce people’s attentiveness in taking care of themselves.

**STUDY: PRESCRIPTION SLEEPING PILLS CAN SHORTEN YOUR LIFE**

New research indicates that two of the most prescribed sleeping pills on the market may shorten your life.
The study, conducted at the University of Warwick in the UK, looked at the impact of sleeping pills and anti-anxiety drugs when taken over a long period of time. Researchers followed nearly 35,000 subjects over seven-and-a-half years. The subjects had been prescribed Xanax, Valium and Klonopin, or sleep aids like Ambien and Lunesta. They found 3.3 times more patients died in the follow-up period, compared to subjects who were not taking the medications.

The study was controlled for factors linked with early deaths including age, smoking and drinking habits, other prescriptions and socioeconomic status, and most importantly, sleep disorders and anxiety itself. Researchers acknowledged that the medications are effective, but they said this study shows that the amount of time that patients take them should be minimized and supplemented with cognitive behavioral therapy.

**Sleeping pills increase risk of death**

Doctors are calling for a rethink of the use of sleeping pills after a large study showed that the drugs carry a substantially increased risk of death for those who are prescribed them. Commonly used sleeping pills, or “hypnotics”, such as temazepam and zolpidem, which is prescribed for short-term insomnia, are associated with more than a fourfold risk of death. The study was carried out in the US, where up to 10% of the adult population took sleeping pills in 2010. The authors estimate that sleeping pills may have been associated with 320,000 to 507,000 extra deaths in the US that year. The researchers, led by Daniel Kripke from the Scripps Clinic Viterbi Family SleepCentre in La Jolla, California, studied the population served by the largest rural integrated healthcare system in America, in Pennsylvania.

Over a two-and-a-half-year period, they compared the death rates among more than 10,500 people who received sleeping pill prescriptions with those of more than 23,600 others – matched for age, state of health and other factors – who had not received such medication.
The average age of the study group was 54. The scientists in the study found that even at a relatively low rate of prescription – fewer than 18 doses a year – those who were given the pills had a 3.5 times greater risk of death compared with those who were not prescribed them. Individuals who were given pills more frequently – between 18 and 132 doses in a year – were more than four times more likely to be dead at the end of the study. The risk of death for those on the most pills – 132 doses or more a year – was more than five times that of those on no pills. Those who had taken the most pills were also 35% more likely to be diagnosed with cancer – although they had not been at greater risk of cancer than the control group before the study began.

The risk was greatest for temazepam, one of the benzodiazepines. A link between sleeping pill use and cancer has also been found in previous studies. Just showing an association between sleeping pills and more deaths does not prove the pills are the cause, the authors point out, although the increased risk as the number of doses went up points in that direction. But there have been other studies in the past that have also appeared to detect an increased death risk with sleeping pills, the authors say.

Some US doctors have suggested a randomised controlled trial to establish for certain the death risk of sleeping pills, they write. “No such trial has ever been mounted, perhaps for reasons similar to the absence of randomised trials of cigarettes and of skydiving without parachutes.”

Yet the benefits of sleeping pills “as critically reviewed by groups without financial interests” are meagre, they add, and it is now generally thought that cognitive behaviour therapy works better for people with chronic insomnia than tablets.

The doctors say there are many ways in which sleeping pills might shorten life. Such medication has been shown to increase depression, which can trigger suicide. They also interfere with motor and cognitive skills, which makes driving dangerous, and can cause sleep apnoea, which results in disturbed sleep and can lead to heart problems.
Some people taking the pills sleepwalk, which can be hazardous, and eat at night, “resulting in poor diet and obesity”, says the paper.

In the study, people on sleeping pills were more likely to have oesophageal problems and peptic ulcers. They were more likely to be diagnosed with lymphomas, lung, colon and prostate cancers even than smokers.

The National Institute for Health and Clinical Excellence has given qualified approval to the short-term use of sleeping pills. The authors suggest it may be time to reconsider even that limited green light.

Nina Barnett of the Royal Pharmaceutical Society said it was “an important study and although it is unlikely to radically change prescribing in the immediate term, it should raise awareness and remind both patients and prescribers to the potential risks of sedative use for insomnia.” She added that the study did not prove the deaths were caused by the pills and warned that individuals should not stop taking prescribed medicines without talking to their doctor or pharmacist.

The Medicines and Healthcare Products Regulatory Agency said the safety of all medicines on the UK market was continuously monitored. It added: “Hypnotics should be used to treat insomnia only when it is severe, disabling, or subjecting the individual to extreme distress, and use should be restricted to short-term (two to four weeks).

“There have been concerns about a possible association between hypnotic medicines and particularly benzodiazepines for a number of years. Unfortunately, the results from cohort studies have been mixed and inconclusive.

“The authors of the latest study have acknowledged the limitations associated with cohort studies and that further research is needed. We will consider the results of this latest study and whether it has any implications for current prescribing guidance.”
TAKING SLEEPING PILLS: ITS RISKS

Various types of drugs are available to treat insomnia, but their side effects can be risky. Find out about the dangers of sleeping pills.

When you take prescription sleeping pills over a long period of time, your body grows accustomed to the drug, and you need higher and higher doses to get the same sleep-inducing effect. But, if you take a high enough dose, this could lead to depressed breathing while you sleep, which can cause death.

To minimize your risk for this side effect, don’t take sleeping pills for longer than a week or two. “If you have a short-term sleep disorder — a need to re-establish normal sleep patterns — that’s a clear reason to use these medications,” Leavey says. “You can have problems when you use them longer than 7 to 10 days.”

DROWSY DRIVING

New data has revealed that people who take certain forms of the sleeping pill zolpidem (Ambien) may still have enough of the drug in their bodies in the morning to impair activities like driving. Women and people who take extended-release forms of the drug are particularly at risk. For this reason, the U.S. Food and Drug Administration required drug makers to lower the recommended dose for women and to suggest that doctors lower the dose for
men. “[The drug’s effects] can really carry over into the daytime,” Leavey says. To avoid next-day drowsiness, follow your doctor’s dosing instructions, and don’t take sleeping pills like Ambien unless you have at least seven hours to devote to sleep.

Erratic Behavior Side Effects

We’ve all been known to do strange things in our sleep, but prescription sleeping pills, particularly benzodiazepines such as triazolam, have been known to causeside effects like sleepwalking and amnesia.

“You’ll wake up, and you won’t know where you are,” Leavey says. This has also been seen in people who have taken the newer sleep aids like Ambien. If you (or your significant other) notice evidence of strange behavior while you’re taking sleeping pills, report these problems with sleeping pills to your doctor promptly.

Falling Down

Hospital patients who took zolpidem were four times more likely to fall than those who did not take the drug during their hospital stay, according to a recent study published in the Journal of Hospital Medicine. “Falling is absolutely a problem,” Leavey says. “Your entire body is balanced on two little feet. You have sensors on your feet that constantly measure your center of gravity and where you are. If I give you a drug that dulls that system, you’ll fall down.” Older patients are particularly at risk for this problem with sleeping pills, he adds.

Cancer and Death

People who took prescription sleeping pills were more likely to die or get cancerthan those who did not take them, according to a 2012 study published in BMJ Open. Though the results are concerning, they don’t necessarily mean that these drugs definitely cause negative side effects. “I would really want to see more evidence on that one,” Leavey says. The study’s authors suggest that cognitive behavioral therapy, a type of treatment that helps
you change your thinking patterns, could be a better treatment for chronic insomnia than drugs.

**Trouble Weaning Off Sleeping Pills**

Once you begin taking sleeping pills, it can be hard to stop, particularly if you’ve been taking them for a long time. Some people experience “rebound insomnia” — when sleeping problems actually worsen once you stop taking the drug. If you want to go off your sleeping pills, talk to your doctor about setting up a schedule to gradually reduce your dosage, rather than just quitting cold turkey. “It may be rough coming off, but things will eventually get better,” Leavey says.

**EFFECTS OF SLEEPING PILLS: UNDERSTANDING THE SIDE**

Between a third and half of all Americans have insomnia and complain of poor sleep. Perhaps you’re one of them. If so, you may be considering taking a sleeping pill. A sleeping pill may be effective at ending your sleep problems short-term. But it’s important to make sure you understand everything you need to know about sleeping pills. That includes knowing about sleeping pill side effects. When you do, you can avoid misusing these sedatives.

**Are There More Complex Sleeping Pill Side Effects?**

Some sleeping pills have potentially harmful side effects, including parasomnias. Parasomnias are behaviors and actions over which you have no control, like sleepwalking. During a parasomnia, you are asleep and unaware of what is happening.

Parasomnias with sleeping pills are complex sleep behaviors and may include sleep eating, making phone calls, or having sex while in a sleep state. Sleep driving, which is driving while not fully awake, is another serious sleeping pill side effect. Though rare, parasomnias are difficult to detect once the medication takes effect.
Product labels for sedative-hypnotic medicines include language about the potential risks of taking a sleeping pill. Because complex sleep behaviors are more likely to occur if you increase the dosage of a sleeping pill, take only what your doctor prescribes — no more.

**Dependent on Sleeping Pills?**

For short-term insomnia, your doctor may prescribe sleeping pills for several weeks. Yet after regular use for a longer period, your sleeping pill may stop working as you build a tolerance to the medication. You may also become psychologically dependent on the medicine. Then the idea of going to sleep without it will make you anxious. Without the sleeping pill, you might find it difficult to sleep. If that happens, it could be a sign of a physical or emotional dependence or both.

Some studies show that long-term use of sleeping pills actually interferes with sleep. The best way to avoid developing a physical or emotional dependence on sleeping pills is to follow your doctor’s instructions and stop taking the drug when recommended.

**SLEEPING PILLS & NATURAL SLEEP AIDS:**
**WHAT’S BEST FOR COMMON MAN**
It’s the middle of the night, and you’re staring at the ceiling, thinking about work, or bills, or the kids. Sleep just won’t come, so you reach for a sleeping pill. But did you know that sleep medications and aids are rarely meant for more than short-term use? They can cause dependence and tolerance, and the risks don’t always outweigh the benefits. Learn what you need to know about the side effects and safety concerns of common sleep medications—as well as effective insomnia treatments that don’t come in pill form.

Are sleeping pills or sleep aids right for Common Man

When you’re desperate to get some rest, it’s tempting to head for the medicine cabinet for relief. And you may get it in the moment. But if you regularly have trouble sleeping, that’s a red flag that something’s wrong. It could be something as simple as too much caffeine or using electronics late at night. Or it may be a symptom of an underlying medical or psychological problem. But whatever it is, it won’t be cured with sleeping pills.

At best, sleeping pills are a temporary band aid. At worst, they’re an addictive crutch that can make insomnia worse in the long run. That’s not to say there’s never a time or a place for medication, but it’s important to weight the benefits against the risks. In general, sleeping pills and sleep medications are most effective when used sparingly for short-term situations, such as traveling across time zones or recovering from a medical procedure. If sleeping pills are used over the long term, they are best used only on an infrequent, “as needed” basis to avoid dependence and tolerance.

Risks and side effects of prescription and over-the-counter sleeping pills

All prescription sleeping pills have side effects, which vary depending on the specific drug, the dosage, and how long the drug lasts in your system. Common side effects include prolonged drowsiness the next day, headache, muscle aches, constipation,
dry mouth, trouble concentrating, dizziness, unsteadiness, and rebound insomnia.

Other risks of sleeping pills as are under:
- Drug tolerance. You may, over a period of time, build up a tolerance to sleep aids, and you will have to take more and more for them to work, which in turn can lead to more side effects.
- Drug dependence. You may come to rely on sleeping pills to sleep, and will be unable to sleep or have even worse sleep without them. Prescription pills, in particular, can be very addictive, making it difficult to stop taking them.
- Withdrawal symptoms. If you stop the medication abruptly, you may have withdrawal symptoms, such as nausea, sweating and shaking.
- Drug interactions. Sleeping pills can interact with other medications. This can worsen side effects and sometimes be dangerous, especially with prescription painkillers and other sedatives.
- Rebound insomnia. If you need to stop taking sleeping pills, sometimes the insomnia can become even worse than before.
- Masking an underlying problem. There may be an underlying medical or mental disorder, or even a sleep disorder, causing your insomnia that can’t be treated with sleeping pills.

Sleeping Pills: Its Grave Risk

Sedative-hypnotic medications (benzodiazepines and non-benzodiazepines) can cause severe allergic reaction, facial swelling, memory lapses, hallucinations, suicidal thoughts or actions, and complex sleep-related behaviors like sleep-walking, sleep-driving (driving while not fully awake, with no memory of the event) and sleep-eating (eating in the middle of the night with no recollection, often resulting in weight-gain). If you experience any unusual sleep-related behavior, consult your doctor immediately.
OVER-THE-COUNTER (OTC) SLEEP AIDS AND SLEEPING PILLS

Standard over-the-counter sleeping pills rely on antihistamines as their primary active ingredient to promote drowsiness. Most use the antihistamine diphenhydramine (the key ingredient in Benadryl) or doxylamine.

Common over-the-counter sleep medications include:
- Diphenhydramine (found in brand names like Nytol, Sominex, Sleepinal, Compoz)
- Doxylamine (brand names such as Unisom, Nighttime Sleep Aid)

Some other OTC sleep aids combine antihistamines with the pain reliever Acetaminophen (found in brand names like Tylenol PM and Aspirin-Free Anacin PM). Others, such as NyQuil, combine antihistamines with alcohol. The problem with antihistamines is that their sedating properties often last well into the next day, leading to a next-day hangover effect. When used long-term, they can also cause forgetfulness and headaches. Because of these issues, sleep experts advise against their regular use.

Common side effects of antihistamine sleeping pills
- Moderate to severe drowsiness the next day
- Dizziness and forgetfulness
- Clumsiness, feeling off balance
- Constipation and urinary retention
- Blurred vision
- Dry mouth and throat
- Nausea.

Prescription sleep medications

There are diverse nature of prescription sleeping pills, classified as sedative hypnotics. In general, these medications act by working on receptors in the brain to slow down the nervous system. Some medications are used more for inducing sleep, while others are used for staying asleep. Some last longer than others in your
system (a longer half life), and some have a higher risk of becoming habit forming.

**Benzodiazepine sedative hypnotic sleeping pills**

Benzodiazepines are the oldest class of sleep medications still commonly in use. Benzodiazepines as a group are thought to have a higher risk of dependence than other insomnia sedative hypnotics. All are classified as controlled substances. Primarily used to treat anxiety disorders, benzodiazepines that have been approved to treat insomnia include estazolam (brand name ProSom), flurazepam (Dalmane), quazepam (Doral), temazepam (Restoril), and triazolam (Halcion).

Drawbacks to benzodiazepine sleeping pills:

- You can become both physically and psychologically dependent on benzodiazepines. When you’re on the pills for a period of time, you may believe that you can’t sleep without them, and once you stop taking them, you may actually experience physical withdrawal symptoms like anxiety and rebound insomnia.
- Sleeping pills can lose their effectiveness if used on a nightly basis, because the brain receptors become less sensitive to their effects. In as little as three to four weeks, benzodiazepines can become no more effective than a sugar pill.
- The overall quality of your sleep can be reduced, with less restorative deep sleep and dream sleep.
- You may experience next day cognitive slowing and drowsiness (the hangover effect), which may be even worse than the sluggishness you feel from actual sleep deprivation.
- Insomnia returns once you stop, even if the medication is effective while taking it.

**Non-benzodiazepine sedative hypnotic sleeping pills**

Some newer medications don’t have the same chemical structure as a benzodiazepine, but act on the same area in the
brain. They are thought to have fewer side effects, and less risk of dependency, but are still considered controlled substances. They include zalepon (Sonata), zolpidem (Ambien), and eszopiclone (Lunesta), which have been tested for longer-term use, up to six months.

**Drawbacks to non-benzodiazepine sleeping pills:**

Generally, non-benzodiazepines have fewer drawbacks than benzodiazepines, but that doesn’t make them suitable for everyone. Some may find this type of sleep medication ineffective at helping them sleep, while the long-term effects remain unknown.

The U.S. Food and Drug Administration (FDA) recently directed the manufacturers of Ambien and similar sleeping pills to lower the standard dosage due to the serious risk of morning grogginess while driving, especially in women patients.

Other side effects include:

- Drug tolerance
- Rebound insomnia
- Headaches, dizziness, nausea, difficulty swallowing or breathing
- In some cases, dangerous sleep-related behaviors such as sleep-walking, sleep-driving, and sleep-eating
- New or worsening depression; suicidal thoughts or actions.

**Melatonin receptor agonist hypnotic sleeping pills**

Ramelton (Rozerem) is the newest type of sleep medication and works by mimicking the sleep regulation hormone melatonin.

It has little risk of physical dependency but still has side effects. It is used for sleep onset problems and is not effective for problems regarding staying asleep.

Ramelton’s most common side effect is dizziness. It may also worsen symptoms of depression and should not be used by those with severe liver damage.
Antidepressants as sleeping pills: Its use

The FDA has not approved antidepressants for the treatment of insomnia, nor has their use been proven effective in treating sleeplessness. However, some antidepressants are prescribed off-label due to their sedating effects. As with all depression medication, there is a small but significant risk of suicidal thoughts or worsening of depression, particularly in children and adolescents.

USING OF SLEEPING PILLS, SLEEP AIDS & MEDICATIONS: PROPER GUIDELINES

If you decide to try sleeping pills, sleep aids, or sleep medications, talk to your doctor about:

- Other medications you are taking, including non-prescription medications such as pain relievers and allergy medicines, as well as herbal supplements. Combining medications can be very dangerous.
- Specific instructions for decreasing and/or terminating use. In some cases, stopping medication abruptly can cause uncomfortable side effects and even rebound insomnia.
- Using the medications intermittently, rather than nightly, in order to decrease the negative side effects and to increase the sleeping pills' efficiency when you do use them. This is not appropriate with all medications, as some cause withdrawal symptoms when stopped abruptly.
- Other medical conditions you have. Some sleep medications can have serious side effects for people with medical problems such as high blood pressure, liver problems, glaucoma, depression, and breathing difficulties.

Taking sleeping pills: Best Precautions While

When taking sleeping pills, sleep aids, or sleep medications, remember to:

- Only take a sleeping pill when you will have enough time to get a full night of sleep (seven to eight hours). Otherwise you may feel very drowsy the next day.
• Carefully read the package insert that comes with your medication. Pay careful attention to the potential side effects.

• Never drink alcohol near the time you take a sleeping pill. Not only will alcohol disrupt your sleep even more, it can interact dangerously with the sleeping pill.

• Never drive a car or operate machinery after taking a sleeping pill. This tip is especially important when you first start taking a new sleep aid, as you may not know how it will affect you.

• Follow directions closely, starting with a very small dose and increasing gradually, according to the doctor’s prescription. Find out whether you should take your medication with or without food. For some medications, certain foods must be avoided.

**HERBAL AND DIETARY SLEEP SUPPLEMENTS CAN BE HELPFUL**

Go the drugstore and you’ll see dozens of so-called “natural” sleep supplements. The FDA doesn’t regulate dietary supplements for safety, quality, effectiveness, or even truth in labeling, so it’s up to you to do your due diligence. Although the evidence is mixed, the following supplements have the most research backing them up as insomnia treatments.

• Valerian. Valerian is a sedating herb that has been used since the second century A.D. to treat insomnia and anxiety. It is believed to work by increasing brain levels of the calming chemical GABA. Although the use of valerian for insomnia hasn’t been extensively studied, the research shows promise and it is generally considered to be safe and non-habit forming. It works best when taken daily for two or more weeks.

• Melatonin. Melatonin is a naturally occurring hormone that increases at night. It is triggered by darkness and its levels remain elevated throughout the night until suppressed by the light of morning. Although melatonin
does not appear to be particularly effective for treating most sleep disorders, it can help sleep problems caused by jet lag and shift work. Simple exposure to light at the right time, however, might be just as effective. If you take melatonin, be aware that it can interfere with certain blood pressure and diabetes medications. It’s best to stick with low doses—1 to 3 milligrams for most people—to minimize side effects and next-day drowsiness.

- Chamomile. Many people drink chamomile tea for its gentle sedative properties, although it may cause allergic reactions in those with plant or pollen allergies. To get the full sleep-promoting benefit, bring water to a boil, then add 2-3 tea bags (or the equivalent of loose-leaf tea), cover with a lid, and brew for 10 minutes.

- Tryptophan. Tryptophan is a basic amino acid used in the formation of the chemical messenger serotonin, a substance in the brain that helps tell your body to sleep. L-tryptophan is a common byproduct of tryptophan, which the body can change into serotonin. Some studies have shown that L-tryptophan can help people fall asleep faster. Results, however, have been inconsistent.

- Kava. Kava has been shown to improve sleep in people with stress-related insomnia. However, kava can cause liver damage, so it isn’t recommended unless taken under close medical supervision.

Other herbs that have been found to have a calming or sedating effect include lemon balm, passionflower, and lavender. Many natural sleep supplements, such as MidNite and Luna, use a combination of these ingredients to promote sleep.

**Natural doesn’t mean safe**

While some remedies, such as lemon balm or chamomile tea are generally harmless, others can have more serious side effects and interfere with or reduce the effectiveness of prescribed medications. Valerian, for example, can interfere with antihistamines and statins. Do your research before trying a new
herbal remedy and talk with your doctor or pharmacist if you have any pre-existing conditions or prescriptions that you take.

SAFER USE OF SLEEPING PILLS: SOME IMPORTANT GUIDES

If you decide to try sleeping pills or sleep aids, keep the following safety guidelines in mind.

- Never mix sleeping pills with alcohol or other sedative drugs. Alcohol not only disrupts sleep quality, but it increases the sedative effects of sleeping pills. The combination can be quite dangerous—even deadly.
- Only take a sleeping pill when you will have enough time for at least 7 to 8 hours of sleep. Otherwise you may feel very drowsy the next day.
- Don't take a second dose in the middle of the night. It can be dangerous to double up on your dosage, and with less time for the medication to clear your system it may be difficult to get up the next morning and shake off gogginess.
- Start with the lowest recommended dose.
- Avoid frequent use. To avoid dependency and minimize adverse effects, try to save sleeping pills for emergencies, rather than nightly use.
- Never drive a car or operate machinery after taking a sleeping pill. This tip is especially important when you first start taking a new sleep aid, as you may not know how it will affect you.
- Carefully read the package insert that comes with your medication. Pay careful attention to the potential side effects and drug interactions. Many common medications, including antidepressants and antibiotics, can cause dangerous interactions with both prescription and over-the-counter sleeping pills. For many sleeping pills, certain foods such as grapefruit and grapefruit juice must also be avoided.
Consult your doctor or pharmacist about:

- Other medications and supplements you are taking. Many common medications, including antidepressants and antibiotics, can cause dangerous interactions with both prescription and over-the-counter sleeping pills. Herbal and dietary supplements and non-prescription medications such as pain relievers and allergy medicines may also interfere.

- Other medical conditions you have. Some sleep medications can have serious side effects for people with medical problems such as high blood pressure, liver problems, glaucoma, depression, and breathing difficulties.

- Specific instructions for increasing, decreasing and/or terminating use. It’s important to follow usage directions closely. It can be risky to increase your dose, but decreasing your use can also cause problems if done too quickly. In some cases, stopping medication abruptly can cause uncomfortable side effects and even rebound insomnia.
INTRODUCTION

The side effects of the prescription sleeping pills are much like their benefits. At night, we want our brain cells to stop working (unless we need to get up in the middle of the night), so sleeping pills make the brain less active. If the sleeping pill is in the blood during the day, it will make the daytime brain less active and less functional. The problem is that no sleeping pill remains in the blood all night, impairing consciousness, and then suddenly evaporates at the moment of awakening. Besides, a large percentage of people who take sleeping pills do often get up at night, at a time when the sleeping pill could cause falls or confusion. Most of the marketed prescription hypnotics, when taken at bedtime, will remain in the blood with at least half strength when morning comes.

Only a few prescription hypnotics marketed in the U.S. leave the blood fast enough to be largely gone from the blood by morning: these include zolpidem (Ambien), zaleplon (Sonata), and triazolam (Halcion). Even these drugs may be found in the morning blood if they are taken in the middle of the night. Ambien CR may sometimes affect people the next morning, and eszopiclone (Lunesta) is likely to produce a few hours of morning impairment,
particularly among people over age 60. On January 10, 2013, the FDA issued a warning recommending that the usual dose of zolpidem (Ambien) be no more than 6.25 mg for women. The FDA had finally discovered that a percentage of patients have enough zolpidem in the blood the next morning to impair performance such as driving.

Oddly enough, despite the brief half-life (time to be half-dissipated) of zolpidem, zaleplon, and triazolam, there is fragmentary evidence that these short-acting hypnotics produce impairments lasting after their disappearance from the blood. Perhaps this is because a percentage of people have genetic variations in their metabolism of sleeping pills which may cause dangerous concentrations to linger. Ramelteon (Rozerem) produces no next-day impairment according to the manufacturer studies, but one well-controlled independent European study showed impairment in driving performance. As explained above, sleeping pills suppress the action potentials of a wide variety of brain cells. The psychological effects are to make us sleepy, reduce alertness and vigilance, slow reaction times and judgment, and impair aspects of intelligence and memory.

Literally hundreds of studies have been done concerning the psychological effects of sleeping pills, both within a few hours after ingestion and then during the day following taking a sleeping pill at bedtime. To summarize an extremely complex group of studies, almost all sleeping pills produce immediate impairments of memory and performance. Further, there is extensive evidence that sleeping pills on average impair performance and memory on the following day. To view sleeping pill advertising, you might imagine sleeping pills help you to work better, think better, or function better the next day. This is deceptive. With very few exceptions, controlled studies supported by the manufacturers show that sleeping pills make test performance WORSE on the following day, or have no effect on performance.

Look through the FDA files for Ambien, Lunesta, Sonata, and Rozerem, at the FDA website. See if you can find any evidence
that these drugs improved next-day performance for people with insomnia. The problem of daytime impairment is more severe with the longer-acting drugs such as flurazepam (Dalmane) and quazepam (Doral), because the active by-products of these drugs remain in the blood day after day following only a single dose. When one of the long-acting drugs is taken every night, the blood concentrations accumulate day by day, increasing for up to 10-20 days, reaching much higher concentrations than after the initial dose. Therefore, with flurazepam (Dalmane) and quazepam (Doral), and also with diazepam (Valium) and chlordiazepoxide (Librium) when they are taken nightly as sleeping pills, daytime impairment accumulates after consecutive days of use.

Remarkably there has been only a smattering of evidence in special conditions that any sleeping pill ever improves daytime performance. Even when it is possible to show that sleeping pills increase sleep (a little) and even though the short-acting drugs are gone by morning, sleeping pills generally do not improve people’s ability to function in their lives. The few experiments where sleeping pills seemed to produce transient improvements in performance often involved models of jet lag and shift work, not the common problem of the aging person with insomnia. In the hundreds of studies where the pharmaceutical industry has studied hypnotic effects on waking function, the emphasis has been on trying to reduce impairments caused by these products, not on assisting people’s ability to carry on their lives. A person’s hope and belief that a prescription sleeping pill will improve the person’s function on the next day is consistently betrayed. It simply does not work.

One admit there might be at least one exception, a study of eszopiclone, which claimed that people given the drug reported better function in the long term. It must be said that there is trouble believing that is correct. Those subjective reports did not seem consistent with the company’s own objective studies of how eszopiclone impairs performance. This same study reported more severe adverse effects with eszopiclone than with placebo. We find from the FDA records of this study that there were more
accidents and more cancers among those receiving eszopiclone. A new study by a different manufacturer showed conclusively that eszopiclone can impair many kinds of performance on the morning after taking a bedtime dose, even in healthy young adults. To repeat, as a generalization, taking sleeping pills at bedtime impairs how people perform on the following day.

A Case Study

Some years ago, a doctor had privilege to participate with a group of sleep experts from different medical schools in a study sponsored by Hoffmann-La Roche, the makers of Dalmane (flurazepam). Concerned about the impairments of driving and other performance caused by Dalmane, the manufacturer wanted to see if a very-short-acting benzodiazepine would improve performance. The short-acting drug tested was midazolam, which is sold as a hypnotic in Europe, though in the U.S. it is marketed only as a short-acting anesthetic.

Many experiments on hypnotic effects on performance had used young healthy volunteers, who had little room for improvement in their sleep. He thought that healthy volunteers might benefit less than insomniacs who really had disturbed sleep. Perhaps the people who benefit most might be a special group. Therefore, we recruited a group of chronic insomniacs who said they had had insomnia and had taken benzodiazepines successfully for an average of over 13 years. Moreover, he selected volunteers in whom we could verify with EEG-sleep recording that their sleep really was disturbed at night, and then we withdrew these people from their sleeping pills for at least 4 weeks. Once withdrawn from whatever they had been taking, they were studied for two baseline nights while receiving a placebo pill. Then, the volunteers were randomly assigned to receive Dalmane, to receive midazolam, or to continue receiving inactive placebo pills. As expected, these chronic insomniacs slept about 20-27 min. more for the first two days they were given Dalmane or midazolam than when given the placebo. That was not a big improvement. Remarkably, after
9 or 14 days of administration, there was no statistically-reliable increase at all in the sleep of the volunteers taking Dalmane or midazolam as compared to those receiving placebo. The volunteers had become tolerant to the sleeping pills, which had lost their effect. Part of the reason that the sleeping pills showed no significant benefit after 14 days was that the placebo group had improved. Perhaps regular sleep habits and the belief that they were being helped had produced this improvement, and possibly, placebo patients improved because they had been two weeks longer off the benzodiazepines they had been previously taking, which might have been making them worse.

This is an important point, because the fact that a person taking a sleeping pills is sleeping more than at an experimental baseline does not mean that the pill is working, a point confused in many of the most-quoted studies. In any case, after two weeks, the groups receiving Dalmane and midazolam were not significantly improved compared to placebo patients. The small increase in sleep which Dalmane and midazolam produced on the first two nights of administration was not sufficient to produce any improvement in performance, which was measured the following mornings with a variety of sophisticated testing methods.

Moreover, by 14 days, both drugs were making performance significantly worse. On tests reflecting driving performance, these sleeping pills would have made the patients less safe drivers. This study yielded a very interesting observation in these chronic insomniacs who for years had believed in sleeping pills. The volunteers themselves said that they thought the research sleeping pill was good and that it was helping them, even when objective tests and at times, their own family observed that the hypnotics were making them worse. Even the group receiving placebo said that placebo was a good sleeping pill which they would like to use again. That is a lesson in the misperception of sleeping pill users. The group receiving either Dalmane or midazolam liked their pill a bit more than the placebo was liked, even although the active drugs were worse for the patients than placebo.
These patients were self-deceived about the value of the medication, almost deluded, thinking the medicines made them better when they actually made them worse. A rather similar study of chronic insomniacs receiving flurazepam (Dalmane) or triazolam (Halcion) also showed that after several weeks of use, the drugs were no better than placebo. This study was interesting because it studied the period of withdrawal after the research drugs were stopped. Even though the volunteers receiving triazolam were no longer sleeping better than those given placebo at the end of 5 weeks, when the drugs were stopped, those who had received triazolam developed a drug-withdrawal insomnia which made them worse than those who had taken placebo.

This study implied that after several weeks of use, people may take sleeping pills not because they continue to benefit in any way, but because their sleep becomes so much worse when they withdraw. It hurts too much to stop. In effect, they have become habituated or addicted to sleeping pills. Because these two studies were focused on the kinds of people who are actually chronic users of sleeping pills, it was particularly disturbing that the active drugs did not produce long-term benefit (only deleterious effects).

It was particularly revealing that the volunteers thought they were benefitting from the drugs (even placebo), when that certainly was not the case. Testing intermittent use (3 times a week), a recent study showed a similar result with zolpidem (Ambien). After several weeks of use, those taking this sleeping pill were sleeping better when they took the drug but then worse when they skipped it. Overall, after several weeks of use, their sleep was averaging no better than a group taking inactive placebo. The manufacturers now admit that both zolpidem (Ambien) and eszopiclone (Lunesta) cause withdrawal insomnia on the night after you stop the pill. Anxiety may also occur as a withdrawal symptom. People become habituated to these drugs because they experience such anxiety and poor sleep, whenever they try to stop. If they stayed off the drug for a few days, they might sleep just as well without the medication.
ITS DISASTROUS SIDE EFFECTS

It was realised that sleeping pills can cause some very strange and disastrous side effects. Because sleeping pills turn off our brain cells - not always in all parts of the brain to an equal extent - they can make people do some mighty strange things. For example, having taken Ambien, people can act like somnambulists or sleep walkers. In the more amusing examples, they may sleep-walk to the refrigerator and stuff themselves with strange foods that they would not normally eat in such quantity. Of course, this is not amusing if it leads to obesity, which can be a life-threatening condition, or if they eat something unhealthy.

Unfortunately, the behavior of the so-called Ambien Zombies is not always harmless. In a few reported cases, people intoxicated with Ambien have climbed into their cars and engaged in sleep driving. Some of the accidents were bad, and the police did not like how the zombies behaved. Hallucinations have been reported with zolpidem, zaleplon, and eszopiclone. At other times, people receiving sleeping pills have become confused or disoriented. Another odd symptom is complete amnesia for events, even during the day. For instance, a successful businessman told me that while taking Ambien, he might have absolutely no recollection of a conference which his own notes showed that he had attended. From viewing various reports, it was realized that these terrible side effects may develop in about 1% of users of sleeping pills.

Perhaps these strange symptoms are not unique to the new non-benzodiazepine hypnotics such as zolpidem, though in 2006, Ambien was getting most of the bad publicity. Similar lapses in memory and strange behaviors were reported frequently when triazolam was the most popular sleeping pill. A lawyer once asked me to consult with her client in the jail, where he was awaiting trial for having murdered his sister. The lawyer said her client thought that the Halcion (triazolam) he had been taking had caused him to commit this irrational crime, because otherwise he had no idea why he had done it.
There would be no way of knowing for certain if Halcion was the explanation, but I wouldn’t be surprised if the murderer had been a Halcion Zombie. One wonders if these reports have been most common with Halcion and Ambien because they were the market leaders, but it is interesting that both drugs are absorbed and removed from blood at about the same speed. It is inclined to think that these disastrous side effects are not so uncommon and can occur with any prescription sleeping pill (though we do not know yet about ramelteon or doxepin). Another side effect of sleeping pills is depression. The sleeping pill industry would like you to believe that insomnia leads to depression, which might be true some of the time. They imply that sleeping pills might prevent depression. It isn’t so. The controlled trials of zaleplon, zolpidem, eszopiclone, and ramelteon mentioned in the FDA NDA documents show a higher rate of developing depression among those given the sleeping pills as compared to those given placebo. This means that sleeping pills cause people to have more depression. Perhaps the common mechanism is that insomnia leads to sleeping pill use, which in turn leads to depression. It has been proven very clearly that sleeping pill use is associated with very high suicide rates, but as yet, the evidence that sleeping pills cause increased suicide is based on the strong evidence that the pills cause depression, as well as very high rates of suicide observed among those known to have taken sleeping pills.

**Lollipops, not sleeping pills.**

The motivations of physicians to give patients sleeping pills have not been studied extensively, but there is some interesting evidence. Physicians routinely explain their medical thinking in their medical records.

Even in the medical records of a distinguished teaching hospital, not one of 331 charts of patients receiving sleeping pills had a proper record of why the pill was given. It is safe to assume that there often was no good medical justification. It has been the same in the hospitals where taught. In the hospital, however, the
staff motivations are not hard to understand. Everyone has heard the stories of nurses awakening patients to give them sleeping pills. As a medical student, I learned that nurses like to keep their patients quiet for the night. Physicians routinely write sleeping pill orders in the hospital, because they hate for nurses to call at night and wake the doctor up to get a sleeping pill order. As a medical student, it was instructed that if one wanted to sleep at night, he had better routinely prescribe a sleeping pill for every patient. If we train young doctors this way in hospitals, the habits will carry over to outpatient practice.

When he was a child, my pediatrician would give me a lollipop at every visit to compensate for the pain of the injections he was likely to receive. Unfortunately, physicians don’t give lollipops to adult patients. They give sleeping pills instead, when a big lemon sucker might do less harm. Giving sleeping pills is often a gift-giving behavior which is part of the “bedside manner.” When a distinguished group of physicians from our national Institute of Medicine were asked which times they would give a patient a sleeping pill, they said it was when they knew the patient well. The decision had to do with the doctor-patient relationship, not with any particular complaint or medical diagnosis.

In the CPSI study, about 1/3 of people who said that they took sleeping pills “often” said that they never had insomnia. Before doctors were required to write in a diagnosis justifying every prescription, only a small percentage of patients given sleeping pill prescriptions received any diagnosis related to sleep disorders. Even if we include all diagnoses related to emotional problems and nervousness, most patients given sleeping pills were not given any diagnosis suggesting a genuine medical reason for the prescription. This suggests that gift-giving explains much hypnotic prescribing.

It’s not good to blame the physicians alone. Patients like to receive gifts! They like to feel that they are taking something which might help, even if there is no scientific evidence. In fact, patients often insist that they need sleeping pills, and may become
quite irate if a doctor does not want to provide what the patient wants.

When one talks to physicians about sleeping pills, they tell me these stories again and again. It is certain that most physicians try to be ethical about sleeping pills, but they also realize that the patient given a sleeping pill is likely to return for a renewal prescription, whereas the patient refused a sleeping pill may look for another doctor. Doctors are fond of their patients and like to keep them. In fee-for-service medicine, it is also quite clear where the doctor’s financial interest lies.

The problem of addiction.

All prescription hypnotics (with the exception of ramelteon and the new drug Silenor) may be physically addicting drugs, and all are sometimes attractive to drug addicts. By addicting, we mean that these drugs have two properties. First, when we take addicting drug such as narcotics or barbiturates, we develop tolerance so that a given dosage has less and less effect or “stops working.” People who develop tolerance are prone to increase their dosage more and more. Second, addicting drugs cause physical withdrawal symptoms when they are stopped abruptly. The withdrawal symptoms of hypnotics such as barbiturates and benzodiazepines are very well known. They include shakiness and tremor, nervousness and anxiety, panic, hyperactivity and increased reflexes, rapid heart rate, and epileptic seizures and death in the most severe cases. In one sense, the withdrawal syndrome with hypnotics can be worse than withdrawal from heroin, because while the heroin addict experiences withdrawal as a terrible anguish, it is rare that addicts do not survive even the most severe heroin withdrawal. Severe withdrawal of sleeping pills can produce death. The risk of seizures and death is probably more severe with withdrawal of barbiturates than with benzodiazepines.

On the other hand, zolpidem (Ambien) seems less prone to cause withdrawal symptoms than the barbiturates or
Sleeping Pills and Daytime Impairment

benzodiazepines. As compared to heroin, the withdrawal syndrome may be more lasting with the hypnotics, perhaps more than a month in some cases, though too little controlled experimentation has been done to be really sure. The addicting properties of hypnotics manifest themselves in several ways. Triazolam (Halcion) is such a short-acting drug that many people used to take bedtime doses which (for the first hour) were much stronger than the initial dose of a drug such as flurazepam or temazepam. But because triazolam disappears from blood largely with 2-3 hours, some people find themselves in triazolam-withdrawal before morning.

As a consequence, people taking triazolam may experience increased early awakening. It is suspected that zaleplon (Sonata) may be similar to Halcion in this regard, since it scarcely increases total sleep time. The manufacturers have admitted that zolpidem (Ambien) and eszopiclone (Lunesta) can also cause this early awakening. Although the problem may be less with Ambien CR, it is not entirely eliminated. Next, by wake-up time, the person taking zaleplon or triazolam or zolpidem will certainly be approaching withdrawal. The result, in at least some patients, may be increased tension and anxiety during the day. Such anxiety symptoms might develop somewhat later in the day with temazepam (Restoril) or estazolam (ProSom), because of the longer half-life. It has been that seen two patients who developed daytime panic attacks for the first time while taking triazolam. After withdrawing from this sleeping pill, the panic attacks of these patients disappeared.

Almost any patient discontinuing any of the short-acting benzodiazepines might experience some sense of anxiety and some withdrawal insomnia after discontinuation. Doctors argue whether the withdrawal syndrome universally leaves patients worse than they would be without the drug, but there is suspicion it often does. This makes it very difficult for patients to stop using these drugs once they have become habituated to them, and sometimes very long-term usage results, because the patient finds too much difficulty withdrawing. If you listen to the drug companies and
many experts who receive research grants from drug manufacturers, they would emphasize that most people who take sleeping pills use them for less than 15 doses in a year and do not become habituated. While this is true, it is likewise true that a small percentage do get into the habit of taking one or more hypnotic pills every night. Because these long-term users take so many pills (365 or more per year), it turns out that most of the hypnotic prescriptions sold go to these chronic users.

For instance, in our CPSII data, 65% of the sleeping pills reported taken in the past month were taken by people reporting that they took at least 30 doses per month, and these patients reported taking sleeping pills for an average of 5 years. It gives quite a different picture of the sleeping pill industry, when we realize that they are profiting primarily from chronic users who have become habituated or physically addicted to these medicines. Studies of barbiturate addicts showed that while taking huge doses of these sleeping pills, many addicts slept very little. In some cases, after a long and unpleasant withdrawal, the abstinent addict found himself sleeping more than he had been while taking high sleeping pill doses. It seemed that long-term usage of the barbiturates had actually decreased sleep.

Whether a similar phenomenon occurs with the benzodiazepines is uncertain, but it is a possibility. Certainly, the CPSII study and similar studies show that people who use sleeping pills often sleep less than people who do not use them, although that relationship does not distinguish which is cause and which effect. It appears that patients who stop chronic sleeping pill use may find that their sleep actually improves. Maybe it becomes a circular process, where people take sleeping pills because of poor sleep, but sleeping pills cause poor sleep.

The situation may be similar to that with alcohol, which can be a sleep-inducing drug with a very short half-life. Its known about little study of how much alcoholics sleep while they are drinking, but after abstinence, it is clear that abstinent alcoholics
sleep very poorly, and they are unable to obtain a normal sleep duration. It appears that in the long run, chronic usage of alcohol damages the sleep system. One advantage of some over-the-counter sleeping pills is that there is less evidence that they cause habituation and addiction.

**Strange sensations of Advantage**

Studies of sleeping pill effects on insomniacs show that they often describe a greater improvement in their sleep than EEG recordings measure. Although the hypnotic medication may hasten sleep onset rather little and decrease awakenings only modestly, the patient feels that the benefit is greater. It generally appears based on objective recording that insomniacs are mistaken in their estimate of whether the sleeping pills are helping with sleep. An example was the Dalmane-midazolam study, where the insomniacs said that the drug was helping, even when after 14 days, there was no benefit either by EEG measurement or even by their own estimates of how long they had slept. Another element may be that the sleeping pills simply make insomniacs forget how much they are awake at night. In the past, many of the over-the-counter sleeping pills contained scopolamine, an anticholinergic drug which causes amnesia but has no substantial sleep-inducing effect. Presumably, scopolamine affected the memory of insomnia rather than its actuality. It just helped people forget how poorly they might be sleeping.

It appears that benzodiazepines may make people less aware of their awakenings or less disturbed by them, because the drug may produce a sense of well-being. Indeed, any number of studies have documented that patients like how they feel when they take sleeping pills. To give perspective, let me mention that people also like how they feel when they take heroin. A good feeling does not mean that taking the drug is wise. I am not insensitive to the idea that some dying people at the end of their lives should receive medications to ease their pain when they want them, even if it shortens their lives. Most people who take sleeping pills are a long
way from being ready to die. It is not so that relief of distress justifies a drugs which may shorten life for most people who take sleeping pills. Regardless of whether or not you agree with assisted suicide, most patients who seek sleeping pills are not ready for this assistance.

**Disinhibition of punished behaviours and the dark side of tranquilization**

To understand why people continue taking benzodiazepine hypnotics when experiments show they improve sleep so little and impair performance, it may be helpful to discuss some affects of these drugs on behavior. In experiments where a laboratory rat will receive an unpleasant shock when it presses a lever, an animal given a benzodiazepine will be more likely to press the lever than an animal given placebo.

Scientists say that benzodiazepines disinhibit punished behavior, which means that the animals become more likely to hurt themselves or to behave in a way in which they will be hurt. Another way of saying this is that benzodiazepines disinhibit aversive behaviors. There is a human analogy. In humans, the action of benzodiazepines is to reduce fears of being harmed, which we may call being tranquilized. People very much like this feeling of reduced fear, and there is no doubt that many people like how they feel when taking benzodiazepines. The manufacturers could not sell as many as 100,000,000 benzodiazepine prescriptions in the U.S. yearly if people did not like them. Unfortunately, this tranquilization effect includes the risk of reducing a person healthy fear of self-destructive actions. For instance, a person driving 80 mph down the highway approaching a curve ought to slow down for the curve, but taking a benzodiazepine might make the driver less likely to slow down. In some studies, benzodiazepines make people more likely to be aggressive. This blunted fear of harmful behaviors or blunted anxiousness to protect oneself may be one way in which sleeping pills shorten people’s lives. There is another curious twist to this idea. When we consider that benzodiazepines
increase people’s tendency to act in a self-harmful way, it is logical that taking harmful sleeping pills may be one of the harmful behaviors which benzodiazepines tend to increase.

Infection

A strange new finding we have obtained with colleagues at Scripps Clinic is that people who take sleeping pills such as eszopiclone, zaleplon, and zolpidem have about a 44% higher risk of developing infections such as sinusitis, pharyngitis, upper respiratory tract infections, influenza, herpes, and so forth. There has been essentially no discussion of this risk in the medical literature, but it is statistically extremely convincing, based on studies which the manufacturers submitted to the FDA and some of their published controlled trials.

One mechanism is that zolpidem (and probably other sleeping pills) relax the stomach sphincter and cause gastro-esophageal regurgitation.

The acid irritation may lead to infection. Incidentally, acid regurgitation may also lead to esophageal cancer, which is one of the cancers most greatly increased among sleeping pill users. At present, we do not know why these infections occur, but it does seem that they would be sometimes annoying, sometimes painful, and sometimes frankly dangerous. It is not clear if ramelteon has the same risks, but there is one table in FDA data which suggests that it might. We could not find adequate information concerning the older sleeping pills. A new study from Great Britain showed that use of benzodiazepines (including popular sleeping pills) was associated with a 50% increase in hospitalizations for pneumonia and about a 30% increase in subsequent mortality.

GETTING OFF SLEEPING PILLS

As it has been explained, because of mortality, cancer, depression, infection, and behavioral risks, one cannot recommend circumstances when anybody should continue taking zolpidem, eszopiclone, zaleplon, temazepam, triazolam, flurazepam,
estazolam, quazepam, barbiturates, or diphenhydramine as hypnotics.

Generally the manufacturers generally claim that a person taking only the recommended dosage each night should safely be able to stop the pill immediately. Actually, patients who have been taking higher doses or a regular dosage for a long time may need to slowly taper off the medication, reducing their dosage by a small portion every week or two. Withdrawal from sleeping pills can cause at least a few nights of insomnia, anxiety (both day and night), tremulousness, and other symptoms. People will have much less difficulty withdrawing from sleeping pills if they first begin CBT treatment. It is always recommended that a patient consult the prescribing doctor before discontinuing a prescribed sleeping pill.

For most patients, it will not be necessary to replace a sleeping pill with any other drug only for treatment of insomnia. If related illnesses such as depression, anxiety, etc. are involved, an approved medication for those conditions may be needed.

Even people with no intrinsic depression or anxiety are likely to become anxious when withdrawing from a sleeping pill. It helps to understand that this anxiety and fear of insomnia is probably a drug withdrawal reaction which will go away in time, often within a day or two, so starting a replacement drug may not be advisable. People withdrawing from sleeping pills may become filled with the idea that they can never do without their pill, when a few days later, they do perfectly well without it.

There are some drugs which could be substituted for the sleeping pills which was recommended discontinuing because of mortality and cancer risks. It is not said that such substitution is recommended. Certainly one would not recommend substituting in ordinary circumstances, but one recognize that physicians will encounter some patients for whom at least short-term substitution seems a good idea. I do not think that the possible substitutes have been shown to be associated with mortality or human cancer. The
most reasonable substitute drugs might be trazodone, Silenor (doxepin 3 or 6 mg.) and melatonin, but this without recommending substitution. Trazodone and melatonin are not FDA-approved as hypnotics as of February, 2012.

Melatonin in an immediate release form sometimes has a benefit in reducing the time to fall asleep, but it is less effective or ineffective in prolonging sleep later in the night, so its benefits for total sleep time are often weak or absent. Melatonin may accelerate sleep onset, but it is a timing drug, not a hypnotic as such. Rodents have the highest melatonin blood concentrations when they are wide awake. There is evidence that melatonin has a variety of minor side effects such as headache and nightmares, and some effects on the reproductive endocrine system, but little or no evidence of serious side effects. A sustained release melatonin preparation (Circadin) has been approved as a sleeping pill in Europe. Initial published reports suggest that Circadin has a favorable benefits/risks ratio.

However, there seems to have been a trend to leave the less favorable studies of sustained release melatonin unpublished. As of this writing, sustained release melatonin is not yet FDA approved in the U.S. Our research suggested a trend for older women who secreted more natural melatonin to have higher mortality, but this trend was not statistically significant. I think we need more long-term studies of melatonin safety.

There is a specific use for melatonin for people with delayed sleep phase disorder (nightowls who have trouble falling asleep and trouble getting up in the morning). There is great evidence that very low doses of melatonin (50-500 micrograms) may be useful for these patients. The recommended dosage is much lower than the 1-5 mg. (1000-5000 micrograms) usually sold over the counter. As it has been mentioned, it is agreeable with the European Committee for Medicinal Products for Human Use (CHMP), which thought that melatonin would have a better benefits/risks ratio than ramelteon.
SLEEPING PILLS AND INSOMNIA

Hypnotics (sleeping pills) are relatively commonly prescribed. While exact numbers are difficult to come by, it has been estimated that 40 million or more Americans regularly use sleeping pills. Is there a risk from the regular use of sleeping pills?

The authors identified 12,465 patients with at least one order for a hypnotic medication. The authors then matched these by sex, age, smoking status, and observation period to 24,793 patients who never received an order for a hypnotic. After statistically adjusting for age, sex, smoking, body mass, ethnicity, marital status, alcohol use and prior cancer, the authors found that the death rate among those using hypnotics was over 4-fold greater than those not using hypnotics.

The range of hypnotics was reasonably representative of what is available by prescription. Because the findings were so dramatic, several news stations picked up this study for coverage.

Indeed, the first author of this well-done study has become a crusader of sorts against the use of hypnotics and, along with others, believes that sleeping pills pose a risk for excess mortality. To address some of the concerns that have been raised in the public conscience regarding the use of sleep pills, it was decided to address this issue head-on and honestly describe what is known about the risks, and what is not known.

Sleeping pills (all varieties) CAUSE death did it prove?

This study was what is called a “retrospective” study, that is, a study looking back. Retrospective studies are a good place to look for things, but since conditions are often not able to be well controlled, they may not be able to say what caused what.

Indeed, for the study at hand, while very well done, the study could not (and did not) claim to have demonstrated a CAUSAL relation. Indeed, the patients in the hypnotic group also had a higher incidence of asthma, cardiovascular diseases (including coronary disease, cerebrovascular disease, hypertension, heart
failure, peripheral vascular disease), chronic kidney diseases, diabetes, obesity, and chronic obstructive lung disease. All these conditions are well known to be associated with increased mortality and with insomnia, for which it is logical to assume that doctors might prescribe sleeping pills.

So, as the authors of this study noted in their discussion of the results, the question of causality cannot be claimed, and these (and other similar studies) may have simply observed that people with chronic illness are more likely to have insomnia (and this is certainly true) and, of course, more likely to die. The cause of death was generally not available on the database.

**How safe are sleeping pills?**

Of course, sleeping pills like any other pills all have potential side effects. However, the side effects are less common, and generally manageable, for the newer classes of medications. Some of the older types (especially the barbituates) are well known to cause depression of the respiratory system, especially in larger doses.

While the “benzos” also suppress respiration, they do less frequently. All sleeping pills are potentially dangerous when combined with alcohol. Some sleeping pills can have depression as a side-effect. Again, there were no data on how many of the deaths were suicide.

All the sleeping pills can be associated with problems with thinking and motor skills the next day. That is why for patients taking the longer acting sleeping pills (“Lunesta” for example), we often ask that at least 8 hours be allowed for sleep, and at follow-up visits, we always assess whether patients are having “carry-over” effects. Some of the sleeping pills may make sleep apnea worse (especially the barbs and benzos), and this could in turn be a risk for car accidents or cardiovascular disease. Some of the sleeping pills (Ambien for one) have been shown to increase reflux of acid from the stomach. This could irritate the upper respiratory tract and potentially be a source of infection.
On the other hand, the FDA trials allowing the prescription sleeping pills to come to market, while tightly controlled, and not involving millions of people did not demonstrate increased mortality. Most of these studies do show that, at least in the short term, sleeping pills may be associated with improved sleep quality and daytime functioning.

Tolerance and addiction are always a potential with sleeping pills. This was especially a problem with heavy use of barbs and benzos. With the newer classes (the non-benos and others) this is less of a problem for most people.

**What is the general approach to the treatment of insomnia?**

This is actually a complex question. This is because insomnia is not a disease (usually), but the result of something else. Causes include physical ailments (most chronic ailments can cause insomnia), pain, psychologic stress (acute and chronic), other medications, “organic” sleep disorders (for example sleep apnea, restless legs syndrome), and poor sleep habits. The common approach is to find out how long the insomnia has been going on (if more than 1 month it is called “chronic”).

We also like to find out if there is something that triggered insomnia. We also ask about the patient’s medical and mental health history as well as medications. The social circumstances are extremely important. For example if a patient works 3 nights a week, it is not surprising that he/she cannot stay awake during the night shift, and cannot sleep during the day. We look for signs of “organic” sleep disorders. Finally, we obtain a detailed history of the patient’s bedtime schedule, sleep habits and sleeping environment. Sometimes, the cause of the insomnia pops right out at you. For example, if a patient takes a 3 - 4 hour nap in the afternoon or evening, it is not surprising that they cannot fall asleep at a reasonable hour. At other times the sleep specialist must “dig” a bit more.

Sometimes (about half the time) an organic sleep disordered is suspected of playing a large role. In these cases, an all-night
sleep study may be useful. Sometimes, patients keep diaries which may be very informative. So, you see, the issue rather complex. As noted elsewhere on our website, treatment options depend on the underlying cause of insomnia, the presence of other problems, and individual patient preferences. We always advocate treatment of any underlying cause (be it in the physical or mental health realm). We always advocate optimization of the patient’s sleep schedule and sleeping habits (sometimes this takes a lot of work). In several cases we are faced with the need to choose some therapy, either temporary or long-term depending on the case for symptomatic relief.

Insomnia is a very distressing symptom, and has real implications for functioning during the day, and treating the symptom is definitely called for while the other issues are addressed. The two major categories of symptomatic relief for insomnia include sleeping pills, and cognitive-behavioral therapy (described elsewhere in this website). Each of these approaches has its own advantages and disadvantages.

For long-term treatment of insomnia as a symptom, we prefer a behavioral approach (if possible), but there are some patients for whom long term sleeping pills are acceptable. We certainly advocate an individual approach to treatment. Only throwing pills at a patient is usually not the answer, certainly for a chronic problem.

**Role of sleeping pills for treatment of insomnia**

Hypnotics are tools. Like any tool, there are indications for use, and types. Hypnotics are often chosen on the basis of how fast they take action and how long their action lasts. For example, a short acting, rapid onset hypnotic may be indicated when the problem is going to sleep, where for sleep maintenance, a longer duration of action may be indicated. Also, interactions with other medical problems or medications must be taken into account.

For short term insomnia (jet lag, temporary life stressor), sleeping pills may be taken for a few days if required, without a
problem. Hypnotics may be useful for nightshift workers who have trouble sleeping in the day after a shift (combined, of course with other coping strategies). Patients who are chronically insomniac do need symptomatic treatment and choices (above) exist. The particular choice for a particular patient must be made on an individual basis, taking all the relevant factors into account. There is no “one size fits all” approach and the appropriate treatment plan must be made by the patient with his/her physician or sleep specialist.

Should we devoid of tenking sleeping pills?

There is no need to panic, or to toss the sleeping pills in the toilet. There is no certain evidence that sleeping pills CAUSED the excess mortality observed, rather it is likely that conditions related to mortality and that cause insomnia led physicians to prescribe sleeping pills. However, as noted above, alternatives exist. There is no reason to accept a lifetime on sleeping pills as a “given.” Other avenues for evaluation and treatment of insomnia certainly can be explored with a health care practitioner knowledgeable in this terrible problem. Before throwing the pills away, patients on chronic sleeping pills should have a frank discussion with their health care practitioner about the issues. The practitioner and the patient can then make rational decision that suits that particular individual patient’s needs.

Various Types of hypnotics

The term “hypnotic” roughly refers to what are commonly called “sleeping pills.” These are medications taken prior to the sleeping period that are an aid to falling asleep and/or maintaining sleep. There are several types of medications out there. They differ in class, onset of action, duration of action, and potential risks. Here are some of the more common types. They are listed as the generic name first, and the brand name after. Most are available generically. These lists are not meant to be all-inclusive, but only representative.
Sleeping Pills and Daytime Impairment

1. Benzodiazepines (“benzos” the “Valium” class of medicines): These medications work on receptors in the brain called “GABA” (stands for gamma-amino-butyric-acid). While Valium was the first of this type (and had a fairly long duration of action), there are others out there that are in more common use. These include temazepam (brand name: Restoril), triazolam (brand name: Halcion), lorazepam (brand name: Ativan), alprazolam (brand name Xanax), oxazepam (brand name Serax), chlordiazepoxide (brand name Librium), and clonazepam (brand name Klonipin). While the benzos have been commonly used as hypnotics, they are less so nowadays. This is partly because there are other effective hypnotics that don’t have all the other effects of the benzos. These other effects comprise anti-anxiety effects and muscle relaxation, as well as some depression of the breathing centers (although this only in large doses). Some of the effects (like anti-anxiety and muscle relaxation) are desired in certain circumstances and may be the main reason they are prescribed.

2. Non-benzodiazepines: These are generally called the “Z” class because they all include the letter “Z” in the generic name. These medications also work on the GABA receptors, but are more specific for sleep inducing than the benzos. These include Zolpidem (brand name Ambien), Zaleplon (brand name Sonata), and Eszopiclone (brand name Lunesta). Because their side-effect profile is a little better, and they don't have the same number of other effects, this class has become the most commonly prescribed.

3. Barbiturates (“barbs”): It include phenobarbital (Most common brand name Luminal), pentobarbital (most common brand name Nembutal), and secobarbital (most common brand name Seconal). While in the past, these were commonly used as hypnotics, because of side effects, primarily the possibility of severe depression of breathing, they are rarely used for this purpose today, although some members of this category are used as effective anti-seizure agents.
4. Melatonin like drugs: Melatonin ("the hormone of the dark") is released by small glands in our brains known as "pineal gland." This gland is an important part of the system which regulates our wake-sleep cycles and synchronizes it to the daylight—dark conditions in which we find ourselves. Essentially as light fades, melatonin is released and affects other areas of the brain, and other areas of the body, to push us into a "nighttime" mode. In the early morning, melatonin secretion stops. The whole system is keyed to blue light being detected in our eyes. There are many receptors in the body for melatonin. It is also fair to say, that we do not yet know the functions of all the melatonin receptors. In the US, melatonin is available as a food supplement in most health food stores (sometimes extracted from the pituitary glands of cows), and are not FDA regulated as drugs. One drug ramelteon (brand name Rozerem) is available and affects certain melatonin receptors (types 1 and 2) known to be associated with sleep induction. Thus, ramelteon does not work on the GABA receptor in the brain.

5. Off-label antidepressants: Some of the antidepressant medications have soporific (sleep inducing) properties. Sometimes, physicians will prescribe these as sleeping pills. A good instance of this is trazodone (brand name Oleptro). While these are effective antidepressants, and depression is a major cause of insomnia, the long-term use in patients who are NOT depressed is certainly far from proven.

6. Over-the-counter use of sedating antihistamines: These are generally available without prescription, and are sometimes used as sleep aids, although their effectiveness, especially long-term, is in doubt this class of medications is often the ingredient in the "nighttime" version of many pain killers (like Tylenol and advil). A commonly used medication in this class is diphenhydramine (brand name Benadryl) but there are many others.
7. Other over-the-counter medications are available as sleep aids without a prescription. There are different types of herbal remedies that are touted as sleep aids. One, valerian root (Valeriana officinalis), is available under various brand names for treatment of anxiety and insomnia. Effectiveness is not as well established as for the “regular” sleep aids. Interestingly, the valerian root contains within it a compound that resembles the benzos
Good Sleep Habits and Attitudes as Alternative

The alternative to sleeping pills is to develop good sleep habits and good sleep attitudes. Good sleep habits and attitude are the best approach for a long-term sleep problem, and they produce surprising improvement. First, remember that most people do not need 8 hours of sleep per night. That old idea just is not so. In our studies in San Diego, the average adult is actually asleep only between 6 and 6.5 hours a night. National polls give similar results. Besides, in the recent Cancer Prevention Study II results, people who said they slept 6.5 to 7.5 hours lived a bit longer than people who slept 8 hours or more.

The shorter sleepers lived longer! Even people who said that they slept as little as 3.5 hours lived longer than those who slept 8 hours or more! In a group of women over age 65 who volunteered for the Women’s Health Initiative, wrist recording indicated that they actually slept about an hour less than they thought they slept. According to the recordings, those who slept 5.0-6.5 hours had the lowest mortality. If you feel you sleep 5 to 7 hours a night and feel rested, there is no evidence that you have to sleep any more as far as life expectancy is concerned. Incidentally, controlling for other illnesses, age, and so forth, people who said that they had insomnia lived a little longer than those who did not have insomnia! Therefore, do not worry about insomnia!
Short sleep is related to good health as well as long life. Studies show that in the range that most Americans sleep (which is 6, 7, or 8 hours or so), there are few discernable differences between people. This may surprise you, but people who sleep 6 hours seem to be at least as happy as people who sleep 8 hours. Moreover, people who sleep 6 hours get just as much work done and are just as rich as people who sleep 8 hours.

There may be some tendency for people with the shortest sleep times (5 or 6 hours) to be outgoing and energetic, whereas people with the longest sleep times (9 or 10 hours) seem to be more introverted, imaginative, or perhaps a bit depressed. Notice the surprise! People who sleep less are less depressed! Indeed, hospital studies of depressed patients show something very surprising. When depressed patients are kept awake all night (or at least for the second half of the night, e.g., after 2 AM), they actually feel less depressed the following day. The sleep loss actually helps depressed mood.

Moreover, after the wake therapy, taking a nap makes depressive symptoms recur. Wake therapy would be a very popular treatment for depression except for one problem: people with depression who stay up at night do get sleepy, and after they sleep soundly the next night, the low mood relapses. In the ebook Brighten Your Life, it has been explained how this relapse can be avoided with bright light. Evidently, although it is true that people who are getting depressed have poor sleep, it is not proven that getting more sleep helps depression. It may be quite the opposite. In fact, it has now been proven that cognitive-behavioral therapy which restricts sleep improves the mood of patients with insomnia. Less time in bed can lessen depression. For these reasons, depressed people should not struggle to get more sleep, and should certainly avoid sleeping pills, which tend to cause depression.

There is another factor. Spending too long in bed – as you might expect – causes people trouble with falling asleep and makes them more likely to awaken while in bed. Sometimes, the frustration of lying in bed awake adds to the problem, and it
builds on itself, getting worse and worse. The more time the person spends in bed trying to get more sleep, the more trouble develops in falling asleep and the more the person awakens in the night. Surprisingly, it seems that spending too long in bed might be a major cause of sleep trouble among both elderly and depressed people. Fortunately, there is an easy solution. People who are spending a lot of time in bed lying awake should spend less time in bed. This means either going to bed later or getting up earlier. Getting up by a regular time seems to be important, so trouble falling asleep should not persuade you to sleep late. The less time you spend in bed, the more sleepy you will be the next evening. Think about it. If you spend less time in bed, you will surely tend to fall asleep more easily and sleep more soundly in the future.

Moreover, the less time you spend in bed, the more you will restore the habit of falling asleep quickly after going to bed, and the more you improve the habit of sleeping soundly. Some doctors would recommend that you should not spend more time in bed than you actually sleep. If you think you only sleep 5 hours a night, spend only 5 hours in bed until you are sleeping all 5 hours. Then you can try increasing time-in-bed about 15 min., e.g., to 5 hours and 15 minutes.

You can gradually increase your time in bed on a weekly basis until you are no longer sleepy enough to sleep at least 85% of your time in bed. Once you are sleeping only 85%, that is the longest bed time which you should allow yourself. Most of the sleep experts also recommend that whatever bedtime you allow yourself, you should not go to bed if you do not feel sleepy.

Moreover, if you awaken at night and no longer feel sleepy, get out of bed, and do not go back until you are sleepy again and expect to fall asleep. Even after being up during the night, you should get out of bed by your regular awakening time, because sleeping late tends to make the problem worse. Getting out of bed when you are not sleepy makes you sleepier the next night and helps maintain good sleep habits. Almost all of us have stayed up
Good Sleep Habits and Attitudes as Alternative

entirely for a night or two, so we know that nothing terrible happens to us. Many of the patients I talk to say that they have slept only a few hours a night for years, and yet they are somehow afraid that losing sleep will hurt them. Probably not.

Remember that if anything, people who sleep a bit less than average tend to live longer and be less depressed. If you are willing to stay out of bed and amuse yourself somewhere else when you are not sleepy, soon you will stop worrying about sleep. If you lose a whole night’s sleep or part of a night, so what? It will not be so bad, as long as you do not worry about it. When you do go to bed (because you are finally sleepy), you will have restored your confidence that you are likely to fall asleep, so the long-term problem resolves. If you do start to worry about how a bad night of sleep will affect you the next day, remember that there is no reason to take a sleeping pill. The sleeping pill is likely to make your performance worse the next day, and very unlikely to help.

Experts also advise that you avoid worrying in bed, watching TV (especially those scary late-night movies), reading scary mysteries, and doing other things besides sleep and sex in bed. The idea is not to make a habit of being worried or alerted in bed. If you are a person who worries, select a place to worry (such as a chair in another room), and sit down to worry there. When you are tired of worrying, then go to bed.

Good sleep habits also need avoiding coffee or anything else with caffeine within 6 hours of bedtime. Alcohol is sometimes a cause of sleep trouble, because although it relaxes us at first, it leads to insomnia as soon as the blood alcohol level falls. Drinking early in the evening may cause trouble falling asleep. Drinking at bedtime may cause midsleep awakenings and early awakening.

People say that exercise helps sleep, but I think the benefit is minimal. Probably it is being outdoors in daylight, which is often where people exercise, which is helpful. We have found that people who are outdoors more have fewer sleep problems.
Controlled scientific studies show that adopting good sleep habits and attitudes is extremely effective in solving long-term sleep problems. It is more effective than sleeping pills. If good sleep habits and good attitudes do not solve your problem, there is a good chance that you are suffering from depression. You should consult your doctor. You can read more about treatment of depression in my online ebook, *Brighten Your Life*. You might also consult a sleep specialist at a sleep clinic. You might have a problem with your body clock (which is described in *Brighten Your Life*) or another sleep disorder which could benefit from specific treatment. For a chronic problem, it is not advised to ask a doctor for sleeping pills. It is the wrong approach.

For help with insomnia by changing habits and attitudes, try Cognitive-Behavioral Therapy or CBT. If you can’t find a CBT therapist in your community, there are several helpful commercial web sites which cost less than a single therapist visit, e.g., CBTforInsomnia.com. Two other CBT web sites are B-Med Interactive and the University of Virginia’s Sleep Healthy Using the Internet (SHUTi) program, but I have no experience with either of them.

**SLEEP AND MOOD**

- Sleep and mood are closely connected; poor or inadequate sleep can cause irritability and stress, while healthy sleep can enhance well-being.
- Chronic insomnia may increase the risk of developing a mood disorder, such as anxiety or depression.
- Poor sleep and feelings of depression or anxiety can be helped through a variety of treatments, starting with improved sleep habits, and, if needed, extending to behavioral interventions and an assessment for a sleep or mood disorder.

Poor sleep harms concentration. Studies have shown a link between depression and abnormal sleep patterns. When Asha, a busy assistant district attorney and mother of two began getting
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better sleep, her mood and quality of life improved. You probably know firsthand that sleep affects mood. After a sleepless night, you may be more irritable, short-tempered, and vulnerable to stress. Once you sleep well, your mood often returns to normal. Studies have shown that even partial sleep deprivation has a significant effect on mood. University of Pennsylvania researchers found that subjects who were limited to only 4.5 hours of sleep a night for one week reported feeling more stressed, angry, sad, and mentally exhausted. When the subjects resumed normal sleep, they reported a dramatic improvement in mood.

Not only does sleep affect mood, but mood and mental states can also affect sleep. Anxiety increases agitation and arousal, which make it hard to sleep. Stress also affects sleep by making the body aroused, awake, and alert. People who are under constant stress or who have abnormally exaggerated responses to stress tend to have sleep problems.

Insomnia and Psychological Problems

“There’s a great relationship between psychiatric and psychological problems and sleep. So people who are depressed or have anxiety often have trouble with sleep as part of those disorders,” says Dr. Lawrence Epstein, Medical Director of Sleep Health Centers and an instructor at Harvard Medical School.

Difficulty in sleeping is sometimes the first symptom of depression. Studies have found that 15 to 20 percent of people diagnosed with insomnia will develop major depression. While sleep research is still exploring the relationship between depression and sleep, studies have shown that depressed people may have abnormal sleep patterns.

Sleep problems may, in turn, contribute to psychological problems. For instance, chronic insomnia may increase an individual’s risk of developing a mood disorder, such as depression or anxiety. In one major study of 10,000 adults, people with insomnia were five times more likely to develop depression. Lack of sleep can be an even greater risk factor for anxiety.
In the same study, people with insomnia were 20 times more likely to develop panic disorder (a type of anxiety disorder). Another study showed that insomnia is a reliable predictor of depression and many other psychiatric disorders, including all types of anxiety disorders.

**Various Treatments for Sleep Problems**

If you sleep poorly and feel depressed, anxious, or less emotionally responsive, there are various treatments that can help. First, look at your sleep habits and see if there are steps that you can take on your own to improve the quantity and quality of your sleep. See Adopt Good Sleep Habits for tips on how to improve your sleep. If problems persist, you may wish to see a medical provider and ask about an evaluation for sleep problems and mental health concerns. After an evaluation and diagnosis, your provider can advise you on the best course of treatment. Options may include behavioral or other forms of therapy and/or medications. You can read about and watch a video of a behavioral sleep consultation in the Healthy Sleep module.

**SLEEP DIFFERENCES AMONG ETHNIC GROUPS: A SURVEY**

The 2010 *Sleep in America* poll released by the National Sleep Foundation (NSF) reveals significant differences in the sleep habits and attitudes of Asians, Blacks/African-Americans, Hispanics and Whites. It is the first poll to examine sleep among these four ethnic groups.

NSF’s *Sleep in America* poll found that more than three-fourths of respondents from each ethnic group agree that poor sleep is associated with health problems (76-83%). These new findings echo lessons learned by former President Bill Clinton who recently admitted that he has adopted a new lifestyle regimen to sleep seven or more hours on the advice of his doctors. The poll also shows that all groups report disturbingly similar experiences missing work or family functions because they were too sleepy
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(19-24%). Among married people or couples living together, all ethnic groups report being too tired for sex frequently (21- 26% of the time).

“As the leading voice of sleep health, we are committed to better understanding people’s sleep needs,” says David Cloud, CEO of the National Sleep Foundation. “By exploring ethnic and family sleep practices we have gained new insight into why we sleep the way we do.”

Blacks/African-Americans report the busiest bedtime routines.

Blacks/African-Americans are the most likely to report performing activities in the hour before going to bed every night or almost every night, specifically watching TV (75%) and/or praying or doing another religious practice (71%). Whether on weekdays/workdays or non-workdays/weekends, Blacks/African-Americans spend much more time in bed without sleeping than the other ethnic groups (54 minutes on weekdays/workdays and 71 minutes on non-workdays/weekends).

- Blacks/African-Americans and Hispanics (10% each) are ten times more likely to report having sex every night than Asians (1%) and 2.5 times more likely than Whites (4%).
- Most Blacks/African-Americans report praying every night (71%); more than four times the reported frequency of Asians (18%), twice the rate of Whites (32%) and 1.5 times the rate of Hispanics (45%).
- Blacks/African-Americans (17%) and Asians (16%) are more likely than Whites (9%) and Hispanics (13%) to report doing job-related work in the hour before bed, among those employed.
- Blacks/African-Americans report losing sleep every night over personal financial concerns (12%) and employment concerns (10%) at a higher rate than Whites (6% and 7%) or Asians (1% and 4%). Hispanics are almost equally concerned each night about these two issues (11% and 9%, respectively).
“The hour before bed is an important time to relax and wind-down before going to sleep,” says Thomas J. Balkin, Ph.D., Chairman of the National Sleep Foundation. “For those who are having problems sleeping, it’s a good idea to consider whether your bedtime routines may be too alerting.”

**Asians had good night sleep and infrequent use of sleep aids.**

Asians are the most likely ethnic group (84%) to say that they had a good night’s sleep at least a few nights or more a week. In addition, Asians are about half as likely (14%) to discuss their sleep issues with a healthcare professional, and are half as likely (10%) to report having been diagnosed with a sleep disorder. Asians are the least likely to report using sleep medication at least a few nights a week (5% versus 13% Whites, 9% Blacks/African-Americans and 8% Hispanics).

- Asians are the least likely (9%) to say that they “rarely” or “never” have a good night’s sleep, compared with 20% of Whites, 18% of Blacks/African-Americans and 14% of Hispanics.
- The poll shows that Asians are more than twice as likely to use the Internet every night in comparison to any other group (51% versus 22% Whites, 20% Blacks/African-Americans, 20% Hispanics). They are also the least likely to watch TV an hour before sleep (52% versus 64% Whites, 72% Hispanics and 75% Blacks/African-Americans).
- Asians report the use of herbal and alternative therapies at rates similar to Hispanics (2% each), but less than Whites (4%).
- Asians report the lowest rates of losing sleep due to personal financial concerns at least a few nights a week (9% versus 22% Hispanics, 20% Whites and 19% Blacks/African-Americans).

**Blacks/African-Americans have least amount of sleep**

Blacks/African-Americans report getting the least amount of sleep on workdays/weekdays (6 hours and 14 minutes).
Interestingly, they also say that they need only 7 hours and 5 minutes of sleep each night to perform at their best during the day, which is significantly less sleep than Asians and Hispanics (7 hours and 29 minutes each).

- Blacks/African-Americans report getting an average of 34 minutes less sleep on a work night/weeknight than Asians and 38 minutes less than Whites.

“The finding that Blacks/African-Americans say they need less sleep and get less sleep is instructive for public health professionals,” says Jose S. Loredo, MD, MPH, Professor of Medicine at the University of California, San Diego. “Their total sleep time and attitudes regarding sleep may be associated with Blacks/African-Americans’ higher rates of sleep apnea, hypertension and diabetes and provide sleep-related insight into how to improve awareness and education programs and, very importantly, how to improve therapy compliance rates.” Hispanics are the most likely to say they are kept awake by financial, employment, personal relationship and/or health-related concerns. Overall, at least one-third of Hispanics (38%) and Blacks/African-Americans (33%) report that any of these concerns disturb their sleep at least a few nights a week, compared to about one-fourth of Whites (28%) and/or Asians (25%).

- Moreover, about two in ten Hispanics (19%) and Blacks/African-Americans (19%) say their sleep is disturbed every night or almost every night by at least one of these concerns.
- Hispanics (16%) are more likely than Blacks/African-Americans (12%), Asians (9%) and Whites (7%) to say that health-related concerns have disturbed their sleep at least a few nights a week.

“Many people are suffering because of economic uncertainty,” says Martica Hall, Ph.D., Associate Professor of Psychiatry at the University of Pittsburgh. “If you find yourself lying awake worrying, write a note to yourself to work on these issues the next day so you can dismiss those ideas at bed time. Consider using relaxation techniques and focus on calming activities and thoughts.”
If your problems persist, you may want to seek out a sleep professional.”

Whites are the most likely to report sleeping with their pets and/or their significant other/spouse. Among those married or partnered, Whites are much more likely (14%) than the other ethnic groups (2% each) to say they usually sleep with a pet.

- Among those married or partnered, 90% of Whites report that they sleep with their significant other compared to 84% of Blacks/African-Americans, 76% of Hispanics and 67% of Asians.
- Interestingly, among all respondents, Whites are the least likely to say they sleep alone (21% versus 41% Blacks/African-Americans, 37% Asians and 31% Hispanics.)

Among those married or partnered respondents with children, Asians (28%) and Hispanics (22%) are the most likely to report that they sleep in the same room with their children (compared to 15% of Blacks/African-Americans and 8% of Whites).* “Other studies support the findings that co-sleeping with children is prevalent with Asians,” says Sonia Ancoli-Israel, Ph.D., chair of the National Sleep Foundation’s Sleep in America Poll Task Force. “If you are having trouble sleeping, and you sleep with your spouse, your child, your pet or all three, remember that may be contributing to sleep disturbances that prevent you from getting a good night’s sleep.”

*Bed sharing/co-sleeping is a complex and controversial practice. This study did not specifically examine the issue of sleeping with infants, nor does the National Sleep Foundation wish to have these results misconstrued to suggest a position on the practice. Parental counseling about infant sleep environments is strongly suggested.

Uneven Sleep among the four ethnic groups

The poll found that sleep disorders continue to be very common among the adults surveyed, with specific disorders occurring at different frequency among the four groups.
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- Whites report the highest rate of diagnosis for insomnia (10%), and Blacks/African-Americans have the highest rate of diagnosed sleep apnea (14%) among the four groups.

- Among those experiencing sleep problems, Whites are the most likely to report using over-the-counter sleep aids at least a few nights a week (7%). Blacks/African-Americans are almost twice as likely to report taking medications prescribed by a doctor (7%) rather than over-the-counter sleep aids (3%). Asians are the least likely to report using any form of sleep medication (5%).

“If you are experiencing problems sleeping,” says Balkin, “Take charge of your own sleep. You should critically examine your bedtime routines and pre-sleep activities and make time to ensure your bedroom is conducive to your sleep comfort. You will spend approximately a third of your life in bed, so it’s worth it to take time to make sure your bed and bedtime routine are right for you. If you continue having problems sleeping for more than a few weeks, it’s advisable to speak with your healthcare professional.”

Ethnic groups seek help for sleep problems differently.

When experiencing a specific sleep problem, Blacks/African-Americans say they are more likely to speak with their doctor (16%) or research online (10%) than to get recommendations from friends or family (4%).

- Asians (15%) are the most likely to say they get advice from family and friends.

- Respondents were also asked if their healthcare professional or doctor had ever asked them about their sleep during a routine visit. At least four in ten Whites (48%), Blacks/African-Americans (42%) and Hispanics (40%) say yes; however, only 28% of Asians had been asked about sleep by their doctor.

“We are making progress with physicians and patients discussing sleep issues in regular office visits,” says Cloud. “But we still have a lot of work to do to make sleep a routine part of every physician-patient interaction.”
Adds David G. Davila, MD, Medical Director of the Baptist Health Sleep Center in Little Rock, Arkansas, “Sleep is a vital sign for overall health, therefore, discussing sleep problems should be an important part of health check ups for doctors and patients, especially since sleep disorders can affect many other medical conditions.” For the most comprehensive source of information on sleep health, visit the National Sleep Foundation’s website, www.sleepfoundation.org. The website also provides a directory of sleep professionals and sleep centers in your community. You can also read the complete Summary of Findings and highlights from this year’s *Sleep in America* poll and polls from prior years.

**Suggestions Healthy Sleep**

The National Sleep Foundation suggests the following to improve your sleep:

- Go to sleep and wake at the same time every day, and avoid spending more time in bed than needed.
- Use bright light to help manage your “body clock.” Avoid bright light in the evening and expose yourself to sunlight in the morning.
- Use your bedroom only for sleep to strengthen the association between your bed and sleep. It may help to remove work materials, computers and televisions from your bedroom.
- Select a relaxing bedtime ritual, like a warm bath or listening to calming music.
- Create an environment that is conducive to sleep that is quiet, dark and cool with a comfortable mattress and pillows.
- Reduce or eliminate your intake of caffeine, nicotine and alcohol.
- Save your worries for the daytime. If concerns come to mind, write them in a “worry book” so you can address those issues the next day.
- If you can’t sleep, go into another room and do something relaxing until you feel tired.
• Exercise regularly, but avoid vigorous workouts close to bedtime.

Poll Methodology and Definitions

The National Sleep Foundation started surveying American sleep health and behaviors in 1991. The 2010 Sleep in America annual poll was conducted for the National Sleep Foundation by WB&A Market Research, using a random sample of 1,007 adults between the ages of 25-60 and identifying themselves as White, Black/African-American, Asian or Hispanic. This poll has adopted the group definition used by the Centers for Disease Control and Prevention (CDC), the U.S. Census Bureau, and related public health groups; while NSF also acknowledges that this is an imperfect description of race and ethnic groups.

No effort was made to verify the accuracy of the respondent’s self-identification. Individuals from other ethnic groups were excluded from participating. The Sleep in America Poll Task Force did consider economic factors in analyzing the data. The margin of error is 3.1 percentage points at the 95% confidence level.

CROSS-CULTURAL ATTITUDES TO SLEEP

While most people experience sleep difficulties at some time in their lives, scientists suspect refugees may have a much higher incidence of sleep disorders than other Australians. And while problems sleeping have been much studied from a medical perspective, cross-cultural attitudes to sleep have received less attention. The University of Victoria is taking a closer look at the sleeping habits of recently arrived Sudanese refugees to find out how culture, migration and, in many cases, trauma are affecting these Australians’ sleeping habits.

Sleep should be a simple enough process - assume a relaxed or horizontal position, close the eyes and wake around eight hours later hopefully refreshed and ready to take on another day. But how and when we sleep and with whom varies from culture to culture. Dorothy Bruck is a Professor of Psychology at Victoria
University. She and other researchers at the university’s Centre for Cultural Diversity & Wellbeing are taking a closer look at the sleeping habits of Australia’s South Sudanese population.

Professor Bruck explains why. “It’s because they’re a very large group of newly-arrived migrants yet they’ve been settled here for between five and ten years. Basically we don’t know anything about their sleep and we don’t know whether they indeed have as we suspect high levels of sleep disorders, including insomnia, and the extent to which these might be related to the traumas that they’ve experienced back in the Sudan before they were able to flee that country. And also because they come from more traditional societies where sleep is often seen in quite different terms.”

According to Professor Bruck the South Sudanese population is of particular interest because they come from a developing country, where different patterns of sleep are observed over the 24-hour period to those commonly seen in the West. She says in many developing countries sleep isn’t always taken as a single eight-hour block as it commonly is in Western countries. Sleeping for say a four-hour-block, and then waking up and doing something else for an hour or so, before falling asleep again for another couple of hours, is commonplace.

Napping is also more widespread than it is in Australia. As for insomnia, Professor Bruck says other studies have shown insomnia is also seen differently in some other parts of the world.

“We did a study that was published this year, immigrants from Zimbabwe and Ghana and what we found when we asked them about their beliefs and attitudes to insomnia is that they see it very much as a physical thing, a bodily thing that you might go to a doctor about, rather than something that might be related to worry or stress, which I think is interesting. I think in Western society we do realise that a lot of how you sleep is related to what you take in your head when you go to bed, whereas what the immigrants from Africa were telling us is that you see it as something that’s got much more to do with the body, which is
indeed how they see depression as well, that it’s much more a physical thing rather than a mental thing.”

Research from Virginia Tech in the United States supports Professor Bruck’s view that the eight-hour block of uninterrupted sleep is a fairly recent phenomenon in Western culture.

The biggest change to our sleep patterns occurred when electric light was introduced. Prior to that segmented sleep was considered normal. Yasmine Musharbash is a senior lecturer in the Anthropology Department at the University of Sydney. She spent 18 months living with and researching the sleeping patterns of the Warlpiri people in the Northern Territory. She says while some things are changing, other aspects of their traditional sleeping behaviour remain, such as co-sleeping with people other than one’s intimate partner and taking sleep in shorter segments.

“It’s not just the sleeping with others but it’s also the way in which sleep really isn’t seen as we see it, that it should be this uninterrupted period at night. There’s like lots of little portions of it where people don’t get grumpy for example when they get woken up in the middle of the night. In fact they get very grumpy when they don’t get woken up if something’s happened. The other thing that comes along with that is that I can’t think of a Warlpiri person that when they are woken up and it doesn’t matter if it’s 3am in the morning or an afternoon snooze when they get woken up that they’re ever grumpy. Like I get grumpy. They don’t. There’s a specific way of waking people up that you gently touch their belly first to settle down their spirit. And then you talk to them very quietly, the waking up is a very gentle process.”

Dr Maree Barnes is a sleep physician with the Australian Sleep Health Foundation. She says technology is one of the biggest threats to human sleep, with the lights and sounds emanating from devices such as computers and phones tricking our bodies into thinking it’s daylight, affecting our ability to fall asleep.

Dr Barnes says co-sleeping is another factor influencing sleep, a practice which is more widespread in western societies than
many people think. And while it’s common in many countries, in
industrialised nations it remains a contentious issue.

“The prevalence of co-sleeping in our society is quite high, I
perhaps, people just don’t talk about it. And that’s not just co-
sleeping with children but also co-sleeping with their animals
dogs and cats in particular. The data as it is recalled is that up
to 20 per cent of the population actually co-sleeps with somebody
apart from their domestic partner. The number of people in some
people’s beds is quite astounding: like it can be up to five people
in the bed, by the time you have a couple of children and maybe
a cat or a dog. Whether or not co-sleeping is good for you is a bit
problematic and quite a sensitive question I think, and certainly
culturally co-sleeping with children has been seen to be an essential
component of the culture in some communities.” Along with the
impact of migration, Professor Dorothy Brucks’s research into the
sleeping habits of recently arrived Sudanese-Australians will also
consider the impact of mental health, shift work and stimulant
intake on the sleep patterns of this group.

Professor Bruck says there’s a lot to learn from studying the
impact of culture on sleep. “If we look at cultures all around the
world, we see that sleep is interpreted in very different ways
between different cultures and between the western culture and
the more traditional cultures. And that’s going to have implications
on how we deal with their sleep problems, how we best help
them.”

HEALTHY SLEEP HABITS

Your behaviors can have a major impact on your sleep and
can contribute to sleeplessness. Your actions during the day, and
especially before bedtime, can make it difficult to fall asleep, stay
asleep or get restful sleep. Your daily routines – what you eat and
drink, the medications you take, how you schedule your days and
how you choose to spend your evenings - can significantly impact
your quality of sleep. Even a few slight adjustments can, in some
cases, mean the difference between sound sleep and a restless
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night. Completing a two-week sleep diary can help you understand how your routines affect your sleep.

The term “sleep hygiene” refers to a series of habits and rituals that can improve your ability to fall asleep and stay asleep. Board certified sleep physicians recommend following a series of common-sense, healthy sleep habits to promote better sleep. These healthy sleep habits are a cornerstone of cognitive behavioral therapy, the most effective long-term treatment for patients with insomnia. CBT-I can help you address the detrimental thoughts and behaviors that are preventing you from sleeping. It also includes techniques for stress reduction, relaxation and sleep schedule management.

Sleep specialists recommend that you follow the healthy sleep habits that are highlighted here. If you have difficulty sleeping or want to improve your sleep, try following these sleep hygiene tips. If your sleep problem persists, the AASM recommends that you seek help from the sleep team at an AASM accredited sleep center.

Quick Sleep Tips

Follow these tips to establish healthy sleep habits:
- Keep a consistent sleep schedule. Get up at the same time every day, even on weekends or during vacations.
- Set a bedtime that is early enough for you to get at least 7 hours of sleep.
- Don’t go to bed unless you are sleepy.
- If you don’t fall asleep after 20 minutes, get out of bed.
- Establish relaxing bedtime rituals.
- Use your bed only for sleep and sex.
- Make your bedroom quiet and relaxing. Keep the room at a comfortable, cool temperature.
- Limit exposure to light in the evenings.
- Don’t eat a large meal before bedtime. If you are hungry at night, eat a light, healthy snack.
- Exercise regularly and maintain a healthy diet.
• Avoid consuming caffeine in the late afternoon or evening.
• Avoid consuming alcohol before bedtime.
• Reduce your fluid intake before bedtime.

THE WAY TO SLEEP BETTER

When it comes to sleep, it’s not just quantity that matters—it’s quality. How you feel during your waking hours hinges greatly on how well you sleep. Similarly, the cure for daytime fatigue and sleep difficulties can often be found in your daily routine. Your sleep schedule, bedtime habits, and day-to-day lifestyle choices can make an enormous difference to the quality of your nightly rest. The following tips will help you optimize your sleep so you can be productive, mentally sharp, emotionally balanced, and full of energy all day long.

How to sleep better tip 1: Support your body’s natural rhythms

Getting in sync with your body’s natural sleep-wake cycle, or circadian rhythm, is one of the most important strategies for achieving good sleep. If you keep a regular sleep schedule—going to bed and getting up at the same time each day—you will feel much more refreshed and energized than if you sleep the same
number of hours at different times. This holds true even if you alter your sleep schedule by only an hour or two. Consistency is vitally important.

- Try to go to sleep and get up at the same time every day. Sticking to a consistent sleep-wake schedule helps set your body's internal clock and optimize the quality of your sleep. Start by setting a realistic bedtime that will work with your lifestyle. Choose a time when you normally feel tired, so that you don't toss and turn. If you're getting enough sleep, you should wake up naturally without an alarm. If you need an alarm clock to wake up on time, you may need to set an earlier bedtime.

- Avoid sleeping in—even on weekends or nights you've stayed up late. It can be tempting to sleep in on weekends, but even a couple hour difference in wake time disrupts your internal clock. The more your weekend/weekday sleep schedules differ, the worse the jetlag-like symptoms you'll experience. If you need to make up for a late night, opt for a daytime nap rather than sleeping in. This strategy allows you to pay off your sleep debt without disturbing your natural sleep-wake rhythm, which often backfires in insomnia and throws you off for days.

- Be smart about napping. As mentioned above, napping is a good way to recharge and make up for lost sleep hours. But if you tend to have trouble falling asleep or staying asleep throughout the night, napping can make things worse. If insomnia is a problem for you, consider eliminating naps altogether or limiting them to 15 to 20 minutes in the early afternoon.

- Fight after-dinner drowsiness. If you find yourself getting sleepy way before your bedtime, get off the couch and do something mildly stimulating to avoid falling asleep, such as washing the dishes, calling a friend, or getting clothes ready for the next day. If you give in to the drowsiness, you may wake up later in the night and have trouble getting back to sleep.
Tips 2: How to sleep better: Control your exposure to light

Melatonin is a naturally occurring hormone controlled by light exposure that helps regulate your sleep-wake cycle.

Your brain secretes more melatonin when it’s dark—making you sleepy—and less when it’s light—making you more alert. However, many aspects of modern life can alter your body’s natural production of melatonin and shift your circadian rhythm.

Spending long days in an office away from natural light, for example, can impact your daytime wakefulness and make your brain sleepy. While bright lights at night—especially from exposure to energy-efficient LED lights and TV and computer screens—can make your body think that it’s time to wake up. Here’s what you can do to keep your hormones and sleep-wake cycle on track.

During the day:

• Expose yourself to bright sunlight in the morning. The closer to the time you get up, the better. Have your coffee outside, for example, or eat breakfast by a sunny window. Skip the sunglasses! The light on your face will help you wake up and feel more alert.

• Spend more time outside during daylight. Try to take your work breaks outside in sunlight, exercise outside, or walk your dog during the day instead of at night.

• Let as much natural light into your home or workspace as possible. Keep curtains and blinds open during the day, and try to move your desk closer to the window.

• If necessary, use a light therapy box. A light therapy box simulates sunshine and can be especially useful during short winter days when there’s limited daylight.

At night:

• Avoid bright screens within 2 hours of your bedtime. All nighttime light can interfere with sleep and your body’s rhythms, but the blue light emitted by electronics is especially disruptive. This includes the screen on your phone, tablet, computer, or TV. You can minimize the
impact by using devices with smaller screens, turning the brightness down, or using light-altering software such as f.lux that adjusts the color of your display.

• Say no to late-night television. Many people use the television to wind down at the end of the day, but this can backfire. Not only does the light suppress melatonin, but many programs are stimulating rather than relaxing. Try listening to music or audio books instead. If your favorite TV show is on late at night, record it for viewing earlier in the day.

• Be smart about nighttime reading. Not all e-readers are created equal. Devices that are backlit, such as the Kindle Fire or the iPad, are more disruptive than those that are illuminated from the front, such as the Kindle Paperwhite or Nook GlowLight. Other smart options include e-ink readers that don’t have their own light source and good old-fashioned books.

• When it’s time to sleep, make sure the room is dark. The darker it is, the better you’ll sleep. Use heavy curtains or shades to block light from windows, or try a sleep mask to cover your eyes. Also consider covering up or moving any electronics that emit light. Even the red numbers on a digital clock can disrupt sleep.

• Keep the lights down if you get up during the night. If you need to get up during the night, avoid turning on the lights if possible. If you need some light to move around safely, try installing a dim nightlight in the hall or bathroom or using a small flashlight. This will make it easier for you to fall back to sleep.

Tip 3: How to sleep better: Get regular exercise

Studies show that regular exercisers sleep better and feel less sleepy during the day.

Regular exercise also improves the symptoms of insomnia and sleep apnea and increases the amount of time you spend in the deep, restorative stages of sleep. The more vigorously you
exercise, the more powerful the sleep benefits. But even light exercise—such as walking for just 10 minutes a day—improves sleep quality.

Just keep in mind that exercise is not a quick fix. It can take several months of regular activity before you experience the full sleep-promoting effects. So be patient. Focus on building an exercise habit that sticks. Better sleep will follow.

**For a better sleep, time your exercise right**

Exercise speeds up your metabolism, elevates body temperature, and stimulates activating hormones such as cortisol. This isn’t a problem if you’re exercising in the morning or afternoon, but too close to bed and it can interfere with sleep.

Try to finish moderate to vigorous workouts at least 3 hours before your bedtime. If you’re still experiencing sleep difficulties, move your workouts even earlier. For some people, it can take up to 6 hours for the body to fully cool down after exercise to a temperature conducive to sleep.

Don’t feel glued to the couch, though. Relaxing, low-impact exercises such as yoga or gentle stretching can help promote sleep.

**Tip 4: How to sleep better: Be smart about what you eat and drink**

Your daytime eating habits play a role in how well you sleep. It’s particularly important to watch what you put in your body in the hours leading up to your bedtime.

- Cut down on caffeine. You might be surprised to know that caffeine can cause sleep problems up to ten to twelve hours after drinking it! Consider eliminating caffeine after lunch or cutting back your overall intake.
- Stay away from big meals at night. Try to make dinnertime earlier in the evening, and avoid heavy, rich foods within two hours of bed. Fatty foods take a lot of work for your stomach to digest and may keep you up. Also be cautious when it comes to spicy or acidic foods in the evening, as they can cause stomach trouble and heartburn.
Avoid alcohol before bed. While a nightcap may help you relax and fall asleep faster, it interferes with your sleep cycle once you’re out. To optimize the quality of your sleep, stay away from alcohol in the hours leading up to your bedtime.

Avoid drinking too many liquids in the evening. Drinking lots of water, juice, tea, or other fluids may result in frequent bathroom trips throughout the night. Caffeinated drinks, which act as diuretics, only make things worse.

NIGHTTIME SNACKS HELP IN SLEEPING

For some people, a light snack before bed can help promote sleep. When you pair tryptophan-containing foods with carbohydrates, it may help calm the brain and allow you to sleep better. For others, eating before bed can lead to indigestion and make sleeping more difficult. Experiment with your food habits to determine your optimum evening meals and snacks.

If you need a bedtime snack, try:
- Half a turkey sandwich
- A small bowl of whole-grain, low-sugar cereal
- Granola with milk or yogurt
- A banana

Tip 5: How to sleep better: Wind down and clear your head

Do you find yourself unable to sleep or waking up night after night? Residual stress, worry, and anger from your day can make it very difficult to sleep well. When you wake up or can’t get to sleep, take note of what seems to be the recurring theme. That will help you figure out what you need to do to get your stress and anger under control during the day. If you can’t stop yourself from worrying, especially about things outside your control, you need to learn how to manage your thoughts. For example, you can learn to evaluate your worries to see if they’re truly realistic and replace irrational fears with more productive thoughts. Even counting
sheep is more productive than worrying at bedtime. If the stress of managing work, family, or school is keeping you awake, you may need help with stress management. By learning how to manage your time effectively, handle stress in a productive way, and maintain a calm, positive outlook, you’ll be able to sleep better at night.

Relaxation techniques for better sleep

Relaxation is beneficial for everyone, but especially for those struggling with sleep. Practicing relaxation techniques before bed is a great way to wind down, calm the mind, and prepare for sleep. Some simple relaxation techniques include:

- Deep breathing. Close your eyes, and try taking deep, slow breaths, making each breath even deeper than the last.
- Progressive muscle relaxation. Starting with your toes, tense all the muscles as tightly as you can, then completely relax. Work your way up from your feet to the top of your head.
- Visualizing a peaceful, restful place. Close your eyes and imagine a place or activity that is calming and peaceful for you. Concentrate on how relaxed this place or activity makes you feel.

BEDTIME RITUALS FOR RELAXATION

Create a “toolbox” of relaxing bedtime rituals to help you unwind before sleep. For example:

- Read a book or magazine by a soft light
- Take a warm bath
- Listen to soft music
- Do some easy stretches
- Wind down with a favorite hobby
- Listen to books on tape
- Make simple preparations for the next day
- Dim the lights in the hours leading up to bed
Tip 6: How to sleep better: Improve your sleep environment

If you make a consistent effort to relax and unwind before bed, you will sleep easier and more deeply. A peaceful bedtime routine sends a powerful signal to your brain that it’s time to wind down and let go of the day’s stresses. Sometimes even small changes to your environment can make a big difference to your quality of sleep.

Keep your room dark, cool, and quiet

- Keep noise down. If you can’t avoid or eliminate noise from barking dogs, loud neighbors, city traffic, or other people in your household, try masking it with a fan, recordings of soothing sounds, or white noise. You can buy a special sound machine or generate your own white noise by setting your radio between stations. Earplugs may also help.

- Keep your room cool. The temperature of your bedroom also affects sleep. Most people sleep best in a slightly cool room (around 65° F or 18° C) with adequate ventilation. A bedroom that is too hot or too cold can interfere with quality sleep.

- Make sure your bed is comfortable. Your bed covers should leave you enough room to stretch and turn comfortably without becoming tangled. If you often wake up with a sore back or an aching neck, you may need to invest in a new mattress or try a different pillow. Experiment with different levels of mattress firmness, foam or egg crate toppers, and pillows that provide more or less support.

Reserve your bed for sleeping and sex

If you associate your bed with events like work or errands, it will be harder to wind down at night. Use your bed only for sleep and sex.

That way, when you go to bed, your body gets a powerful cue: it’s time to either nod off or be romantic.
Tip 7: How to sleep better: Ways to get back to sleep

It's normal to wake briefly during the night. In fact, a good sleeper won’t even remember it. But if you’re waking up during the night and having trouble falling back asleep, the following tips may help.

- Stay out of your head. The key to getting back to sleep is continuing to cue your body for sleep, so remain in bed in a relaxed position. Hard as it may be, try not to stress over the fact that you’re awake or your inability to fall asleep again, because that very stress and anxiety encourages your body to stay awake. A good way to stay out of your head is to focus on the feelings and sensations in your body or to practice breathing exercises. Take a breath in, then breathe out slowly while saying or thinking the word, “Ahhh.” Take another breath and repeat.

- Make relaxation your goal, not sleep. If you find it hard to fall back asleep, try a relaxation technique such as visualization, progressive muscle relaxation, or meditation, which can be done without even getting out of bed. Remind yourself that although they’re not a replacement for sleep, rest and relaxation still help rejuvenate your body.

- Do a quiet, non-stimulating activity. If you’ve been awake for more than 15 minutes, try getting out of bed and doing a quiet, non-stimulating activity, such as reading a book. Keep the lights dim so as not to cue your body clock that it’s time to wake up. Also avoid screens of any kind—computers, TV, cell phones, iPads—as the type of light they emit is stimulating to the brain. A light snack or herbal tea might help relax you, but be careful not to eat so much that your body begins to expect a meal at that time of the day.

- Postpone worrying and brainstorming. If you wake during the night feeling anxious about something, make a brief note of it on paper and postpone worrying about it until the next day when you are fresh and it will be easier to resolve. Similarly, if a brainstorm or great idea is keeping
you awake, make a note of it on paper and fall back to
sleep knowing you’ll be much more productive and creative
after a good night’s rest.

BE HABITUAL TO GOOD SLEEP

To hear Nagma talk about her sleep routine, you might think
this woman, who is an employee living alone, has always practiced
good sleep habits. “Oh, no,” she says. “When I was growing up,
my mom used to let me stay up as late as I wanted, and on
weekends I often slept into the afternoon.” Back then, and into her
early 30s, sleep was easy for Nagma. Then the stresses of adult
life—her job, parenthood, financial concerns—began to keep her
awake at night. She found herself lying in bed for hours sometimes,
not knowing why she couldn’t sleep, and lacking the tools and
good habits to remedy the situation on her own. Frustrated by her
inability to sleep even when she was exhausted, Nagma shared
her concerns with her primary care physician, who helped her
identify factors that might be keeping her awake at night. Together
they came up with strategies to overcome many of these factors.
For the first time in her life, Nagma had to plan for sleep and
follow a sleep routine. However, she was desperate enough to try
just about anything, and much of what her doctor recommended
seemed easy enough.

What the Sleep Doctors Say

Sleep doctors recommend a variety of measures to help adults
and children achieve adequate sleep. In general, all of these
approaches are intended to help with relaxation as the desired
sleep time approaches, to maintain a comfortable sleep
environment, and to encourage a healthful balance of nutrition
and exercise. Their recommendations include:

- maintaining a regular sleep-wake schedule
- avoiding caffeine, alcohol, nicotine, and other chemicals
  that interfere with sleep
- making your bedroom a comfortable sleep environment
- establishing a calming pre-sleep routine
• going to sleep when you’re truly tired
• not watching the clock at night
• using light to your advantage by exposing yourself to light during the day and limiting light exposure in the evening
• not napping too close to your regular bedtime
• eating and drinking enough—but not too much or too soon before bedtime
• exercising regularly—but not too soon before bedtime

Making Your Sleep Routine Your Own

Experts acknowledge that most people find it difficult to follow all these recommendations; however, they also stress that it isn’t typically necessary to do so. They suggest that individuals identify the factors that are most disruptive to their own sleep and then focus on altering particular behaviors and patterns to overcome these factors.

Nagma, for example, admits that she doesn’t follow all of the advice her doctor gave her. For instance, she occasionally reads and does word puzzles in bed, which she knows sleep specialists typically discourage. “They help me take my mind off of the day,” she says. Otherwise, she says she heeds her doctor’s advice, which includes staying away from caffeine in the evening, avoiding stressful activities too close to bedtime, and keeping the television out of her bedroom. Knitting, reading, and listening to relaxing music and nature recordings are some of the activities she uses to transition to sleep. In spite of growing up with few bedtime restrictions, Nagma now keeps a very regular schedule. Even on weekends, she seldom wakes much later than her typical weekday wake time of 5:30 a.m. As a result, “It feels like my body knows when it’s time to go to bed and when it’s time to wake up,” she says. And unlike in her youth, waking has become much easier, despite the early hour. According to sleep experts, a regular schedule not only tends to increase the amount of sleep people get each night, it can also improve the quality of that sleep.
INTRODUCTION

Sleep Restriction Therapy (SRT) is a non-drug method for addressing insomnia, and has had success with several problem sleepers. Like an exercise or diet program it needs dedication by the patient who may find it easy to fall away from the program. But if SRT is incorporated into a insomniac’s life, it can work. Although it might sound counterintuitive, forcing your available sleep time into a fixed window can help you beat insomnia. That’s the idea behind sleep restriction therapy. The sleeper sets a bedtime and wake-up time and sticks to those times closely. The total time in bed is probably shorter than what the sleeper had been doing.

The time allocated for bed is determined from an estimate of how long the patient has actually been sleeping at night. If the patient routinely spends 8 hours in bed every night but sleeps a total of 6 hours over that period, the initial time for bed allocated under SRT is 6 hours. The patient is forbidden to go to bed early or get up late, and forbidden from taking naps during the daytime. This regimen forces the patient’s sleep into a window. If the patient continues to have bedtime periods of waking, the time allocated for sleep is further reduced. The goal is to have the patient sleeping the entire time he or she is in bed.
Once this goal is achieved, if the patient feels sleepy during the day, the time allocated for bed can be slowly increased, maybe by 15 minutes at a time. After enough iterations, an equilibrium is achieved that the patient can keep going indefinitely. There is no significant daytime sleepiness and no excess time spent in bed. All treatments have side effects, and even a non-drug regimen like SRT produces patient complaints that could be considered side effects.

A Scottish trial found most patients experienced fatigue, excessive daytime sleepiness, and headache. It makes complete sense that insomniacs in a sleep restriction trial experience daytime sleepiness and fatigue. In a sense the SRT produces these effects on purpose. If successful, the daytime sleepiness disappears after a while. What kind of medical practitioner conducts sleep restriction therapy?

Probably not your family doctor, who is more likely to address insomnia with sleeping pills. A psychologist or psychiatrist is more apt to endorse this type of treatment. But you don’t really absolutely need an external practitioner. With self-discipline, you can set up and execute a SRT regimen on your own. It’s not rocket science. Some people need coaching, though, to stick to the plan. And that’s where a psychologist can be helpful.

Successful use of sleep restriction therapy can retrain the insomniac into sleeping right in a few weeks. A closely controlled trial at the University of Glasgow found patients benefitted both immediately after a 4-week training regimen and several months later.

DEPRESSION AND SLEEP RESTRICTION THERAPY

Insomnia and hypsomnia are both common symptoms of depression, even mild depression. Doctors who suspect depression ask patients about their sleeping patterns. Depressed people with insomnia frequently get to sleep in a normal period of time (no unusual sleep latency) but wake after a few hours and pretty much are up for the morning at around 5 am.
Sleep restriction therapy can actually be a short-term treatment for depression. Don’t let people sleep as much as they want to, and the depression subsides. It doesn’t work for everyone, and it’s hardly a long-term cure, but sleep restriction can play a part in overall depression management. Indeed, staying up past one’s normal bedtime can often produce a feeling of euphoria.

**SLEEP RESTRICTION**

It is a method of curing insomnia by limiting a person’s total time in bed. It is often associated with related treatments in cognitive behavioral therapy for insomnia. Often insomniacs go to bed early and linger there for 10 or more hours each night, laying awake and experiencing only fragments of light sleep. Remaining in bed for long periods without sleeping makes insomnia worse for many people, by creating a mental association between the bed and insomnia. The bed becomes a site of nightly frustration where it is difficult to relax.

Often insomniacs will nap during the day, which further disrupts their 24 hour sleep cycle and ultimately leads to more insomnia.

Sleep restriction is mainly inclined to consolidate nightly sleep so that it is continuous and not fragmented. A doctor may instruct a patient to avoid napping during the day and only get in bed when he/she is very tired and truly ready to sleep. This may mean sleeping only 6 hours or in extreme cases it may mean sleeping only 2 to 3 hours, then, gradually increasing sleep time over the course of several weeks. Although the total sleep time of the patient may be low initially, the quality of the sleep will generally become higher. By the end of the process many patients experience less fragmented, more continuous sleep and return to sleeping 7-8 hours a night. “Sleep restriction” may also refer to partial sleep deprivation.

Restricting sleep has also been shown to be an effective but usually temporary measure for treating depression.
CBT – SLEEP RESTRICTION

Sleep Restriction Therapy

Sleep restriction therapy aims to limit the time spent in bed to the actual time spent sleeping and to increase sleep efficiency by prolonging sleep time. Restricting the time spent in bed creates a mild sleep deprivation and can promote an earlier sleep onset, more effective and deeper sleep, and less night-by-night variability in the quality and quantity of sleep. This decreases insomnia and creates confidence in the ability to regain natural sleep.

A typical sleep restriction protocol includes:

1. Determine the individual’s Average Total Sleep Time (ATST) per night (this can be calculated from a sleep diary that has been filled out for one week).
2. Restrict the individual’s time in bed each night to the ATST.
3. Establish a fixed bedtime depending on the desired wake time in the morning, and do not permit any sleep to occur outside of the sleep window. (Do not, however, reduce time spent in bed to less than 4.5 hours per night, as this can lead to noncompliance with the sleep restriction therapy.)
4. Monitor daily sleep efficiency, which is calculated by the Total Sleep Time (TST) / time spent in bed multiplied by 100.
5. Extend the time spent in bed by 15 minutes when the weekly average sleep efficiency exceeds 90 percent. Reduce the time spent in bed by 15 minutes when the weekly average sleep efficiency falls below 80 percent.

CBT – RELAXATION

Relaxation Therapy

Relaxation techniques are useful in reducing both somatic activation (e.g., muscle tension) and cognitive activation (e.g., intrusive thoughts) that can lead to insomnia.
Common relaxation techniques to help address insomnia focus on breathing and progressive muscle relaxation (i.e., tensing and relaxing specific muscle groups). Meditation is also very helpful for decreasing cognitive arousal and addressing insomnia.

Patients with insomnia typically need about six individual sessions with a therapist to learn these relaxation techniques.

**SLEEP RESTRICTION THERAPY: AS LAST RESORT ELSE WORKS**

So you’ve tried all the ‘better sleep tips;’ seen a doctor, dieted, exercised, excluded caffeine and bad foods etc, and nothing seems to really help? If so, don’t lose hope. Researchers are learning new and effective ways to help us regain those few precious hours and even minutes of sleep. One of these most effective treatments is called Sleep Restriction Therapy.

Dr. Spielman at Columbia Presbyterian in New York may have pioneered a new, effective treatment called sleep restriction therapy. Within a month, his insomniacs were sleeping a good seven hours, and they reported that the quality of their sleep was much improved.

**Retraining Your Body**

Sleep deprivation therapy is based on the idea that your body has learned how to get along without sleep. Whether this was caused by circadian rhythms, trauma or bad habits when you were young, good evidence shows that you can retrain your body to sleep again. The bad news: It’s not easy and it takes a few weeks. The good news: You’ve probably suffered worse, and it only takes a few weeks.

**The Downside of Sleeping Pills**

One of the hardest things you may have to do before trying sleep deprivation therapy is make sure you’re off sleeping pills. If you’ve been on sleeping pills before, you know they don’t really help with long term sleep problems, they don’t increase sleep
duration, and they are highly addictive. “The only effect sleeping pills have,” says sleep expert Dr. Kripke at UCSD, “is they make you feel good about not being able to sleep.” Sleeping pills will harm any chance of retraining your body to know when to sleep and how to stay asleep.

**Step 1: Find your minimum sleep threshold**

Almost all of us can get a little bit of sleep each night, even if it is for only a few hours. Use the mood tracker to keep a daily log of your sleep times. The mood tracker is also great for identifying foods, activities or events that disrupt sleep. Once you have determined the average minimum amount of time you are able to sleep, move to step 2.*

**Step 2: Go without sleep all day**

By depriving your body of sleep for a 24-hour period, your body builds up endogenous sleep inducing chemicals that increase your desire and ability to sleep. Staying completely awake also disrupts your ‘learned’ sleep cycle, and is similar to holding down the restart button on your computer. Sleep fasting reboots your internal sleep computer.

**Step 3: Use of your minimum sleep time to allow yourself to sleep**

Only sleep for that amount of time, even if you could sleep in more. Also, subtract the time you are able to sleep from the time you usually wake up or want to get up, and set this as your subjective bedtime. For example, if you wake up at 6:00am, and your minimum sleep threshold is 3 hours, then stay awake until 3:00 am before going to sleep. Remember to get up at 6:00 even though you may want to sleep in.

**Step 4: Use of specialized bright light to reinforce your new wake schedule**

This is one of the most important steps to sleep deprivation therapy. Bright light is the most powerful regulator of the sleep wake cycle. Using light will help reset a normal sleep/wake pattern,
Sleep Restriction Therapy (SRT): A Non-Drug Method

and trying sleep deprivation therapy without bright light is not nearly as successful. Using light for approximately ½ hour upon awakening is sufficient to regulate the sleep/wake cycle.

**Step 5: Gradually increase minimum sleep threshold**

This is one of the most important steps, because if you jump back too quickly into trying to sleep all night, you’ll lose any benefit you gained up to this point. The idea here is to only add 15 minutes of sleep per night until you start having trouble sleeping again. For example, on night one, you go to sleep at 3:00 am and get up at 6:00 am. Night two, you go to sleep at 2:45 am and get up again at 6:00 am (Always keep the same waking schedule). Let’s say that by night six, you’re going to sleep at 1:30, but now you start having trouble sleeping. Go back to where you are able to sleep solid and stay there a few days before trying to add more time.

**Step 6: Don’t nap!**

Napping can disrupt your circadian rhythm and hurt your ability to sleep again when you need to. When you nap during the day, you teach your body to sleep when it shouldn’t, and then it can’t sleep when you really need to. If you suffer from chronic insomnia, you should never try to nap again, it’s that important. If you feel tired during the day, use your light box or get out in the sunshine and exercise until the drowsiness is gone, but don’t give in to napping.

Sleep deprivation therapy works with most chronic sleep suffers. It may not bring back the elusive 8 hours of sleep but it will most likely add a couple of hours of needed sleep. As one sleep sufferer said, “If I could even get another half hour, that would be paradise.” Remember, as with all disorders, you should talk with your doctor or sleep specialist when considering any treatment.
A laborious and somewhat misplaced effort has occupied sleep laboratories over the years to measure the small amount by which sleeping pills increase sleep. We will not bore you with the details. The effort is misplaced, in the sense that the prescription sleeping pills increase sleep only a little, so that the exact size of the tiny benefit may be trivial. In most sleep laboratory studies, sleeping pills given to insomniacs increase the duration of sleep only 20-40 min. or even less.

This is only a small increase, when we consider that many people who sleep only 5 hours do not complain of insomnia, whereas there are people who sleep 9 hours or more who feel their insomnia is severe. As it has been mentioned above, although 20 min. increases in sleep may be statistically significant (which means statistically reliable), they are not functionally significant, since sleeping pills usually produce no measurable improvements in daytime performance. Zaleplon (Sonata) is an especially unfortunate pill. The official information on this drug stated, “a significant difference from placebo on sleep duration was not demonstrated,” which means that zaleplon generally did not help people sleep more than a dummy pill. Does it make sense to take
a hypnotic which does not substantially increase nocturnal sleep? Although this drug might help a person fall asleep 10 minutes faster, possibly it makes sleep worse later the same night, so that total sleep time does not significantly improve.

Ramelteon (Rozerem) may offer little risk risk (we did not have enough data in our epidemiologic study for ramelteon), but it also offers little benefit. According to the NDA data at the FDA web sites, in many of the company studies, patients who received Rozerem did not think they were sleeping better than those receiving placebo. Rozerem produces a small decrease of time to objective EEG sleep of 7 to 16 minutes, which is trivial. However, if many patients taking ramelteon do not feel they are sleeping better, why buy the stuff? It has been found that many patients do not like it. We do not know about mortality, but some indications suggest that ramelteon might cause depression, infection and cancer.

“The European Committee for Medicinal Products for Human Use (CHMP) has issued a negative opinion on the use of the melatonin receptor agonist ramelteon in insomnia, due to its unfavourable risk-benefit balance.” They thought melatonin itself might have a better benefits/risk ratio for treating insomnia. It is agreeble with the European opinion.

Whereas most sleeping pills increase sleep a few minutes for the first few nights of use, it is unclear how long the benefits last with continuous nightly usage. In our Dalmane-midazolam study, the benefits were gone in less than 7 days as compared to placebo, and in the triazolam-flurazepam study, the benefits were gone after 3 weeks as compared to placebo. Unfortunately, the majority of laboratory studies have used placebo baseline recordings as the control, without counterbalancing the order of placebo and hypnotic. The studies where hypnotic and placebo are given in parallel (at the same time to randomly-assigned volunteers) suggest that participation in laboratory experiments (and spontaneous recovery) lead to improvements in sleep. After 2-4 weeks, the improvement seen in a drug-treated group as compared to baseline
may be due to the time-related improvement rather than due to drug benefit. When we go beyond 4 weeks, there are few properly controlled experiments which show that any sleeping pill objectively increases sleep even a little. One exception was the 8-week study of Morin.

Morin’s study, however, showed that behavioral treatment was as effective as temazepam and more lasting in its benefit. When we ask whether hypnotic drugs work when taken nightly for years, there really is no scientifically convincing evidence of efficacy or benefit.

Again, it is to emphasize that in general, hypnotics do not improve daytime function. Patients generally seek this benefit, but they usually do not receive it. Further, although we hear colleagues mention that perhaps a patient will be healthier if the patient sleeps better, our research found that patients taking sleeping pills were more likely to develop new medical disorders than matched control patients who avoided sleeping pills.

HYPNOTIC

Hypnotic or soporific drugs, commonly known as sleeping pills, are a class of psychoactive drugs whose primary function is to induce sleep and to be used in the treatment of insomnia (sleeplessness), or surgical anesthesia.

Fig. Stilnoct (zolpidem) tablets, a common hypnotic
This group is related to sedatives. Whereas the term sedative describes drugs that serve to calm or relieve anxiety, the term hypnotic generally describes drugs whose main purpose is to initiate, sustain, or lengthen sleep. Because these two functions frequently overlap, and because drugs in this class generally produce dose-dependent effects (ranging from anxiolysis to loss of consciousness) they are often referred to collectively as sedative-hypnotic drugs.

Hypnotic drugs are regularly prescribed for insomnia and other sleep disorders, with over 95% of insomnia patients being prescribed hypnotics in some countries. Many hypnotic drugs are habit-forming and, because of a large number of factors known to disturb the human sleep pattern, a physician may instead recommend changes in the environment before and during sleep, better sleep hygiene, and the avoidance of caffeine or other stimulating substances before prescribing medication for sleep. When prescribed, hypnotic medication should be used for the shortest period of time possible.

Most hypnotics prescribed today are either benzodiazepines or nonbenzodiazepines. Early classes of drugs, such as barbiturates, have fallen out of use in most practices but are still prescribed for some patients. In children, prescribing hypnotics is not yet acceptable unless used to treat night terrors or somnambulism. Elderly people are more sensitive to potential side effects of daytime fatigue and cognitive impairments, and a meta-analysis found that the risks generally outweigh any marginal benefits of hypnotics in the elderly.

A review of the literature regarding benzodiazepine hypnotics and Z-drugs concluded that these drugs can have adverse effects, such as dependence and accidents, and that optimal treatment uses the lowest effective dose for the shortest therapeutic time period, with gradual discontinuation in order to improve health without worsening of sleep.

Falling outside of the above-mentioned categories, the neurohormone melatonin has a hypnotic function.
History

Hypnotica was a class of somniferous drugs and substances tested in medicine of the 1890s and later, including: Urethan, Acetal, Methyal, Sulfonal, Paraldehyd, Amylenhydrate, Hypnon, Chloralurethan and Ohloralamid or Chloralimid. Research about using medications to treat insomnia evolved throughout the last half of the 20th century. Treatment for insomnia in psychiatry dates back to 1869 when chloral hydrate was first used as a soporific.

Barbiturates emerged as the first class of drugs that emerged in the early 1900s, after which chemical substitution allowed derivative compounds. Although the best drug family at the time (less toxic and with fewer side effects) they were dangerous in overdose. During the 1970s, quinazolinones and benzodiazepines were introduced as safer alternatives to replace barbiturates; by the late 1970s benzodiazepines emerged as the safer drug.

Benzodiazepines are not without their drawbacks; substance dependence is possible, and deaths from overdoses sometimes occur, especially in combination with alcohol and/or other depressants. Questions have been raised as to whether they disturb sleep architecture. Nonbenzodiazepines are the most recent development (1990s–present). Although it’s clear that they are less toxic than their predecessors, barbiturates, comparative efficacy over benzodiazepines have not been established. Without longitudinal studies, it is hard to determine; however some psychiatrists recommend these drugs, citing research suggesting they are equally potent with less potential for abuse. Other sleep remedies that may be considered “sedative-hypnotics” exist; psychiatrists will sometimes prescribe medicines off-label if they have sedating effects. Examples of these include mirtazapine (an antidepressant), clonidine (generally prescribed to regulate blood pressure), quetiapine (an antipsychotic), and the over-the-counter sleep aid diphenhydramine (Benadryl – an antihistamine). Off-label sleep remedies are particularly useful when first-line treatment is unsuccessful or deemed unsafe (for example, in patients with a history of substance abuse).
Benefits of Hypnotics: History, Types and Advantages

TYPES

Barbiturates

Barbiturates are drugs that act as central nervous system depressants, and can therefore produce a wide spectrum of effects, from mild sedation to total anesthesia. They are also effective as anxiolytics, hypnotics, and anticonvulsants. Barbiturates also have analgesic effects; however, these effects are somewhat weak, preventing barbiturates from being used in surgery in the absence of other analgesics. They have dependence liability, both physical and psychological.

Barbiturates have now largely been replaced by benzodiazepines in routine medical practice – for example, in the treatment of anxiety and insomnia – mainly because benzodiazepines are significantly less dangerous in overdose. However, barbiturates are still used in general anesthesia, for epilepsy, and assisted suicide. Barbiturates are derivatives of barbituric acid.

The chief mechanism of action of barbiturates is believed to be positive allosteric modulation of GABA<sub>A</sub> receptors.

Examples include amobarbital, pentobarbital, phenobarbital, secobarbital, and sodium thiopental.

Quinazolinones

Quinazolinones are also a class of drugs which function as hypnotic/sedatives that contain a 4-quinazolinone core. Their use has also been proposed in the treatment of cancer.

Instances of quinazolinones include cloroqualone, diproqualone, etaqualone (Aolan, Athinazone, Ethinazone), mebroqualone, mecloqualone (Nubarene, Casfen), andmethaqualone (Quaalude).

Benzodiazepines

Benzodiazepines can be useful for short-term treatment of insomnia. Their use beyond 2 to 4 weeks is not recommended due
The Effortless Sleep Method: Cure for Insomnia...

to the risk of dependence. It is preferred that benzodiazepines be taken intermittently and at the lowest effective dose. They improve sleep-related problems by shortening the time spent in bed before falling asleep, prolonging the sleep time, and, in general, reducing wakefulness.

Like alcohol, benzodiazepines are commonly used to treat insomnia in the short-term (both prescribed and self-medicated), but worsen sleep in the long-term. While benzodiazepines can put people to sleep (i.e., inhibit NREM stage 1 and 2 sleep), while asleep, the drugs disrupt sleep architecture: decreasing sleep time, delaying time to REM sleep, and decreasing deep slow-wave sleep (the most restorative part of sleep for both energy and mood). This can directly and indirectly worsen other psychiatric symptoms such as depression, anxiety and irritability. Other drawbacks of hypnotics, including benzodiazepines, are possible tolerance to their effects, rebound insomnia, and reduced slow-wave sleep and a withdrawal period typified by rebound insomnia and a prolonged period of anxiety and agitation. The list of benzodiazepines approved for the treatment of insomnia is fairly similar among most countries, but which benzodiazepines are officially designated as first-line hypnotics prescribed for the treatment of insomnia can vary distinctly between countries. Longer-acting benzodiazepines such as nitrazepam and diazepam have residual effects that may persist into the next day and are, in general, not recommended. It is not clear as to whether the new nonbenzodiazepine hypnotics (Z-drugs) are better than the short-acting benzodiazepines.

The efficacy of these two groups of medications is similar. According to the US Agency for Healthcare Research and Quality, indirect comparison indicates that side-effects from benzodiazepines may be about twice as frequent as from nonbenzodiazepines. Some experts suggest using nonbenzodiazepines preferentially as a first-line long-term treatment of insomnia. However, the UK National Institute for Health and Clinical Excellence (NICE) did not find any convincing evidence in favor of Z-drugs. A NICE review pointed out that
short-acting Z-drugs were inappropriately compared in clinical trials with long-acting benzodiazepines. There have been no trials comparing short-acting Z-drugs with appropriate doses of short-acting benzodiazepines. Based on this, NICE recommended choosing the hypnotic based on cost and the patient’s preference.

Older adults should not use benzodiazepines to treat insomnia unless other treatments have failed to be effective. When benzodiazepines are used, patients, their caretakers, and their physician should discuss the increased risk of harms, including evidence which shows twice the incidence of traffic collisions among driving patients as well as falls and hip fracture for all older patients.

Their mechanism of action is mainly at GABA<sub>A</sub> receptors.

**Nonbenzodiazepines**

Nonbenzodiazepines are a class of psychoactive drugs that are very “benzodiazepine-like” in nature. Nonbenzodiazepines pharmacodynamics are almost entirely the same as benzodiazepine drugs and therefore employ similar benefits, side-effects, and risks. Nonbenzodiazepines, however, have dissimilar or entirely different chemical structures, and therefore are unrelated to benzodiazepines on a molecular level.

Instances include zopiclone (Imovane, Zimovane), eszopiclone (Lunesta), zaleplon (Sonata), and zolpidem (Ambien, Stilnox, Stilnoct).

Research on nonbenzodiazepines is new and conflicting. A review by a team of researchers suggests the use of these drugs for people that have trouble falling asleep but not staying asleep, as next-day impairments were minimal. The team noted that the safety of these drugs had been established, but called for more research into their long-term effectiveness in treating insomnia. Other evidence suggests that tolerance to nonbenzodiazepines may be slower to develop than with benzodiazepines. A different team was more skeptical, finding little benefit over benzodiazepines.
Others

Melatonin and its agonists

Melatonin, the hormone produced in the pineal gland in the brain and secreted in dim light and darkness, among its other functions, promotes sleep in diurnal mammals. Because of its hypnotic properties, it is available on prescription in many countries and is over-the-counter in others. A timed-release version, trade name Circadin®, was approved in 2007 in Europe (EU) for use as a treatment for primary insomnia. At the beginning of the 21st century, several melatonin receptor agonists that bind to and activate melatonin receptors were developed. These analogues, prescribed for several sleep disorders, include ramelteon, agomelatine, TIK-301 and tasimelteon. Ramelteon (Rozerem®) was approved for treatment of insomnia in the US in 2005. In 2009 agomelatine (Valdoxan®, Melitor®, Thymanax®), primarily used for depression, was approved in Europe. Both TIK-301 (in 2004) and tasimelteon (Hetlioz®) ten years later were approved in the US for the circadian rhythm sleep disorder non-24-hour sleep–wake disorder in totally blind individuals.

Antihistamines

In common use, the term antihistamine refers only to compounds that inhibit action at the H₁ receptor (and not H₂, etc.).

Clinically, H₁ antagonists are used to treat allergic reactions. Sedation is a common side-effect, and some H₁ antagonists, such as diphenhydramine (Benadryl) and doxylamine, are also used to treat insomnia.

Second-generation antihistamines cross the blood–brain barrier to a much lower degree than the first ones. This results in their primarily affecting peripheral histamine receptors, and therefore having a much lower sedative effect. High doses can still induce the central nervous system effect of drowsiness.

Antidepressants

Some antidepressants have sedating effects. Some may increase
actual quality of sleep (biologically) in contrast to Benzodiazepines that decrease quality.

**HYPNOTIC HAZARDS: ADVERSE EFFECTS OF ZOLPIDEM AND OTHER Z-DRUGS**

The ‘z-drugs’, zolpidem, zopiclone and zaleplon, are sedatives, marketed as hypnotics. Zopiclone was marketed in Australia in 1994 with zolpidem following in 2000. Zaleplon is not currently available in Australia. The z-drugs have been promoted as being safer than benzodiazepines, and in many countries they are the most widely prescribed drugs for insomnia. As the drugs have never been listed on the Australian Pharmaceutical Benefits Scheme, there are no readily available data on how widely they have been used here.

**Pharmacology**

The z-drugs are sedatives which act at GABA receptors in the brain. They are not chemically related to benzodiazepines but their pharmacology is similar. (They bind to a receptor subtype known as the benzodiazepine-1 subtype.) At standard doses, in sleep laboratory tests, they do not impair memory and cognition as much as benzodiazepines. Their half-lives are relatively short (1 hour for zaleplon, 2-3 hours or so for zolpidem and about 5 hours for zopiclone). At standard doses, they are less likely to cause marked residual daytime sedation than benzodiazepines.

**Unusual adverse effects**

In the 1990s there were sporadic published case reports of visual hallucinations, and later of amnesia and compulsive behaviour associated with zolpidem. After the first year of marketing in Australia, the Adverse Drug Reactions Advisory Committee (ADRAC) noted a significant number of reports of visual hallucinations and a smaller number of reports of amnesia with zolpidem. By 2007 ADRAC had received 104 reports of hallucinations, 62 of amnesia, and 16 of unusual or inappropriate behaviour of which the patient had no memory.
Television and newspaper reports, on the other hand, state that there have been ‘more than 400’ adverse event reports and ‘up to 14 deaths’ related to zolpidem.

Despite the numerical dominance of hallucinations in ADRAC reports, it has been inappropriate behaviour with amnesia which has created most media interest and which has dominated direct reports from consumers.

Similar events related to zaleplon and zopiclone have rarely been reported, but media stories have often referred to problems with z-drugs as a group. There have been reports in other countries, but the rate of adverse events relating to zolpidem appears to be much higher in Australia. Although the media have been impressed with the outlandish adverse events reported with zolpidem, these events are not unprecedented. Amnesia, hallucinations and bizarre behaviour were also seen frequently in patients taking the short-acting benzodiazepine, triazolam, for insomnia.

Nocturnal activity with amnesia

Complex behaviour with amnesia is a common and non-specific effect of sedative drugs. Alcohol is the prototype drug causing disinhibition, inappropriate behaviour and amnesia, but all sedative drugs can have similar effects.

Z-drugs do cause sedation and amnesia, especially in higher doses. This effect is little different from that of the benzodiazepines - although advertisements for the z-drugs may not have conveyed this clearly.

The frequency of reports of amnesia with zolpidem, with or without abnormal behaviour, may be related to a mistaken belief that it would not cause sedation and amnesia at all. Taking zolpidem with alcohol or other psychoactive drugs is common, and exaggerates the sedative and amnesic effects. Many overseas reports of bizarre behaviour with zolpidem have involved patients taking multiple psychoactive drugs as well as alcohol, but it is not clear how often this has been the case in Australia.
Sleepwalking

Several of the ‘unusual behaviour with amnesia’ events reported with zolpidem have been called sleepwalking, but electroencephalographic confirmation of this diagnosis is lacking, and it may not be correct. Sleepwalking occurs when the cortex is asleep, but areas of the brain concerned with motor control are active. Z-drugs do not prevent sleepwalking in the way benzodiazepines do, but their pharmacology as it is currently understood does not suggest that they would worsen sleepwalking or cause it to start.

No drug has ever been shown in laboratory studies to cause sleepwalking or even to precipitate events in known sleepwalkers. However, the reported ability of zolpidem (but not zopiclone or zaleplon) to activate the cortex in patients with anoxic brain injury does raise the possibility that it has unusual effects on the cortex. These effects could, conceivably, precipitate sleepwalking in patients predisposed to it. Since about 10% of children and 2% of adults sleepwalk there is a large pool of patients predisposed to sleepwalking, so a small effect of the drug could possibly account for what has been reported.

The spectrum of behaviour in sleepwalking is wide, from muttering and talking to getting up and walking about, but it is confined to what can be done with no cortical input: purposive or adaptive behaviour is not likely to be sleepwalking.

In contrast, many reports of abnormal behaviour with zolpidem are of complex and apparently adaptive behaviour inconsistent with sleepwalking. There is a wide differential diagnosis for unusual nocturnal activity with amnesia. As well as sleepwalking, common causes are epilepsy, REM (rapid eye movement) behaviour disorder, micro-sleeps, confusional arousals and dissociative states associated with mental illness. Normal sleep causes antegrade amnesia for the 5-10 minutes before sleep onset, and micro-sleeps (intrusions of sleep, lasting seconds, into wakefulness) also do this. Severely fatigued individuals can have frequent micro-sleeps,
and thus quite long periods of amnesia, although the person is awake between the micro-sleeps and can carry out complex actions. This is relatively common in severe obstructive sleep apnoea, in parents of babies who sleep poorly, and in shift workers.

Confusional arousals are arousals from sleep with disorientation, amnesia and sometimes automatism, which can involve inappropriate or aggressive behaviour. Mild events are common in fatigued individuals, such as long distance travellers (waking up in hotel rooms with no idea where they are) and shift workers. Sedatives of all kinds can also cause these events, and the combination of fatigue and sedative drugs makes them more frequent and worse.

**Bizarre and compulsive behaviour**

Many reports of behaviour with amnesia related to zolpidem have emphasised its bizarre or inappropriate character. Sleep-eating, sleep-sex and sleep-driving have been reported. However, in no case is there electroencephalographic evidence that the patient was asleep at the time, that is, evidence to distinguish sleepwalking from, for example, confusional arousal.

Often, it is said that the behaviour was compulsive or irresistible, but it is unclear what is meant by this when amnesia is reported as well. For example, the ADRAC Bulletin has spoken of patients with ‘uncontrollable urges to eat while asleep’, but if the patients were asleep, how did they know they had uncontrollable urges? While these forms of behaviour seem outlandish, there are case series of sleep-eating and sleep-sex in patients who have not taken z-drugs which are larger than those in patients who have. Nocturnal eating is common, and although it can occur during sleepwalking, when there are feelings of compulsion the eating occurs during wakefulness.

Reports, or claims, of having sex while asleep are also common. The difficulty is to distinguish sex during sleep from (what is far more likely) sex with amnesia for the event caused by subsequent sleep (assisted, perhaps, by alcohol or another drug). The great
The majority of carefully studied cases of sex with amnesia have been found to represent sex after partial or confusional arousal rather than sex during sleep.

Sleep-driving is a more difficult problem as it cannot be studied in the sleep laboratory in the way that sleep-sex and sleep-eating can. Carefully studied cases of sleep-driving are rare, and are actually cases of patients who have histories of driving with amnesia and well-documented sleepwalking. Wakeful driving with amnesia caused by drugs is a far more likely cause of reports of sleep-driving, and is certainly the cause of the great majority of cases of sleep-driving reported with zolpidem in the USA.

Zolpidem has been linked to suicide, although in one widely publicised Australian case zolpidem had been withdrawn and replaced by zopiclone a week before death. Database evidence shows clearly that z-drugs are not associated with a higher risk of suicide from poisoning and although an effect on other means of suicide is not excluded it must be unlikely.

**Hallucinations and psychosis**

The most frequent unusual adverse effect of zolpidem reported in Australia has been visual hallucinations. In published reports the hallucinations usually last 30 minutes or so, although there are reports of hallucinations lasting several hours in patients taking both zolpidem and serotonin reuptake inhibitors. In most reported cases the hallucinations have been an isolated phenomenon, but there are reports of psychotic reactions to zolpidem.

**Comparative incidence of adverse effects**

Whether abnormal behaviour with amnesia and hallucinations are commoner with z-drugs than with other sedatives cannot be determined from the available data. Systematic reviews of controlled trials of z-drugs have not revealed the adverse effects reported by patients in Australia. However, adverse events occurring in less than 1% of patients would not be expected to be revealed in trials. Systematic reviews do show that in older people...
adverse cognitive and psychomotor effects are common with all sedatives, but they are not obviously more common with z-drugs. Motor vehicle accidents are increased by use of z-drugs (relative risk 2.3), but somewhat less than by use of benzodiazepines (relative risk for nitrazepam 2.7 and for flunitrazepam 4.0).

Postmarketing surveillance outside Australia has not revealed a high prevalence of behavioural adverse events with z-drugs. For example, a survey of 14 029 patients treated with zolpidem for four weeks found 20 patients who reported nightmares, 19 who reported agitation, and one who developed paranoid ideation during treatment. A French regional study of prescriptions for hypnotics, anxiolytics and antidepressants given to adolescents found that of 3286 prescriptions issued in one year, 2724 were for zolpidem, but there were only three reports of adverse drug reactions. Available data also do not answer the question of whether the frequency or severity of adverse effects of z-drugs may relate to particular patient characteristics. Psychiatric illnesses, particularly anxiety and depression, are common in patients with insomnia, but it is not clear that this plays a role in the adverse event reports.

**Recommendations**

Z-drugs are effective for insomnia - in a manner of speaking. ‘In a manner of speaking’ because the effect on the deficits complained of by patients with insomnia is small. Across all hypnotic drugs there is a mean increase in total sleep time of 25 minutes. Only for zopiclone is there evidence from randomised controlled trials of sustained improvements in self-reported work performance and quality of life. These effects were small and there is, obviously, a problem with blinding in placebo-controlled trials of a drug with zopiclone’s action.

Z-drugs are no better for insomnia than benzodiazepines. They cause sedation and increase the risk of motor vehicle accidents, and are not a safe alternative to benzodiazepines in patients who need to drive. Z-drugs do cause dependency20, and are not a safe
alternative for patients who have had problems with dependence on benzodiazepines. It is possible to manage insomnia without ever using hypnotic drugs and this approach should be the rule rather than the exception. Insomnia is commonly caused by delayed sleep phase syndrome*, constitutional short sleep need**, or the effects of caffeine or alcohol, and sedative drugs should not be used for these patients. Some patients with depression and others with significant psychiatric illness may need drug treatment specifically for poor sleep, but most patients seen in general practice do not.

At present, there is no good evidence that z-drugs should be prescribed with unique precautions. On the other hand, it is seldom a good idea to prescribe any sedative drug for insomnia in patients over 60 years of age, for patients who may need or choose to drive or make important decisions within eight hours of taking a dose, or who live alone.

These cautions apply with special force to patients taking another psychoactive drug. If patients are prescribed z-drugs they should be made aware that sedation, confusion and disinhibition may occur. They should be advised to avoid alcohol. The hypnotic should be taken once the patient is in bed, not on the way to bed. Simple changes to the home environment, such as securing the bedroom door and windows, can reduce the risk of harm from sedation, disinhibition and confusion. It may be prudent to advise patients to make these changes, especially if they have a psychiatric illness that may predispose them to suicide or are taking multiple psychoactive drugs.

**To be Concluded**

Evidence that z-drugs, especially zolpidem, commonly cause adverse effects not predictable from their pharmacology is weak. Zolpidem may cause hallucinations relatively frequently (as triazolam did), but reports of ‘abnormal behaviour with amnesia’ probably reflect predictable effects. Z-drugs have few advantages over benzodiazepines, and there is no good reason for their use
in insomnia. If there were fewer prescriptions there would be fewer adverse events.

*‘Delayed sleep phase’ refers to otherwise normal individuals whose natural sleep pattern is to go to sleep late - midnight or later - and wake up late - 9 am or later. If for social or occupational reasons getting up this late is unacceptable, the person typically attempts to go to sleep earlier in order to get up earlier, but when they are unable to go to sleep before their natural sleep time they may complain of insomnia.

**‘Constitutional short sleep need’ refers to otherwise normal individuals who habitually sleep only a few hours a night (often four or five) but do not feel the need of more. This may cause a complaint of insomnia, typically when the person retires and no longer values their ability to study until midnight and then be up at 5 am to exercise before going to work.
Insomnia: Classification, Types and Patterns

Insomnia is a general term referring to any difficulty in falling asleep or staying asleep, such that the sufferer is still tired, unrefreshed and unrested on waking. Left untreated, it may lead to irritability, memory problems, depression, anxiety, and, in the longer term, to an increased risk of accidents, heart disease, hypertension, diabetes, immune system problems, etc. A recent study by British researchers has indicated that the normal working over 700 separate genes may be affected by the reduced sleep times associated with insomnia, with potentially severe implications over an extended period. It is a very common complaint - indeed, the most commonly diagnosed sleep disorder - affecting some 30% to 50% of the general population according to some estimates, with about 10% of the population suffering from long-standing or chronic insomnia. It can occur at any age, but is most common in the elderly. It is also generally more common among women than men.

Insomnia is generally a symptom or side-effect of another disease or complaint (such as hyperthyroidism, congestive heart failure, chronic obstructive pulmonary disease, dementia, pain-related conditions, or other underlying sleep disorders) rather than a disorder in itself, in which case it is known as secondary insomnia. However, where the insomnia symptoms are not due
Insomnia can also be classified according to its general causes: psychophysiological insomnia (the classic type, arising from a variety of psychological and behavioural stressors and/or environmental and situational causes); paradoxical insomnia (genuine complaints of little or no sleep that are not corroborated by objective evidence of actual sleep disturbances); and idiopathic insomnia (persistent insomnia, usually beginning in childhood, which is unrelated to psychosocial stressors or medical disorders).

Insomnia may also be classed depending on its regularity and persistence: transient insomnia (insomnia that persists for just a few days, usually following a stressful event or excessive use of stimulants like caffeine or nicotine); episodic (short-term) insomnia (insomnia symptoms that last up to three weeks, interspersed with periods of more or less normal sleep); or chronic (persistent) insomnia (ongoing insomnia symptoms that recur at least two days a week for at least a month). Finally, insomnia is sometimes categorized according to the part of the sleep period which is disrupted: sleep-onset (initial) insomnia (difficulty getting to sleep in the first place); sleep-maintenance (middle) insomnia (difficulty staying asleep or getting back to sleep once woken); or terminal (late) insomnia (waking up too early in the morning).

Insomnia may have one or more of several causes, including (but not limited to) stress, heartburn or acid reflux, bed-wetting, a poor sleep environment, aches and pains from injuries or illnesses, an inconsistent sleep schedule, excessive exercise or food just before bedtime, or the effects of medications, alcohol, tobacco, caffeine, etc. It is often not understood that caffeine, for example, has a “half-life” of about five hours, so that, even five hours after a cup of coffee or a cola, half of the caffeine still remains active in the body, and as much as a quarter is still there even ten hours later.

The number one cause of episodic or transient insomnia is stress and anxiety, whether from school- or job-related pressures, family...
or marriage problems, serious illness or death in the family, etc. Middle-aged men in particular have been shown to exhibit increased sensitivity to arousal-producing stress hormones, such as corticotropin-releasing hormone and cortisol. But, if short-term insomnia is not managed properly, it can morph into a long-term problem, persisting long after the original stress has passed. Most insomniacs tend to be anxiety-prone by nature, and this may predispose them to worry more about sleep. Stress and anxiety about difficulties in sleeping may in itself be enough to perpetuate the insomnia, in a kind of vicious circle (sometimes referred to as conditioned insomnia). At the extreme end of the scale, there is a very rare genetic sleep disorder called fatal familial insomnia (FFI), which appears in a handful of families in late adulthood, and which is in fact quite as fatal as the name suggests. In FFI, malformed proteins called prions attack the thalamus, an organ in the brain that plays a major role in regulating sleep.

The sufferer gradually completely loses the ability to sleep, first the ability to nap and then the ability to sleep at night. Hallucinations soon follow, then rapid weight loss and dementia, and finally complete unresponsiveness. Within a year of striking, the disease causes death.

The first step in the treatment of insomnia should always be to identify and remove contributing factors to the sleep problem. Usually, simple behavioural changes and improved sleep hygiene (i.e., eliminating some of the common causes) are sufficient to treat the problem, and increased exercise (although not too close to bedtime), relaxation therapy and white noise are also often beneficial. In some cases, though, more active interventions may be called for, such as sleep restriction therapy, stimulus control therapy, paradoxical therapy, cognitive-behavioural therapy, etc.

Sleep restriction therapy is an effective, if rather gruelling, treatment for insomnia. It involves setting a consistent wake-up time every morning, regardless of the amount of sleep achieved, and very gradually increasing sleep time, over a period of weeks or months, from an initial achievable low level. Bright light therapy
in the morning is also often incorporated. Stimulus control therapy (also called the “10-minute rule”) is also an effective insomnia treatment technique, which imposes the strict rule that an individual has just ten minutes to fall asleep and, if sleep is not achieved in that time, they must get up, go into another room and relax for a while (for example, by doing something boring and mindless), and only return to bed gain when they feel sleepy.

Paradoxical therapy, which asks the insomniac to do the exact opposite of trying to fall asleep, has proven to be a surprisingly effective therapeutic approach to conquering insomnia. By instructing a patient to continue the symptomatic behaviour instead of stopping it, this forces them to confront the problem and to make a deliberate decision on how to proceed, which in some cases may serve to eliminate any subconscious resistance to treatment.

Cognitive-behavioural therapy, which effectively combines most of these interventions into an organized whole and attempts to change patients’ dysfunctional attitudes towards sleep, has yielded good long-term results among chronic insomniacs. Too many insomniacs, however, rely on sedatives and other sleep medications, despite the fact that most of these have unfortunate side-effects and also carry the added risk of dependence, and some studies have thrown serious doubts on their effectiveness anyway. The most common medications for insomnia include several kinds of hypnotics such as benzodiazepines (e.g. temazepam, flunitrazepam, triazolam, etc) and non-benzodiazepines (e.g. zolpidem, zopiclone, eszopiclone, zaleplon, etc), as well as antidepressants (e.g. doxepin, trazodone), antihistamines (e.g. diphenhydramine, doxylamine), melatonin (e.g. ramelteon), etc.

**INSOMNIA**

Insomnia is a sleep disorder. People with insomnia have trouble sleeping: difficulty falling asleep, or staying asleep as long as desired. While the term is sometimes used to describe a disorder
as diagnosed by polysomnographic or actigraphic evidence, this is often practically defined as a positive response to either of two questions: “do you experience difficulty sleeping?” or “do you have difficulty falling or staying asleep?”

Insomnia is most often thought of as both a medical sign and a symptom that can accompany several sleep, medical, and psychiatric disorders characterized by a long term difficulty falling asleep and/or staying asleep or sleep of poor quality. Insomnia is typically followed by functional impairment while awake. Insomnia can occur at any age, but it is particularly common in the elderly. Insomnia can be short term (up to three weeks) or long term (above 3–4 weeks); it can lead to memory problems, depression, irritability and an increased risk of heart disease and automobile related accidents.

Insomnia can be grouped into primary and secondary insomnia. Primary insomnia is a sleep disorder not due to a medical, psychiatric, or environmental cause. It is described as a complaint of prolonged sleep onset latency, disturbance of sleep maintenance, or the experience of non-refreshing sleep. A diagnosis will differentiate between free-standing primary insomnia, insomnia as secondary to another condition, and primary insomnia co-morbid with one or more conditions.

Cognitive behavioral therapy is useful in insomnia that is present for a long duration. Those who are having trouble sleeping sometimes turn to sleeping pills, which may help, but also may lead to substance dependency or addiction, and long-term worsening of sleep, if used regularly for an extended period.

CLASSIFICATION

DSM-5 criteria

The DSM-5 criteria for insomnia include the following:

Predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms:
• Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)
• Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)
• Early-morning awakening with inability to return to sleep. In addition,
  • The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.
  • The sleep difficulty occurs at least 3 nights per week.
  • The sleep difficulty is present for at least 3 months.
  • The sleep difficulty occurs despite adequate opportunity for sleep.
  • The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).
  • The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).
  • Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.

Insomnia: Its Types

Insomnia can be classified as transient, acute, or chronic.

1. Transient insomnia lasts for less than a week. It can be caused by another disorder, by changes in the sleep environment, by the timing of sleep, severe depression, or by stress. Its consequences – sleepiness and impaired psychomotor performance – are similar to those of sleep deprivation.
2. Acute insomnia is the inability to consistently sleep well for a period of less than a month. Insomnia is present when there is difficulty initiating or maintaining sleep or when the sleep that is obtained is non-refreshing or of poor quality. These problems occur despite adequate opportunity and circumstances for sleep and they must result in problems with daytime function. Acute insomnia is also known as short term insomnia or stress related insomnia.

3. Chronic insomnia lasts for longer than a month. It can be caused by another disorder, or it can be a primary disorder. People with high levels of stress hormones or shifts in the levels of cytokines are more likely than others to have chronic insomnia. Its effects can vary according to its causes. They might include muscular weariness, hallucinations, and/or mental fatigue. Chronic insomnia can cause double vision.

**Symptoms of Patterns of insomnia**

Symptoms of insomnia:
- difficulty falling asleep, including difficulty finding a comfortable sleeping position
- waking during the night and being unable to return to sleep
- feeling unrefreshed upon waking
- daytime sleepiness, irritability or anxiety

Sleep-onset insomnia is difficulty falling asleep at the beginning of the night, often a symptom of anxiety disorders. Delayed sleep phase disorder can be misdiagnosed as insomnia, as sleep onset is delayed to much later than normal while awakening spills over into daylight hours.

It is common for patients who have difficulty of falling asleep to also have nocturnal awakenings with difficulty returning to sleep. Two thirds of these patients wake up in the middle of the night, with more than half having trouble falling back to sleep after a middle of the night awakening.
Early morning awakening is an awakening occurring earlier (more than 30 minutes) than desired with an inability to go back to sleep, and before total sleep time reaches 6.5 hours. Early morning awakening is often a characteristic of depression.

**Poor sleep quality**

Poor sleep quality can occur as a result of, for example, restless legs, sleep apnea or major depression. Poor sleep quality is caused by the individual not reaching stage 3 or delta sleep which has restorative properties.

Major depression leads to alterations in the function of the hypothalamic-pituitary-adrenal axis, causing excessive release of cortisol which can lead to poor sleep quality.

Nocturnal polyuria, excessive nighttime urination, can be very disturbing to sleep.

**Subjective insomnia**

Some cases of insomnia are not really insomnia in the traditional sense. People experiencing sleep state misperception often sleep for normal durations, yet severely overestimate the time taken to fall asleep. They may believe they slept for only four hours while they, in fact, slept a full eight hours.

**Causes of Symptoms of Insomnia**

Potential complications of insomnia. Symptoms of insomnia can be caused by or be associated with:

- Use of psychoactive drugs (such as stimulants), including certain medications, herbs, caffeine, nicotine, cocaine, amphetamines, methylphenidate, aripiprazole, MDMA, modafinil, or excessive alcohol intake.
- Use of or withdrawal from alcohol and other sedatives, such as anti-anxiety and sleep drugs like benzodiazepines.
- Use of or withdrawal from pain-relievers such as opioids.
- Previous thoracic surgery.
- Heart disease.
• Deviated nasal septum and nocturnal breathing disorders.
• Restless legs syndrome, which can cause sleep onset insomnia due to the discomforting sensations felt and the need to move the legs or other body parts to relieve these sensations.
• Periodic limb movement disorder (PLMD), which occurs during sleep and can cause arousals of which the sleeper is unaware.
• Pain, an injury or condition that causes pain can preclude an individual from finding a comfortable position in which to fall asleep, and can in addition cause awakening.
• Hormone shifts such as those that precede menstruation and those during menopause.
• Life events such as fear, stress, anxiety, emotional or mental tension, work problems, financial stress, birth of a child and bereavement.
• Gastrointestinal issues such as heartburn or constipation.
• Mental disorders such as bipolar disorder, clinical depression, generalized anxiety disorder, post traumatic stress disorder, schizophrenia, obsessive compulsive disorder, dementia, and ADHD
• Disturbances of the circadian rhythm, such as shift work and jet lag, can cause an inability to sleep at some times of the day and excessive sleepiness at other times of the day. Chronic circadian rhythm disorders are characterized by similar symptoms.
• Certain neurological disorders, brain lesions, or a history of traumatic brain injury.
• Medical conditions such as hyperthyroidism and rheumatoid arthritis.
• Abuse of over-the-counter or prescription sleep aids (sedative or depressant drugs) can produce rebound insomnia.
• Poor sleep hygiene, e.g., noise or over-consumption of caffeine.
• A rare genetic condition can cause a prion-based, permanent and eventually fatal form of insomnia called fatal familial insomnia.

• Physical exercise. Exercise-induced insomnia is common in athletes in the form of prolonged sleep onset latency.

Sleep studies using polysomnography have suggested that people who have sleep disruption have elevated nighttime levels of circulating cortisol and adrenocorticotropic hormone. They also have an elevated metabolic rate, which does not occur in people who do not have insomnia but whose sleep is intentionally disrupted during a sleep study. Studies of brain metabolism using positron emission tomography (PET) scans indicate that people with insomnia have higher metabolic rates by night and by day. The question remains whether these changes are the causes or consequences of long-term insomnia.

SUBSTANCE-INDUCED

Alcohol-induced

Generally Alcohol is often used as a form of self-treatment of insomnia to induce sleep. However, alcohol use to induce sleep can be a cause of insomnia. Long-term use of alcohol is related to a decrease in NREM stage 3 and 4 sleep as well as suppression of REM sleep and REM sleep fragmentation. Frequent moving between sleep stages occurs, with awakenings due to headaches, the need to urinate, dehydration, and excessive sweating. Glutamine rebound also plays a role as when someone is drinking; alcohol inhibits glutamine, one of the body’s natural stimulants. When the person stops drinking, the body tries to make up for lost time by producing more glutamine than it needs.

The increase in glutamine levels stimulates the brain while the drinker is trying to sleep, keeping him/her from reaching the deepest levels of sleep. Stopping chronic alcohol use can also lead to severe insomnia with vivid dreams. During withdrawal REM sleep is typically exaggerated as part of a rebound effect.
Benzodiazepine-induced

Like alcohol, benzodiazepines, such as alprazolam, clonazepam, lorazepam and diazepam, are commonly used to treat insomnia in the short-term (both prescribed and self-medicated), but worsen sleep in the long-term. While benzodiazepines can put people to sleep (i.e., inhibit NREM stage 1 and 2 sleep), while asleep, the drugs disrupt sleep architecture: decreasing sleep time, delaying time to REM sleep, and decreasing deep slow-wave sleep (the most restorative part of sleep for both energy and mood).

Opioid-induced

Opioid medications such as hydrocodone, oxycodone, and morphine are used for insomnia that is related to pain due to their analgesic properties and hypnotic effects. Opioids can fragment sleep and decrease REM and stage 2 sleep. By producing analgesia and sedation, opioids may be appropriate in carefully selected patients with pain-associated insomnia. However, dependence on opioids can lead to long-term sleep disturbances.

Risk factors

Insomnia affects people of all age groups but people in the following groups have a higher chance of acquiring insomnia.

- Individuals older than 60
- History of mental health disorder including depression, etc.
- Emotional stress
- Working late night shifts
- Travelling through different time zones

MECHANISM

Cortisol

Cortisol is typically thought of as the stress hormone in humans, but it is also the awakening hormone. Analyzing saliva samples
taken in the morning has shown that patients with insomnia wake up with significantly lower cortisol levels when compared to a control group with regular sleeping patterns. Further studies have revealed that those with lower levels of cortisol upon awakening also have poorer memory consolidation in comparison to those with normal levels of cortisol. Studies support that larger amounts of cortisol released in the evening occurs in primary insomnia. In this case, drugs related to calming mood disorders or anxiety, such as antidepressants, would regulate the cortisol levels and help prevent insomnia.

**Estrogen**

A number of postmenopausal women have reported changes in sleep patterns since entering menopause that reflect symptoms of insomnia. This could occur because of the lower levels of estrogen. Lower estrogen levels can cause hot flashes, change in stress reactions, or overall change in the sleep cycle, which all could contribute to insomnia. Estrogen treatment as well as estrogen-progesterone combination supplements as a hormone replacement therapy can help regulate menopausal women’s sleep cycle again.

**Progesterone**

Low levels of progesterone throughout the female menstruation cycle, but primarily near the end of the luteal phase, have also been known to correlate with insomnia as well as aggressive behavior, irritability, and depressed mood in women. Around 67% of women have problems with insomnia right before or during their menstrual cycle. Lower levels of progesterone can, like estrogen, correlate with insomnia in menopausal women.

A common misperception is that the amount of sleep required decreases as a person ages. The ability to sleep for long periods, rather than the need for sleep, appears to be lost as people get older. Some elderly insomniacs toss and turn in bed and occasionally fall off the bed at night, diminishing the amount of sleep they receive.
In medicine, insomnia is widely measured using the Athens insomnia scale. It is measured using eight different parameters related to sleep, finally it is represented as an overall scale which assess an individual’s sleep pattern. A qualified sleep specialist should be consulted in the diagnosis of any sleep disorder so the appropriate measures can be taken. Past medical history and a physical examination need to be done to eliminate other conditions that could be the cause of the insomnia. After all other conditions are ruled out a comprehensive sleep history should be taken.

The sleep history should include sleep habits, medications (prescription and non-prescription), alcohol consumption, nicotine and caffeine intake, co-morbid illnesses, and sleep environment. A sleep diary can be used to keep track of the individual’s sleep patterns. The diary should include time to bed, total sleep time, time to sleep onset, number of awakenings, use of medications, time of awakening and subjective feelings in the morning. The sleep diary can be replaced or validated by the use of outpatientactigraphy for a week or more, using a non-invasive device that measures movement. Workers who complain of insomnia should not routinely have polysomnography to screen for sleep disorders. This test may be indicated for patients with symptoms in addition to insomnia, including sleep apnea, obesity, a risky neck diameter, or risky fullness of the flesh in the oropharynx.

Usually, the test is not needed to make a diagnosis, and insomnia especially for working people can often be treated by changing a job schedule to make time for sufficient sleep and by improving sleep hygiene.

Some patients may need to do a sleep study to determine if insomnia is present. The sleep study will involve the assessment tools of a polysomnogram and the multiple sleep latency test and will be conducted in a sleep center or a designated hotel. Specialists in sleep medicine are qualified to diagnose the many different sleep disorders. Patients with various disorders, including delayed
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Sleep phase syndrome, are often mis-diagnosed with primary insomnia. When a person has trouble getting to sleep, but has a normal sleep pattern once asleep, a delayed circadian rhythm is the likely cause.

In many cases, insomnia is co-morbid with another disease, side-effects from medications, or a psychological problem. Approximately half of all diagnosed insomnia is related to psychiatric disorders. In depression in many cases “insomnia should be regarded as a co-morbid condition, rather than as a secondary one;” insomnia typically predates psychiatric symptoms. “In fact, it is possible that insomnia represents a significant risk for the development of a subsequent psychiatric disorder.”

Insomnia occurs in between 60% and 80% of people with depression. This may partly be due to treatment used for depression.

Knowledge of causation is not necessary for a diagnosis.

Prevention

Going to sleep and waking up at the same time every day can create a steady pattern which may help to prevent or treat insomnia. Avoidance of vigorous exercise and any caffeinated drinks a few hours before going to sleep is recommended, while exercise earlier in the day is beneficial. The bedroom should be cool and dark, and the bed should only be used for sleep and sex. These are some of the points included in what doctors call “sleep hygiene”.

TREATMENT

It is important to identify or rule out medical and psychological causes before deciding on the treatment for insomnia. Cognitive behavioral therapy (CBT) has been found to be as effective as medications for the short-term treatment of chronic insomnia. The beneficial effects, in contrast to those produced by medications, may last well beyond the stopping of therapy. Medications have been used mainly to reduce symptoms in insomnia of short duration; their role in the management of chronic insomnia remains unclear. Several different types of medications are also effective
for treating insomnia. However, many doctors do not recommend relying on prescription sleeping pills for long-term use. It is also important to identify and treat other medical conditions that may be contributing to insomnia, such as depression, breathing problems, and chronic pain.

**Non-pharmacological**

Non-pharmacological strategies have comparable efficacy to hypnotic medication for insomnia and they may have longer lasting effects. Hypnotic medication is only recommended for short-term use because dependence with rebound withdrawal effects upon discontinuation or tolerance can develop. Non pharmacological strategies provide long lasting improvements to insomnia and are recommended as a first line and long term strategy of management. The strategies include attention to sleep hygiene, stimulus control, behavioral interventions, sleep-restriction therapy, paradoxical intention, patient education and relaxation therapy.

Some examples are keeping a journal, restricting the time spent awake in bed, practicing relaxation techniques, and maintaining a regular sleep schedule and a wake-up time. Behavioral therapy can assist a patient in developing new sleep behaviors to improve sleep quality and consolidation. Behavioral therapy may include, learning healthy sleep habits to promote sleep relaxation, undergoing light therapy to help with worry-reduction strategies and regulating the circadian clock. Music may improve insomnia in adults. EEG biofeedback has demonstrated effectiveness in the treatment of insomnia with improvements in duration as well as quality of sleep.

Self-help therapy (defined as a psychological therapy that can be worked through on one’s own) may improve sleep quality for adults with insomnia to a small or moderate degree.

Stimulus control therapy is a treatment for patients who have conditioned themselves to associate the bed, or sleep in general, with a negative response. As stimulus control therapy involves taking steps to control the sleep environment, it is sometimes
referred interchangeably with the concept of sleep hygiene. Examples of such environmental modifications include using the bed for sleep or sex only, not for activities such as reading or watching television; waking up at the same time every morning, including on weekends; going to bed only when sleepy and when there is a high likelihood that sleep will occur; leaving the bed and beginning an activity in another location if sleep does not result in a reasonably brief period of time after getting into bed (commonly ~20 min); reducing the subjective effort and energy expended trying to fall asleep; avoiding exposure to bright light during nighttime hours, and eliminating daytime naps. A component of stimulus control therapy is sleep restriction, a technique that aims to match the time spent in bed with actual time spent asleep.

This technique involves maintaining a strict sleep-wake schedule, sleeping only at certain times of the day and for specific amounts of time to induce mild sleep deprivation. Complete treatment usually lasts up to 3 weeks and involves making oneself sleep for only a minimum amount of time that they are actually capable of on average, and then, if capable (i.e. when sleep efficiency improves), slowly increasing this amount (~15 min) by going to bed earlier as the body attempts to reset its internal sleep clock. Bright light therapy, which is generally used to help early morning wakers reset their natural sleep cycle, can also be used with sleep restriction therapy to reinforce a new wake schedule. Although applying this technique with consistency is difficult, it can have a positive effect on insomnia in motivated patients. Paradoxical intention is a cognitive reframing technique where the insomniac, instead of attempting to fall asleep at night, makes every effort to stay awake (i.e. essentially stops trying to fall asleep). One theory that may explain the effectiveness of this method is that by not voluntarily making oneself go to sleep, it relieves the performance anxiety that arises from the need or requirement to fall asleep, which is meant to be a passive act. This technique has been shown to reduce sleep effort and performance anxiety and also lower subjective assessment of sleep-onset latency and
overestimation of the sleep deficit (a quality found in many insomniacs).

**Sleep hygiene**

Sleep hygiene is a common term for all of the behaviors which relate to the promotion of good sleep. These behaviors are used as the basis of sleep interventions and are the primary focus of sleep education programs. Behaviors include the use of caffeine, nicotine and alcohol consumption, maximizing the regularity and efficiency of sleep episodes, minimizing medication usage and daytime napping, the promotion of regular exercise, and the facilitation of a positive sleep environment. Exercise can be helpful when establishing a routine for sleep but should not be done close to the time that you are planning on going to sleep. The creation of a positive sleep environment may also be helpful in reducing the symptoms of insomnia. In order to create a positive sleep environment one should remove objects that can cause worry or distressful thoughts from view.

**Cognitive behavioral therapy**

There is some evidence that cognitive behavioural therapy for insomnia is superior in the long-term to benzodiazepines and the nonbenzodiazepines in the treatment and management of insomnia. In this therapy, patients are taught improved sleep habits and relieved of counter-productive assumptions about sleep. Common misconceptions and expectations that can be modified include: (1) unrealistic sleep expectations (e.g., I need to have 8 hours of sleep each night), (2) misconceptions about insomnia causes (e.g., I have a chemical imbalance causing my insomnia), (3) amplifying the consequences of insomnia (e.g., I cannot do anything after a bad night’s sleep), and (4) performance anxiety after trying for so long to have a good night’s sleep by controlling the sleep process. Numerous studies have reported positive outcomes of combining cognitive behavioral therapy for insomnia treatment with treatments such as stimulus control and the relaxation therapies. Hypnotic medications are equally effective in the short-term
treatment of insomnia but their effects wear off over time due to tolerance. The effects of CBT-I have sustained and lasting effects on treating insomnia long after therapy has been discontinued. The addition of hypnotic medications with CBT-I adds no benefit in insomnia. The long lasting benefits of a course of CBT-I shows superiority over pharmacological hypnotic drugs. Even in the short term when compared to short-term hypnotic medication such as zolpidem (Ambien), CBT-I still shows significant superiority. Thus CBT-I is recommended as a first line treatment for insomnia. Metacognition is also a recent trend in approach to behaviour therapy of insomnia.

Internet interventions

Despite the therapeutic effectiveness and proven success of CBT, treatment availability is significantly limited by a lack of trained clinicians, poor geographical distribution of knowledgeable professionals, and expense. One way to potentially overcome these barriers is to use the Internet to deliver treatment, making this effective intervention more accessible and less costly. The Internet has already become a critical source of health-care and medical information. Although the vast majority of health websites provide general information, there is growing research literature on the development and evaluation of Internet interventions.

These online programs are typically behaviorally-based treatments that have been operationalized and transformed for delivery via the Internet. They are usually highly structured; automated or human supported; based on effective face-to-face treatment; personalized to the user; interactive; enhanced by graphics, animations, audio, and possibly video; and tailored to provide follow-up and feedback.

There is good evidence for the use computer based CBT for insomnia.

Medications

Numerous people with insomnia use sleeping tablets and other sedatives. In some places medications are prescribed in over
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95% of cases. The percentage of adults using a prescription sleep aid increases with age. During 2005–2010, about 4% of U.S. adults aged 20 and over reported that they took prescription sleep aids in the past 30 days. Prevalence of use was lowest among the youngest age group (those aged 20–39) at about 2%, increased to 6% among those aged 50–59, and reached 7% among those aged 80 and over. More adult women (5.0%) reported using prescription sleep aids than adult men (3.1%). Non-Hispanic white adults reported higher use of sleep aids (4.7%) than non-Hispanic black (2.5%) and Mexican-American (2.0%) adults. No difference was shown between non-Hispanic black adults and Mexican-American adults in use of prescription sleep aids.

**Antihistamines**

As an alternative to taking prescription drugs, some evidence shows that an average person seeking short-term help may find relief from taking over-the-counter antihistamines such as diphenhydramine or doxylamine. Diphenhydramine is widely used in nonprescription sleep aids such as Benadryl, and doxylamine is used in nonprescription sleep aids such as Unisom (USA), Unisom 2 (Canada), and, in some countries, including Australia, is marketed under the names Restavit and Dozile. It is the most effective over-the-counter sedative currently available in the United States, and is more sedating than some prescription hypnotics. Antihistamine effectiveness for sleep may decrease over time, and Anticholinergic side-effects (such as dry mouth) may also be a draw back of these particular drugs. While addiction does not seem to be an issue with this class of drugs, they can induce dependence and rebound effects upon abrupt cessation of use.

**Melatonin**

Melatonin is another non-prescription option, available in some countries labeled “dietary supplement”. Melatonin is a hormone synthesized by the pineal gland, secreted through the bloodstream in the dark or commonly at nighttime, in order to control the sleep cycle. Evidence for ramelteon, a melatonin receptor agonist
approved by the Food and Drug Administration, looks promising. It and tasimelteon increase sleep time due to a melatonin rhythm shift with no apparent negative effects on the next day. Most melatonin drugs have not been tested for longitudinal side effects. Prolonged-release melatonin improves quality of sleep with minimal side effects. Studies have also shown that children who are on the Autism spectrum or have learning disabilities, Attention-Deficit Hyperactivity Disorder (ADHD) or related neurological diseases can benefit from the use of melatonin. This is because they often have trouble sleeping due to their disorders.

For example, children with ADHD tend to have trouble falling asleep because of their hyperactivity and, as a result, tend to be tired during most of the day. Another cause of insomnia in children with ADHD is the use of stimulants used to treat their disorder. Children who have ADHD then, as well as the other disorders mentioned, may be given melatonin before bedtime in order to help them sleep.

**Antidepressants**

Since insomnia is a common symptom of depression, antidepressants are effective for treating sleep problems whether or not they are associated with depression. While all antidepressants help regulate sleep, some antidepressants such as amitriptyline, doxepin, mirtazapine, and trazodone can have an immediate sedative effect, and are prescribed to treat insomnia. Amitriptyline and doxepin both have antihistaminergic, anticholinergic, and antiadrenergic properties, which contribute to both their therapeutic effects and side effect profiles, while mirtazapine’s side effects are primarily antihistaminergic, and trazodone’s side effects are primarily antiadrenergic. Mirtazapine is known to decrease sleep latency (i.e., the time it takes to fall asleep), promoting sleep efficiency and increasing the total amount of sleeping time in people with both depression and insomnia.

Agomelatine a novel melatonergic antidepressant with sleep-improving qualities that does not cause daytime drowsiness, is
licensed for marketing in the European Union and TGA Australia. After trials in the United States its development for use there was discontinued in October 2011 by Novartis, who had bought the rights to market it there from the European pharmaceutical company Servier.

**Benzodiazepines**

The most commonly used class of hypnotics for insomnia are the benzodiazepines. Benzodiazepines are not significantly better for insomnia than antidepressants. Chronic users of hypnotic medications for insomnia do not have better sleep than chronic insomniacs not taking medications. In fact, chronic users of hypnotic medications have more regular nighttime awakenings than insomniacs not taking hypnotic medications. Many have concluded that these drugs cause an unjustifiable risk to the individual and to public health and lack evidence of long-term effectiveness. It is preferred that hypnotics be prescribed for only a few days at the lowest effective dose and avoided altogether wherever possible, especially in the elderly.

The benzodiazepine and nonbenzodiazepine hypnotic medications also have a number of side-effects such as daytime fatigue, motor vehicle crashes and other accidents, cognitive impairments and falls and fractures. Elderly people are more sensitive to these side-effects. Some benzodiazepines have demonstrated effectiveness in sleep maintenance in the short term but in the longer term benzodiazepines can lead to tolerance, physical dependence, benzodiazepine withdrawal syndrome upon discontinuation, and long-term worsening of sleep, especially after consistent usage over long periods of time. Benzodiazepines, while inducing unconsciousness, actually worsen sleep because they promote light sleep while decreasing time spent in deep sleep. A further problem is, with regular use of short-acting sleep aids for insomnia, daytime rebound anxiety can emerge. Although there is little evidence for benefit of benzodiazepines in insomnia compared to other treatments and evidence of major harm,
prescriptions have continued to increase. This is likely due to their addictive nature, both due to misuse and because—through their rapid action, tolerance and withdrawal—they can “trick” insomniacs into thinking they are helping with sleep. There is a general awareness that long-term use of benzodiazepines for insomnia in most people is inappropriate and that a gradual withdrawal is usually beneficial due to the adverse effects associated with the long-term use of benzodiazepines and is recommended whenever possible.

Benzodiazepines all bind unselectively to the GABA$_A$ receptor. Some theorize that certain benzodiazepines (hypnotic benzodiazepines) have significantly higher activity at the $\alpha_1$ subunit of the GABA$_A$ receptor compared to other benzodiazepines (for example, triazolam and temazepam have significantly higher activity at the $\alpha_1$ subunit compared to alprazolam and diazepam, making them superior sedative-hypnotics – alprazolam and diazepam in turn have higher activity at the $\alpha_2$ subunit compared to triazolam and temazepam, making them superior anxiolytic agents). Modulation of the $\alpha_1$ subunit is associated with sedation, motor-impairment, respiratory depression, amnesia, ataxia, and reinforcing behavior (drug-seeking behavior). Modulation of the $\alpha_2$ subunit is associated with anxiolytic activity and disinhibition. For this reason, certain benzodiazepines may be better suited to treat insomnia than others.

**Benzodiazepine-like medications**

Drugs that may prove more effective and safer than benzodiazepines for insomnia is an area of active research. Nonbenzodiazepine sedative-hypnotic drugs, such as zolpidem (Ambien), zaleplon, zopiclone (Imovane), and eszopiclone (Lunesta), are a class hypnotic medications that are similar to benzodiazepines in their mechanism of action, and indicated for mild to moderate insomnia. Their effectiveness at improving time to sleeping is slight, and they have similar—though potentially less severe—side effect profiles compared to benzodiazepines.
Suvorexant is FDA approved for insomnia, characterized by difficulties with sleep onset and/or sleep maintenance.

**Antipsychotics**

The use of antipsychotics for insomnia, while common, is not recommended as the evidence does not demonstrate a benefit and the risk of adverse effects is significant. Concerns regarding side effects is greater in the elderly.

**Alternative medicine**

Some insomniacs use herbs such as valerian, chamomile, lavender, cannabis, hops, *Withania somnifera*, and passion-flower. L-Arginine L-aspartate, S-adenosyl-L-homocysteine, and delta sleep-inducing peptide (DSIP) may also be helpful in alleviating insomnia. It is unclear if acupuncture is useful.

**Epidemiology**

A survey of 1.1 million residents in the United States found that those that reported sleeping about 7 hours per night had the lowest rates of mortality, whereas those that slept for fewer than 6 hours or more than 8 hours had higher mortality rates. Getting 8.5 or more hours of sleep per night increased the mortality rate by 15%. Severe insomnia – sleeping less than 3.5 hours in women and 4.5 hours in men – also led to a 15% increase in mortality. However, most of the increase in mortality from severe insomnia was discounted after controlling for co-morbid disorders. After controlling for sleep duration and insomnia, use of sleeping pills was also found to be associated with an increased mortality rate.

The lowest mortality was seen in individuals who slept between six and a half and seven and a half hours per night. Even sleeping only 4.5 hours per night is associated with very little increase in mortality. Thus, mild to moderate insomnia for most people is associated with increased longevity and severe insomnia is associated only with a very small effect on mortality. It is unclear why sleeping longer than 7.5 hours is associated with excess mortality.
Insomnia is 40% more common in women than in men.

Prevalence

The National Sleep Foundation’s 2002 *Sleep in America* poll showed that 58% of adults in the U.S. experienced symptoms of insomnia a few nights a week or more. Although insomnia was the most common sleep problem among about one half of older adults (48%), they were less likely to experience frequent symptoms of insomnia than their younger counterparts (45% vs. 62%), and their symptoms were more likely to be associated with medical conditions, according to the poll of adults between the ages of 55 and 84.

As explained by Thomas Roth, estimates of the prevalence of insomnia depend on the criteria used as well as the population studied. About 30% of adults report at least one of the symptoms of insomnia. When daytime impairment is added as a criterion, the prevalence is about 10%. Primary insomnia persisting for at least one month yields estimates of 6%.

Society

The topic of insomnia is discussed in many cultural contexts.

The word insomnia is from Latin: *in + somnus* “without sleep” and *-ia* as nominalizing suffix.

ITS SLEEP RESTRICTION AND BEHAVIORAL THERAPY TREATMENT

Sleep restriction, a behavioral therapy, may be just the treatment you need to fix your insomnia. It may seem strange, but spending too much time in bed can actually cause you to have difficulties sleeping. There are simple steps you can take to remedy this problem though.

How Time in Bed Causes Insomnia

Insomnia is defined as an inability to obtain a sufficient amount of sleep to feel rested and is generally characterized by a difficulty
falling or staying asleep. This inevitably leads to problems with daytime functioning. Significantly, these difficulties must occur despite adequate opportunity for sleep. However, can too much time in bed actually worsen your insomnia?

As part of better sleep guidelines, if you suffer from insomnia it is advised that you not lie in bed tossing and turning. Rather, if you are unable to sleep within 15 minutes, it is better to leave your bed. You should find another quiet place to lie down until you feel ready to fall asleep, and then return to your bedroom to sleep. This is recommended because otherwise you will learn to associate your bed with the anxiety of not being able to sleep.

If you do have trouble sleeping, you might convince yourself that you need to stay in bed for a longer period of time to make up for it. This can be a mistake. The later into the morning that you remain in bed will set you up to have difficulty sleeping that next night. You will cause a shift in your body’s circadian rhythm and diminish your drive to sleep. Therefore, you may obtain some additional rest, but at the expense of not feeling sufficiently tired later.

**Consolidating Sleep May Need Sleep Restriction**

Spending your night tossing and turning may set you up for fragmented sleep. Naturally, our body cycles through sleep stages. If, for whatever reason, you are constantly awakening, this won’t occur properly and you won’t feel rested.

People with insomnia will often claim they only get a few hours of “good sleep”. The rest of the night is spent flitting in and out of wakefulness, looking to the alarm clock, and trying in desperation to get back to sleep. This leads to poor sleep efficiency. Sleep efficiency is the amount of time you spend asleep divided by the time you spend in bed. If you sleep six hours out of the eight you spend in bed, your sleep efficiency would be 75 percent. Ideally, your sleep efficiency would approach 100 percent.

Sleep restriction is a behavioral treatment for insomnia. It works to improve your sleep efficiency by limiting the amount of
time you allow yourself to sleep in bed. Imagine if you stayed up all night and tomorrow night you only allowed yourself to sleep two hours. Chances are you’d be pretty tired, and that time would be spent sleeping deeply. Sleep restriction works on a less extreme level to increase your desire to sleep (called sleep drive). This leads to a consolidation of your sleep, less fitful sleeping, and improved sleep efficiency.

**How to Treat Your Insomnia with Sleep Restriction**

First, you may find it helpful to keep track of your sleep patterns with a sleep log. This will record your bedtime, the time you spend asleep, the time you spend in bed, and the time you get up on a daily basis. You may wish to keep these records for a few weeks to establish your pattern. Based on these results, figure out the average amount of time you feel like you actually sleep each night.

You will use the amount of time you spend asleep to determine the amount of time you will spend in bed. For example, if you only sleep five hours per night on average based on your sleep log, you will only allow yourself to be in bed for five hours. Do not spend less than four hours in bed, not even if you feel you sleep less. Start restricting yourself to this amount of time in bed. Each day you will calculate your sleep efficiency.

Once you are sleeping at least 85 percent of the time you are spending in bed, you will increase the time in bed by 15 minutes. You will keep increasing the time in bed using this sleep efficiency as your goal until the time in bed stabilizes. Importantly, you are not allowed to take naps during the day and you should also follow sleep hygiene guidelines. If you are older than 65 years old, your rules are slightly different. Your sleep efficiency goal is 80 percent and you are allowed a 30 minute nap during the day.

Hopefully with the simple process of sleep restriction you will be able to correct the changes in your sleep patterns and resolve your insomnia.
COGNITIVE BEHAVIORAL THERAPY TREATMENT FOR INSOMNIA

Cognitive behavioral therapy for insomnia (CBT-I) is a technique for treating insomnia without (or alongside) medications. Insomnia is a common problem involving trouble falling asleep, staying asleep, or getting quality sleep. CBT-I aims to improve sleep habits and behaviors by identifying and changing the thoughts and the behaviors that are affecting the ability to allow the person to sleep or sleep well. The first step in treating insomnia with CBT-I is to identify the underlying causes of the insomnia. People with insomnia should evaluate or have their sleep patterns evaluated and take into account all possible factors that may be affecting the person’s ability to sleep. This would involve keeping a sleep diary or journal for a couple weeks.

The journal will help identify habits of thought or behavior, stress, etc. that could be contributing to the person’s insomnia. After identifying the possible underlying cause and the factors contributing to the insomnia, the person can begin taking steps towards getting better sleep. In CBT-I these steps include stimulus control, sleep hygiene, sleep restriction, relaxation training, and cognitive therapy. Some sleep specialists will recommend Biofeedback as well.

CBT-I has been found to be an effective form of treatment of insomnia. It is also effective in treatment of insomnia related to or caused by mood disorders. Those with PTSD have also shown improvement.

Various Components of CBT-I

Behavioral practices to treat insomnia

- Practicing sleep hygiene by keeping a good sleeping environment
- removing distractions such as television, computers, and other engaging activities
- keeping the sleeping space dark and quiet
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- having a good bed
- Committing to a consistent bedtime
- Committing to a consistent wake-up time
- Avoiding staying in bed while awake for a longer time period than ideal for going to sleep. A recommended practice is relaxing elsewhere, such as by sitting, then returning to bed when one is more likely to sleep.
- Stimulus control - limit stimulation before bed
  - Finishing meals three hours before bedtime, especially for those prone to indigestion or heartburn
  - Avoiding alcoholic or caffeinated beverages before sleeping
  - Because medications can delay or disrupt sleep, choosing to take them far in advance of sleeping times is preferred unless a physician directs otherwise
  - Avoiding smoking for at least 3 hours before bed
  - Engaging in regular physical exercise, but not within 4 hours of going to sleep
  - Avoiding stressful situations before time for sleep
  - Avoiding napping too soon before sleep

**Stimulus control**

Stimulus control intends to associate the bed with sleeping and limit its association with stimulating behavior. People with insomnia are guided to do the following:

- go to bed only when they are tired
- limit activities in bed to sleep and sex
- get out of bed at the same time every morning
- get up and move to another room when sleep-onset does not occur within ten minutes

**Sleep hygiene**

Sleep hygiene aims to control the environment and behaviors that precede sleep. This involves limiting substances that can interfere with proper sleep, particularly within 4–6 hours of going to bed. These substances include caffeine, nicotine and alcohol. Sometimes a light bedtime snack, such as milk or peanut butter,
is recommended. The environment in which one sleeps, and the environment that directly precedes sleep, is also very important. Patients should engage in relaxing activities prior to going to bed, such as reading, writing, listening to calming music or taking a bath. Importantly, they should limit stimulating activity such as watching television, using a computer or being around bright lights.

**Sleep restriction**

Sleep restriction is perhaps the most controversial step of CBT-I, since it initially involves the restriction of sleep. Although it is counterintuitive, it is a significant and effective component of CBT-I. It involves controlling time in bed (TIB) based upon the person’s sleep efficiency in order to restore the homeostatic drive to sleep. Sleep Efficiency (SE) is the measure of reported Total Sleep Time (TST), the actual amount of time the patient is usually able to sleep, compared with his or her TIB.

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\text{Sleep Efficiency} = \frac{\text{Total Sleep Time}}{\text{Time In Bed}}
\]

- First, Time In Bed is restricted to the Total Sleep Time
- Increase or decrease TIB weekly by only 20-30 min
- Increase TIB if SE >90%
- Decrease TIB if SE <80%

This process may take several weeks or months to complete, depending on the person’s initial Sleep Efficiency and how effective the treatment is for them individually. Daytime sleepiness is a side-effect during the first week or two of treatment, so those who operate heavy machinery or otherwise cannot safely be sleep deprived should not undergo this process.

**Relaxation training**

Relaxation training is a collection of practices that can help people to relax throughout the day and particularly close to bedtime. It is useful for insomnia patients with difficulty falling asleep. However it is unclear whether or not it is useful for those who tend to wake up in the middle of the night or very early in
the morning. Techniques include hypnosis, guided imagery and meditation.

**Cognitive therapy**

Cognitive therapy within CBT-I is not synonymous with versions of Cognitive Behavioral Therapy that are not targeted at insomnia. When dealing with insomnia, cognitive therapy is mostly about offering education about sleep in order to target dysfunctional beliefs/attitudes about sleep.

Cognitive therapists will directly question the logical basis of these dysfunctional beliefs in order to point out their flaws. If applicable, the therapist will arrange a situation for the individual to test these flawed beliefs. For instance, many insomniacs believe that if they don’t get enough sleep they will be tired the entire following day. They will then try to conserve energy by not moving around or by taking a nap. These responses are understandable but can exacerbate the problem, since they do not generate energy. If instead a person actively tries to generate energy by taking a walk, talking to a friend and getting plenty of sunlight, he or she may find that the original belief was self-fulfilling and not necessarily true.

Worry is a common factor of insomnia. Therapists will work to control worry and rumination with the use of a thought record, a log where a person writes down concerns. The therapist and the patient can then approach each of these concerns individually.

**APPLICATIONS TO MOOD DISORDERS**

Psychiatric mood disorders, such as major depressive disorder (MDD) and bipolar disorder, are intertwined with sleep disorders. This is evident in the high rate of comorbidity with psychiatric disorders and insomnia and other sleep disorders. Most people with psychiatric diagnoses have significantly reduced sleep efficiency and total sleep time compared to controls. Thus it is not surprising that treating insomnia with CBT-I can help to improve mood disorders. A study in 2008 showed that augmenting
antidepressant medication with CBT-I in patients with MDD and comorbid insomnia helped to alleviate symptoms for both disorders. The overlap between mood- and sleep disorders is just starting to be rigorously explored, but the efficacy of CBT-I for MDD and bipolar disorder looks promising.

Application to Post-traumatic Stress Disorder

Post-traumatic Stress Disorder (PTSD) is an anxiety disorder that may develop after a person experiences a traumatic event. Many people with PTSD relive or re-experience a traumatic event; memories of the event can appear at any time and the person feels the same fear/horror as when the event occurred. These can be either in the form of nightmares and/or flashbacks. Those with PTSD also have hyperarousal (fight-or-flight) and can be too alert to go to sleep. Due to this, many experience some form of insomnia.

Studies made in recent past have shown CBT-I offers some improvement with those suffering from PTSD. For example, a study conducted February 2014, examined if CBT-I improved sleep in those with PTSD along with other PTSD related symptoms. The study showed improved sleep and improved psychosocial functioning.

Other studies even suggest CBT-I in combination with Imagery Rehearsal Therapy helps improve sleep-related PTSD symptoms. Imagery Rehearsal Therapy (IRT) is a modified Cognitive Behavioral Therapy technique used to treat recurring nightmares. This technique involves recalling the nightmare, writing it down, modifying parts of the dream to make it positive, and rehearsing the new dream to create a cognitive shift that counters the original dream. Imagery Rehearsal Therapy can be used for anyone suffering from recurring nightmares.

Efficacy

- Patients who have undergone CBT-I spend more time in stages 3 and 4 sleep (also known as slow-wave sleep, delta sleep or deep sleep) and less time awake than those treated
with zopiclone (also known as Imovane or Zimovane). They also had lasting benefits according to a review six months later, whereas zopiclone had no lasting results.

- When the common hypnotic drug zolpidem (more commonly known as Ambien) was compared with CBT-I, the latter had a larger impact on sleep-onset insomnia. Surprisingly, CBT-I by itself was no less effective than CBT-I paired with Ambien.
- Computer-based CBT-I was shown to be comparable in effectiveness to therapist-delivered CBT-I in a placebo-controlled clinical study.
- A meta-analysis showed that adherence and effectiveness are related in technology-mediated sleep treatment.
- For a meta-analysis of cognitive behavioral therapy for insomnia.

**WHAT IS A CURE FOR INSOMNIA?**

Do you have trouble getting to sleep at night or staying asleep? About 30% of the adult population reports difficulties initiating sleep, sustaining sleep, or experiencing restful sleep. To deal with these problems, many people resort to medications or some form of supplement. But it now appears that there is an effective way to banish insomnia without the use of chemicals, by simply applying the principles of hormesis.

The remedy intended to discuss here is called Sleep Restriction Therapy (SRT). The credit is given to Derek Haswell for bringing SRT to my attention. A 4-8 week course of treatment has been shown to be very effective in restoring normal sleep. The basic idea behind SRT is to limit your sleeping in a controlled manner
until it renormalizes. As with any application of hormesis, the solution may at first seem paradoxical: to combat a stress you should apply judicious amounts of that very stress to train the mind or body to adapt. It works for building muscles, improving eyesight, normalizing appetite, and improving immunity. And sleep therapists have now found a way to use hormesis to improve the quality of sleep.

The protocol. Here is how Sleep Restriction Therapy works:

1. Determine a fixed time to wake up every morning and set your alarm for that time. This is an absolute requirement: when the alarm goes off you must get out of bed immediately with no snoozing or exceptions. If necessary, use a loud alarm and put it across the room. Some researchers find that exposure to bright morning light upon waking is important to the success of SRT.

2. Determine the minimum number of hours you require to sleep. This is usually done by keeping a sleep log for several nights to figure out the average number of hours you are actually sleeping. If you are in bed for 8 hours but are awake for 2 of those hours, then your sleep requirement is 6 hours. In general, the minimum sleep requirement should never be less than 4.5 hours.

3. Do not go to bed or even go into your bedroom until the official bedtime. If your wake time is 6 a.m. and your initial sleep time is five hours, that means you cannot go into your bedroom to sleep until 1 a.m. You have to keep yourself awake between 6 a.m. and 1 a.m. the next day. No napping, lying down or nodding off is allowed. This is difficult and can produce drowsiness and grumpiness during the initial days of treatment. In some versions of SRT, slightly longer hours are allowed on weekends as a “reward” for making progress.

4. Measure your “sleep efficiency” each night. Calculate sleep efficiency as the hours you actually sleep expressed as a percentage of the total hours you are in the bedroom. To track sleep efficiency, keep a sleep log — a record of when
you go to bed and wake up during the night, noting the related circumstances and activities. Your goal is 90% or better sleep efficiency. An alternative method is to use a home sleep monitor such as that made by Zeo. The Zeo sleep monitor is an affordable and comfortable “headband” that wirelessly transmits data on your different sleep phases and sleep efficiency to a bedside “alarm clock”, with the ability to view your progress on your PC. I’ve found the Zeo to be very useful in analyzing sleep patterns. It reveals the inner workings of your sleep in a way that a manual sleep log cannot.

5. Adjust your sleep time. If your sleep efficiency is greater than 90%, increase your sleep time by moving your bedtime 15 minutes earlier. If your sleep time is less than 85%, delay your bedtime by 15 minutes.

6. Allow your sleep to normalize. Continue the treatment until your sleep time can be increased to “normal” sleep time of 6-8 hours with at least 90% sleep efficiency and subjective feeling of restfulness upon waking and during the day.

Case study. Here is a very compelling video about the success that one British man had using SRT to overcome insomnia:

A study of SRT in 10 elderly patients found that it significantly reduced both sleep latency (time to fall asleep) and subsequent waking during sleep. And the benefits were still in place 3 months after ending the therapy. SRT appears to be effective for most types of insomnia, except for sleep disturbances related to depression, bipolar disorder, sleep apnea or circadian disorders resulting from, e.g., shift work. One of the immediate benefits that patients note is the reduction of “anticipatory anxiety” — the time and concern spent worrying about what the night will bring. Many insomniacs see their bedroom as a prison or place of dread. SRT very quickly compartmentalizes that anxiety.

Once they begin to bank 5 or 6 good hours of sleep each night, the progress itself helps to dissipate the anxiety, which in turn tends to make for better sleep. As with any application of hormetic
stress, SRT at first involves “one step backward” by seeming to make things worse. And indeed the first few days may bring increased drowsiness, while the benefits take weeks to become evident. The reality is that our bodies adapt often slowly, over a period of weeks or longer. And so it is with SRT. But once patients begin to adapt to the new sleep regimen, the quality of their sleep usually improves markedly. Several weeks of drowsiness and irritability seems a small price to pay for a cure that lasts.

Why does it work? Looked at from a behaviorist perspective, SRT is a form of behavior modification based upon stimulus control. Because patients are truly much more tired when they are finally allowed to climb into bed, the association between the action of getting into bed and the response of falling asleep is strengthened, and the association with “tossing and turning” is weakened. Undoubtedly, at the level of neuropeptides and receptors in the hypothalamus, SRT must be restoring a functional homeostasis. The neuronal pathways, transmitters, and receptors involved in sleep regulation are quite complex. The ascending arousal system located in hypothalamus interacts with sleep-active neurons in the ventrolateral preoptic nucleus (VLPO) producing a “flip-flop switch” that produces distinct sleep-wake states with abrupt transitions. The sleep disruptions characteristic of insomnia are believed to involve an excess of corticotropin-releasing factor (CRF) secreted by the hypothalamic-pituitary-adrenal (HPA) axis. This results in excess production of the hormones ACTH and cortisol, leading to hyperarousal. It appears that Sleep Restriction Therapy quiets the HPA, leading to improved sleep.

Regardless of the underlying mechanism, Sleep Restriction Therapy appears to be an excellent example of hormesis, a chemical-free way to teach your body to adapt, by exposing it to controlled doses of the very same stress than you want to tolerate more effectively.
A sleep disorder, or somniphathy, is a medical disorder of the very patterns of a person or animal. Some sleep disorders are serious enough to interfere with normal physical, mental, social and emotional functioning. Polysomnography and actigraphy are tests commonly ordered for some sleep disorders.

Disruptions in sleep can be caused by a number of issues, from teeth grinding (bruxism) to night terrors. When a person suffers from difficulty falling asleep and/or staying asleep with no obvious cause, it is referred to as insomnia.

CLASSIFICATION OF SLEEP DISORDERS

Sleep disorders are broadly classified into dyssomnias, parasomnias, circadian rhythm sleep disorders involving the timing of sleep, and other disorders including ones caused by medical or psychological conditions and sleeping sickness. Some common sleep disorders include sleep apnea (stops in breathing during sleep), narcolepsy and hypersomnia (excessive sleepiness at inappropriate times), cataplexy (sudden and transient loss of muscle tone while awake), and sleeping sickness (disruption of sleep cycle due to infection). Other disorders include sleepwalking, night terrors and bed wetting. Management of sleep disturbances
that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

**COMMON SLEEP DISORDERS**

The most common sleep disorders include:

- **Bruxism**, involuntarily grinding or clenching of the teeth while sleeping
- **Catathrenia**, nocturnal groaning during prolonged exhalation
- **Delayed sleep phase disorder (DSPD)**, inability to awaken and fall asleep at socially acceptable times but no problem with sleep maintenance, a disorder of circadian rhythms. Other such disorders are advanced sleep phase disorder (ASPD), non-24-hour sleep–wake disorder (non-24) in the sighted or in the blind, and irregular sleep wake rhythm, all much less common than DSPD, as well as the situational shift work sleep disorder
- **Hypopnea syndrome**, abnormally shallow breathing or slow respiratory rate while sleeping
- **Idiopathic hypersomnia**, a primary, neurologic cause of long-sleeping, sharing many similarities with narcolepsy
- **Insomnia disorder (primary insomnia)**, chronic difficulty in falling asleep and/or maintaining sleep when no other cause is found for these symptoms. Insomnia can also be comorbid with or secondary to other disorders.
- **Kleine–Levin syndrome**, a rare disorder characterized by persistent episodic hypersomnia and cognitive or mood changes
- **Narcolepsy**, including excessive daytime sleepiness (EDS), often culminating in falling asleep spontaneously but unwillingly at inappropriate times. Also often associated with cataplexy, a sudden weakness in the motor muscles that can result in collapse to the floor.
- **Night terror, Pavor nocturnus**, sleep terror disorder, an abrupt awakening from sleep with behavior consistent with terror
Nocturia, a frequent need to get up and urinate at night. It differs from enuresis, or bed-wetting, in which the person does not arouse from sleep, but the bladder nevertheless empties.

Parasomnias, disruptive sleep-related events involving inappropriate actions during sleep, for example sleep walking, night-terrors and catathrenia.

Periodic limb movement disorder (PLMD), sudden involuntary movement of arms and/or legs during sleep, for example kicking the legs. Also known as nocturnal myoclonus. See also Hypnic jerk, which is not a disorder.

Rapid eye movement sleep behavior disorder (RBD), acting out violent or dramatic dreams while in REM sleep, sometimes injuring bed partner or self (REM sleep disorder or RSD).

Restless legs syndrome (RLS), an irresistible urge to move legs. RLS sufferers often also have PLMD.

Shift work sleep disorder (SWSD), a situational circadian rhythm sleep disorder. (Jet lag was previously included as a situational circadian rhythm sleep disorder, but it doesn’t appear in DSM-5 (Diagnostic and Statistical Manual of Mental Disorders).)

Sleep apnea, obstructive sleep apnea, obstruction of the airway during sleep, causing lack of sufficient deep sleep, often accompanied by snoring. Other forms of sleep apnea are less common. When air is blocked from entering into the lungs, the individual unconsciously gasps for air and sleep is disturbed. Stops of breathing of at least ten seconds, 30 times within seven hours of sleep, classifies as apnea. Other forms of sleep apnea include central sleep apnea and sleep-related hypoventilation.

Sleep paralysis, characterized by temporary paralysis of the body shortly before or after sleep. Sleep paralysis may be accompanied by visual, auditory or tactile hallucinations. Not a disorder unless severe. Often seen as part of narcolepsy.
• Sleepwalking or somnambulism, engaging in activities normally associated with wakefulness (such as eating or dressing), which may include walking, without the conscious knowledge of the subject.

• Somniphobia, one cause of sleep deprivation, a dread/fear of falling asleep or going to bed. Signs of the illness include anxiety and panic attacks before and during attempts to sleep.

**Its Various Types**

• Dyssomnias - A broad category of sleep disorders characterized by either hypersomnia or insomnia. The three major subcategories include intrinsic (i.e., arising from within the body), extrinsic (secondary to environmental conditions or various pathologic conditions), and disturbances of circadian rhythm.

• Insomnia: Insomnia may be primary or it may be comorbid with or secondary to another disorder such as a mood disorder (i.e., emotional stress, anxiety, depression) or underlying health condition (i.e., asthma, diabetes, heart disease, pregnancy or neurological conditions).

• Primary hypersomnia. Hypersomnia of central or brain origin.

• Narcolepsy: A chronic neurological disorder (or dyssomnia), which is caused by the brain’s inability to control sleep and wakefulness.

• Idiopathic hypersomnia: a chronic neurological disease similar to narcolepsy in which there is an increased amount of fatigue and sleep during the day. Patients who suffer from idiopathic hypersomnia cannot obtain a healthy amount of sleep for a regular day of activities. This hinders the patients' ability to perform well, and patients have to deal with this for the rest of their lives.

• Recurrent hypersomnia - including Kleine–Levin syndrome

• Posttraumatic hypersomnia

• Menstrual-related hypersomnia
• Sleep disordered breathing (SDB), including (non exhaustive):
  • Several types of Sleep apnea
  • Snoring
  • Upper airway resistance syndrome
  • Restless leg syndrome
  • Periodic limb movement disorder
  • Circadian rhythm sleep disorders
  • Delayed sleep phase disorder
  • Advanced sleep phase disorder
  • Non-24-hour sleep–wake disorder
• Parasomnias - A category of sleep disorders that involve abnormal and unnatural movements, behaviors, emotions, perceptions, and dreams in connection with sleep.
• Bedwetting or sleep enuresis
• Bruxism (Tooth-grinding)
• Catathrenia - nocturnal groaning
• Exploding head syndrome - Waking up in the night hearing loud noises.
• Sleep terror (or Pavor nocturnus)- Characterized by a sudden arousal from deep sleep with a scream or cry, accompanied by some behavioral manifestations of intense fear.
• REM sleep behaviour disorder
• Sleepwalking (or somnambulism)
• Sleep talking (or somniloquy)
• Sleep sex (or sexsomnia)
• Medical or psychiatric conditions that may produce sleep disorders
• Alcoholism
• Mood disorders
• Depression
• Anxiety
• Panic
- Psychosis (such as Schizophrenia)
- Sleeping sickness - a parasitic disease which can be transmitted by the Tsetse fly.

**VARIOUS RISKS**

A systematic review found that traumatic childhood experiences (such as family conflict or sexual trauma) significantly increases the risk for a number of sleep disorders in adulthood, including sleep apnea, narcolepsy, and insomnia. It is currently unclear whether or not moderate alcohol consumption increases the risk of obstructive sleep apnea.

Besides, an evidence-based synopses suggests that the sleep disorder, idiopathic REM sleep behavior disorder (iRBD), may have a hereditary component to it. A total of 632 participants, half with iRBD and half without, completed self-report questionnaires.

The results of the study suggest that people with iRBD are more likely to report having a first-degree relative with the same sleep disorder than people of the same age and sex that do not have the disorder. More research requires to be conducted to gain further information about the hereditary nature of sleep disorders.

**TREATMENT FOR SLEEP DISORDERS**

Treatments for sleep disorders generally can be grouped into four categories:

- Behavioral and psychotherapeutic treatment
- Rehabilitation and management
- Medication
- Other somatic treatment.

None of these general approaches is sufficient for all patients with sleep disorders. Rather, the choice of a specific treatment depends on the patient’s diagnosis, medical and psychiatric history, and preferences, as well as the expertise of the treating clinician. Often, behavioral/psychotherapeutic and pharmacological approaches are not incompatible and can effectively be combined
to maximize therapeutic benefits. Management of sleep disturbances that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

Medications and somatic treatments may provide the most rapid symptomatic relief from some sleep disturbances. Certain disorders such as narcolepsy, are best treated with prescription drugs such as Modafinil. Others, such as chronic and primary insomnia, may be more amenable to behavioral interventions, with more durable results.

**CHRONIC SLEEP DISORDERS IN CHILDHOOD**

Chronic sleep disorders in childhood, which affect some 70% of children with developmental or psychological disorders, are under-reported and under-treated. Sleep-phase disruption is also common among adolescents, whose school schedules are often incompatible with their natural circadian rhythm. Effective treatment begins with careful diagnosis using sleep diaries and perhaps sleep studies. Modifications in sleep hygiene may resolve the problem, but medical treatment is often warranted.

Special equipment may be required for treatment of several disorders such as obstructive apnea, the circadian rhythm disorders and bruxism. In these cases, when severe, an acceptance of living with the disorder, however well managed, is often necessary. Some sleep disorders have been found to compromise glucose metabolism.

**Acupuncture treatment**

Research suggests that acupuncture may be helpful for some sleep disorders. With insomnia specifically, acupuncture was found to be more effective in increasing the sleep quality of individuals who received a diagnosis. This form of treatment for sleep disorders is generally studied in adults, rather than children. Further research would be needed to study the effects of acupuncture on sleep disorders in children.
Hypnosis treatment

Research suggests that hypnosis may be helpful in alleviating some types and manifestations of sleep disorders in some patients. "Acute and chronic insomnia often respond to relaxation and hypnotherapy approaches, along with sleep hygiene instructions." Hypnotherapy has also helped with nightmares and sleep terrors. There are several reports of successful use of hypnotherapy for parasomnias specifically for head and body rocking, bedwetting and sleepwalking.

Hypnotherapy has been studied in the treatment of sleep disorders in both adults and children.

Music therapy

Although more research should be done to increase the reliability of this method of treatment, research suggests that music therapy can improve sleep quality in acute and chronic sleep disorders. In one particular study, participants (18 years or older) who had experienced acute or chronic sleep disorders were put in a randomly controlled trial and their sleep efficiency (overall time asleep) was observed. With a view to assess sleep quality, researchers used subjective measures (i.e. questionnaires) and objective measures (i.e. polysomnography).

The results of the study suggest that music therapy did improve sleep quality in subjects with acute or chronic sleep disorders, however only when tested subjectively. Although these results are not fully conclusive and more research should be conducted, it still provides evidence that music therapy can be an effective treatment for sleep disorders. In another study, specifically looking to help people with insomnia, similar results were seen. The participants that listened to music experienced better sleep quality than those who did not listen to music.

Melatonin

In addressing sleep disorders and possible solutions, there is often a lot of buzz surrounding melatonin. Research suggests that
melatonin is useful in helping people to fall asleep faster (decreased sleep latency), to stay asleep longer, and to experience improved sleep quality.

In order to test this, a study was conducted that compared subjects that had taken Melatonin to subjects that had taken a placebo pill in subjects with primary sleep disorders. Researchers assessed sleep onset latency, total minutes slept, and overall sleep quality in the Melatonin and placebo groups to note the differences. In the end, researchers found that melatonin decreased sleep onset latency, increased total sleep time, and improved quality of sleep significantly more than the placebo group.

INCREASING KNOWLEDGE OF SLEEP MEDICINE

Because of rapidly increasing knowledge about sleep in the 20th century, including the discovery of REM sleep in the 1950s and circadian rhythm disorders in the 70s and 80s, the medical significance of sleep was recognized. The medical community began paying more attention than previously to primary sleep disorders, such as sleep apnea, as well as the role and quality of sleep in other conditions.

By the 1970s in the USA, clinics and laboratories devoted to the study of sleep and sleep disorders had been founded, and a need for standards arose. Specialists in Sleep Medicine were originally certified by the American Board of Sleep Medicine, which still recognizes specialists. Those passing the Sleep Medicine Specialty Exam received the designation “diplomate of the ABSM.” Sleep Medicine is now a recognized subspecialty within internal medicine, family medicine, pediatrics, otolaryngology, psychiatry and neurology in the United States. Certification in Sleep Medicine shows that the specialist:

“has demonstrated expertise in the diagnosis and management of clinical conditions that occur during sleep, that disturb sleep, or that are affected by disturbances in the wake-sleep cycle. This specialist is skilled in the analysis and interpretation of
Competence in sleep medicine requires an understanding of a myriad of very diverse disorders, many of which present with similar symptoms such as excessive daytime sleepiness, which, in the absence of volitional sleep deprivation, “is almost inevitably caused by an identifiable and treatable sleep disorder”, such as sleep apnea, narcolepsy, idiopathic hypersomnia, Kleine–Levin syndrome, menstrual-related hypersomnia, idiopathic recurrent stupor, or circadian rhythm disturbances.

Another common complaint is insomnia, a set of symptoms which can have a great many different causes, physical and mental. Management in the varying situations differs greatly and cannot be undertaken without a correct diagnosis.

Sleep dentistry (bruxism, snoring and sleep apnea), while not recognized as one of the nine dental specialties, qualifies for board-certification by the American Board of Dental Sleep Medicine (ABDSM).

The resulting Diplomate status is recognized by the American Academy of Sleep Medicine (AASM), and these dentists are organized in the Academy of Dental Sleep Medicine (USA). The qualified dentists collaborate with sleep physicians at accredited sleep centers and can provide oral appliance therapy and upper airway surgery to treat or manage sleep-related breathing disorders.

In the UK, knowledge of sleep medicine and possibilities for diagnosis and treatment appear to lag, Guardian.co.uk quotes the director of the Imperial College Healthcare Sleep Centre: “One problem is that there has been relatively little training in sleep medicine in this country – certainly there is no structured training for sleep physicians.”

The Imperial College Healthcare site shows attention to obstructive sleep apnea syndrome (OSA) and very few other sleep disorders.
SLEEP DISORDERS IN SLEEP APNEA

Sleep apnea (spelled apnoea in England) is a potentially life-threatening sleep disorder characterized by abnormal pauses (apneas) in breathing during sleep. It was once known as Pickwickian syndrome after the symptoms of a character described in Charles Dickens’ 1836 book *Pickwick Papers*. It is quite a common complaint, and at least 4% of men and 2% of women suffer from sleep apnea, although it often goes undiagnosed.

There are two main types of sleep apnea: central sleep apnea, a relatively uncommon form which occurs when the brain fails to send the signal to the muscles to take a breath, and so there are periods in which there is just no muscular effort to breathe; and obstructive sleep apnea (OSA), a much more common form, where the brain sends signals to the muscles and the muscles do make an effort to take a breath, but they are unable to comply effectively because an obstructed airway prevents an adequate flow of air. Mixed sleep apnea, a mixture of the two, is also possible but extremely uncommon.

Sleep hypopnea is similar in various respects to sleep apnea, with similar symptoms and long-term effects, although it is less common. It is caused by excessively shallow breathing or an abnormally low respiratory rate, rather than by complete breathing pauses due to obstructions or other causes. This typically leads to loud, heavy snoring, interrupted several times an hour by choking sounds or snorts followed by a silence of up to 20 seconds as insufficient air flows into the lungs.

Sleep hypopnea and the various kinds of sleep apnea mentioned above are often lumped together under the heading sleep-disordered breathing. Upper airway resistance syndrome is a similar, but milder, form of sleep-disordered breathing. In the most common case of obstructive sleep apnea, breathing is disrupted by a physical block to the airflow caused by a collapse of the in the throat and respiratory tract (the same tissues as produce the sound of snoring, which almost always accompanies
sleep apnea). During these pauses in breathing (or apneas), the sleeper effectively starts to suffocate (in addition to experiencing a sharp loss in blood oxygen levels and increased carbon dioxide levels), and the brain sends an immediate emergency signal to the body to wake up. When the sleeper wakes and takes a deep breath, the brain is replenished and the person is able to go back to sleep. Each apnea episode may last from just a few seconds to minutes (at least 10 seconds is the usual benchmark, whether referring to obstructive or central sleep apnea), and they may occur anywhere from 5 to 30 or more times an hour. Because of the complete loss of muscle tone associated with REM sleep, that is the most common time to experience apneas, and they are relatively rare during non-REM sleep.

The frequent partial awakenings that are caused by sleep apnea (often referred to as micro-awakenings) lead, over time, to chronic sleep deprivation and excessive daytime sleepiness. Sleep apnea can disturb sleep to such an extent that, even after a full night in bed, the sleeper does not feel rested due to the compromised quality of the sleep.

Besides excessive daytime sleepiness, the constant sleep interruptions may lead to loss of energy, headaches, forgetfulness, and, in the longer term, to high blood pressure, heart attack, stroke, depression, or other mood disorders. The lowered blood oxygen level during sleep apnea can also disrupt the stages of sleep in a person’s sleep cycles.

Men are more likely to suffer from sleep apnea than women and children, and the risk increases with age, body weight and smoking habits. In particular, sleep apnea is highly correlated with obesity, mainly due to excess fat on the sides of the neck that can cause obstructions in the airway. Several other conditions also increase the risk of sleep apnea, including menopause, asthma, epilepsy, Down syndrome, etc. In children, it may result from enlarged tonsils or adenoids.

Generally, a sufferer from sleep apnea is completely unaware of the condition, which may therefore continue for years without
identification. Even then it may only be identified by someone else witnessing the episodes or complaining about the loud snoring that usually accompanies it, or merely as a consequence of the ongoing daytime sleepiness, fatigue and irritability that result from it. It has become apparent in recent years that those with sleep apnea are more vulnerable to a variety of parasomnias, such as sleep-walking, sleep-sex, sleep-eating, confusional arousals, night terrors, etc, as well as other sleep disorders like periodic limb movement disorder, restless legs syndrome, etc.

Common treatments include lifestyle changes (such as avoiding alcohol and other muscle relaxants, losing weight and quitting smoking), sleeping on a 30 degree angle or on one’s side, various kinds of oral/dental appliances or masks (particularly continuous positive airway pressure, or CPAP, masks, which remains the leading therapy for severe sleep apnea), or even surgical procedures to increase the size of the airway.

**RESTLESS LEGS SYNDROME**

Restless legs syndrome (RLS) is a neurological disorder characterized by a constant urge to move the legs (or, more rarely, other body parts like the arms, torso or even phantom limbs) in order to stop uncomfortable or odd sensations. These sensations, typically in the lower legs, are experienced when relaxing, especially on going to bed (but before sleep itself starts), and may last up to an hour in total. Moving the body part usually provides relief, but only temporarily, and the sensations usually start up again almost immediately.

Frustratingly, the more the sufferer tries to relax and ignore the symptoms, the worse it gets.

The sensations, which may be a pain or ache, but are more often described as an itching, tickling, tingling or “crawling” sensation, usually begin while relaxing (especially in the evening) or while preparing to sleep. The almost irresistible urge to move the legs and the resulting inability to remain at rest, can result in
severe sleep disturbance. To make matters worse, the disorder is also usually accompanied by limb twitching or jerking during sleep (known as periodic limb movement disorder), which can lead to further sleep disruption.

As with most of the conditions, restless legs syndrome can vary in its severity, ranging from a minor annoyance to a severe disruption causing significant impairment to quality of life. In moderate and severe cases, the symptoms are present almost every night. The condition often starts early in adulthood and gets worse with age, but it is most common in people over 40. By some estimates, as many as 10%-15% of adults are affected by at least some level of the condition, although only 2%-5% seriously. It is almost twice as common in women as men.

RLS is very genetic in provenance, and a gene marker has recently been discovered which might explain why it tends to run in families. It has been associated with low levels of iron and the neurotransmitter dopamine in the brain. There also appears to be some association with periodic limb movement disorder (PLMD) (a similar complaint in which, unlike RLS, limb movement occurs involuntarily during sleep), and some 80% of RLS sufferers also report PLMD (although the reverse association is much weaker). Both PLMD and RLS are much more common in older people, affecting up to a third of all over-60s by some estimates. The two disorders are often talked about together and conflated, although they are quite distinct and separate complaints.

Moving the legs, or walking around, brings immediate but only temporary relief from the symptoms, and long-term treatment mainly revolves around oral iron supplements, dopamine agonists (similar to those used to treat Parkinson’s Disease) or relaxants like opioids or cannabis. Nutritional treatments - increasing foods high in iron and magnesium, as well as calcium, potassium and vitamin E, and minimizing the intake of refined sugars, soft drinks and caffeine - often prove quite effective in the long run, and regular exercise may also help.
HYPERSOMNIA

Hypersomnia, also known as hypsomnolence or sometimes idiopathic hypersomnia (meaning that it arises from no known cause), is a sleep disorder characterized by excessive daytime sleepiness, excessive sleep periods each day (usually taken to mean more than 10 hours) and/or an inability to achieve the feeling of refreshment that sleep usually brings. Chronic sufferers may sleep up to 18 hours a day or more and still not feel refreshed upon waking. The disorder usually develops slowly over a period of years, typically starting in late adolescence, when it is often confused with normal teenage sleep issues like delayed sleep phase syndrome.

Hypersomniacs may feel compelled to nap repeatedly during the day, even if this still brings no relief

Hypersomniacs may feel compelled to nap repeatedly during the day, even if this still brings no relief. This may be due to some extent to a reported concomitant symptom of hypersomnia, the failure of the heart rate to decrease during sleep as it normally
Sleep Disorders: Types, Risks and Treatment

would, so that hypsomniac sleep may not be as restful per unit of time as normal sleep. Other symptoms may include anxiety, irritability, decreased energy, restlessness, slow thinking, slow speech, loss of appetite, hallucinations, memory difficulties and often severe sleep inertia on waking. These symptoms may be severe enough to affect a person’s ability to function well in family, social and occupational settings. Normal hypersomnia, on the other hand, is a term sometimes applied to naturally "long sleepers”.

In primary hypersomnia, the symptoms of hypersomnia may continue unabated for months or even years. Inrecurrent hypersomnia, the symptoms recur several times during the year, in between periods of relatively normal sleep-wake cycles, and may also be accompanied by other psychological disorders such as hypersexuality or compulsive eating.

Kleine-Levin syndrome (also known as Sleeping Beauty syndrome) is an even more extreme variant of recurrent hypersomnia, first described by Willi Kleine in 1925 and then by Max Levin in 1929. It occurs almost exclusively in teenage boys, and sufferers may sleep for several days at a time, before waking ravenously hungry, irritable and often hypersexual.

Hypersomnia may be caused by other disorders such as depression, Celiac disease, mononucleosis or fibromyalgia, or it may arise as a by-product of other sleep disorders. It may also be in some cases an adverse reaction to certain medications, or result from drug or alcohol abuse. A genetic predisposition may also be a factor, as may excess weight. It is thought that the immediate mechanism for hypersomnia may be a particular somnogen (sleep-inducing substance) in the spinal fluid, although the substance’s exact identity and cause have still not been narrowed down.

Generally, prescribed stimulants are used to treat the symptoms, although these may be less effective for hypersomnia than they are for narcolepsy. Improved sleep hygiene and the avoidance of caffeine and alcohol are also usually recommended.
CIRCADIAN RHYTHM SLEEP DISORDERS

Circadian rhythm sleep disorders (CRSD) are a family of related sleep disorders, all characterized by an inability to sleep and/or wake at normal or appropriate times due to the dictates of the individual’s biological or circadian clock.

As a result, sleep is attempted (or actually occurs) at an abnormal time in the individual’s circadian cycle, rather like having jet lag all the time. Usually, the sleep is of normal quality, and even its quantity would be usually sufficient if allowed to start and finish at the times dictated by their body clocks, but often this does not fit in with the schedule required for normal work, school or social requirements.

The body’s circadian rhythm controls things like core temperature, alertness, appetite, hormone secretion, etc, over the 24-hour day, and it also influences the times of day when a person is ready to sleep and wake. If the person’s extrinsic circumstances are such that they are not able to keep to this internal timetable, then sleep patterns may be impacted, sometimes severely.

Thus, the problem is not that sufferers are unable to sleep, but that their natural schedules are not compatible with the schedules and demands of modern life, leading to an accumulating sleep debt and daytime sleepiness. CRSDs are normally only diagnosed as such when the phase advance or phase delay differs from the norm by at least two hours (i.e. it is more extreme than just an individual’s tendency towards being a “night owl” or a “morning lark” due to their chronotype). In the case of a CRSD, the phase shifts may be three to five hours or more.

The most common circadian rhythm sleep disorders include:

- delayed sleep phase syndrome (DSPS), the most common CRSD, frequently found in adolescents, teenagers and depressives, where a person naturally has a much later-than-normal timing of sleep onset, and may experience peak alertness very late in the evening or even in the middle of the night. There is some argument to be made...
that this is not actually a disorder in teenagers at all, but a normal (if unexplained) phase of the development of the human circadian clock.

- advanced sleep phase syndrome (ASPS), the opposite case, most common in the elderly, where a person naturally has difficulty staying awake in the evening (feelings of sleepiness often set in as early as the late afternoon) and difficulty staying asleep in the morning. As with DSPS, this is arguably a normal part of aging.

- non-24-hour sleep-wake syndrome (non-24), mainly found among blind people with no light perception (who are therefore unable to receive the usual environmental time cues or Zeitgebers), in which a person’s alertness and performance patterns are totally desynchronized from the normal 24-hour day. Sleep tends to occur one or two hours later and later each day, following a so-called “free-running” cycle of 25 hours or more - the complaint is sometimes called free-running disorder - typically taking a few weeks to complete a full cycle.

- irregular sleep-wake rhythm disorder (ISWRD), mainly found in sufferers from Alzheimer’s disease and other forms of dementia, where a person takes numerous naps at irregular times throughout a 24-hour period, with no main nighttime sleep episode (also known as polyphasic sleep). Total sleep time may be roughly similar to normal, but the sleep pattern is highly irregular and socially impractical. Body temperature also tends to fluctuate wildly throughout the 24-hour period, although usually in sync with the person’s sleep tendencies.

Most of these disorders are largely genetic in origin, often involving the PER and CLOCK genes. Treatments may include bright light therapy (bright light at desired wake-up times, and darkness at desired sleep times) and chronotherapy (gradually resetting the circadian clock by manipulating bedtimes). Oral melatonin supplements to induce sleepiness, and a strict schedule of good sleep hygiene are also useful tools.
Shift work and jet lag are sometimes included as circadian rhythm sleep disorders, and may be referred to as shift work disorder and jet lag disorder. Certainly they arise from same root cause (circadian rhythm phase shifts), although the reasons for their incidence are more social and occupational than medical.

PARASOMNIAS

Parasomnias are a category of sleep disorders involving abnormal or unnatural movements, behaviours, emotions, perceptions and dreams during sleep. The “para-” in the name indicates that these are undesirable events that occur “alongside” sleep, but they may occur before sleep, during sleep, on awakening, or during the transitions between different stages of sleep. They generally involving partial awakenings or micro-awakenings, especially during the transitions between sleep and wakefulness. They are usually divided into non-REM parasomnias and REM parasomnias, depending on when in the sleep cycle they occur.

There is generally a genetic predisposition for these phenomena, and they tend to be inherited from parents and run in families. Most are triggered by sleep deprivation from other underlying pre-existing sleep disorders (especially sleep apnea and restless legs syndrome/periodic limb movement disorder), as well as from stress, medications, alcohol abuse, etc, although they can also arise with no identifiable trigger (known as idiopathic). It is important to note that the occurrences are completely involuntary, and do not imply any underlying psychological disorder, as often used to be assumed.

Non-REM parasomnias occur, as the name suggests, during non-REM sleep, usually during the earlier part of the night. The most common of these include:

- sleep-talking or somniloquy, common in children (and not uncommon in adults) and largely harmless. Sleep-talking may occur when the body does not move smoothly from one stage of non-REM sleep to another, resulting in
transitory partial awakenings, or less commonly a partial “motor breakthrough” during REM sleep (so that dreams are to some extent “acted out” aloud). The talking can vary from gibberish or indistinct mumblings to shouting or even complex monologues and dialogues. Sleep-laughing is another variant.

- sleep-walking or somnambulism, quite common among pre-teens (it is experienced by about 10%-15% of children) and less so among adults (around 4%). Sleepers rise from deep slow-wave sleep in the early part of the night to perform activities usually performed during full consciousness, such as talking, walking, cleaning, cooking, even driving, for periods lasting up to ten minutes, all without any conscious awareness of what they are doing. Episodes occur with no warning, and usually with absolutely no subsequent memory. The eyes are usually open, but they appear not to be focusing. Occasionally, incidental injuries may arise, but usually it is not dangerous, and treatment is not normally necessary. Contrary to common belief, it is generally quite safe to wake a sleepwalker, although often it may be easier just to lead them back to bed.

- sleep-related eating disorder (SRED), also called sleep eating or night eating syndrome, a potentially dangerous variant or extension of sleep-walking in which the sufferer sleeps to the kitchen and eats and drinks at random, often including unhealthy fatty foods, raw foods, strange combinations of foods, or even toxic substances, cleaning fluids, etc. SRED is not driven by hunger or thirst, but is an involuntary activity, totally unrelated to normal eating needs and preferences. In severe cases, the practice can lead to obesity, diabetes, hypertension or other diet-related problems, and accidents may occur at any time from using knives and appliances, or ingesting poisonous products.

- sleep-sex or sexsomnia, sexual acts, ranging from masturbation and sexual vocalizations to full intercourse and actual sexual assault, performed while still asleep,
and usually not remembered afterwards. Like many parasomnias, sleep-sex may be triggered by sleep deprivation, alcohol or stress, and is often associated with sleep apnea.

- night terrors, or sleep terrors or pavor nocturnus, intense, violent and inconsolable feelings of terror or dread experienced on waking from deep slow-wave sleep, mainly among young children (about 6%) and younger adults (about 2%). The events are often accompanied by screaming, thrashing around (sometimes with almost superhuman strength and speed), and are usually followed by a period of confusion and almost complete amnesia about the incident. Unlike nightmares, which occur during the main dream sequence of REM sleep and which usually involve complex dream scenarios, night terrors appear to be very brief, hair-trigger responses to very small stimuli (such as strange noises, for example) during non-REM sleep, and usually have no clear narrative, just a generalized feeling of dread. Medication is generally quite successful in controlling the occurrences, but resolution of the underlying sleep disorder and good sleep hygiene are better long-term solutions.

- confusional arousals, also known by the descriptive phrase "sleep drunkenness", a similar but less violent experience than night terrors, quite common in children, where a period of movement and crying gives way to a partial and confused awakening, marked by disorientation, mental dullness, slurred speech and slowed reactions. Confusional arousals may be brought on by ongoing sleep deprivation, but also by alcohol abuse, medications, stress or other sleep disorders.

- exploding head syndrome or auditory sleep starts, the hallucinatory experience of a sudden loud noise, like an explosion, gunshot, cymbal clash or roar, sometimes accompanied by a flash of light, apparently from within the sleeper’s own head just as they are about to fall asleep, causing a sense of fear or anxiety.
• teeth grinding or bruxism, a common complaint, often caused by stress or anxiety, where the compulsive grinding of teeth, mainly during the light stages of non-REM sleep, can cause sleep disruption as well as tooth damage and jaw pain.

• restless legs syndrome (RLS) and periodic limb movement disorder (PLMD) are sometimes considered as non-REM parasomnias, but they have been treated as self-contained sleep disorders.

REM parasomnias, which occur during the later REM stages of sleep, include:

• REM sleep behaviour disorder (RBD), a relatively rare but dramatic phenomenon, where the muscle atonia (the protective mechanism that causes immobilization during REM sleep) is partially or completely absent. Sufferers, predominantly older males, may therefore try to physically act out their dreams, often suffering (or causing) physical injuries in the process. To make things worse, the dreams involved are usually even more vivid and intense than usual, often involving classic fight-or-flight scenarios. Curiously, RBD patients rarely complain of fatigue, and it seems that restorative slow-wave sleep tends to increase in compensation. The condition is now thought to be a kind of degenerative brain disease, and RBD sufferers often go on to later develop Parkinson’s disease or similar neurological diseases. Medication is usually able to control this potentially dangerous condition.

• catathrenia or nocturnal groaning, breath-holding during REM sleep, followed by a long drawn-out groaning, wheezing or squeaking sound during exhalation. The groans can last from 2 to 20 seconds each, and usually occur in clusters or episodes of 2 to 60 minutes throughout the night. The groaner does not normally feel tired after sleep, which does not appear to have been unduly disrupted, and tends to have no memory of the groaning.

• sleep paralysis (also known as recurrent isolated sleep paralysis), the inability to perform voluntary actions, either
at sleep onset or upon awakening, as a result of disrupted REM sleep. It is caused by a dissociation of REM activity, where the normal muscle atonia or paralysis of REM sleep “leaks into” wakefulness, resulting in a complete temporary inability to speak, move or respond in any way, despite the feeling of being awake, lasting anywhere from thirty seconds to several minutes. It is usually accompanied by laboured breathing, a vague sense of dread, and often a feeling of being crushed or sat upon. A full-blown attack may include additional symptoms such as a tingling sensation, bright lights in the head, buzzing or ringing the ears, hypnagogic or hypnopompic hallucinations of threatening figures, like a kind of waking nightmare, and sometimes a feeling of floating, similar to an out-of-body experience. Despite its dramatic nature, this is actually a relatively common condition, and some 25%-30% of the population might expect to experience an episode at some point.

SLEEP STATE MISPERCEPTION

Sleep state misperception (SSM), also called variously asparadoxical insomnia, pseudo-insomnia or subjective insomnia, refers to anyone who mistakenly perceives their sleep as wakefulness and thus severely underestimates their sleep time. It can also, less commonly, refer to the opposite misperception of overestimating sleep. While anyone may of course make such an error, sleep state misperception is considered a sleep disorder when such misperceptions become ingrained or chronic.

Sleepers with SSM will generally report not having slept at all, or having slept very little, even though clinical recordings (e.g. using a polysomnograph or actigraph) may demonstrate normal or near normal sleep patterns. It may be diagnosed when a person - otherwise healthy, both psychiatrically and medically - is not really tired, despite their subjective perception of not having slept. Thus, this perception of poor sleep may be entirely illusory, and even their reports of excessive daytime sleepiness may be merely
“nocebo” effects based on their own expectations. SSM is inevitably a type of hypochondria, and there are no real symptoms to treat, so treatment usually involves treatment of the underlying depression or anxiety. Sedatives may be prescribed to help relieve the symptoms, although this may lead to undesirable complications such as drug dependency, and often education about normal sleep patterns may be enough to alleviate the anxiety.

SLEEP DISORDERS IN WOMEN

Women usually tend to report more insomnia than men, although, when measured in studies, they actually seem to sleep better than men, suggesting a higher incidence of sleep state misperception. That said, women are subject to various specific conditions that can have significant sleep consequences.

One report suggests that 67% of women lose sleep during their menstrual cycle each month. The female period, and particularly the time just before it, is associated with a sharp drop in the hormone progesterone, which is a known hypnotogenic substance or soporific. Nighttime pain from menstrual cramps, as well as complaints such as migraine, tension headaches, rheumatism, arthritis, heartburn, etc (all of which affect women to a greater degree than men), can also lead to disrupted sleep. As many as 78% of women report more disturbed sleep during pregnancy than at other times. This may result from the changing hormone levels during pregnancy, but many common pregnancy-related complaints, such as anxiety, emotional extremes, nausea, physical discomfort, leg cramps, acid reflux, snoring, shortness of breath, extra bathroom trips during the night, etc, may also contribute to sleep disturbances. This combination of effects is sometimes referred to as pregnancy-related sleep disorder. Pregnant women are also at substantially increased risk of full-blown sleep disorders such as insomnia, sleep apnea, restless legs syndrome and periodic limb movement disorder.

Once the baby is born, of course, most of these problems will be resolved, but then looking after a new baby brings its own sleep
deprivation issues. The hormone-related period of menopause in middle-aged women can lead to depression-like symptoms as well as sleep problems.

The “hot flashes” that are typical of menopause can occur in the nighttime too, and may seriously disrupt sleep. Menopause has a marked effect on the incidence of sleep disorders in women, and post-menopausal women report about twice the rate of insomnia compared to pre-menstrual women, and about three times the rate of sleep apnea.

However, sleep state misperception also appears to be more pronounced after menopause.

OTHER SLEEP-AFFECTING CONDITIONS

A few other minor sleep disorders and conditions affecting sleep are worth mentioning, including:

• nocturia or nycturia, interrupted sleep due to the frequent need to get up to urinate during the night, particularly common in pregnant women and the elderly.
• bed-wetting or enuresis, uncontrolled urination during sleep, especially prevalent in young children, which may be caused by an insufficient supply of the antidiuretic hormone ADH, a small bladder combined with long sleep periods, or other physical or emotional problems.
• hypnophobia or somniphobia, an anxiety disorder manifesting as an abnormal fear of sleeping or going to bed, a psychological state perpetuated by self-induced stress and anxiety (also known as negative sleep conditioning).
• nocturnal dissociative disorder, a psychiatric disorder of wakefulness, superficially similar to sleep-walking, in which a sufferer wanders off or acts out scenarios while technically awake (although completely unaware of their actions, and with no subsequent memory of them), usually as a psychological response to earlier abuse or trauma.
• encephalitis lethargica, an extremely rare viral infection of
the sleep-wake cycle mechanisms in the hypothalamus, causing extreme lethargy, sleep period inversion, even catatonia or a completely unresponsive coma-like state.

Many other superficially unconnected medical or psychological conditions have nevertheless been closely linked with sleep problems. It is, however, not always clear where the causal relationship lies: in some cases, the conditions lead to sleep problems; in other cases, the opposite is true, and long-term sleep disorders can actually cause the conditions; occasionally, both may occur, in a spiral of positive reinforcement.

Some of the better-known diseases and conditions that fall into this category include the following:

- Alzheimer’s disease (AD), and other kinds of dementia, which in their early stages may be characterized by excessive sleeping (hypersomnia), and in their later stages may be marked by insufficient sleep or insomnia, with nighttime sleep being ultimately replaced by short irregular dozes throughout the day and night more reminiscent of irregular sleep-wake rhythm disorder (ISWRD) or polyphasic sleep (in dementia patients, the number of neurons in the circadian pacemaker becomes substantially reduced, so that circadian rhythms may be severely disrupted).
- Anxiety (and other related mood disorders), which typically leads to difficulty falling asleep and staying asleep throughout the night.
- Asthma, particularly nocturnal asthma, in which asthma symptoms worsen at night, so that coughing, wheezing and breathlessness disrupt sleep.
- Attention deficit hyperactivity disorder (ADHD), whose incidence and symptoms in children show marked overlaps with those of sleep disorders. Sleep disorders in children are often misdiagnosed as ADHD (and vice versa), and some recent research has also suggested that sleep’s role in the brain’s consolidation of emotional memories in particular may be linked to ADHD symptoms.
• Autism Spectrum Disorders affect an estimated 1 in 150-160 children, and half to three-quarters of them typically develop sleep disorders of some kind. Others appear to be able to function more or less normally on significantly reduced hours of sleep. Some have theorized that children with autism produce less melatonin in their brains, or do not produce it at normal times, possibly due to genetic mutations (the gene and enzyme ASMT, which is known to be involved in the production of melatonin, has been specifically flagged in this respect). Another possible link stems from iron deficiency, a common problem in autistic children, which may lead to sleep disorders like restless legs syndrome.

• Depression, which is often accompanied by insomnia or similar symptoms (especially waking up too early in the morning), or sometimes the opposite, hypersomnia-like symptoms. Those suffering from depression tend to experience REM sleep much earlier in their sleep cycles than normal, suggesting some disruption in the drive-regulation function. REM deprivation, by means of antidepressant medication, may fix this sleep stage abnormality, as well as relieving the waking symptoms of depressives. Depression shares many risk factors and biological features with various different sleep disorders, and misdiagnosis is common.

• Diabetes, specifically type II diabetes, which can be precipitated by sleep deprivation-driven changes in the balance of hormones that regulate appetite, leading to overeating, higher glucose levels and insulin resistance, all of which are risk factors for type II diabetes.

• Multiple sclerosis (MS), which tends to bring with it a variety of sleep disorders including insomnia, restless legs syndrome, narcolepsy, REM sleep behaviour disorder, and others.

• Epilepsy, as well as the drugs typically used to treat it, appear to be inherently implicated in sleep disorders. In fact, epilepsy disturbs sleep and sleep deprivation
aggravates epilepsy, in a two-way connection. Epilepsy sufferers may or may not have seizures at night depending on the type of epilepsy (for some people, seizures may occur exclusively during sleep), and they are also more prone to sleep apnea.

• Obesity, which is a major contributing factor to sleep disorders like sleep apnea, but also a common consequence of many sleep disorders, through their effect on metabolism and hormonally-increased appetite.

• Parkinson’s disease (PD), which has been linked with several sleep disorders, including insomnia, REM sleep behaviour disorder, periodic leg movement disorder, restless legs syndrome, sleep apnea, narcolepsy, etc.

• Schizophrenia, for which sleep disorders are one of the most common indications (affecting some 30%-80% of patients). An improvement in sleep quality is frequently correlated with an improvement in negative symptoms in schizophrenics.

• Seasonal affective disorder (SAD), also known as winter depression, which is triggered by the desynchronization of circadian rhythms during the shorter days of fall and winter.

Snoring is not a sleep disorder as such, but it can lead to disrupted sleep patterns in some extreme cases. An estimated 45% or people snore at least occasionally, and 25% snore regularly. The noise of snoring can rise to as much as 80-90 dB - equivalent to a large truck or motorcycle passing - and severe snoring can disturb the snorer’s own sleep (as well as that of their sleeping partner), even if it is not part of another disorder such as sleep apnea.
Side Effects of Sleep Drugs

COMPLEX SLEEP-RELATED BEHAVIORS

Complex behaviors are a potential side effect of sedative-hypnotic products—a class of drugs used to help a person fall asleep and stay asleep.

“Complex behaviors, such as sleep-driving, could be potentially dangerous to both the patients and to others,” says Russell Katz, M.D., Director of the Food and Drug Administration’s Division of Neurology Products.
Allergic Reactions

Other rare but potential side effects of sedative-hypnotic drugs are a severe allergic reaction (anaphylaxis) and severe facial swelling (angioedema), which can occur as early as the first time the product is taken. “Severe allergic reactions can affect a patient’s ability to breathe and can affect other body systems as well, and can even be fatal at times,” says Katz. “Although these allergic reactions are probably very rare, people should be aware that they can occur, because these reactions may be difficult to notice as people are falling asleep.”

Stronger Warnings

To make known the risks of these products, FDA requested in early 2007 that all manufacturers of sedative-hypnotic drug products strengthen their product labeling to include warnings about complex sleep-related behaviors and anaphylaxis and angioedema.

“There are so many prescription sleep aids available that are well-tolerated and effective for many people,” says Steven Galson, M.D., M.P.H., Director of FDA’s Center for Drug Evaluation and Research. However, after reviewing the available information on adverse events that occurred after the sedative-hypnotic drugs were on the market, FDA concluded that labeling changes were necessary to inform health care providers and consumers about risks, says Galson.

Besides the labeling changes, FDA has requested that manufacturers of sedative-hypnotic products

- send letters to health care providers to notify them about the new warnings. (Manufacturers sent these letters beginning in March 2007.)
- develop Patient Medication Guides for the products to inform consumers about risks and advise them of precautions that can be taken. (Patient Medication Guides are handouts given to patients, families, and caregivers when a medicine is dispensed. The guides will contain
FDA-approved information, such as proper use and the recommendation to avoid ingesting alcohol or other central nervous system depressants.)

• conduct clinical studies to investigate the frequency with which sleep-driving and other complex behaviors occur in association with individual drug products.

The revised labeling and other actions to make risks known affect these sedative-hypnotic products:

• Ambien, Ambien CR (zolpidem tartrate)
• Butisol sodium
• Carbrital (pentobarbital and carbromal)
• Dalmane (flurazepam hydrochloride)
• Doral (quazepam)
• Halcion (triazolam)
• Lunesta (eszopiclone)
• Placidyl (ethchlorvynol)
• Prosom (estazolam)
• Restoril (temazepam)
• Rozerem (ramelteon)
• Seconal (secobarbital sodium)
• Sonata (zaleplon).

Advises for Precautions

FDA advises people who are treated with any of these products to take the following precautions:

• Talk to your health care provider before you start these medications and if you have any questions or concerns.
• Read the Medication Guide, when available, before taking the product.
• Do not increase the dose prescribed by your health care provider. Complex sleep-related behaviors are more likely to occur with higher than appropriate doses.
• Do not drink alcohol or take other drugs that depress the nervous system.
• Do not discontinue the use of these medications without first talking to your health care provider.

Over-the-Counter Sleep Aids

Not all sleep medications are prescription. FDA has approved over-the-counter (OTC) medications for use up to two weeks to help relieve occasional sleepiness in people ages 12 and older. “If you continue to have sleeping problems beyond two weeks, you should see a doctor,” says Marina Chang, R.Ph., pharmacist and team leader in FDA’s Division of Nonprescription Regulation Development.

OTC sleep aids are non-habit-forming and do not present the risk of allergic reactions and complex sleep-related behaviors that are known to occur with sedative-hypnotic drugs.

But just because they’re available over-the-counter doesn’t mean they don’t have side effects, says Chang. “They don’t have the same level of precision as the prescription drugs. They don’t completely stop working after 8 hours—many people feel drowsy for longer than 8 hours after taking them.”

Chang advises reading the product label and exercising caution when taking OTC sleep aids until you learn how they will affect you. “They affect people differently,” she says. “They are not for everybody.”

Tips for Better Sleep

• Go to bed and get up at the same time each day.
• Avoid caffeine, nicotine, beer, wine, and liquor in the four to six hours before bedtime.
• Don’t exercise within two hours of bedtime.
• Don’t eat large meals within two hours of bedtime.
• Don’t nap later than 3 p.m.
• Sleep in a dark, quiet room that isn’t too hot or cold for you.
• If you can’t fall asleep within 20 minutes, get up and do something quiet until you feel sleepy.
Wind down in the 30 minutes before bedtime by doing something relaxing, such as reading or listening to music.

**Sleep Facts**
- Your brain stays active throughout sleep.
- Not getting enough sleep increases the risk of having high blood pressure, heart disease, and other medical conditions.
- Insomnia—trouble sleeping at night—is more common in females, people with depression, and people older than 60.

**How Much Sleep is Enough?**
- Most adults need 7–8 hours of sleep each night.
- Newborns sleep between 16 and 18 hours a day.
- Preschool children sleep between 10 and 12 hours a day.
- School-aged children and teens need at least 9 hours of sleep a night.

THE VERY REAL DANGERS OF TAKING SLEEPING PILLS
Side Effects of Sleep Drugs

At some point in your life, you or someone you know has probably taken a sleeping pill. Perhaps it was an OTC sleep aid or maybe you even have a prescription for something more potent. But according to new research, released by the Substance Abuse and Mental Health Services Administration, those prescription meds may be more dangerous than you think.

The report showed that the number of emergency room visits involving overmedication of zolpidem—the active ingredient in some prescription sleeping pills—almost doubled between 2005 and 2010, increasing from 21,824 visits in a two-year period to 42,274. And unfortunately, females accounted for two thirds of those visits.

So what’s so dangerous about sleeping pills, exactly? Aren’t they just designed to help you sleep, which is a good thing? “People think they’re pretty much benign, but there are definitely problems there,” explains Carl Bazil, M.D., director of sleep and epilepsy at Columbia University, who points out that prescription pills are generally stronger than the over-the-counter variety. “Yes, they’re a quick fix to help you get a good night’s sleep temporarily, but they’re not a long-term solution to sleep problems in general—and they can be dangerous if used incorrectly,” he says.

One of the biggest dangers is that they hit women much harder than they hit men. “Women tend to metabolize sleeping pills slower than men do, but many people—including some doctors—don’t know this,” Bazil explains. In January 2013, the FDA lowered the recommended dose for women from 10 mg to 5 mg. But some doctors still prescribe women more than that, while other women may have an older prescription or just borrow one from their husband (Note: Never ever share prescriptions). “And when they take too high a dose, the effect is extra strong,” explains Bazil. Another big problem with taking sleeping pills is the after-effect that they have the next day. While they’re supposed to wear off after eight hours, that drowsiness can last for much longer if you take too high a dose.
As a result, many people are still sluggish in the morning when they get in the car to drive to work—and that’s a serious safety threat. “Impaired driving is one of the biggest problems with sleeping pills, because people don’t realize they’re still hazy,” says Bazil. In other words, it’s almost like driving drunk in that you don’t have good judgment or quick reaction times—so the risk of accidents increases drastically.

Sleeping pills can also cause harm when you mix them with other drugs, namely alcohol and stimulants. “It’s not a good idea to mix sleeping pills with other drugs, ever,” says Bazil. “What happens is it accentuates the effect of both of them—so you are more drugged off of both the pills and the booze or the stimulants. That means that the pill lasts longer, so chances are, you will feel more confused and groggy when you wake up.” An even more extreme scenario is suppressed breathing. “If you take a high dose, or two at once, it could suppress your breathing,” says Bazil, which would definitely constitute a trip to the ER. Next up on the list of potential harms is that sleeping pills can cause you to do weird-slash-questionable things around the house if you take them when you’re not already in bed.

Sleeping pills hit you right away. But again, many people don’t realize just how quickly the effects take hold, so they pop one, and go about their business for about half an hour—which can lead to harmful decisions. “If you take them while you’re still awake, you may end up doing really weird—and potentially dangerous—things that you don’t even remember,” says Bazil. Think falling, burning yourself, or even having risky sex. The last big problem with sleeping pills is addiction, though luckily, it’s not super common. Although the long-term dangers of prescription sleeping pills haven’t been studied, Bazil says the big danger is when you stop using them after having become dependent on them. “If your body becomes accustomed to sleeping pills, you’ll end up being worse off when you stop them because your body adapted—and that means you’ll have more, not less, difficulty getting good rest,” Bazil cautions.
Finally, it’s important to remember that at a basic level, sleeping pills don’t fix the problem of long-term bad sleeping habits. Think of them like sleep training wheels: At some point, you need to take them off. To do that, Bazil recommends using them for exactly one month (under a doctor’s supervision) to retrain your brain—and then quitting them entirely. “That gives you enough time to develop better sleeping patterns, and then you’ll want to think about going off them,” he says. How often you use them within that month is up to you. “Some people take them every night, whereas others take them sporadically a couple times a week when they feel they really need them.”

USING PILLS TO FALL ASLEEP AT NIGHT

In 2012 doctors wrote nearly 60 million prescriptions (including refills) for Ambien, Lunesta and other prescription sleep aids, according to IMS Health, a health care technology and information company. That makes sleeping pills some of the most popular medications around.

The pills can help encourage sleep — at least in the short run — but older users should know that the medications come with some risks, says Michael J. Sateia, M.D., chief of sleep medicine at Dartmouth-Hitchcock Medical Center in Lebanon, N.H.
According to Sateia, people in their 50s, 60s and beyond tend to be more sensitive to the drugs and may be more likely to experience side effects such as drowsiness and confusion. “Older people should approach these medications with an extra dose of caution,” he says.

**Overused, overprescribed**

In extreme cases, sleeping pills can send people to the hospital. In fact, more than 19,000 people ended up in the emergency room in 2010 after taking Ambien or other drugs with the active ingredient zolpidem, according to a recent report by the Substance Abuse and Mental Health Services Administration (SAMHSA). That’s about a 200 percent increase in ER visits since 2005, a dramatic rise that mirrors America’s growing reliance on sleeping pills. About three-quarters of the ER patients were 45 or over, and one-third were 65 or over, underscoring the dangers to older patients.

“Even if they’re taking the drug exactly as prescribed, the dose can be more than they can handle,” says Peter Delany, director of SAMHSA’s Office of Applied Studies. What’s more, sleeping pills are often prescribed, especially to people over 50 because so many of them have trouble going to sleep or staying asleep, Sateia says. “Doctors will first try to reassure them,” he says. “If reassurance doesn’t work, doctors often resort to medication rather than alternative, non-pharmacological treatments.”

**A long and checkered past**

Sleeping pills have a troublesome record. Older drugs known as benzodiazepines (such as Dalmene or Halcion) are infamous for causing drowsiness, sedation and addiction.

As reported in a 2005 issue of the *BMJ*, people taking benzodiazepines for sleep problems are about twice as likely to be harmed by the drugs than helped.

Doctors and sleepless patients alike hoped that newer-generation drugs such as Ambien and Lunesta could promote
sleep without so many side effects, but that hope has largely faded, says Nicole Brandt, associate professor of pharmacy at the University of Maryland. Not only can Ambien and Lunesta leave people groggy and disoriented, but a few people taking the drugs end up walking, eating or even driving when they aren’t fully awake. “There’s a perception that these drugs are safer, but the potential for harm is still there,” she says. Sleeping pills and advancing age aren’t a good mix for many reasons, Brandt says. Older bodies tend to break down the drugs relatively slowly, she says, which means the medication lingers longer than it should. That makes it more likely that a user will wake up feeling confused, groggy or unsteady on the feet — exactly the kinds of problems that many older people already face even without sleeping pills.

**Beware drug-drug interactions**

Complicating the problem is that people in their later years often take other medications that can potentially clash with sleeping pills, Delany says. In the SAMHSA study, over half of the ER visits were chalked up to combinations of zolpidem with other drugs such as narcotic pain relievers. He says patients can avoid such dangerous combinations by using a single pharmacy and talking to their doctor about all of the medications they take, including over-the-counter products.

Ambien and similar drugs work by increasing the brain’s supply of GABA, a brain chemical that causes drowsiness.

Most people can handle tiny amounts of the drugs, but the risk jumps up dramatically with larger doses. In January of this year, the Food and Drug Administration halved the recommended starting dose of Ambien for women to 5 milligrams instead of the previous 10 mg. The recommended starting dose for men is now either 5 mg or 10 mg. And in May the FDA warned that people taking zolpidem extended-release (Ambien CR) should not drive or engage in other activities that require complete mental alertness the day after taking the drug.
Sateia suggests that older people of either gender generally start at 5 mg — or even less — and only after a long conversation about the risks involved. He adds that if they notice any worrisome side effects — such as sleepwalking or extreme groginess — they should stop taking the pills immediately and discuss it with their provider.

Better ways to fall asleep

Ideally, older people would avoid sleeping pills completely, says Adam Spira, a sleep specialist and assistant professor of mental health at the Johns Hopkins Bloomberg School of Public Health in Baltimore. “It’s easy to take a pill and go to sleep, but it’s a totally shortsighted approach with the potential for negative consequences,” he says.

Spira notes that the more we learn from research, the more important good sleep appears to be for healthy aging. He speculates that people who get enough sleep may enjoy protection from the diseases that can come with passing years. But he says that instead of taking medications, people struggling with insomnia should find other, better ways to fall asleep.

Fortunately, there are many other options. For starters, Sateia says, patients and their doctors should try looking at the root of insomnia. Many common, treatable health problems can interfere with sleep. The list includes depression, anxiety, poorly managed pain, restless leg syndrome and sleep apnea.

“It’s easy to take a pill and go to sleep, but it’s a totally shortsighted approach with the potential for negative consequences.”

Once a person is truly ready for good sleep, Sateia says it’s time to learn the basics of “sleep hygiene.” That means avoiding caffeine in the evening, going easy on alcohol, not napping during the day and keeping the bedroom dark, quiet and cool. But these are just the first steps.

According to Sateia, far too many doctors and sleepless patients give up if sleep hygiene alone doesn’t solve their insomnia. “Tips
for sleep hygiene are plastered all over magazines and newspapers,” he says. “After people try that, they think they’ve tried everything.”

When all else fails

To really solve their insomnia, many people need to fundamentally shift their attitude about sleep, Sateia says. As he explains, insomnia is often a self-fulfilling prophecy. “Before their head even hits the pillow, they’ve convinced themselves that they’re not going to be able to sleep,” he says.

Sateia says those expectations can be turned around with the help of cognitive behavioral therapy (CBT), a type of counseling that combines meditation and relaxation techniques with other proven sleep strategies. One of the main goals of cognitive behavioral therapy for insomnia — also called CBT-i — is to reduce the amount of time that people spend awake in bed. That means not using the bed for reading and work, and getting out of bed if it feels like sleep isn’t coming. If they can spend less time struggling for sleep, even hard-core insomniacs can feel more confident when they get under the covers. And confidence, Sateia says, can be the best sedative of all. “We believe that everyone should go through a course in cognitive behavioral therapy before trying a sleeping pill,” Sateia says. He adds that qualified practitioners may be difficult to find, especially in small towns. However, he says, new Web-based programs could help more people enjoy the benefits of the therapy. “There are no side effects to CBT-i, and the benefits can last for years,” he says.

ARE SLEEPING PILLS HARMFUL?

What are they?

There are various types of sleeping pills. Some are only available with a prescription, such as benzodiazepines. These are a group of drugs that slow down the brain and central nervous system and are used to reduce anxiety, relax the body and help with sleep. There are about 30 different types and each can be sold
under several brand names. The most well-known brand name, Valium, is the generic drug diazepam. Different types of benzodiazepines work for different lengths of time.

The z-drugs - zolpidem, zopiclone and zaleplon - are also only available on prescription and have a similar affect to benzodiazepines. Most over-the-counter pills contain antihistamines as the active ingredient. They are also used to treat allergies and hay fever and are not as powerful as benzodiazepines or z-drugs.

There are also a various type of “natural” sleeping tablets. Most contain the herb valerian or the hormone melatonin. Melatonin is made in the brain by the pineal gland and affects our internal body clock and sleep cycle. The Australian Consumers’ Association says valerian is the most popular natural sleeping aid as it has undergone the highest number of trials. Other pills contain herbs such as passionflower, hops and chamomile and minerals such as calcium, magnesium and vitamins B6 and K.

The pros
- Prescription tablets are very powerful. They may be prescribed for a short time to get you over a bad bout of insomnia.
- A Harvard Medical School study found that melatonin tablets may help people whose sleep patterns are disrupted by shift work or travel across time zones.
- Herbal sleeping pills have fewer side effects than the other pills.

The cons
- Prescription pills have several side effects that can last from a few hours to a few days, depending on the dose and type of drug. Side effects include drowsiness, confusion, dizziness, blurred vision, clumsiness, mood swings and poor memory.
- Your body develops a tolerance for prescription pills after between three and 14 days of continued use and you will need to increase the dose. Some people also become
Side Effects of Sleep Drugs

dependant on them and have withdrawal symptoms, such as anxiety and shaking, when they stop taking them.

- Antihistamines are not as strong as prescription drugs, but can still cause drowsiness the next day. “Side effects include difficulty urinating, urinary retention, dry mouth and blurred vision. People quickly develop a tolerance to them,” says Dr Lynn Weekes, National Prescribing Service CEO.

- The benefits of melatonin pills are still unproven, says the University of California Berkeley. Although they help people fall asleep faster, they may not help them stay asleep and may cause drowsiness the next day.

- A Choice magazine study found that most herbal sleeping pills had no effect on insomnia. There have also been rare reports of liver damage from valerian use and it can cause headaches and stomach upsets.

When not to take them

- You should not take prescription sleeping pills if you are on antidepressants, pregnant or a new mother. You should not drink alcohol or drive while taking them.

- Antihistamines may interact with other medications, including antidepressants, and shouldn’t be taken by people with asthma, epilepsy or glaucoma.

- Tell your doctor if you are taking herbal sleeping tablets as they may affect other conditions or interact with medications.

THE DANGERS OF SLEEPING PILLS

Sleeping pills, both prescription and over the counter (OTC), are a popular remedy for those suffering from disordered sleep. But how does a prescription sleeping pill differ from an over-the-counter sleep medication, and how long can or should you safely take either of them?

The chief ingredient in various OTC sleeping pills is an antihistamine which results in the drowsy and sedative effect. Many of the OTC sleep aids are good for specific situations; as
an example, an analgesic sleep aid is good when someone has pain keeping them from sleeping. These medications are usually a combination of a pain or inflammation reliever and an antihistamine.

Always read the label carefully, and follow the recommended dosage and use instructions. What one would not recommend is that someone take an OTC sleep aid every night. These are not meant for every night use, which the manufacturers say on the box. You need to be responsible for what you take and if you need an OTC every night to aid your sleep, it’s time to speak to a sleep specialist. Some of the more popular prescription sleeping pills contain zolpidem. While they are very effective, be cautious of potential side effects. These side effects include hallucinations, problems with memory, excessive daytime tiredness, sleepwalking and engaging in other behaviors such as eating and even driving while not fully awake and alert.

One way to avoid these side effects is to avoid interactions with other medications and alcoholic beverages, and to always take the prescribed dosage – never take more medication than your doctor tells you to take. Patients who are prescribed a sleep medication need to give themselves enough time in bed for sleep
after taking their dose in the evening. In a clinical setting, it is a standard recommendation that people taking this type of sleep medication have a full 8 hours to spend in bed. If you don’t give yourself enough time to sleep, you are more likely to experience side effects.

When taking a sleeping pill for the first time, it is suggested to trying it on a Friday night, or a night when you do not have to be up a particular time the next morning. If you find yourself groggy and need to sleep in the following morning you can. You have an added window of time to help you get adjusted to the new medication over the weekend. When there is any change in your pill you also want someone there with you, in case of an adverse reaction.

COMMON SLEEP DRUG IS LITTLE-KNOWN ANTIDEPRESSANT

What are the top prescribed drugs for insomnia—Ambien? Lunesta? Yes, but there’s another: a three-decade-old generic antidepressant called trazodone, which causes drowsiness as a potentially useful side effect. A recent U.S. study in the journal Sleep found it to be one of most commonly used medications to
treat sleeplessness. Trazodone was first approved by the Food and Drug Administration in 1981 as an antidepressant. Though doctors can legally prescribe trazodone (and all drugs, for that matter), for any treatment, the drug is actually not approved to treat insomnia. Today, there’s no branded form of trazodone—you can only get it as a generic—but there is a long-acting version available called Oleptro.

In a few studies, trazodone is reported to improve sleep during the first two weeks of treatment. But the drug has not been studied for longer than six weeks, so little is known about how well it works or its safety past that point. Also, an effective dose range has not been studied.

There’s very little clinical trial evidence on whether it’s effective as a sleep aid when a person does not have depression, and only modest evidence when there is. Treatment guidelines from the American Academy of Sleep Medicine recommend trazodone for chronic insomnia without depression only when drugs like Ambien and Lunesta have failed. But numerous doctors are convinced, based mainly on their own experience, that trazodone is an appropriate sleep medication for many people, even when there’s no depression. Here’s why trazodone has become so popular—and what to do if your doctor suggests you try it.

**Trazodone: Risks and Advantages**

While trazodone is rarely used to treat depression alone any more, it’s widely prescribed, off-label, at lower doses for treating insomnia, for several likely reasons.

First, trazodone has one distinct advantage—and possibly a few others. It’s generic, so it’s considerably cheaper than many of the other widely prescribed sleep medications—about $3 for a week’s supply. That’s compared to other sleep drugs like generic zolpidem (Ambien), generic eszopiclone (Lunesta) or generic Sonata (zalepon) that run about $15 for a week’s supply. And while some of the insomnia drugs are classified by the FDA as controlled substances that require doctors and pharmacists to take
additional steps before they’re prescribed or dispensed; trazodone is not a controlled substance, so doctors can prescribe it without those constraints.

Besides, many physicians apparently believe that trazodone is safer than other frequently prescribed sleep medications. But because there are not studies that actually show it is safer, whether or not that is true remains unknown.

It’s right that the other drugs approved to treat insomnia can impair your ability to recall new experiences, and may even—although rarely—cause you to walk, eat, have sex, or drive a car while still essentially unconscious. We could find no evidence to date of those problems having been reported with trazodone. Moreover, many doctors seem to believe that trazodone is less likely than even the newer sleep drugs to cause dependency and, when discontinued, renewed insomnia.

Yet there’s little evidence to prove or disprove those ideas. And, trazodone has certain risks of its own. In particular, it’s more likely than the newer sleep drugs, particularly the short-acting ones, to leave you feeling drowsy the next day, which increases the chance of accidents. It can also cause abnormally low blood pressure and, in turn, dizziness or even fainting, particularly in seniors.

Trazodone can also cause heart-rhythm disorders. It might possibly weaken the immune system. And some evidence suggests it can cause priapism, or persistent erection, a medical emergency that may require surgery and can lead to impotence if not treated promptly.

Moreover, a black-box warning in the package insert notes that trazodone, like other antidepressants, can increase the risk of suicidal thoughts and behavior in children and adolescents.

**Trazodone: Should It be taken?**

For the average person who has occasional brief bouts of insomnia, making certain changes to your lifestyle may help,
including: avoiding big meals, alcohol, smoking and exercising late at night or working or watching TV in bed. If those don’t work, our medical advisors recommend first trying an inexpensive over-the-counter drug containing an antihistamine such as diphenhydramine (Benadryl, Nytol, Sominex, and generic) or doxylamine (Unisom Nighttime Sleep-Aid and generic)—but only use those for a few nights.

If your insomnia lasts longer than a few nights and this continues for several weeks, you should see your doctor to determine if other conditions or drug side effects could be disturbing your sleep. If those are ruled out—or if your insomnia persists despite treatment of the underlying problem—nondrug sleep treatments such as cognitive behavioral therapy appear to yield better, more lasting results than medication. If possible, try that before resorting to medication, which can undermine your motivation to make the behavioral changes.

If your doctor recommends sleeping pills for more than a temporary bout of insomnia without mentioning nondrug therapy, you should mention it yourself. For more on such treatment, see our Best Buy Drug report on drugs to treat insomnia.

Of course, medication is sometimes required for persistent insomnia—when nondrug treatment is refused, unavailable, or ineffective, or when the sleep disturbance is affecting your ability to carry out your daily activities.

Here are the main considerations for using drug trazodone to treat insomnia:

- Insomnia without depression. Because there’s so little supporting evidence, sleep experts generally recommend trazodone for insomnia only after the newer sleep drugs have failed. Trazodone may improve sleep initially, as found in one small study, but that effect could fade after several weeks. Researchers theorize that this could be due to residual sleepiness in the daytime, so a person is less physically active, which may contribute to the ability to sleep well at night.
• Insomnia with depression. Some conditions, such as depression, have a complex and intertwined relationship with insomnia, and the best treatment for these two issues together has not been determined. If you have both, discuss the options with your doctor, based on the severity of the depression, the nature of your sleep problem, your medical history and susceptibility to side effects, any possible drug interactions, and, of course, your personal preferences.

Generally, the most important consideration is managing the depression, which should be treated separately with a more effective antidepressant medication, counseling, or both. A separate drug can then be prescribed for the insomnia—either a newer sleep medication or low-dose trazodone. Studies have suggested that trazodone plus another antidepressant can improve sleep in these cases. Alternatively, trazodone might be taken alone, at a higher, antidepressant dose, to treat both problems.

Although trazodone may improve sleep at first, the effect may not continue past several weeks. Taking trazodone may also worsen sleepiness during the daytime, and morning grogginess. Plus, the side effect of sedation may not actually improve depression or insomnia.

Precautions to take
• Because trazodone may not work well to treat insomnia after a few weeks, check in with your doctor periodically to discuss how or if it’s still working.
• If you have trouble getting to sleep, take it several hours before you go to bed; if you have trouble staying asleep, take it within 30 minutes before bedtime.
• Avoid trazodone if you’re recovering from a heart attack. Inform your doctor if you have abnormal heart rhythms, weakened immunity, active infection, or liver or kidney disease. Use it cautiously if you have heart disease.
• Watch for adverse effects. That’s especially important for people over age 55 or so since they’re more susceptible to falls caused by dizziness or drowsiness and to abnormal
heart rhythms. Close monitoring is also crucial if you’re taking trazodone with another antidepressant.

- As with any sleep medication, never mix trazodone with alcohol, and use it cautiously if you’re taking other sedating medications or antihypertensive drugs. Ask your doctor or pharmacist about other possible drug interactions.

- If you develop an erection that is unusually prolonged or occurs without stimulation, discontinue the drug and contact your physician. Also call your doctor if you develop fever, sore throat, or other signs of infection while taking trazodone.
INSOMNIA: AN INTRODUCTION

Insomnia is a sleep disorder that is characterized by difficulty falling and/or staying asleep. People with insomnia have one or more of the following symptoms:

- Difficulty falling asleep
- Waking up often during the night and having trouble going back to sleep
- Waking up too early in the morning
- Feeling tired upon waking.

Insomnia: Its various Types

There are two types of insomnia: primary insomnia and secondary insomnia.

- Primary insomnia: Primary insomnia means that a person is having sleep problems that are not directly associated with any other health condition or problem.
- Secondary insomnia: Secondary insomnia means that a person is having sleep problems because of something else, such as a health condition (like asthma, depression, arthritis, cancer, or heartburn); pain; medication they are taking; or a substance they are using (like alcohol).
Acute vs. Chronic Insomnia

Insomnia also varies in how long it lasts and how often it occurs. It can be short-term (acute insomnia) or can last a long time (chronic insomnia).

It can also come and go, with periods of time when a person has no sleep problems. Acute insomnia can last from one night to a few weeks. Insomnia is called chronic when a person has insomnia at least three nights a week for a month or longer.

Causes of Insomnia

Causes of acute insomnia can include:
- Significant life stress (job loss or change, death of a loved one, divorce, moving)
- Illness
- Emotional or physical discomfort
- Environmental factors like noise, light, or extreme temperatures (hot or cold) that interfere with sleep
- Some medications (for example those used to treat colds, allergies, depression, high blood pressure, and asthma) may interfere with sleep
- Interferences in normal sleep schedule (jet lag or switching from a day to night shift, for example)

Causes of chronic insomnia include:
- Depression and/or anxiety
- Chronic stress
- Pain or discomfort at night.

Symptoms of Insomnia

Symptoms of insomnia can include:
- Sleepiness during the day
- General tiredness
- Irritability
- Problems with concentration or memory.
Diagnosing Insomnia

If you think you have insomnia, talk to your health care provider. An evaluation may include a physical exam, a medical history, and a sleep history. You may be asked to keep a sleep diary for a week or two, keeping track of your sleep patterns and how you feel during the day. Your health care provider may want to interview your bed partner about the quantity and quality of your sleep. In some cases, you may be referred to a sleep center for special tests.

FACTS ABOUT INSOMNIA

Insomnia is the most common sleep complaint. It occurs when you have trouble falling asleep or staying asleep even though you had the opportunity to get a full night of sleep. The causes, symptoms and severity of insomnia vary from person to person. Insomnia may include:

- Difficulty falling asleep
- Difficulty staying asleep throughout the night
- Waking up too early in the morning.

Insomnia involves both a sleep disturbance and daytime symptoms. The effects of insomnia can impact nearly every aspect of your life. Studies show that insomnia negatively affects work performance, impairs decision-making and can damage relationships. In most cases, people with insomnia report a worse overall quality of life.

As many as 30 to 35 percent of adults complain of insomnia. Everyone has the occasional night of poor sleep. In many cases this is due to staying up too late or waking up too early. This does not mean you have insomnia, it means you didn’t get enough sleep.

As many as 30 to 35 percent of adults complain of insomnia. It is more common in groups such as older adults, women, people under stress and people with certain medical and mental health problems such as depression.
There are two types of insomnia based on the regularity and duration of the sleep disturbance and daytime symptoms:

- **Short-term insomnia**: This type of brief insomnia lasts for up to three months. It occurs in 15 to 20 percent of people.
- **Chronic insomnia**: This type of insomnia occurs at least three times per week and lasts for at least three months. About 10 percent of people have chronic insomnia.

A board certified sleep medicine physician diagnoses chronic insomnia. The sleep team at an accredited sleep center can provide ongoing care.

**Symptoms & Causes**

Symptoms and causes of insomnia are different for every patient. Insomnia symptoms may include:

- Fatigue
- Problems with attention, concentration or memory (cognitive impairment)
- Poor performance at school or work
- Moodiness or irritability
- Daytime sleepiness
- Impulsiveness or aggression
- Lack of energy or motivation
- Concern or frustration about your sleep.

Insomnia is most often associated with another problem. Insomnia that is not caused or worsened by other factors is rare. These factors may include:

**Stress**

This varies from relatively minor things like work or personal stress, to more severe changes such as death, divorce or job loss.

**Other sleep disorders**

Some sleep disorders can cause insomnia or make it worse. For instance, people with restless legs syndrome may have a hard time falling asleep.
Medical conditions

Different types of physical illnesses can cause insomnia. People who experience pain, discomfort or limited mobility from medical problems may have difficulty falling asleep or staying asleep. Insomnia due to medical conditions is most common in older adults because people tend to have more chronic health problems as they age. Conditions such as pregnancy, particularly the third trimester, and menopause can cause sleep problems. The severity and duration of insomnia often varies with the related health condition.

Mental disorders

The relationship between sleep and mental health is complex. Insomnia is sometimes caused by a mental health disorder. Often a mental health disorder will be found after a complaint of insomnia. Depression is one of the most common mental illnesses in the United States and a frequent cause of insomnia. People with depression often have trouble falling asleep or staying asleep. Difficulty falling asleep is also common in people with anxiety disorders. Other mood disorders such as bipolar disorder may also cause sleep problems.

Medication or substance use or abuse

Insomnia can be an unwanted side effect of many prescription or over-the-counter medications. Common cold and allergy medicines contain pseudoephedrine and can make it difficult to fall asleep. Antidepressants and medications to treat ADHD, high blood pressure or Parkinson’s disease can also cause insomnia.

Drinking alcohol before bedtime can cause frequent awakenings during the night. Insomnia also can occur if you suddenly stop using a sleeping pill.

Caffeine and other stimulants can prevent you from falling asleep. Stimulants also cause frequent awakenings during the night.
Some people are sensitive to certain foods and may be allergic to them. This can result in insomnia and disrupted sleep.

**Environmental factors**

The environment where you sleep can cause insomnia. Disruptive factors such as noise, light or extreme temperatures can interfere with sleep. Sleeping with a bed partner who snores also can cause sleep disruption. Extended exposure to environmental toxins and chemicals may prevent you from being able to fall asleep or stay asleep.

**Diagnosis & Self-Tests**

If you think you may have insomnia, ask yourself the following questions:

- Does it take you more than 30 minutes to fall asleep, or do you wake up during the night and have trouble returning to sleep, or do you wake up earlier than desired?
- Do you have daytime symptoms such as fatigue, moodiness, sleepiness or reduced energy?
- Do you give yourself enough time in bed to get at least 7 hours of sleep each night?
- Do you go to bed in a safe, dark and quiet environment that should allow you to sleep well?

If you answered “yes” to all of these questions, then you may have insomnia.

If you’ve had insomnia for at least three months (chronic insomnia), consider booking an appointment with a board certified sleep physician at an AASM accredited sleep center. If you have had insomnia for fewer than three months, you may have short-term insomnia. Try to follow good sleep hygiene, and if the problem does not go away in three months, talk to a sleep physician.

A board-certified sleep physician can diagnose insomnia and work with the sleep team to treat it. Before your appointment, the doctor will ask you to keep a sleep diary for two weeks. By recording when you go to sleep and when you wake up, along
with how long you were awake during the night, a sleep diary will help your sleep medicine physician see your habits. This may give your physicians clues about what is causing your insomnia and what course of treatment to take.

The board-certified sleep physician will need to know your medical history and whether you are taking any medications, including over-the-counter drugs. He will also want to know whether anything else has happened in your life, such as any event that is causing stress or trauma. The physician may give you a written test to analyze your mental and emotional well being. You may also receive a blood test if the physician suspects a related medical problem is causing insomnia.

Treatment

The treatment for insomnia depends on its underlying cause. For chronic insomnia a board certified sleep medicine physician may recommend any combination of the following treatments:

Sleep Hygiene

In many chronic insomnia cases, by practicing good hygiene and changing your sleep habits you can improve your sleep. Sleep hygiene is a set of bedtime habits and rituals you can do every night to improve how you sleep.

Cognitive Behavioral Therapy for Insomnia

Cognitive behavioral therapy for insomnia, or CBT-I, addresses the thoughts and behaviors that keep you from sleeping well. It also helps you learn new strategies to sleep better. CBT-I can include techniques for stress reduction, relaxation and sleep schedule management. The Society of Behavioral Sleep Medicine has a directory of behavioral sleep specialists who provide CBT-I.

Medications

Your board certified sleep medicine physician may prescribe medication to treat your insomnia. Sleeping pills that are specifically
approved to treat insomnia are called hypnotics. You may build a tolerance to these medications over time. Some medications that treat other problems also may help you sleep. Your doctor can decide which medication is best for you. You should only take a medication when supervised by a doctor. In cases where the insomnia is caused by a medical condition, the doctor may refer you to a specialist who can treat the underlying condition.

The course of insomnia is likely to change as your medical condition improves. Your board-certified sleep medicine physician may also want to change any medications that you currently take if he suspects the drugs are related to your insomnia. Although insomnia is common, most people can find a treatment that works for them with the help of a board-certified sleep medicine physician at an accredited sleep center.

SLEEP AND HEALTH: THE RELATIONSHIP BETWEEN THE TWO

Not getting enough sleep can have profound consequences on a daily and potentially long-term basis for your health and mental well-being. We all have some sense of the relationship between sleep and our ability to function throughout the day. After all, everyone has experienced the fatigue, bad mood, or lack of focus that so often follow a night of poor sleep. What many people do not realize is that a lack of sleep—especially on a regular basis—is related to long-term health consequences, including chronic medical conditions like diabetes, high blood pressure, and heart disease, and that these conditions may lead to a shortened life expectancy. Additional research studies show that habitually sleeping more than nine hours is also associated with poor health.

Researching the Link Between Sleep Duration and Chronic Disease

There are three main types of study that help us understand the links between sleep habits and the risk of developing certain diseases. The first type (called sleep deprivation studies) involves
depriving healthy research volunteers of sleep and examining any short-term physiological changes that could trigger disease.

Such studies have revealed a variety of potentially harmful effects of sleep deprivation usually associated with increased stress, such as increased blood pressure, impaired control of blood glucose, and increased inflammation. The second type of research (called cross-sectional epidemiological studies) involves examining questionnaires that provide information about habitual sleep duration and the existence of a particular disease or group of diseases in large populations at one point in time. For example, both reduced and increased sleep duration, as reported on questionnaires, are linked with hypertension, diabetes, and obesity. However, cross-sectional studies cannot explain how too little or too much sleep leads to disease because people may have a disease that affects sleep, rather than a sleep habit that causes a disease to occur or worsen. The third and most convincing type of evidence that long-term sleep habits are associated with the development of numerous diseases comes from tracking the sleep habits and disease patterns over long periods of time in individuals who are initially healthy (i.e., longitudinal epidemiological studies).

We do not yet know whether adjusting one’s sleep can reduce the risk of eventually developing a disease or lessen the severity of an ongoing disease. However, the results from longitudinal epidemiological studies are now beginning to suggest that this is likely. Below are some of the studies that look at the relationship between sleep habits and risk for developing certain medical conditions.

Obesity

Many studies have linked insufficient sleep and weight gain. For example, studies have shown that people who habitually sleep less than six hours per night are much more likely to have a higher than average body mass index (BMI) and that people who sleep eight hours have the lowest BMI. Sleep is now being seen as a potential risk factor for obesity along with the two most commonly
identified risk factors: lack of exercise and overeating. Research into the mechanisms involved in regulating metabolism and appetite are beginning to explain what the connection between sleep and obesity might be.

Insufficient sleep has been linked to a high probability for weight gain.

During sleep, our bodies secrete hormones that help to control appetite, energy metabolism, and glucose processing. Obtaining too little sleep upsets the balance of these and other hormones. For example, poor sleep leads to an increase in the production of cortisol, often referred to as the “stress hormone.” Poor sleep is also associated with increases in the secretion of insulin following a meal. Insulin is a hormone that regulates glucose processing and promotes fat storage; higher levels of insulin are associated with weight gain, a risk factor for diabetes. Insufficient sleep is also associated with lower levels of leptin, a hormone that alerts the brain that it has enough food, as well as higher levels of ghrelin, a biochemical that stimulates appetite. As a result, poor sleep may result in food cravings even after we have eaten an adequate number of calories. We may also be more likely to eat foods such as sweets that satisfy the craving for a quick energy boost. In addition, insufficient sleep may leave us too tired to burn off these extra calories with exercise.

Diabetes

Researchers have found that insufficient sleep may lead to type 2 diabetes by influencing the way the body processes glucose, the high-energy carbohydrate that cells use for fuel. One short-
term sleep restriction study found that a group of healthy subjects who had their sleep cut back from 8 to 4 hours per night processed glucose more slowly than they did when they were permitted to sleep 12 hours. Numerous epidemiological studies also have revealed that adults who usually slept less than five hours per night have a greatly increased risk of having or developing diabetes.

In addition, researchers have correlated obstructive sleep apnea—a disorder in which breathing difficulties during sleep lead to frequent arousals—with the development of impaired glucose control similar to that which occurs in diabetes.

**Heart Disease and Hypertension**

![Image](image.jpg)

*Even minor periods of inadequate sleep can cause an elevation in blood pressure.*

Studies have found that a single night of inadequate sleep in people who have existing hypertension can cause elevated blood pressure throughout the following day. This effect may begin to explain the correlation between poor sleep and cardiovascular disease and stroke. For example, one study found that sleeping too little (less than six hours) or too much (more than nine hours) increased the risk of coronary heart disease in women.

There is also growing evidence of a connection between obstructive sleep apnea and heart disease. People who have apnea typically experience multiple awakenings each night as a result of the closing of their airway when they fall asleep. In addition to these sleep disturbances, apnea sufferers also experience brief surges in blood pressure each time they wake up. Over time, this can lead to the chronic elevation of blood pressure known as
hypertension, which is a major risk factor for cardiovascular disease. Fortunately, when sleep apnea is treated, blood pressure may go down.

**Mood Disorders**

Given that a single sleepless night can cause people to be irritable and moody the following day, it is conceivable that chronic insufficient sleep may lead to long-term mood disorders. Chronic sleep issues have been correlated with depression, anxiety, and mental distress.

In one study, subjects who slept four and a half hours per night reported feeling more stressed, sad, angry, and mentally exhausted. In another study, subjects who slept four hours per night showed declining levels of optimism and sociability as a function of days of inadequate sleep. All of these self-reported symptoms improved dramatically when subjects returned to a normal sleep schedule.

**Immune Function**

It is natural for people to go to bed when they are sick. Substances produced by the immune system to help fight infection also cause fatigue. One theory proposes that the immune system evolved “sleepiness inducing factors” because inactivity and sleep provided an advantage: those who slept more when faced with an infection were better able to fight that infection than those who slept less. In fact, research in animals suggests that those animals who obtain more deep sleep following experimental challenge by microbial infection have a better chance of survival.

**Alcohol**

Studies have shown that alcohol use is more prevalent among people who sleep poorly. The reason for this is twofold. First, alcohol acts as a mild sedative and is commonly used as a sleep aid among people who have sleep problems such as insomnia. Second, the sedative quality of alcohol is only temporary. As alcohol is processed by the body over a few hours it begins to
stimulate the parts of the brain that cause arousal, in many cases causing awakenings and sleep problems later in the night.

Despite its mild sedative qualities, alcohol often contributes to poor sleep.

Life Expectancy

Considering the many potential adverse health effects of insufficient sleep, it is not surprising that poor sleep is associated with lower life expectancy. Data from three large cross-sectional epidemiological studies reveal that sleeping five hours or less per night increased mortality risk from all causes by roughly 15 percent.

Of course, just as sleep problems can affect disease risk, several diseases and disorders can also affect the amount of sleep we get. While an estimated 50 to 70 million Americans suffer from some type of sleep disorder, most people do not mention their sleeping problems to their doctors, and most doctors do not necessarily ask about them. This widespread lack of awareness of the impact of sleep problems can have serious and costly public health consequences.

SEEING A PSYCHOLOGIST ABOUT SLEEP DISORDERS

In several cases, people experience insomnia because they develop a pattern of behavior that interferes with good sleep habits. Sleeping difficulties are often connected to underlying problems such as stress, depression or anxiety. It is a good idea to consult with a physician or another medical professional to learn if medical issues may be contributing to your sleep difficulties
and treat related medical problems. Seeing a psychologist may also help you address sleep problems. Psychologists can help people change their behaviors and manage the thoughts, feelings and emotions that can interfere with a healthy night’s sleep.

Licensed psychologists have the professional training and skills to treat individuals suffering from depression and anxiety, which have been linked to sleep problems like insomnia. In working with a psychologist, you can expect to talk about your overall physical and emotional health, and your health beliefs and behaviors. A psychologist will help you identify any underlying stressors and behaviors that may be interfering with sleep.

A psychologist may ask you to keep a sleep diary with information about your routines and behaviors. This can help the psychologist identify patterns of behavior that might be interfering with sleep. For example, if you have a habit of exercising at night or watching television in bed, your psychologist can help you take a look at how your routines impair sleep, and help you find alternatives. The psychologist may also teach you relaxation techniques to help you learn to quiet your mind and unwind before bed.

**Depression and Sleep**

Depression is one of the most common mental illnesses. More than 16 percent of Americans experience major depressive disorder during their lifetime, according to the National Institute of Mental Health. And depression and sleep problems often go hand in hand. Many people with depression experience hypersomnia, a condition in which they sleep more than normal. On the other end of the sleep spectrum, insomnia is also common among people with depression. In fact, research suggests that people with insomnia are 10 times as likely to suffer from clinical depression. Some people develop sleep problems first, and then go on to experience depression.

In others, depression occurs before signs of sleep disorders. In either case, sleep difficulty is just one of many reasons to seek
treatment for depression. Depressed people typically feel hopeless and guilty. They often lose interest in routine activities and withdraw from family and friends. They may have thoughts of suicide. Treatment can address both depression and the sleep problems that go along with it.

Understanding Insomnia

Insomnia is a common sleep disorder that occurs in 30 million Americans, according to the Institute of Medicine. A person with insomnia has trouble falling or staying asleep. When sleepless nights persist for longer than a month, the problem is considered chronic. Often, people with chronic insomnia see the problem come and go, experiencing several days of good sleep followed by a stretch of poor sleep.

Studies show that people with insomnia who learned to recognize and change stressful thoughts slept better than those who took sleeping pills to treat their insomnia.

Whatever the cause, you’re more likely to rest if you adopt healthy sleep behaviors. Much like diet and exercise, sleep is a basic building block to health.

Steps to Better Sleep

Consider the following steps that can be helpful in changing unhealthy habits and improving your sleep.

• Create a relaxing sleep environment. Keep your bedroom dark, cool and as quiet as possible and keep electronics such as a computer, TV and phones out of the bedroom. Exposure to stimulating objects and lights from computer and TV screens can affect levels of melatonin, a hormone that regulates your body’s internal clock.

• Don’t discuss or deal with stressful or anxiety-inducing situations right before bedtime. Just as exercise can increase energy levels and body temperature, discussing difficult topics will increase tension and may provoke a racing heartbeat. Protect the quality of your sleep by dealing with any stressful topics long before bedtime.
Set a sleep schedule. Maintain a regular sleep routine. Go to bed and get up at the same times each day, even on the weekends. Don’t go to bed too early. If you hit the sack before you’re sleepy, you may lie in bed awake and start to feel anxious. That will only make it more difficult to drift off.

Limit naps. Late afternoon naps can interfere with nighttime slumber.

Maintain a regular exercise routine. Research shows that exercise increases total sleep time, particularly the slow-wave sleep that’s important for body repair and maintenance. However, don’t exercise too late in the day. Working out close to bedtime can boost energy levels and body temperature, making it harder to fall asleep.

Avoid late night meals and alcohol consumption. Skip heavy meals before bed, and limit alcohol. Even if a cocktail seems to help you fall asleep, it can interfere with sleep quality and disrupt sleep later in the night.

Curb nicotine and caffeine use. These stimulants can make it harder to fall asleep and stay asleep, especially if consumed late in the day.

Schedule down time before bed. Setting aside time to unwind and quiet your mind will help you get into a sleepy state of mind. Meditating, breathing exercises, taking a bath and listening to relaxing music are great ways to calm down at night.

Don’t check the clock. Tallying how much sleep you’re losing can create anxiety and make it harder to fall asleep.

Take notes. If you can’t stop the stream of thoughts, get up and write them down. Tell yourself you can check the list in the morning, so there’s no need to keep worrying tonight.

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ADULT SLEEP DISORDERS

Poor Sleep Habits

Poor sleep habits (referred to as hygiene) are one of the most common problems encountered in our society. We stay up too late and get up too early. We interrupt our sleep with drugs, chemicals, work, and we overstimulate ourselves with late-night activities such as television.

Insomnia

Insomnia is the inability to sleep or inability to sleep well at night. Many different medical and mental health problems cause insomnia. Insomnia may be situational, lasting a few days to weeks, or chronic, lasting for more than 1 month.

Around 9-12 percent of the American population report chronic insomnia. In severe cases, patients experience fatigue, sleepiness, difficulty concentrating and difficulty with thinking.

Many sufferers feel that they have been robbed of the joy of life. Insomnia may be a symptom of breathing problems at night like sleep apnea, of medical illness like heart failure, a side effect of medications, or a symptom of severe anxiety or depression illness.

While short-lasting insomnia periods are well treated with medication, chronic or long-lasting insomnia may not respond well to medications. Thus, throwing sleeping pills at many patients with chronic insomnia is not an effective way to treat the problem. An evaluation by the patient’s personal physician or a sleep specialist often helps get to the root of the problem. Many patients respond well to what is called “cognitive behavioral therapy.”

In this form of therapy, incorrect ideas about sleep are corrected. In addition, relaxation and behavioral techniques may be used to help patients fall asleep. This combined with treatment of any underlying disorders is often the best way to treat the devastating symptom of insomnia.
Sleep Apnea

Sleep apnea is dangerous, common, relative easy to diagnose, and treatable.

Sleep apnea is a common and potentially devastating sleep disorder. It is the most common reason that patients are referred to sleep centers around the country.

The word *apnea* means “not breathing.” Patients with the usual form of sleep apnea actually close off their airway at night.

This airway closure occurs either behind the tongue or behind the nose. Patients continue to make efforts to breathe. Then after 10 to 120 seconds, the brain, realizing it is not getting any oxygen, actually “wakes up.” The brain then tells the upper airway to open to let some air in.

This is related to loud bothersome snoring, often described as snorting and gasping. Patients may take a few breaths of air, the brain goes to sleep again and the cycle may repeat itself several hundred times a night. Patients are often not even aware that they are doing this (although the bed partner is).

Patients with sleep apnea are at great risk for heart disease, heart attacks, strokes and high blood pressure. In addition, since the sleep is poor quality (remember the brain keeps waking up), patients are often sleepy during the day. Sleepiness is associated with inability to concentrate, remember or think. There is also increased risk in falling asleep while doing vital tasks such as driving or using heavy machinery.

Medical treatment involves weight loss if the patient is overweight, avoidance of drugs, which increase the risk of apneas such as sleeping pills, alcohol and sedative medicines, and sometimes sleeping semi-upright. However, in most cases additional treatment is warranted.

In few cases we use Continuous Positive Airway Pressure (CPAP for short) to treat patients. For this treatment a mask is fit over the nose or over the nose and mouth. The mask is pressurized
slightly to hold the airway open and allow the patient to sleep normally. Newer technology has made the masks relatively comfortable to use.

Few patients may be candidates for surgery on the upper airway. In the usual upper airway surgery the uvula (that punching bag in the back of the throat) and some of the surrounding soft tissue is removed to enlarge the air passage. In other cases a dental device designed to move the lower jaw down and outwards slightly may be worn at night.

In some cases, treatment is begun with an emergent tracheostomy when sleep apnea is considered to be immediately life-threatening. The decision about which form of treatment to use should be decided by the patient and his/her physician on the basis of the sleep studies and rest of the clinical data.

Narcolepsy

Narcolepsy is a chronic sleep disorder that commonly begins during adolescence and is characterized by excessive daytime sleepiness with the occurrence of sleep attacks. Narcolepsy can run in families, but can occur in the absence of any family history as well. There are several other characteristic symptoms that may or may not be present, including cataplexy, sleep paralysis and hypnogogic hallucinations.

- Cataplexy is the sudden loss of muscle tone, commonly associated with strong emotions. It may be a subtle sensation of weakness or a complete loss of strength with a fall to the ground.
- Sleep paralysis is a sensation of not being able to move on waking, usually for a few seconds.
- Hypnogogic hallucinations are very vivid and sometimes violent or bizarre sensations, almost dreamlike, that occur on waking or falling asleep.

The treatment of narcolepsy and its associated symptoms commonly requires a combination of behavioral modification and drug therapy. Many patients with narcolepsy will do well with
naps scheduled at specific times during the day. Stimulant medication may be used to alleviate symptoms of daytime sleepiness. Other medications, such as certain anti-depressants, are used to treat cataplexy.

A new promising treatment for cataplexy using a drug called sodium oxybate has recently become available. Treatment for each patient must be individualized and each patient with his/her physician needs to discuss this on a case-by-case basis.

**Restless Legs Syndrome and Periodic Limb Movement Disorder**

Restless legs syndrome (RLS) is characterized by an intolerable, internal itching sensation occurring in the lower extremities that causes an almost irresistible urge to move the legs. The sensation is commonly described as a “creepy” or “crawly” sensation and is typically relieved by movement of the legs or walking around. When movement stops, however, the sensations frequently return. The abnormal sensations are more common in the late afternoon or evening hours. In some patients, this problem persists into the nighttime and may prevent patients from getting a restful night’s sleep. Pregnancy and iron deficiency are associated with an increased frequency of this disease. In many patients, RLS is extremely distressing. Further, RLS is more common than previously thought, affecting 5-10% of adults and increasing with age.

Almost all patients with restless legs syndrome have a problem called period limb movement disorder. In this, there are leg (sometimes arm) movements occurring at regular intervals during the night. These movements may fragment sleep, leading to poor quality, non-refreshing sleep. Periodic limb movement disorder can also occur as an isolated problem, often reported by the bed partner. Fortunately, in most people, restless legs syndrome and periodic limb movement disorder are relatively easily treated. Treatment commonly includes the incorporation of both aerobic and leg stretching exercises. Leg stretching or even yoga exercises
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can be done prior to bedtime to alleviate symptoms and may be all that is needed in mild cases. Iron replacement therapy is used if patients are iron deficient.

Drugs used to treat Parkinson’s disease are very effective in treating most cases. These include the drug pramipexole (Mirapex®) and ropinirole (Requip®). Medications, such as valium-type medications, such as clonazepam (Klonopin®) or analgesic medications related to morphine and opium, can be also be used. In some cases, anti-seizure medications may be effective.

Sleepwalking/Somnambulism

Sleepwalking, also referred to as somnambulism, is characterized by walking or other physical activities during sleep. Sleepwalking is common in children — up to 15 percent of children have had this problem — but can occur at any age. In children, it can be associated with sleep deprivation or anxiety. In adults, it is more commonly associated with other medical disorders, medication use, or anxiety or depressive disorders.

Clinically, the person may simply sit up with their eyes open, appearing to be awake, or they may engage in a complex task. Episodes can last from seconds to minutes. Contrary to popular belief, it is safe to wake a sleepwalker, but they may be confused and disoriented on waking.

There is no particular treatment except to avoid triggers if known, or treat anxiety or depression. If severe, short-term use of sedatives may be considered. Otherwise it is best to keep the person safe and out of harm’s way. We often advise families to make sure the windows are closed and that there is no possibility of sleepwalking leading to danger for the patient.

Sleep Disorders in Medical Illnesses

Various medical illnesses are related to disturbances of sleep. Patients with chronic lung disease may experience low oxygen levels at night that disturb sleep. Patients with asthma may develop wheezing or shortness of breath at night, usually in the early
morning hours. Patients with heart failure may develop abnormal breathing at night, which disturbs sleep much in the way that sleep apnea does. Patients with Parkinson’s or other neurological diseases may develop disturbed sleep.

Sleep Disorders in Mental Illnesses

So many people with mental illnesses, notably depression, anxiety, post-traumatic stress syndrome, and panic attacks, develop profound sleep disturbances. Insomnia is a common symptom in many people with these problems. Evaluation and treatment by a health care provider skilled in these disorders, usually in conjunction with evaluation by a sleep specialist, often brings about great improvement.
Sleep Medicine: Scope, Classification and Treatment

Sleep medicine is a medical specialty or subspecialty devoted to the diagnosis and therapy of sleep disturbances and disorders. From the middle of the 20th century, research has provided increasing knowledge and answered many questions about sleep-wake functioning. The rapidly evolving field has become a recognized medical subspecialty in some countries.

Dental sleep medicine also qualifies for board certification in some countries. Properly organized, minimum 12-month, postgraduate training programs are still being defined in the United States. In some countries, the sleep researchers and the physicians who treat patients may be the same people. The first sleep clinics in the United States were established in the 1970s by interested physicians and technicians; the study, diagnosis, and treatment of obstructive sleep apnea were their first tasks. As late as 1999, virtually any American physician, with no specific training in sleep medicine, could open a sleep laboratory. Disorders and disturbances of sleep are widespread and can have significant consequences for affected individuals as well as economic and other consequences for society. The US National Transportation Safety Board has, according to Dr. Charles Czeisler, member of the Institute of Medicine and Director of the Harvard University
Medical School Division of Sleep Medicine at Brigham and Women’s Hospital, discovered that the leading cause (31%) of fatal-to-the-driver heavy truck crashes is fatigue related, (though rarely associated directly with sleep disorders, such as sleep apnea), with drugs and alcohol as the number two cause (29%). Sleep deprivation has also been a significant factor in dramatic accidents, such as the Exxon Valdez oil spill, the nuclear incidents at Chernobyl and Three Mile Island and the explosion of the space shuttle Challenger.

**HISTORY**

A 16th-century physician wrote that many laborers dozed off exhausted at the start of each night; sexual intercourse with their wives typically occurring in the watching period, after a recuperative first sleep. Anthropologists find that isolated societies without electric light sleep in a variety of patterns; seldom do they resemble our modern habit of sleeping in one single eight-hour bout. Much has been written about dream interpretation, from biblical times to Freud, but sleep itself was historically seen as a passive state of not-awake.

The concept of sleep medicine belongs to the second half of the 20th century. Due to the rapidly increasing knowledge about sleep, including the growth of the research field chronobiology from about 1960 and the discoveries of REM sleep (1952–53) and sleep apnea (first described in the medical literature in 1965), the medical importance of sleep was recognized. The medical community began paying more attention than previously to primary sleep disorders, such as sleep apnea, as well as the role and quality of sleep in other conditions. By the 1970s in the US, and in many western nations within the two following decades, clinics and laboratories devoted to the study of sleep and the treatment of its disorders had been founded. Most sleep doctors were primarily concerned with apnea; some were experts in narcolepsy. There was as yet nothing to restrict the use of the title “sleep doctor,” and a need for standards arose.
Basic medical training has paid little attention to sleep problems; according to Benca in her review *Diagnosis and Treatment of Chronic Insomnia* (2005), most doctors are “not well trained with respect to sleep and sleep disorders,” and a survey in 1990–91 of 37 American medical schools showed that sleep and sleep disorders were “covered” in less than two (2) hours of total teaching time, on average. Benca’s review cites a 2002 survey by Papp et al. of more than 500 primary care physicians who self-reported their knowledge of sleep disorders as follows: Excellent – 0%; Good – 10%, Fair – 60%; and Poor – 30%. The review of more than 50 studies indicates that both doctors and patients appear reluctant to discuss sleep complaints, in part because of perceptions that treatments for insomnia are ineffective or associated with risks, and:

“Physicians may avoid exploring problems such as sleep difficulties in order to avoid having to deal with issues that could take up more than the normal allotted time for a patient.”

Also, an editorial in the American College of Chest Physicians’ (pulmonologists’) journal *CHEST* in 1999 was quite concerned about the Conundrums in Sleep Medicine. The author, then chair of her organization’s Sleep Section, asked “What is required to set up a sleep laboratory? Money and a building! Anyone can open a sleep laboratory, and it seems that just about everyone is.” On the accreditation process for sleep laboratories, she continues: “This accreditation, however, is currently not required by most states, or more importantly, by most insurance carriers for reimbursements... There is also an American Board of Sleep Medicine (ABSM) that certifies individuals as sleep specialists. This certification presumably makes those individuals more qualified to run a sleep laboratory; however, the certification is not required to run a laboratory or to read sleep studies.” Her concern at the turn of the century was:

“Not all patients with hypersomnia have sleep apnea, and other diagnoses may be missed if the physician is only trained to diagnose and treat sleep apnea. Also, when a physician runs a
sleep laboratory, they are “assumed” to be a sleep expert and are asked to evaluate and treat all types of sleep disorders when they are not adequately trained to do so."

In the UK, knowledge of sleep medicine and possibilities for diagnosis and treatment seem to lag. Guardian.co.uk quotes the director of the Imperial College Healthcare Sleep Centre: “One problem is that there has been relatively little training in sleep medicine in this country – certainly there is no structured training for sleep physicians.” The Imperial College Healthcare site shows attention to obstructive sleep apnea syndrome (OSA) and very few other disorders, specifically not including insomnia.

SCOPE AND CLASSIFICATION

Competence in sleep medicine requires an understanding of a plethora of very diverse disorders, many of which present with similar symptoms such as excessive daytime sleepiness, which, in the absence of volitional sleep deprivation, “is almost inevitably caused by an identifiable and treatable sleep disorder,” such as sleep apnea, narcolepsy, idiopathic hypersomnia, Kleine-Levin syndrome, menstrual-related hypersomnia, idiopathic recurrent stupor, or circadian rhythm disturbances. Another common complaint is insomnia, a set of symptoms that can have many causes, physical and mental. Management in the varying situations differs greatly and cannot be undertaken without a correct diagnosis.

ICSD, The International Classification of Sleep Disorders, was restructured in 1990, in relation to its predecessor, to include only one code for each diagnostic entry and to classify disorders by pathophysiologic mechanism, as far as possible, rather than by primary complaint. Training in sleep medicine is multidisciplinary, and the present structure was chosen to encourage a multidisciplinary approach to diagnosis. Sleep disorders often do not fit neatly into traditional classification; differential diagnoses cross medical systems. Minor revisions and updates to the ICSD were made in 1997 and in following years. The present classification
system in fact follows the groupings suggested by Nathaniel Kleitman, the “father of sleep research,” in his seminal 1939 book *Sleep and Wakefulness.*

The revised ICSD, ICSD-R, placed the primary sleep disorders in the subgroups (1) dyssomnias, which include those that produce complaints of insomnia or excessive sleepiness, and (2) the parasomnias, which do not produce those primary complaints but intrude into or occur during sleep. A further subdivision of the dyssomnias preserves the integrity of circadian rhythm sleep disorders, as was mandated by about 200 doctors and researchers from all over the world who participated in the process between 1985–1990. The last two subgroups were (3) the medical or psychiatric sleep disorder section and (4) the proposed new disorders section. The authors found the heading “medical or psychiatric” less than ideal but better than the alternative “organic or non-organic,” which seemed more likely to change in the future. Detailed reporting schemes aimed to provide data for further research. A second edition, called ICSD-2, was published in 2005.

MeSH, *Medical Subject Headings*, a service of the US National Library of Medicine and the National Institutes of Health, uses similar broad categories: (1) dyssomnias, including narcolepsy, apnea, and the circadian rhythm sleep disorders, (2) parasomnias, which include, among others, bruxism (tooth-grinding), sleepwalking and bedwetting, and (3) sleep disorders caused by medical or psychiatric conditions. The system used produces “trees,” approaching each diagnosis from up to several angles such that each disorder may be known by several codes.

*DSM-IV-TR*, the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*, using the same diagnostic codes as the *International Statistical Classification of Diseases and Related Health Problems* (ICD), divides sleep disorders into three groups: (1) primary sleep disorders, both the dyssomnias and the parasomnias, presumed to result from an endogenous disturbance in sleep-wake generating or timing mechanisms, (2) those secondary to mental disorders and (3) those related to a general
medical condition or substance abuse. Recent thinking opens for a common cause for mood and sleep disorders occurring in the same patient; a 2010 review states that, in humans, “single nucleotide polymorphisms in *Clock* and other clock genes have been associated with depression” and that the “evidence that mood disorders are associated with disrupted or at least inappropriately timed circadian rhythms suggests that treatment strategies or drugs aimed at restoring ‘normal’ circadian rhythmicity may be clinically useful.”

GLOBAL TRAINING AND CERTIFICATION

The World Federation of Sleep Research & Sleep Medicine Societies (WFSRMS) was founded in 1987. As its name implies, members are concerned with basic and clinical research as well as medicine. Member societies in the Americas are the American Academy of Sleep Medicine (AASM), the Sleep Research Society of the United States (SRS), the Canadian Sleep Society (CSS) and the Federation of Latin American Sleep Societies (FLASS). WFSRMS publishes the *Journal of Sleep Research*, the *Journal of Clinical Sleep Medicine*, *SLEEP* and *Sleep and Biological Rhythms* and promotes both sleep research and physician training and education.

Africa

The Colleges of Medicine of South Africa (CMSA) provide the well-defined specialty Diploma in Sleep Medicine of the College of Neurologists of South Africa: DSM(SA), which was first promulgated by the Health Professions Council in 2007. The newly formed South African Society of Sleep Medicine (SASSM) was launched at its inaugural congress in February 2010. The society’s membership is diverse; it includes general practitioners, ENT surgeons, pulmonologists, cardiologists, endocrinologists and psychiatrists.

Asia

WFSRMS members in Asia include the Australasian Sleep Association (ASA) of New Zealand and Australia and the Asian
Sleep Research Society (ASRS), an umbrella organization for the societies of several Asian nations.

**Europe**

The European Sleep Research Society (ESRS) is a member of the WFSRMS. The Assembly of National Sleep Societies (ANSS), which includes both medical and scientific organizations from 26 countries as of 2007, is a formal body of the ESRS. The ESRS has published *European Accreditation Guidelines for SMCs* (Sleep Medicine Centres), the first of several proposed guidelines to coordinate and promote sleep science and medicine in Europe.

**United States**

The American Academy of Sleep Medicine (AASM), founded in 1978, administered the certification process and sleep medicine examination for doctors until 1990. Its independent daughter entity the American Board of Sleep Medicine (ABSM) was incorporated in 1991 and took over the aforementioned responsibilities. As of 2007, the ABSM ceased administering its examination, as it conceded that an examination process recognized by the American Board of Medical Specialties (ABMS) was advantageous to the field. Candidates who passed the ABSM exam in 1978–2006 retain lifetime certification as Diplomates of that organization.

The American Board of Psychiatry and Neurology (ABPN), and the corresponding boards of Internal Medicine, of Pediatrics, and of Otolaryngology (ear, nose and throat, ENT) now administer collectively the Sleep Medicine Certification exam for their members. Each board supervises the required 12 months of formal training for its candidates, while the exam is administered to all of them at the same time in the same place. For the first five years, 2007–2011, during “grandfathering,” there was a “practice pathway” for ABSM certified specialists while additional, coordinated requirements were to be added after 2011. The ABPN provides information about the pathways, requirements and the exam on its website. Additionally, there are currently four boards
of the American Osteopathic Association Bureau of Osteopathic Specialists that administer Sleep Medicine Certification exams. The American Osteopathic boards of Family Medicine, Internal Medicine, Neurology & Psychiatry, and Ophthalmology & Otolaryngology grant certificates of added qualification to qualified candidate physicians.

Sleep medicine is now a recognized subspecialty within anesthesiology, internal medicine, family medicine, pediatrics, otolaryngology, psychiatry and neurology in the US. Certification in Sleep Medicine by the several “Member Boards” of the ABMS shows that the specialist:

“has demonstrated expertise in the diagnosis and management of clinical conditions that occur during sleep, that disturb sleep, or that are affected by disturbances in the wake-sleep cycle. This specialist is skilled in the analysis and interpretation of comprehensive polysomnography, and well-versed in emerging research and management of a sleep laboratory.”

Pulmonologists, already subspecialists within internal medicine, may be accepted to sit for the board and be certified in Sleep Medicine after just a six-month fellowship, building on their knowledge of sleep-related breathing problems, rather than the usual twelve-month fellowship required of other specialists.

Sleep dentistry (bruxism, snoring and sleep apnea), while not recognized as one of the nine dental specialties, qualifies for board-certification by the American Board of Dental Sleep Medicine (ABDSM). The resulting Diplomate status is recognized by the AASM, and these dentists are organized in the Academy of Dental Sleep Medicine (USA).

The qualified dentists collaborate with sleep doctors at accredited sleep centers and can provide several types of oral appliances or upper airway surgery to treat or manage sleep-related breathing disorders as well as tooth-grinding and clenching.

Laboratories for sleep-related breathing disorders are accredited by the AASM, and are required to follow the Code of
Medical Ethics of the American Medical Association. The new and very detailed Standards for Accreditation are available online. Sleep disorder centers, or clinics, are accredited by the same body, whether hospital-based, university-based or “freestanding”; they are required to provide testing and treatment for all sleep disorders and to have on staff a sleep specialist who has been certified by the American Board of Sleep Medicine and otherwise meet similar standards.

DIAGNOSTIC METHODS

Pediatric polysomnography

The taking of a thorough medical history while keeping in mind alternative diagnoses and the possibility of more than one ailment in the same patient is the first step. Symptoms for very different sleep disorders may be similar and it must be determined whether any psychiatric problems are primary or secondary.

The patient history includes previous attempts at treatment and coping and a careful medication review. Differentiation of transient from chronic disorders and primary from secondary ones influences the direction of evaluation and treatment plans.

The Epworth Sleepiness Scale (ESS), designed to give an indication of sleepiness and correlated with sleep apnea, or other questionnaires designed to measure excessive daytime sleepiness, are diagnostic tools that can be used repeatedly to measure results of treatment.
A sleep diary, also called sleep log or sleep journal, kept by a patient at home for at least two weeks, while subjective, may help determine the extent and nature of sleep disturbance and the level of alertness in the normal environment. A parallel journal kept by a parent or bed partner, if any, can also be helpful. Sleep logs can also be used for self-monitoring and in connection with behavioral and other treatment. The image at the top of this page, with nighttime in the middle and the weekend in the middle, shows a layout that can aid in noticing trends. An actigraph unit is a motion-sensing device worn on the wrist, generally for one or two weeks. It gives a gross picture of sleep-wake cycles and is often used to verify the sleep diary. It is cost-efficient when full polysomnography is not required.

Polysomnography is performed in a sleep laboratory while the patient sleeps, preferably at his or her usual sleeping time. The polysomnogram (PSG) objectively records sleep stages and respiratory events. It shows multiple channels of electroencephalogram (EEG), electrooculogram (EOG), electrocardiogram (ECG), nasal and oral airflow, abdominal, chest and leg movements and blood oxygen levels. A single part of a polysomnogram is sometimes measured at home with portable equipment, for example oximetry, which records blood oxygen levels throughout the night. Polysomnography is not routinely used in the evaluation of patients with insomnia or circadian rhythm disorders, except as needed to rule out other disorders. It will usually be a definitive test for sleep apnea.

A Multiple Sleep Latency Test (MSLT) is often performed during the entire day after polysomnography while the electrodes and other equipment are still in place. The patient is given nap opportunities every second hour; the test measures the number of minutes it takes from the start of a daytime nap period to the first signs of sleep. It is a measure of daytime sleepiness; it also shows whether REM sleep is achieved in a short nap, a typical indication of narcolepsy.
Imaging studies may be performed if a patient is to be evaluated for neurodegenerative disease or to determine the obstruction in obstructive sleep apnea.

TREATMENTS

When sleep complaints are secondary to pain, other medical or psychiatric diagnoses, or substance abuse, it may be necessary to treat both the underlying cause and the sleep problems.

When the underlying cause of sleep problems is not immediately obvious, behavioral treatments are usually the first suggested. These range from patient education about sleep hygiene to cognitive behavioral therapy (CBT). Studies of both younger and older adults have compared CBT to medication and found that CBT should be considered a first-line and cost-effective intervention for chronic insomnia, not least because gains may be maintained at long-term follow-up. Sleep physicians and psychologists, at least in the US, are not in agreement about who should perform CBT nor whether sleep centers should be required to have psychologists on staff. In the UK the number of CBT-trained therapists is limited so CBT is not widely available on the NHS.

Behavioral therapies include progressive relaxation, stimulus control (to reassociate the bed with sleepiness), limiting time-in-bed to increase sleep efficiency and debunking misconceptions about sleep.
Pharmacology is necessary for some conditions. Medication may be useful for acute insomnia and for some of the parasomnias. It is almost always needed, along with scheduled short naps and close follow-up, in the treatment of narcolepsy and idiopathic hypersomnia. Chronic circadian rhythm disorders, the most common of which is delayed sleep phase disorder, may be managed by specifically-timed bright light therapy, usually in the morning, darkness therapy in the hours before bedtime, and timed oral administration of the hormone melatonin.

Chronotherapy has also been prescribed for circadian rhythm disorders, though results are generally short-lived. Stimulants may also be prescribed. When these therapies are unsuccessful, counseling may be indicated to help a person adapt to and live with the condition. People with these disorders who have chosen a lifestyle in conformity with their sleeping schedules have no need of treatment, though they may need the diagnosis in order to avoid having to meet for appointments or meetings during their sleep time. Continuous positive airway pressure (CPAP) machines and oral appliances are used nightly at home to manage sleep-related breathing disorders such as apnea. In mild cases in obese people, weight reduction may be sufficient, but it is usually recommended as an adjunct to CPAP treatment since sustaining weight loss is difficult. In some cases, upper airway surgery, generally performed by an otolaryngologist/head & neck surgeon or occasionally an oral and maxillofacial surgeon, is indicated.

The treatments prevent airway collapse, which interrupts breathing during sleep. A 2001 study published by Hans-Werner Gessmann in the Journal of Sleep Medicine and Sleep Psychology found that patients who practiced a series of electrical stimulations of suprahyoidal tongue muscles for 20 minutes a day showed a marked decline in sleep apnea symptoms after two months. Patients experienced an average of 36% fewer apnea episodes after successfully completing the treatments.
Quality of Sleep and Various Stages of Sleep

SLEEP: A DYNAMIC ACTIVITY

Until the 1950s, most people thought of sleep as a passive, dormant part of our daily lives. We now know that our brains are very active during sleep. Moreover, sleep affects our daily functioning and our physical and mental health in many ways that we are just beginning to understand.

Nerve-signaling chemicals known neurotransmitters control whether we are asleep or awake by acting on different groups of nerve cells, or neurons, in the brain. Neurons in the brainstem, which connects the brain with the spinal cord, produce neurotransmitters such as serotonin and norepinephrine that keep some parts of the brain active while we are awake. Other neurons at the base of the brain begin signaling when we fall asleep. These neurons appear to “switch off” the signals that keep us awake. Research also suggests that a chemical called adenosine builds up in our blood while we are awake and causes drowsiness. This chemical gradually breaks down while we sleep.

VARIOUS STAGES OF SLEEP

During sleep, we usually pass through five phases of sleep: stages 1, 2, 3, 4, and REM (rapid eye movement) sleep. These
stages progress in a cycle from stage 1 to REM sleep, then the cycle starts over again with stage 1. We spend almost 50 percent of our total sleep time in stage 2 sleep, about 20 percent in REM sleep, and the remaining 30 percent in the other stages. Infants, by contrast, spend about half of their sleep time in REM sleep.

During stage 1, which is light sleep, we drift in and out of sleep and can be awakened easily. Our eyes move very slowly and muscle activity slows. People awakened from stage 1 sleep often remember fragmented visual images. Many also experience sudden muscle contractions called hypnic myoclonia, often preceded by a sensation of starting to fall. These sudden movements are similar to the “jump” we make when startled. When we enter stage 2 sleep, our eye movements stop and our brain waves (fluctuations of electrical activity that can be measured by electrodes) become slower, with occasional bursts of rapid waves called sleep spindles. In stage 3, extremely slow brain waves called delta waves begin to appear, interspersed with smaller, faster waves. By stage 4, the brain produces delta waves almost exclusively. It is very difficult to wake someone during stages 3 and 4, which together are called deep sleep. There is no eye movement or muscle activity. People awakened during deep sleep do not adjust immediately and often feel groggy and disoriented for several minutes after they wake up. Some children experience bedwetting, night terrors, or sleepwalking during deep sleep.

When we switch into REM sleep, our breathing becomes more rapid, irregular, and shallow, our eyes jerk rapidly in various directions, and our limb muscles become temporarily paralyzed. Our heart rate increases, our blood pressure rises, and males develop penile erections. When people awaken during REM sleep, they often describe bizarre and illogical tales – dreams.

The first REM sleep period usually occurs about 70 to 90 minutes after we fall asleep. A complete sleep cycle takes 90 to 110 minutes on average. The first sleep cycles each night contain relatively short REM periods and long periods of deep sleep. As the night progresses, REM sleep periods increase in length while
deep sleep decreases. By morning, people spend nearly all their sleep time in stages 1, 2, and REM. People awakened after sleeping more than a few minutes are usually unable to recall the last few minutes before they fell asleep. This sleep-related form of amnesia is the reason people often forget telephone calls or conversations they’ve had in the middle of the night. It also explains why we often do not remember our alarms ringing in the morning if we go right back to sleep after turning them off.

Since sleep and wakefulness are influenced by different neurotransmitter signals in the brain, foods and medicines that change the balance of these signals affect whether we feel alert or drowsy and how well we sleep. Caffeinated drinks such as coffee and drugs such as diet pills and decongestants stimulate some parts of the brain and can cause insomnia, or an inability to sleep. Many antidepressants suppress REM sleep.

Heavy smokers often sleep very lightly and have reduced amounts of REM sleep. They also tend to wake up after 3 or 4 hours of sleep due to nicotine withdrawal. Many people who suffer from insomnia try to solve the problem with alcohol – the so-called night cap. While alcohol does help people fall into light sleep, it also robs them of REM and the deeper, more restorative stages of sleep. Instead, it keeps them in the lighter stages of sleep, from which they can be awakened easily.

People lose some of the ability to regulate their body temperature during REM, so abnormally hot or cold temperatures in the environment can disrupt this stage of sleep. If our REM sleep is disrupted one night, our bodies don’t follow the normal sleep cycle progression the next time we doze off. Instead, we often slip directly into REM sleep and go through extended periods of REM until we “catch up” on this stage of sleep.

People who are under anesthesia or in a coma are often said to be asleep. However, people in these conditions cannot be awakened and do not produce the complex, active brain wave patterns seen in normal sleep. Instead, their brain waves are very slow and weak, sometimes all but undetectable.
TIP: Having a comfortable bedroom and mattress are also important for facilitating good sleep. Have a quite bedroom. Mattresses and beds should be comfortable for you and your bed partner.

How Much Sleep Do We Need?

The amount of sleep each person needs depends on many factors, including age. Infants generally require about 16 hours a day, while teenagers need about 9 hours on average. For most adults, 7 to 8 hours a night appears to be the best amount of sleep, although some people may need as few as 5 hours or as many as 10 hours of sleep each day. Women in the first 3 months of pregnancy often need several more hours of sleep than usual. The amount of sleep a person needs also increases if he or she has been deprived of sleep in previous days. Getting too little sleep creates a “sleep debt,” which is much like being overdrawn at a bank. Eventually, your body will demand that the debt be repaid. We don’t seem to adapt to getting less sleep than we need; while we may get used to a sleep-depriving schedule, our judgment, reaction time, and other functions are still impaired.

People tend to sleep more lightly and for shorter time spans as they get older, although they generally need about the same amount of sleep as they needed in early adulthood. About half of all people over 65 have frequent sleeping problems, such as insomnia, and deep sleep stages in many elderly people often become very short or stop completely. This change may be a normal part of aging, or it may result from medical problems that are common in elderly people and from the medications and other treatments for those problems.

Experts say that if you feel drowsy during the day, even during boring activities, you haven’t had enough sleep. If you routinely fall asleep within 5 minutes of lying down, you probably have severe sleep deprivation, possibly even a sleep disorder. Microsleeps, or very brief episodes of sleep in an otherwise awake person, are another mark of sleep deprivation. In many cases,
people are not aware that they are experiencing microsleeps. The widespread practice of “burning the candle at both ends” in western industrialized societies has created so much sleep deprivation that what is really abnormal sleepiness is now almost the norm.

Several studies make it clear that sleep deprivation is dangerous. Sleep-deprived people who are tested by using a driving simulator or by performing a hand-eye coordination task perform as badly as or worse than those who are intoxicated. Sleep deprivation also magnifies alcohol’s effects on the body, so a fatigued person who drinks will become much more impaired than someone who is well-rested.

Driver fatigue is responsible for an estimated 100,000 motor vehicle accidents and 1500 deaths each year, according to the National Highway Traffic Safety Administration. Since drowsiness is the brain’s last step before falling asleep, driving while drowsy can – and often does – lead to disaster. Caffeine and other stimulants cannot overcome the effects of severe sleep deprivation. The National Sleep Foundation says that if you have trouble keeping your eyes focused, if you can’t stop yawning, or if you can’t remember driving the last few miles, you are probably too drowsy to drive safely.

What Does Sleep Do For Us?

Although scientists are still trying to learn exactly why people need sleep, animal studies show that sleep is necessary for survival. For example, while rats normally live for two to three years, those deprived of REM sleep survive only about 5 weeks on average, and rats deprived of all sleep stages live only about 3 weeks. Sleep-deprived rats also develop abnormally low body temperatures and sores on their tail and paws. The sores may develop because the rats’ immune systems become impaired. Some studies suggest that sleep deprivation affects the immune system in detrimental ways.

Sleep appears necessary for our nervous systems to work properly. Too little sleep leaves us drowsy and unable to concentrate
the next day. It also leads to impaired memory and physical performance and reduced ability to carry out math calculations. If sleep deprivation continues, hallucinations and mood swings may develop.

Some experts believe sleep gives neurons used while we are awake a chance to shut down and repair themselves. Without sleep, neurons may become so depleted in energy or so polluted with byproducts of normal cellular activities that they begin to malfunction. Sleep also may give the brain a chance to exercise important neuronal connections that might otherwise deteriorate from lack of activity.

Deep sleep coincides with the release of growth hormone in children and young adults. Many of the body’s cells also show increased production and reduced breakdown of proteins during deep sleep. Since proteins are the building blocks needed for cell growth and repair of damage from factors like stress and ultraviolet rays, deep sleep may truly be “beauty sleep.” Activity in parts of the brain that control emotions, decision-making processes, and social interactions is drastically reduced during deep sleep, suggesting that this type of sleep may help people maintain optimal emotional and social functioning while they are awake.

A study in rats also showed that certain nerve-signaling patterns which the rats generated during the day were repeated during deep sleep. This pattern repetition may help encode memories and improve learning.

**Dreaming and REM Sleep**

We typically spend more than 2 hours each night dreaming. Scientists do not know much about how or why we dream. Sigmund Freud, who greatly influenced the field of psychology, believed dreaming was a “safety valve” for unconscious desires. Only after 1953, when researchers first described REM in sleeping infants, did scientists begin to carefully study sleep and dreaming. They soon realized that the strange, illogical experiences we call dreams
almost always occur during REM sleep. While most mammals and birds show signs of REM sleep, reptiles and other cold-blooded animals do not.

REM sleep starts with signals from an area at the base of the brain called the pons. These signals travel to a brain region called the thalamus, which relays them to the cerebral cortex – the outer layer of the brain that is responsible for learning, thinking, and organizing information. The pons also sends signals that shut off neurons in the spinal cord, causing temporary paralysis of the limb muscles. If something interferes with this paralysis, people will begin to physically “act out” their dreams – a rare, dangerous problem called REM sleep behavior disorder.

A person dreaming about a ball game, for example, may run headlong into furniture or blindly strike someone sleeping nearby while trying to catch a ball in the dream.

REM sleep stimulates the brain regions used in learning. This may be important for normal brain development during infancy, which would explain why infants spend much more time in REM sleep than adults. Like deep sleep, REM sleep is associated with increased production of proteins. One study found that REM sleep affects learning of certain mental skills. People taught a skill and then deprived of non-REM sleep could recall what they had learned after sleeping, while people deprived of REM sleep could not.

Some scientists are of the view that dreams are the cortex’s attempt to find meaning in the random signals that it receives during REM sleep. The cortex is the part of the brain that interprets and organizes information from the environment during consciousness. It may be that, given random signals from the pons during REM sleep, the cortex tries to interpret these signals as well, creating a “story” out of fragmented brain activity.

Sleep and Circadian Rhythms

Circadian rhythms are regular changes in mental and physical characteristics that occur in the course of a day (circadian is Latin for “around a day”). Most circadian rhythms are controlled by the
body’s biological “clock.” This clock, called the **suprachiasmatic nucleus** or **SCN**, is actually a pair of pinhead-sized brain structures that together contain about 20,000 neurons. The SCN rests in a part of the brain called the **hypothalamus**, just above the point where the optic nerves cross. Light that reaches photoreceptors in the **retina** (a tissue at the back of the eye) creates signals that travel along the optic nerve to the SCN.

Signals from the SCN travel to several brain regions, including the **pineal gland**, which responds to light-induced signals by switching off production of the hormone melatonin. The body’s level of melatonin normally increases after darkness falls, making people feel drowsy. The SCN also governs functions that are synchronized with the sleep/wake cycle, including body temperature, hormone secretion, urine production, and changes in blood pressure.

By depriving people of light and other external time cues, scientists have learned that most people’s biological clocks work on a 25-hour cycle rather than a 24-hour one. But because sunlight or other bright lights can reset the SCN, our biological cycles normally follow the 24-hour cycle of the sun, rather than our innate cycle. Circadian rhythms can be affected to some degree by almost any kind of external time cue, such as the beeping of your alarm clock, the clatter of a garbage truck, or the timing of your meals. Scientists call external time cues **zeitgebers** (German for “time givers”).

When travelers pass from one time zone to another, they suffer from disrupted circadian rhythms, an uncomfortable feeling known as **jet lag**. For instance, if you travel from California to New York, you “lose” 3 hours according to your body’s clock. You will feel tired when the alarm rings at 8 a.m. the next morning because, according to your body’s clock, it is still 5 a.m. It usually takes several days for your body’s cycles to adjust to the new time.

To reduce the effects of jet lag, some doctors try to manipulate the biological clock with a technique called light therapy. They
Quality of Sleep and Various Stages of Sleep

expose people to special lights, many times brighter than ordinary household light, for several hours near the time the subjects want to wake up. This helps them reset their biological clocks and adjust to a new time zone.

Symptoms much like jet lag are common in people who work nights or who perform shift work. Because these people’s work schedules are at odds with powerful sleep-regulating cues like sunlight, they often become uncontrollably drowsy during work, and they may suffer insomnia or other problems when they try to sleep. Shift workers have an increased risk of heart problems, digestive disturbances, and emotional and mental problems, all of which may be related to their sleeping problems.

The number and severity of workplace accidents also tend to increase during the night shift. Major industrial accidents attributed partly to errors made by fatigued night-shift workers include the Exxon Valdez oil spill and the Three Mile Island and Chernobyl nuclear power plant accidents. One study also found that medical interns working on the night shift are twice as likely as others to misinterpret hospital test records, which could endanger their patients. It may be possible to reduce shift-related fatigue by using bright lights in the workplace, minimizing shift changes, and taking scheduled naps.

Several people with total blindness experience life-long sleeping problems because their retinas are unable to detect light. These people have a kind of permanent jet lag and periodic insomnia because their circadian rhythms follow their innate cycle rather than a 24-hour one.

Daily supplements of melatonin may improve night-time sleep for such patients. However, since the high doses of melatonin found in most supplements can build up in the body, long-term use of this substance may create new problems. Because the potential side effects of melatonin supplements are still largely unknown, most experts discourage melatonin use by the general public.
Sleep and Disease

Sleep and sleep-related problems play a role in a large number of human disorders and affect almost every field of medicine. For example, problems like stroke and asthma attacks tend to occur more frequently during the night and early morning, perhaps due to changes in hormones, heart rate, and other characteristics associated with sleep. Sleep also affects some kinds of epilepsy in complex ways. REM sleep seems to help prevent seizures that begin in one part of the brain from spreading to other brain regions, while deep sleep may promote the spread of these seizures. Sleep deprivation also triggers seizures in people with some types of epilepsy.

Neurons that control sleep interact closely with the immune system. As anyone who has had the flu knows, infectious diseases tend to make us feel sleepy. This probably happens because cytokines, chemicals our immune systems produce while fighting an infection, are powerful sleep-inducing chemicals. Sleep may help the body conserve energy and other resources that the immune system needs to mount an attack.

Sleeping problems occur in almost all people with mental disorders, including those with depression and schizophrenia. People with depression, for example, often awaken in the early hours of the morning and find themselves unable to get back to sleep. The amount of sleep a person gets also strongly influences the symptoms of mental disorders. Sleep deprivation is an effective therapy for people with certain types of depression, while it can actually cause depression in other people. Extreme sleep deprivation can lead to a seemingly psychotic state of paranoia and hallucinations in otherwise healthy people, and disrupted sleep can trigger episodes of mania (agitation and hyperactivity) in people with manic depression.

Sleeping problems are common in many other disorders as well, including Alzheimer’s disease, stroke, cancer, and head injury. These sleeping problems may arise from changes in the brain
regions and neurotransmitters that control sleep, or from the drugs used to control symptoms of other disorders. In patients who are hospitalized or who receive round-the-clock care, treatment schedules or hospital routines also may disrupt sleep. The old joke about a patient being awakened by a nurse so he could take a sleeping pill contains a grain of truth. Once sleeping problems develop, they can add to a person’s impairment and cause confusion, frustration, or depression. Patients who are unable to sleep also notice pain more and may increase their requests for pain medication. Better management of sleeping problems in people who have other disorders could improve these patients’ health and quality of life.

**Sleep Disorders**

At least 40 million Americans each year suffer from chronic, long-term sleep disorders each year, and an additional 20 million experience occasional sleeping problems. These disorders and the resulting sleep deprivation interfere with work, driving, and social activities. They also account for an estimated $16 billion in medical costs each year, while the indirect costs due to lost productivity and other factors are probably much greater. Doctors have described more than 70 sleep disorders, most of which can be managed effectively once they are correctly diagnosed. The most common sleep disorders include insomnia, sleep apnea, restless legs syndrome, and narcolepsy.

**Insomnia**

Almost everyone occasionally suffers from short-term insomnia. This problem can result from stress, jet lag, diet, or many other factors. Insomnia almost always affects job performance and well-being the next day. About 60 million Americans a year have insomnia frequently or for extended periods of time, which leads to even more serious sleep deficits. Insomnia tends to increase with age and affects about 40 percent of women and 30 percent of men. It is often the major disabling symptom of an underlying medical disorder.
For short-term insomnia, doctors may prescribe sleeping pills. Most sleeping pills stop working after several weeks of nightly use, however, and long-term use can actually interfere with good sleep. Mild insomnia often can be prevented or cured by practicing good sleep habits. For more serious cases of insomnia, researchers are experimenting with light therapy and other ways to alter circadian cycles.

**Sleep Apnea**

Sleep apnea is a disorder of interrupted breathing during sleep. It usually occurs in association with fat buildup or loss of muscle tone with aging. These changes allow the windpipe to collapse during breathing when muscles relax during sleep. This problem, called *obstructive sleep apnea*, is usually associated with loud snoring (though not everyone who snores has this disorder). Sleep apnea also can occur if the neurons that control breathing malfunction during sleep.

During an episode of obstructive apnea, the person’s effort to inhale air creates suction that collapses the windpipe. This blocks the air flow for 10 seconds to a minute while the sleeping person struggles to breathe. When the person’s blood oxygen level falls, the brain responds by awakening the person enough to tighten the upper airway muscles and open the windpipe. The person may snort or gasp, then resume snoring. This cycle may be repeated hundreds of times a night. The frequent awakenings that sleep apnea patients experience leave them continually sleepy and may lead to personality changes such as irritability or depression. Sleep apnea also deprives the person of oxygen, which can lead to morning headaches, a loss of interest in sex, or a decline in mental functioning. It also is linked to high blood pressure, irregular heartbeats, and an increased risk of heart attacks and stroke. Patients with severe, untreated sleep apnea are two to three times more likely to have automobile accidents than the general population. In some high-risk individuals, sleep apnea may even lead to sudden death from respiratory arrest during sleep.
An estimated 18 million Americans have sleep apnea. However, few of them have had the problem diagnosed. Patients with the typical features of sleep apnea, such as loud snoring, obesity, and excessive daytime sleepiness, should be referred to a specialized sleep center that can perform a test called polysomnography. This test records the patient’s brain waves, heartbeat, and breathing during an entire night. If sleep apnea is diagnosed, several treatments are available. Mild sleep apnea frequently can be overcome through weight loss or by preventing the person from sleeping on his or her back. Other people may need special devices or surgery to correct the obstruction. People with sleep apnea should never take sedatives or sleeping pills, which can prevent them from awakening enough to breathe.

Restless Legs Syndrome

Restless legs syndrome (RLS), a familial disorder causing unpleasant crawling, prickling, or tingling sensations in the legs and feet and an urge to move them for relief, is emerging as one of the most common sleep disorders, especially among older people. This disorder, which affects as many as 12 million Americans, leads to constant leg movement during the day and insomnia at night. Severe RLS is most common in elderly people, though symptoms may develop at any age. In some cases, it may be linked to other conditions such as anemia, pregnancy, or diabetes.

Many RLS patients also have a disorder called periodic limb movement disorder or PLMD, which causes repetitive jerking movements of the limbs, especially the legs. These movements occur every 20 to 40 seconds and cause repeated awakening and severely fragmented sleep. In one study, RLS and PLMD accounted for a third of the insomnia seen in patients older than age 60.

RLS and PLMD often can be relieved by drugs that affect the neurotransmitter dopamine, suggesting that dopamine abnormalities underlie these disorders’ symptoms. Learning how these disorders occur may lead to better therapies in the future.
Narcolepsy

Narcolepsy affects an estimated 250,000 Americans. People with narcolepsy have frequent “sleep attacks” at various times of the day, even if they have had a normal amount of night-time sleep. These attacks last from several seconds to more than 30 minutes. People with narcolepsy also may experience cataplexy (loss of muscle control during emotional situations), hallucinations, temporary paralysis when they awaken, and disrupted night-time sleep. These symptoms seem to be features of REM sleep that appear during waking, which suggests that narcolepsy is a disorder of sleep regulation. The symptoms of narcolepsy typically appear during adolescence, though it often takes years to obtain a correct diagnosis. The disorder (or at least a predisposition to it) is usually hereditary, but it occasionally is linked to brain damage from a head injury or neurological disease.

Once narcolepsy is diagnosed, stimulants, antidepressants, or other drugs can help control the symptoms and prevent the embarrassing and dangerous effects of falling asleep at improper times. Naps at certain times of the day also may reduce the excessive daytime sleepiness.

In 1999, a research team working with canine models identified a gene that causes narcolepsy—a breakthrough that brings a cure for this disabling condition within reach. The gene, hypocretin receptor 2, codes for a protein that allows brain cells to receive instructions from other cells. The defective versions of the gene encode proteins that cannot recognize these messages, perhaps cutting the cells off from messages that promote wakefulness. The researchers know that the same gene exists in humans, and they are currently searching for defective versions in people with narcolepsy.

The Future

Sleep research is expanding and attracting more and more attention from scientists. Researchers now know that sleep is an active and dynamic state that greatly influences our waking hours,
and they realize that we must understand sleep to fully understand
the brain. Innovative techniques, such as brain imaging, can now
help researchers understand how different brain regions function
during sleep and how different activities and disorders affect
sleep. Understanding the factors that affect sleep in health and
disease also may lead to revolutionary new therapies for sleep
disorders and to ways of overcoming jet lag and the problems
associated with shift work. We can expect these and many other
benefits from research that will allow us to truly understand
sleep’s impact on our lives.

NATURAL PATTERNS OF SLEEP

Our bodies require sleep in order to maintain proper function
and health. In fact, we are programmed to sleep each night as a
means of restoring our bodies and minds. Two interacting
systems—the internal biological clock and the sleep-wake
homeostat—largely determine the timing of our transitions from
wakefulness to sleep and vice versa. These two factors also explain
why, under normal conditions, we typically stay awake during the
day and sleep at night. But what exactly happens when we drift
off to sleep? Before the era of modern sleep research in the early
1920s, scientists regarded sleep as an inactive brain state. It was
genерally accepted that as night fell and sensory inputs from the
environment diminished, so too did brain function. In essence,
scientists thought that the brain simply shut down during sleep,
only to restart again when morning came.

EEGs are used in sleep studies to monitor brain activity during
various stages of sleep.
In 1929, an invention that enabled scientists to record brain activity challenged this way of thinking. From recordings known as electroencephalograms (EEGs), researchers could see that sleep was a dynamic behavior, one in which the brain was highly active at times, and not turned off at all. Over time, sleep studies using EEGs and other instruments that measured eye movements and muscle activity would reveal two main types of sleep. These were defined by characteristic electrical patterns in a sleeping person’s brain, as well as the presence or absence of eye movements.

An EEG of typical REM sleep.

The two main types of sleep are rapid-eye-movement (REM) sleep and non-rapid-eye-movement (NREM) sleep. On an EEG, REM sleep, often called “active sleep,” is identifiable by its characteristic low-amplitude(small), high-frequency (fast) waves and alpha rhythm, as well as the eye movements for which it is named. Many sleep experts think that these eye movements are in some way related to dreams. Typically, when people are awakened from REM sleep, they report that they had been dreaming, often extremely vivid and sometimes bizarre dreams. In contrast, people report dreaming far less frequently when awakened from NREM sleep. Interestingly, during REM sleep muscles in the arms and legs are temporarily paralyzed. This is thought to be a neurological barrier that prevents us from “acting out” our dreams.

NREM sleep can be broken down into three distinct stages: N1, N2, and N3. In the progression from stage N1 to N3, brain waves become slower and more synchronized, and the eyes remain still. In stage N3, the deepest stage of NREM, EEGs reveal high-
amplitude (large), low-frequency (slow) waves and spindles. This stage is referred to as “deep” or “slow-wave” sleep.

In healthy adults, sleep typically begins with NREM sleep. The pattern of clear rhythmic alpha activity associated with wakefulness gives way to N1, the first stage of sleep, which is defined by a low-voltage, mixed-frequency pattern. The transition from wakefulness to N1 occurs seconds to minutes after the start of the slow eye movements seen when a person first begins to nod off. This first period of N1 typically lasts just one to seven minutes. The second stage, or N2, which is signaled by sleep spindles and/or K complexes in the EEG recording, comes next and generally lasts 10 to 25 minutes. As N2 sleep progresses, there is a gradual appearance of the high-voltage, slow-wave activity characteristic of N3, the third stage of NREM sleep. This stage, which generally lasts 20 to 40 minutes, is referred to as “slow-wave,” “delta,” or “deep” sleep. As NREM sleep progresses, the brain becomes less responsive to external stimuli, and it becomes increasingly difficult to awaken an individual from sleep.

Following the N3 stage of sleep, a series of body movements usually signals an “ascent” to lighter NREM sleep stages. Typically, a 5- to 10-minute period of N2 precedes the initial REM sleep episode. REM sleep comprises about 20 to 25 percent of total sleep in typical healthy adults.

NREM sleep and REM sleep continue to alternate through the night in a cyclical fashion. Most slow-wave NREM sleep occurs in the first part of the night; REM sleep episodes, the first of which may last only one to five minutes, generally become longer through the night. During a typical night, N3 sleep occupies less time in the second cycle than the first and may disappear altogether from later cycles. The average length of the first NREM-REM sleep cycle is between 70 and 100 minutes; the average length of the second and later cycles is about 90 to 120 minutes. The reason for such a specific cycling pattern of NREM and REM sleep across the night is unknown. Some scientists speculate that specific sequences of NREM and REM sleep optimize both physical and mental
recuperation as well as some aspects of memory consolidation that occur during sleep, but this has not been confirmed.

**Shifting Sleep Patterns**

Sleep patterns can be affected by many factors, including age, the amount of recent sleep or wakefulness, the time of the day or night relative to an individual’s internal clock, other behaviors prior to sleep such as exercise, stress, environmental conditions such as temperature and light, and various chemicals.

For instance, for the first year of life, sleep often begins in the REM state. The cyclical alternation of NREM-REM sleep in newborns is present from birth but at 50 to 60 minutes is much shorter than the 90-minute cycles that occur in adults. Consolidated nocturnal sleep and fully developed EEG patterns of the NREM sleep stages emerge only after two to six months. Slow-wave sleep is greatest in young children and it decreases steadily with age, even if sleep duration does not change. This may be related to changes in the structure and function of the brain.

Sleep history—the quantity and quality of an individual’s sleep in recent days—can also have dramatic effects on sleep patterns. Repeatedly missing a night’s sleep, an irregular sleep schedule, or frequent disturbance of sleep can result in a redistribution of sleep stages, for instance, prolonged and deeper periods of slow-wave NREM sleep. Drugs may affect sleep stages as well. For example, alcohol before sleep tends to suppress REM sleep early in the night. As the alcohol is metabolized later in the night, REM sleep rebounds. However, awakenings also become more frequent during this time.

To learn more about the many factors that affect sleep patterns, see External Factors That Influence Sleep.

**Daytime Napping**

Although it is common for people in various western societies to sleep in a single consolidated block of about eight hours during the night, this is by no means the only sleep pattern. In fact,
following this schedule and foregoing an afternoon nap would seem highly abnormal to many people around the world.

Daytime napping helps to restore one's energy and alertness.

In various cultures, particularly those with roots in tropical regions, afternoon napping is commonplace and is built into daily routines. And although the exact timing of naps is not officially scheduled, it is not uncommon for stores and government offices to close and for many activities to stop for an hour or two every afternoon.

Afternoon naptime typically coincides with a brief lag in the body’s internal alerting signal. This signal, which increases throughout the day to offset the body’s increasing drive to sleep, wanes slightly in mid-afternoon, giving sleep drive a slight edge. Napping also typically happens during the warmest period of the day and generally follows a large mid-day meal, which explains why afternoon sleepiness is so often associated with warm afternoon sun and heavy lunches.

Afternoon naps for most people typically last between 30 and 60 minutes. Any longer and there is a risk of falling into deep sleep and having a difficult time waking. Following a nap, having dissipated some of the accumulated sleep drive, many people
report feeling better able to stay awake and alert in the late afternoon and evening. This increased alertness typically causes people to go to bed later and generally to sleep less at night than people who do not take naps.

According to sleep experts, napping can be a good way for people who do not sleep well at night to catch up. They do caution, however, that people with insomnia may make their nighttime sleep problem worse by sleeping during the day. Otherwise, they generally recommend naps for people who feel they benefit from them.

IMPACT OF FOOD AND DRUGS ON SLEEP

Hypnotics

• Nonbenzodiazepine hypnotics such as eszopiclone (Lunesta), zaleplon (Sonata), and zolpidem (Ambien) are commonly used as sleep aids prescribed by doctors to treat forms of insomnia. Nonbenzodiazepines are the most commonly prescribed and over-the-counter sleep aids used worldwide and have been greatly growing in use since the 1990s. They target the GABA_A receptor.

• Benzodiazepines target the GABA_A receptor also, and as such, they are commonly used sleep aids as well, though benzodiazepines have been found to decrease REM sleep.

• Antihistamines, such as diphenhydramine (Benadryl) and doxylamine (found in various OTC medicines, such as NyQuil)

• Alcohol (ethanol) – Often, people start drinking alcohol in order to get to sleep (alcohol is initially a sedative and will cause somnolence, encouraging sleep). However, being addicted to alcohol can lead to disrupted sleep, because alcohol has a rebound effect later in the night. As a result, there is strong evidence linking alcoholism and forms of insomnia. Alcohol also reduces REM sleep.

• Barbiturates cause drowsiness and have actions similar to alcohol in that they have a rebound effect and inhibit REM sleep, so they are not used as a long-term sleep aid.
Melatonin is a naturally occurring hormone that regulates sleepiness. It is made in the brain, where tryptophan is converted into serotonin and then into melatonin, which is released at night by the pineal gland to induce and maintain sleep. Melatonin supplementation may be used as a sleep aid, both as a hypnotic and as a chronobiotic (see phase response curve, PRC).

Siesta and the “post-lunch dip” – Many people have a temporary drop in alertness in the early afternoon, commonly known as the “post-lunch dip.” While a large meal can make a person feel sleepy, the post-lunch dip is mostly an effect of the circadian clock. People naturally feel most sleepy at two times of the day about 12 hours apart—for example, at 2:00 a.m. and 2:00 p.m. At those two times, the body clock “kicks in.” At about 2 p.m. (14:00), it overrides the homeostatic buildup of sleep debt, allowing several more hours of wakefulness. At about 2 a.m. (02:00), with the daily sleep debt paid off, it “kicks in” again to ensure a few more hours of sleep.

Tryptophan – The amino acid tryptophan is a building block of proteins. It has been claimed to contribute to sleepiness, since it is a precursor of the neurotransmitter serotonin, involved in sleep regulation. However, no solid data have ever linked modest dietary changes in tryptophan to changes in sleep.

Cannabis – Some people use cannabis to induce sleepiness. Users often report relaxation and drowsiness. It has been shown that tetrahydrocannabinol (THC), the principal psychoactive constituent in cannabis, reduces the amount of REM sleep. Frequent users often report being unable to recall their dreams.

Stimulants

• Amphetamine (dextroamphetamine, and a related, slightly more powerful drug methamphetamine, etc.) are used to treat narcolepsy. Their most common effects are anxiety, insomnia, stimulation, increased alertness, and decreased hunger.
• Caffeine is a stimulant that works by slowing the action of the hormones in the brain that cause somnolence, particularly by acting as an antagonist at adenosine receptors. Effective dosage is individual, in part dependent on prior usage. It can cause a rapid reduction in alertness as it wears off.

• Cocaine and crack cocaine – Studies on cocaine have shown its effects to be mediated through the circadian rhythm system. This may be related to the onset of hypersomnia (oversleeping) in regard to “cocaine-induced sleep disorder.”

• MDMA, including similar drugs like MDA, MMDA, or bk-MDMA – The class of drugs called empathogen-entactogens keep users awake with intense euphoria.

• Methylphenidate – Commonly known by the brand names Ritalin and Concerta, methylphenidate is similar in action to amphetamine and cocaine; its chemical composition more closely resembles that of cocaine.

• Other analeptic drugs like Modafinil and Armodafinil are prescribed to treat narcolepsy, idiopathic hypersomnia, shift work sleep disorder, and other conditions causing excessive daytime sleepiness. The precise mechanism of these central nervous system (CNS) stimulants is not known, but they have been shown to increase both the release of monoamines and levels of hypothalamic histamine, thereby promoting wakefulness.

Nutritional effects on sleep

Dietary and nutritional choices affect sleep duration and quality. Research is being conducted in an attempt to discover what kinds of nutritional choices result in better sleep quality.

A study in the Western Journal of Nursing Research in 2011 compared how sleep quality was affected by four different diets: a high-protein diet, a high-fat diet, a high-carbohydrate diet, and a control diet. Results indicated that the diets high in protein resulted in fewer wakeful episodes during night-time sleep. The
high carbohydrate diet was linked to much shorter periods of quiescent or restful sleep. These results suggest that ingested nutrients do play a role in determining sleep quality. Another investigation published in *Nutrition Research* in 2012 examined the effects of various combinations of dietary choices in regard to sleep. Although it is difficult to determine one perfect diet for sleep enhancement, this study indicated that a variety of micro and macro nutrients are needed to maintain levels of healthful and restful sleep. A varied diet containing fresh fruits and vegetables, low-fat proteins, and whole grains can be the best nutritional option for individuals seeking to improve the quality of their sleep.

**SLEEP'S ANTHROPOLOGY**

Research suggests that sleep patterns vary significantly across cultures. The most striking differences are between societies that have plentiful sources of artificial light and ones that do not. The primary difference appears to be that pre-light cultures have more broken-up sleep patterns. For example, people without artificial light might go to sleep far sooner after the sun sets, but then wake up several times throughout the night, punctuating their sleep with periods of wakefulness, perhaps lasting several hours.

The boundaries between sleeping and waking are blurred in these societies. Some observers believe that nighttime sleep in these societies is most often split into two main periods, the first characterized primarily by deep sleep and the second by REM sleep.

Some societies display a fragmented sleep pattern in which people sleep at all times of the day and night for shorter periods. In many nomadic or hunter-gatherer societies, people will sleep on and off throughout the day or night depending on what is happening. Plentiful artificial light has been available in the industrialized West since at least the mid-19th century, and sleep patterns have changed significantly everywhere that lighting has been introduced. In general, people sleep in a more concentrated
burst through the night, going to sleep much later, although this is not always true.

Historian Roger Ekirch thinks that the traditional pattern of “segmented sleep,” as it is called, began to disappear among the urban upper class in Europe in the late 17th century and the change spread over the next 200 years; by the 1920s “the idea of a first and second sleep had receded entirely from our social consciousness.” Ekirch attributes the change to increases in “street lighting, domestic lighting and a surge in coffee houses,” which slowly made nighttime a legitimate time for activity, decreasing the time available for rest. Today in most societies people sleep during the night, but in very hot climates they may sleep during the day.

During Ramadan, many Muslims sleep during the day rather than at night and people working nights try to sleep in the daytime. In some societies, people generally sleep with at least one other person (sometimes many) or with animals. In other cultures, people rarely sleep with anyone but a most intimate relation, such as a spouse.

In almost all societies, sleeping partners are strongly regulated by social standards. For instance, a person might only sleep with the immediate family, the extended family, a spouse or romantic partner, children, children of a certain age, children of specific gender, peers of a certain gender, friends, peers of equal social rank, or with no one at all. Sleep may be an actively social time, depending on the sleep groupings, with no constraints on noise or activity.

People sleep in a variety of locations. Some sleep directly on the ground; others on a skin or blanket; others sleep on platforms or beds. Some sleep with blankets, some with pillows, some with simple headrests, some with no head support. These choices are shaped by a variety of factors, such as climate, protection from predators, housing type, technology, personal preference, and the incidence of pests.
ABOUT SLEEP STAGES AND GETTING BETTER QUALITY SLEEP

Various Stages of Sleep

The suprachiasmatic nucleus (SCN) was identified in the 1970s as the location of the internal clock. This is the brain’s pacemaker, its “traffic cop” regulating the sleep/wake cycle. This cell cluster is part of the hypothalamus, the brain center that regulates appetite and other biological states. Melatonin, the sleep hormone is produced by the pineal gland deep inside the brain in a daily rhythm controlled by light.

Melatonin levels increase after dark and fall off after dawn. Melatonin induces drowsiness as its light-sensitive cycles help keep our circadian rhythms operating normally. Activity in the brain stem and the chemical messengers they produce help to coordinate the timing of wakefulness, arousal, and the stages of sleep.
Sleep is a very complex activity. During the night we go through several 90-minute sleep cycles. Sleep can be categorized into two major types: rapid eye movement (REM) sleep or dreaming sleep, and non-REM or quiet sleep, which consists of three distinct phases.

**Stage I: Drowsiness**

This stage lasts for about five minutes once your head hits the pillow and is that stage between wakefulness and sleep. Brainwaves slow down into the theta range of 4-7Hz. During this phase, body temperature begins to drop and muscles begin to relax. It is easy to be brought back to full waking awareness while in this phase.

**Stage II: Light Sleep**

We spend about half our sleeping hours in Stage II light sleep. After passing through the first stage, brainwaves settle into an alpha brainwave 10Hz rhythmic pattern. Large, slow wave brainwave activity intermingles with short second-long bursts of activity called sleep spindles, when brain waves speed up.

It is during the lighter sleep phase when beta activity can “spike” or suddenly rise, causing us to wake up. So instead of remaining in alpha wave or low intensity beta dreaming state, we are so anxious it knocks us right out of the sleep cycle and we awaken. This increases our anxiety and stress. It becomes a damaging, repetitive cycle of negativity. When this condition becomes chronic, it can lead to serious and debilitating health and psychological issues. Stress can cause our mind to shift into a combination of fast, high intensity brainwaves. In this state, we are not so much solving problems as just thinking about them.

**REM Sleep: Dreaming**

Generally we experience 3-5 stages of REM sleep during the night with every 90-minute cycle. These stages increase in length as the night progresses. REM sleep restores mental functioning and is important for absorption of learned material or event of the day for learning, memory and overall mental functioning. This is
the stage where the body is paralyzed while the brain is active. It is thought that this paralysis is a nature defense mechanism to avoid harming or waking ourselves while dreaming.

Our sympathetic nervous system creates the fight-or-flight response and is twice as active as when awake. It is the stage when the eyes move rapidly back and forth so we are asleep but actually mentally quite active. During this stage, body temperature rises along with blood pressure and heart rate. Breathing patterns match daytime levels.

**Stage III: Deep Sleep**

This is known as large, slow-wave sleep with brainwave patterns in the .05 – 3Hz delta range. This stage allows us restorative sleep for healing and growth. This is deep sleep that is difficult to wake up from. This stage is critical for physical functioning.

When we are young, about 1/5th of our time is spent in the Stage. However, as we grow older, this stage significantly reduces in length to the point that by the age of 65 it is nearly absent in most people.

Other physiological responses taking place during this slow-wave stage include reduced blood flow to the brain, cooling the brain. Also, breathing becomes more regular, pulse slows considerably along with blood pressure. The immune system is activated during this phase helping the body defend against infection.

**Correcting for Disturbed Sleep**

It is often in Stage II that sleep is interrupted by an over-active mind. These are known as mental loops where sources of stress and frustration come to the surface. MindSpa’s programs help to disrupt these mental loops by helping to drive the brain back toward natural alpha state relaxation rhythms, allowing the mind and body to relax. An added alpha state benefit is it allows us to tap into the creative, problem-solving part of our brain while sleeping.
With regular use, the mind will naturally attune to these alpha waves quieting and slowing down our internal dialog. When relaxed, we can fall asleep and stay asleep more easily. The quality of your sleep will improve ultimately resulting in a better quality of life.

**Our CalmBlue LED Glasses and Best Time for Use**

Our CalmBlue glasses are to help with SAD (Seasonal Affective Disorder and winter depression), jet lag. If your issue is not staying asleep but falling asleep too early in the evening, particularly for the older person, or not being able to fall asleep until late at night, blue light can help resolve this issue. In the simplest terms, if you are falling asleep too early you need to reset your body clock. Use the blue leds late in the afternoon or early evening for about 40-60 minutes with eyes closed or open.

If you are falling asleep too late and want to go to sleep earlier, use the blue led glasses early in the morning for 40-60 minutes preferably with eyes open, though eyes closed is effective as well.

You can even put them on and go back to sleep as the melonopsin photoreceptors in your retina are effected by blue light and are affected whether we are awake or asleep. Get lots of natural light in the morning and avoid sunglasses.

For our mental health and physical well being. A lack of deep sleep can lead to reduced concentration and memory functions, mood alterations, depression and fatigue. A recent study published in the Journal of the American Medical Association finds that sleeping less than seven and a half hours a day may be associated with a greater risk for heart disease, hypertension and other serious health-related issues.

**Stress & Anxiety**

Various sleep issues are stress related. When stressed, we tend to create mental loops. This is most noticeable in the quiet of the night when our inner dialog takes over. It is during these quiet periods our mind tends to get stuck on problems commonly related
to finances, work, health, or relationships making quality sleep difficult to attain. We have all experienced these high-intensity “mental loops” at different times. In the morning we wake up feeling exhausted, anxious and agitated. Stress-caused sleep disruption can result on seriously impacting our decision making abilities and our physical functioning. The American Academy of Sleep Medicine reports people with chronic stress report shorter sleep duration, worse sleep quality, and more daytime functioning impairments, according to new research.

Conversely, daytime functioning impairments and shorter sleep duration demonstrated a predictive relationship with habitual stress complaints.

**Brainwave Activity**

Think of brainwaves like ocean waves. They are measured on two scales; height and frequency of the waves. Normal beta brainwave activity is associated with the regular, active thinking process. When we are stressed, mental loops will cause our mind to shift to a high “beta” activity state. As we explain on our Brainwave States section, high amplitude, fast beta brainwave activity generally reflects a state of heightened anxiety or stress accompanied by feelings of agitation and discomfort due to mental over-activity. This is related to what is commonly known as the fight or flight state. When the high amplitude beta state is maintained for extended periods it leaves us feeling drained of energy and over time can erode our physical and emotional well-being resulting in a variety of health issues.

Using MindSpa’s relaxation programs can significantly help to reduce certain undesirable high amplitude activity in just a few weeks. Many reports experiencing immediate effectiveness. When you encounter common stress producing situations you will be better able to maintain an inner calmness with enhanced control of your life. Conversely, when you feel like you need a quick pick up, or when you just do not feel as mentally sharp as you would like to feel, MindSpa can help here as well.
Steps to de-stress

In our Reduce Stress and Five Elements sections we cover a series of small, simple steps you can take in addition to using MindSpa that will help you. To show you how it works, right now pay attention to your facial muscles. Find any tension spots and relax those areas.

Now notice your breathing. Take a nice deep breath, and let it out. While doing these simple body awareness exercises, you are actually generating more alpha brainwave activity. These exercises can be practiced virtually anywhere at any time to help reduce stress.

The effect is magnified when used in conjunction with MindSpa on a regular basis. We want to help you incorporate these and other relaxation techniques into your daily life. You will experience a positive difference!

MindSpa for Late at Night

Another common question is how to use MindSpa at night. While a number of our customers are reporting success getting to sleep or falling back to sleep using MindSpa at night, in general, we suggest avoiding use at night as the lights can disrupt circadian rhythms.

As some find the lights too stimulating for use in the middle of the night the question comes up, “Then how do I use MindSpa for sleep if not at night?” Think of its use in the long-term. We are helping you reduce the root cause for insomnia by helping you train your mind to be quieter and calmer over time and by helping you get proper levels of light when your body needs them most.

Optionally, if you wish to use MindSpa at night, you can effectively use the sound alone without the lights to help you fall back asleep. Just set it to any one of the relaxation sessions and allow it to run. Keep the volume low. If you fall asleep in the meantime, MindSpa will automatically switch off at the end of the session.
The Power Nap Process

Another common use for MindSpa is power napping. There is a rapidly growing body of scientific evidence demonstrating daily naps are a highly productive use of time promoting better health, mental alertness, creativity and problem solving, better memory and concentration, increases in worker and student efficiency, accuracy and output and helps older people lead more active lives. One recent Japanese study demonstrated student test scores markedly increased with daily naps.

Besides many health benefits, naps have an overall positive performance impact. We highly suggest making naps using MindSpa an integral part of your daily regimen.

Sleeping and Napping

The process of taking a nap while using MindSpa is distinct from sleep. Sleeping is primarily a regenerative process following a regular, 90 minute cyclic pattern of deep, dreamless sleep to light (REM) sleep. Napping is primarily a performance-based process where you remain at the edge of consciousness in a sleep-like state for a relatively short period of time. Sleeping and napping both help to enhance information processing and learning.

A “Power Nap” is as little as 10 minutes but typically 20 – 40 minute period of revitalization resulting in increased energy and productivity, and provides reduction in feelings of stress and anxiety. The effect is cumulative when practiced on a regular basis for providing both short and long-term benefits. A study by NASA’s Fatigue Countermeasures Program found that pilots who took a short nap improved their performance by 34% and their alertness by 54%.

Among the best times for power napping are when you feel a general lowering of your energy level as commonly experienced in early or mid-afternoon.

Generally, one power nap during the day or early evening is quite sufficient.
Imbalances in circadian rhythms are another major cause of sleep disruption. We are light-regulated beings. A lack of proper daily light will disrupt our internal body clock. MindSpa can assist by providing the correct does of blue light for resetting rhythms when natural light in sufficient quantities is not available.

A major issue is not receiving enough beneficial light in the morning and late afternoon when it is most required. Too many wear sunglasses as protection or for comfort. But in the morning, this effectively blocks beneficial blue sky light. It is very significant to get at least 45 minutes of unfiltered natural morning light. Keep in mind that many car windows and building windows block much of this light. Chronic overuse of sunglasses can for some create symptoms very similar to season affective disordered depression (SADS). According to research at Stanford University, MIT and Harvard, late morning and afternoon light has little or no effect on melatonin production. However, late afternoon/ early evening light is important to balance your sleep/wake cycle. Bottom line: zig you are suffering from insomnia, get as much natural light as you can in the morning especially. You will find with time an improvement in your overall sleep patterns.

**Our Internal Body Clock**

Light is a powerful regulator of the human circadian system, our biological clock, the “body clock.” The circadian rhythm is the internal 24 hour clock controlling physiological changes that occur with the natural light-dark cycle of the day.

The SCN or suprachiasmatic nucleus acts as the central processing system for our biological clock. It is located in a part of the brain, the hypothalamus, just above the point where the optic nerves cross. Light reaches photoreceptors in the back of the eye, the retina, generating signals that travel along the optic nerve to several areas of the brain including the SCN, which is a non-visual part of the brain. In addition to sleep/wake cycle regulation, the SCN also plays a primary role in hormone secretion, body temperature and blood pressure regulation, among other daily
functions. In the presence of light, or the lack thereof, signals from the SCN travel to various parts of the brain, including the pineal gland. Among its responsibilities, the pineal gland controls production of the hormone melatonin, the sleep hormone.

Melatonin levels normally increase in the absence of light. Exposure to specific light frequencies suppresses melatonin production for several hours. Melatonin makes us feel drowsy and plays a role in mood change. However, this only begins to describe the critical role Melatonin plays in regulating body function. We suggest further independent reading on its role. Click here (University of Maryland Medical Center) for one of many useful links on Melatonin and circadian rhythms.

The Retina and our Body Clock

The retina contains three types of specialized photoreceptors that respond to the visible light spectrum. Visible light ranges from approximately 370 nm to 730 nm, indigo to red. These photoreceptors consist of the rods, cones and the recently discovered light/dark receptors also referred to as the melanopsin photo receptor cells.

The rods are the most numerous photoreceptors, and the most sensitive to light, but are not sensitive to color. The retina contains approximately 110 – 125,000,000 rods. They are primarily responsible for dim light vision. The rods peak in the blue range and have almost no response to red light. Known as the scotopic photoreceptor system, the peak wavelength sensitivity is 507 nm, the green/blue-green color range. The cones are color sensitive and divided primarily into red and green cones with a small percentage of blue cones. There are approximately 6.5 million cones in the retina divided into approximately 64% red sensitive cones, 32% green cones, and 2% blue cones.

The blue cones are more sensitive to light than the red or green cones. The cones are responsible for high resolution vision known as photopic photoreceptor system. The cones have a peak wavelength sensitivity of 555 nm, the green spectrum.
The Melatonin Action Spectrum

This is where it becomes interesting. In 1998 scientists discovered a specialized set of cells in the retina that respond specifically to short wavelength blue light in the 446-483 nanometer (nm) range. This is also the wavelength of the clear, blue sky. Called the action spectrum, this blue light wavelength band plays a major role in aligning and resetting the body clock through the control of release of the sleep hormone, melatonin.

The melanopsin receptors are independent of the classic rod and cone photoreceptors used for vision, and are not part of the visual system. They are active even with eyes closed and while asleep. It is theorized that blue sky exposure is how these ganglion cell photoreceptors evolved their specialized purpose.

These photoreceptors regulate circadian rhythms primarily via melatonin secretion. When exposed to this specific band, melatonin production is suppressed for several hours. The MindSpa CalmBlue glasses are tuned within a few nanometers of the peak frequency range making them very effective for resetting the body clock.

Circadian Rhythm Disorders

Circadian rhythm disorders are typically related to sudden and/or extreme changes in the relationship between exposure to environmental light and activity. For example, circadian rhythm disorders are known to be associated with change in geographical location (jet lag), aging, and night activity (night time shift workers). Another common type of circadian rhythm disorder is seasonal affective disorder (SAD), which is characterized by symptoms such as lethargy and depression during the winter seasons when the duration of daylight is reduced. Due to decreased light exposure melatonin production continues during the waking hours.

Symptoms much like jet lag are common in people who work nights or who perform shift work. Because shift work schedules are at odds with powerful sleep-regulating cues like sunlight, they
often become uncontrollably drowsy during work, and they may suffer insomnia or other problems when they try to sleep.

Shift workers have an increased risk of heart problems, digestive disturbances, and emotional and mental problems, all of which may be related to their sleeping problems.

The number and severity of workplace accidents also tend to increase during the night shift. Recent evidence suggests it may be possible to reduce shift-related fatigue by exposure to specific frequencies of blue light in the workplace, minimizing shift changes, and taking scheduled naps. A John Hopkins study found that chronic exposure to bright light at night, even light normally experienced in a typical living room, can elevate certain stress related hormones in the body, which results in depression and lowers cognitive functioning.

Sunlight also causes other changes in the body, such as increases in serotonin production. Serotonin neurotransmitter production increases when a person is exposed to sunlight. Low levels of serotonin are associated with depression and mood swings. Along with using MindSpa, it is important to get as much light as possible every day for health, balance and general well-being. This becomes even more necessary in the winter when light levels are low.

Another Common Reasons Causes for Disruption of Sleep

Recent published research is reinforcing the fact that there is a direct link between exercise and diet at the root cause of sleep disruption in many cases. Exercise is among the best stress reduction methods known to man. Published research also establishes a link between stress reduction and how it affects an individual’s ability to maintain a healthy weight. Read our Five Elements Program where you will learn more about what you can do to improve sleep and your have a long-term, positive impact on your quality of life.
Drugs to Treat Insomnia and Sleep

In few cases, doctors will prescribe drugs for the treatment of insomnia. All insomnia medications should be taken some time before bed. Do not attempt to drive or perform other activities that require concentration after taking an insomnia drug because it will make you sleepy. Medications should be used in combination with good sleep practices.

Listed below are some drugs that can be used to treat insomnia.

- **zolpidem (Ambien, Intermezzo)**: These medicines work well at helping you get to sleep, but some people tend to wake up in the middle of the night. Zolpidem is now available in an extended release version, Ambien CR. This may help you go to sleep and stay asleep longer. You should not take zolpidem unless you are able to get a full night’s sleep — at least 7 to 8 hours. The FDA has approved a prescription oral spray called Zolpimist, which contains zolpidem, for the short-term treatment of insomnia brought on by difficulty falling asleep.

- **eszopiclone (Lunesta)**: Lunesta also helps you fall asleep quickly, and studies show people sleep an average of seven to eight hours. Don’t take Lunesta unless you are able to get a full night’s sleep as it could cause grogginess. Because of the risk of impairment the next day, the FDA recommends the starting dose of Lunesta be no more than 1 mg.
Drugs to Treat Insomnia and Sleep

- ramelteon (Rozerem): This is a sleep medication that works differently than the others. It works by targeting the sleep-wake cycle, not by depressing the central nervous system. It is prescribed for people who have difficulty falling asleep. Rozerem can be prescribed for long-term use, and the drug has shown no evidence of abuse or dependence.

- zaleplon (Sonata): Of all the new sleeping pills, Sonata stays active in the body for the shortest amount of time. That means you can try to fall asleep on your own. Then, if you’re still staring at the clock at 2 a.m., you can take it without feeling drowsy in the morning. However, if you tend to wake during the night, this might not be the best choice for you.

- doxepine (Silenor): This sleep drug is approved for use in people who have trouble staying asleep. Silenor may help with sleep maintenance by blocking histamine receptors. Do not take this drug unless you are able to get a full seven or eight hours of sleep. Dosage is based on your health, age, and response to therapy.

- Benzodiazepines: These older sleeping pills — triazolam (Halcion), temazepam (Restoril), alprazolam (Xanax), and others — may be useful when you want an insomnia medication that stays in the system longer. For instance, they have been effectively used to treat sleep problems such as sleepwalking and night terrors. However, these drugs may cause you to feel sleepy during the day and can also cause dependence, meaning you may always need to be on the drug to be able to sleep.

- Antidepressants: Some antidepressant drugs, such as trazodone (Desyrel) and mirtazapine (Remeron), are particularly effective in treating sleeplessness and anxiety.

- Over-the-Counter Sleep Aids: Most of these sleeping pills are antihistamines. They generally work well but can cause some drowsiness the next day. They’re safe enough to be sold without a prescription. However, if you’re taking other drugs that also contain antihistamines — like cold
or allergy medications — you could inadvertently take too much.

**USE ETHANOL AND SLEEP**

Ethanol, the type of alcohol found in alcoholic beverages, can exacerbate sleep problems. During abstinence, sleep disruption is one of the greatest predictors of relapse.

**MODERATE ALCOHOL CONSUMPTION AND SLEEP DISRUPTIONS**

Moderate alcohol consumption 30–60 minutes before bedtime results in disruptions in sleep maintenance and sleep architecture that are mediated by blood alcohol levels. Disruptions in sleep maintenance are most marked once alcohol has been completely metabolized from the body. Under conditions of moderate alcohol consumption where blood alcohol levels average 0.06–0.08% and decrease 0.01–0.02% per hour, an alcohol clearance rate of 4–5 hours would coincide with disruptions in sleep maintenance in the second half of an 8-hour sleep episode. In terms of sleep architecture, moderate doses of alcohol facilitate “rebounds” in rapid eye movement (REM) and stage 1 sleep; following suppression in REM and stage 1 sleep in the first half of an 8-hour sleep episode, REM and stage 1 sleep increase well beyond baseline in the second half. Moderate doses of alcohol also increase slow wave sleep (SWS) in the first half of an 8-hour sleep episode. Enhancements in REM sleep and SWS following moderate alcohol consumption are mediated by reductions in glutamatergic activity by adenosine in the central nervous system. In addition, tolerance to changes in sleep maintenance and sleep architecture develops within 3 days of alcohol consumption before bedtime.

**ALCOHOL CONSUMPTION AND SLEEP IMPROVEMENTS**

During the weight low doses of alcohol (one 360.0 ml (13 imp fl oz; 12 US fl oz) beer) are sleep-promoting by increasing total
sleep time and reducing awakenings. The sleep-promoting benefits of alcohol dissipate at moderate and higher doses of alcohol (two 12 oz. beers and three 12 oz. beers, respectively). Previous experience with alcohol also determines whether or not alcohol is a “sleep promoter” or “sleep disrupter.”

Under free-choice conditions, in which subjects chose between drinking alcohol or water, inexperienced drinkers were sedated while experienced drinkers were stimulated following alcohol consumption. In insomniacs, moderate doses of alcohol improve sleep maintenance.

**Alcohol consumption and fatigue**

Sleepiness influences the severity of alcohol consumption. Conditions of sleep deprivation encourage more episodes of alcohol consumption. Increased alcohol consumption during the winter months for Northern climate residents is attributed to escalations in fatigue.

**Alcohol abstinence and sleep disruptions**

Sleep and hormonal disruptions following withdrawal from chronic alcohol consumption are the greatest predictors of relapse. During abstinence, recovering alcoholics have attenuated melatonin secretion in the beginning of a sleep episode, resulting in prolonged sleep latencies. Escalations in cortisol and core body temperatures during the sleep period contribute to poor sleep maintenance. Abstinent alcoholics tend to have lighter, more fragmented sleep than normal control subjects. Research indicates that it may take as long as one to two years for sleep to return to normal in abstinent alcoholics and that for some it may never return to normal.

**ALCOHOL’S SHORT-TERM EFFECTS**

The short-term effects of alcohol (ethanol) consumption—due to drinking beer, wine, distilled spirits or other alcoholic beverages—range from a decrease in anxiety and motor skills and euphoria
at lower doses to intoxication (drunkenness), stupor, unconsciousness, anterograde amnesia (memory “blackouts”), and central nervous system depression at higher doses. Cell membranes are very permeable to alcohol, so once alcohol is in the bloodstream it can diffuse into nearly every cell in the body.

The concentration of alcohol in blood is measured via blood alcohol content (BAC). The amount and circumstances of consumption play a large part in determining the extent of intoxication; for instance, eating a heavy meal before alcohol consumption causes alcohol to absorb more slowly.

The amount of alcohol consumed largely determines the extent of hangovers, although hydration also plays a role. After excessive drinking, stupor and unconsciousness can occur. Extreme levels of consumption can lead to alcohol poisoning and death (a concentration in the blood stream of 0.40% will kill half of those affected). Alcohol may also cause death indirectly, by asphyxiation from vomit.

Alcohol can greatly exacerbate sleep problems. During abstinence, residual disruptions in sleep regularity and sleep patterns are the greatest predictors of relapse.

**DIFFERENT EFFECTS OF ALCOHOL ON THE SUBJECT**

Different concentrations of alcohol in the human body have different effects on the subject.

The following lists the common effects of alcohol on the body, depending on the blood alcohol concentration (BAC). However, tolerance varies considerably between individuals, as does individual response to a given dosage; the effects of alcohol differ widely between people. Hence, BAC percentages are just estimates used for illustrative purposes.

**Euphoria (BAC = 0.03% to 0.12%)**

- Overall improvement in mood and possible euphoria
• Increased self-confidence
• Increased sociability
• Decreased anxiety
• Shortened attention span
• Flushed appearance
• Impaired judgment
• Impaired fine muscle coordination

**Lethargy (BAC = 0.09% to 0.25%)**
• Sedation
• Impaired memory and comprehension
• Delayed reactions
• Ataxia; balance difficulty; unbalanced walk
• Blurred vision; other senses may be impaired

**Confusion (BAC = 0.18% to 0.30%)**
• Profound confusion
• Impaired senses
• Analgesia
• Increased ataxia; impaired speech; staggering
• Dizziness often associated with nausea (“the spins”)
• Vomiting (emesis)

**Stupor (BAC = 0.25% to 0.40%)**
• Severe ataxia
• Lapses in and out of consciousness
• Unconsciousness
• Anterograde amnesia
• Vomiting (death may occur due to inhalation of vomit (pulmonary aspiration) while unconscious)
• Respiratory depression (potentially life-threatening)
• Decreased heart rate (usually results in coldness and/or numbness of the limbs)
• Urinary incontinence

**Coma (BAC = 0.35% to 0.80%)**
• Unconsciousness (coma)
• Depressed reflexes (i.e., pupils do not respond appropriately to changes in light)
• Marked and life-threatening respiratory depression
• Markedly decreased heart rate
• Most deaths from alcohol poisoning are caused by dosage levels in this range.

Moderate doses

Ethanol inhibits the ability of glutamate to open the cation channel related to the N-methyl-D-aspartate (NMDA) subtype of glutamate receptors. Stimulated areas include the cortex, hippocampus and nucleus accumbens, which are responsible for thinking and pleasure seeking. Another one of alcohol’s agreeable effects is body relaxation, possibly caused by neurons transmitting electrical signals in an alpha waves-pattern; such waves are observed (with the aid of EEGs) when the body is relaxed.

Alcohol’s short term effects include the risk of injuries, violence and fetal damage. Alcohol has also been linked with lowered inhibitions, though it is unclear to what degree this is chemical versus psychological as studies with placebos can often duplicate the social effects of alcohol at low to moderate doses.

Some studies have suggested that intoxicated people have much greater control over their behavior than is generally recognized, though they have a reduced ability to evaluate the consequences of their behavior. Behavioral changes related to drunkenness are, to some degree, contextual.

Areas of the brain responsible for planning and motor learning are sharpened. A related effect, caused by even low levels of alcohol, is the tendency for people to become more animated in speech and movement. This is because of increased metabolism in areas of the brain associated with movement, such as the nigrostriatal pathway. This causes reward systems in the brain to become more active, which may induce certain individuals to behave in an uncharacteristically loud and cheerful manner.
Drugs to Treat Insomnia and Sleep

Alcohol has been known to mitigate the production of antidiuretic hormone, which is a hormone that acts on the kidney to favour water reabsorption in the kidneys during filtration. This occurs because alcohol confuses osmoreceptors in the hypothalamus, which relay osmotic pressure information to the posterior pituitary, the site of antidiuretic hormone release.

Alcohol causes the osmoreceptors to signal that there is low osmotic pressure in the blood, which triggers an inhibition of the antidiuretic hormone. As a consequence, one’s kidneys are no longer able to reabsorb as much water as they should be absorbing, leading to creation of excessive volumes of urine and the subsequent overall dehydration.

Excessive doses

Acute alcohol intoxication through excessive doses in general causes short- or long-term health effects. NMDA receptors start to become unresponsive, slowing areas of the brain for which they are responsible. Contributing to this effect is the activity that alcohol induces in the gamma-aminobutyric acid (GABA) system. The GABA system is known to inhibit activity in the brain. GABA could also be responsible for the memory impairment that many people experience. It has been said that GABA signals interfere with the registration and consolidation stages of memory formation. As the GABA system is found in the hippocampus (among other areas in the CNS), which is thought to play a large role in memory formation, this is thought to be possible.

Anterograde amnesia, colloquially referred to as “blacking out”, is another symptom of heavy drinking. This is the loss of memory during and after an episode of drinking. When alcohol is consumed at a rapid rate, the point at which most healthy people’s long-term memory creation starts to fail usually occurs at approximately 0.20% BAC, but can be reached as low as 0.14% BAC for inexperienced drinkers.

Another classic finding of alcohol intoxication is ataxia, in its appendicular, gait, and truncal forms. Appendicular ataxia results
in jerky, uncoordinated movements of the limbs, as though each muscle were working independently from the others. Truncal ataxia results in postural instability; gait instability is manifested as a disorderly, wide-based gait with inconsistent foot positioning. Ataxia is responsible for the observation that drunk people are clumsy, sway back and forth, and often fall down. It is presumed to be due to alcohol’s effect on the cerebellum.

**ALLERGIC REACTION-LIKE SYMPTOMS**

Humans metabolize ethanol mainly through NAD-dependent alcohol dehydrogenase (ADH) class I enzymes (i.e. ADH1A, ADH1B, and ADH1C) to acetaldehyde and then metabolize acetaldehyde primarily by NAD<sup>2</sup>-dependent aldehyde dehydrogenase 2 (ALDH2) to acetic acid. Eastern Asians reportedly have a deficiency in acetaldehyde metabolism in a surprisingly high percentage (approaching 50%) of their populations. The issue has been most thoroughly investigated in native Japanese where persons with a single-nucleotide polymorphism (SNP) variant allele of the ALDH2 gene were found; the variant allele, encodes lysine (lys) instead of glutamic acid (glu) at amino acid 487; this renders the enzyme essentially inactive in metabolizing acetaldehyde to acetic acid. The variant allele is variously termed glucose, ALDH2*2, and ALDH2*504lys.

In the overall Japanese population, about 57% of individuals are homozygous for the normal allele (sometimes termed ALDH2*1), 40% are heterozygous for glucose, and 3% are homozygous for glucose. Since ALDH2 assembles and functions as a tetramer and since ALDH2 tetramers containing one or more glucose proteins are also essentially inactive (i.e. the variant allele behaves as a dominant negative), homozygote individuals for glucose have undetectable while heterozygote individuals for glucose have little ALDH2 activity. In consequence, Japanese individuals homozygous or, to only a slightly lesser extent, homozygous for glucose metabolize ethanol to acetaldehyde normally but metabolize acetaldehyde poorly and are susceptible
to a set of adverse responses to the ingestion of, and sometimes even the fumes from, ethanol and ethanol-containing beverages; these responses include the transient accumulation of acetaldehyde in blood and tissues; facial flushing (i.e. the “oriental flushing syndrome” or Alcohol flush reaction), urticaria, systemic dermatitis, and alcohol-induced respiratory reactions (i.e. rhinitis and, primarily in patients with a history of asthma, mild to moderately bronchoconstriction exacerbations of their asthmatic disease. These allergic reaction-like symptoms, which typically occur within 30–60 minutes of ingesting alcoholic beverages, do not appear to reflect the operation of classical IgE- or T cell-related allergen-induced reactions but rather are due, at least in large part, to the action of acetaldehyde in stimulating tissues to release histamine, the probable evoker these symptoms.

The percentages of glucose heterozygous plus homozygous genotypes are about 35% in native Caboclo of Brazil, 30% in Chinese, 28% in Koreans, 11% in Thai people, 7% in Malaysians, 3% in natives of India, 3% in Hungarians, and 1% in Filipinos; percentages are essentially 0 in individuals of Native African descent, Caucasians of Western European descent, Turks, Australian Aborigines, Australians of Western European descent, Swedish Lapps, and Alaskan Eskimos. The prevalence of ethanol-induced allergic symptoms in 0 or low levels of glucose genotypes commonly ranges above 5%. These “ethanol reactors” may have other gene-based abnormalities that cause the accumulation of acetaldehyde following the ingestion of ethanol or ethanol-containing beverages. For instance, the surveyed incidence of self-reported ethanol-induced flushing reactions in Scandinavians living in Copenhagen as well as Australians of European descent is about ~16% in individuals homozygous for the “normal” ADH1B gene but runs to ~23% in individuals with the ADH1-Arg48His SNP variant; in vitro, this variant metabolizes ethanol rapidly and in humans, it is proposed, may form acetaldehyde at levels that exceed the capacity of ALDH2 to metabolize the acetaldehyde. Notwithstanding such considerations, experts suggest that the
large proportion of alcoholic beverage-induced allergic-like symptoms in populations with a low incidence the glucose genotype reflect true allergic reactions to the natural and/or contaminating allergens particularly those in wines and to a lesser extent beers.

ALCOHOL CONSUMPTION AND BALANCE

By altering the viscosity of the endolymph within the otolithic membrane, the fluid inside the semicircular canals inside the ear. Alcohol can affect balance. The endolymph surrounds the ampullary cupula which contains hair cells within the semicircular canals. When the head is tilted, the endolymph flows and moves the cupula. The hair cells then bend and send signals to the brain indicating the direction in which the head is tilted. By changing the viscosity of the endolymph to become less dense when alcohol enters the system, the hair cells can move more easily within the ear, which sends the signal to the brain and results in exaggerated and overcompensated movements of body. This can also result in vertigo, or “the spins.”

Pathophysiology

At low or moderate doses, alcohol acts primarily as a positive allosteric modulator of GABA<sub>₁</sub>. Alcohol binds to various different subtypes of GABA<sub>₄</sub>, but not to others. The main subtypes responsible for the subjective effects of alcohol are the α<sub>₁</sub>β<sub>₃</sub>δ<sub>₂</sub>, α<sub>₁</sub>β<sub>₃</sub>δ<sub>₂</sub>γ, and α<sub>₁</sub>β<sub>₃</sub>γ subtypes, although other subtypes such as α<sub>₁</sub>β<sub>₃</sub>δ<sub>₂</sub> and α<sub>₁</sub>β<sub>₃</sub>δ<sub>₂</sub>γ are also affected. Activation of these receptors causes most of the effects of alcohol such as relaxation and relief from anxiety, sedation, ataxia and increase in appetite and lowering of inhibitions that can cause a tendency toward violence in some people.

Alcohol has a powerful effect on glutamate also. Alcohol decreases glutamate’s ability to bind with NMDA and acts as an antagonist of the NMDA receptor, which plays a critical role in LTP by allowing Ca<sup>2+</sup> to enter the cell. These inhibitory effects
Drugs to Treat Insomnia and Sleep

are thought to be responsible for the “memory blanks” that can occur at levels as low as 0.03% blood level. In addition, reduced glutamate release in the dorsal hippocampus has been linked to spatial memory loss. Chronic alcohol users experience an upregulation of NMDA receptors because the brain is attempting to reestablish homeostasis.

When a chronic alcohol user stops drinking for more than 10 hours, apoptosis can occur due to excitotoxicity. The seizures experienced during alcohol abstinence are thought to be a result of this NMDA upregulation. Alteration of NMDA receptor numbers in chronic alcoholics is likely to be responsible for some of the symptoms seen in delirium tremens during severe alcohol withdrawal, such as delirium and hallucinations. Other targets such as sodium channels can also be affected by high doses of alcohol, and alteration in the numbers of these channels in chronic alcoholics is likely to be responsible for as well as other effects such as cardiac arrhythmia. Other targets that are affected by alcohol include cannabinoid, opioid and dopamine receptors, although it is unclear whether alcohol affects these directly or if they are affected by downstream consequences of the GABA/NMDA effects. People with a family history of alcoholism may exhibit genetic differences in the response of their NMDA glutamate receptors as well as the ratios of GABA\_A subtypes in their brain. Alcohol inhibits sodium-potassium pumps in the cerebellum and this is likely how it corrupts cerebellar computation and body coordination.

Opposite to popular belief, research suggests that acute exposure to alcohol is not neurotoxic in adults and actually prevents NMDA antagonist-induced neurotoxicity.

Research

Animal models using mammals and invertebrates have been informative in studying the effects of ethanol on not only pharmacokinetics of alcohol but also pharmacodynamics, in particular in the nervous system. Ethanol-induced intoxication is
not uncommon in the animal kingdom, as noted here: “Many of us have noticed that bees or yellow jackets cannot fly well after having drunk the juice of overripe fruits or berries; bears have been seen to stagger and fall down after eating fermented honey; and birds often crash or fly haphazardly while intoxicated on ethanol that occurs naturally as free-floating microorganisms convert vegetable carbohydrates to alcohol.”

In a recent past, studies using animal models have begun to elucidate the effects of ethanol on the nervous system. Traditionally, many studies have been performed in mammals, such as mice, rats, and non-human primates. However, non-mammalian animal models have also been employed; in particular, Ulrike Heberlein group at UC San Francisco has used *Drosophila melanogaster*, the fruit fly, taking advantage of its facile genetics to dissect the neural circuits and molecular pathways, upon which ethanol acts.

The series of studies carried in the Heberlein lab has identified insulin and its related signaling pathways as well as biogenic amines in the invertebrate nervous system as being important in alcohol tolerance. The value of antabuse (disulfiram) as a treatment for alcoholism has been tested using another invertebrate animal model, the honey bees. It is significant to note that some of the analogous biochemical pathways and neural systems have been known to be important in alcohol’s effects on humans, while the possibility that others may also be important remains unknown. Research of alcohol’s effects on the nervous system remains a hot topic of research, as scientists inch toward understanding the problem of alcohol addiction.

Besides the studies carried out in invertebrates, researchers have also used vertebrate animal models to study various effects of ethanol on behaviors.

**SLEEP AIDS AND INSOMNIA**

If you have trouble falling or staying asleep, or you wake up feeling unrefreshed, you may be suffering from insomnia.
Drugs to Treat Insomnia and Sleep

is a symptom. It may be caused by stress, anxiety, depression, disease, pain, medications, sleep disorders or poor sleep habits. Your sleep environment and health habits may also play a role in your sleep problems. Some medications can lead to insomnia as well. These include medications for cold and allergy (some antihistamines and decongestants, high blood pressure (antihypertensives), heart disease (betablockers), thyroid disease and birth control (hormones), as well as asthma and pain medications (containing caffeine). Some common sleep disorders can also cause poor sleep. These disorders range from restless legs syndrome (a creeping, crawling sensation in the legs only relieved by movement) to a bed partner’s sleep apnea (a breathing disorder with loud snoring and brief periods when breathing stops).

Insomnia may be experienced for a few days, for two to three weeks, or it may be chronic, lasting for three weeks or more. Chronic insomnia is more difficult to treat, and doesn’t go away on its own. You may need to see a physician or sleep specialist.

Many people experience insomnia, especially women before and at the onset of the menstrual cycle, during pregnancy and menopause.

Poll Data

- Forty-eight percent of Americans report insomnia occasionally, while 22 percent experience insomnia every or almost every night.*
- Women are 1.3 times more likely to report insomnia than men.
- People over age 65 are 1.5 times more likely to complain of insomnia than younger people.
- Divorced, widowed and separated people report more insomnia.

Symptoms

Before you can treat insomnia, you require to identify its cause. Your doctor may ask about your mood. Are you depressed? Anxious? Under stress? Could your insomnia be caused by pain,
medications, disruption in your life due to travel across time zones, or working non-traditional shifts? Could caffeine, alcohol, nicotine or spicy foods play a part in your difficulty sleeping? Questions you answer with a “no” may help point to a diagnosis of primary insomnia.

Insomnia can have a very serious impact on quality of life, productivity and safety:

- People with insomnia are four times as likely to suffer from depression than people who sleep well.
- Lack of sleep due to insomnia may contribute to illness, including heart disease.
- Safety on the job, at home, and on the road may be affected by sleepiness.
- People with insomnia may miss more time from work or receive fewer promotions.
- After a poor night’s sleep, many people report accomplishing fewer daily tasks and enjoying activities less.

Costs

While individual suffering is hard to measure, researchers can estimate specific direct and indirect costs to the nation. Direct costs include dollars spent on insomnia treatments, healthcare services, hospital and nursing home care. The most recent annual estimate of the direct costs of insomnia is nearly $14 billion!

Indirect costs - such as work loss, property damage from accidents, and transportation to and from healthcare providers - are estimated at double the direct costs near $28 billion. One conservative report places total costs at up to $35 billion. (A National Sleep Foundation 1997 survey calculated that lost productivity alone from insomnia topped $18 billion!)

Treatment for Insomnia

Treating insomnia with medication is the most common treatment for these sleep problems. Twenty-five percent of
Americans take some type of medication every year to help them sleep.

Medications may be taken when:
- The cause of insomnia has been identified and is best treated with medication.
- Sleep difficulties cause problems in accomplishing daily activities.
- Behavioral approaches have proven ineffective and the person is unwilling to try them.
- A person is suffering insomnia-related distress and beginning behavioral therapy.
- Insomnia is temporary or short-term.
- Insomnia is expected or occurs in association with a known medical or biological condition (e.g., Premenstrual Syndrome) or an event such as giving a speech or traveling across time zones.

**Important Guidelines**

Treatment with medications should:
- begin with the lowest possible effective dose
- be short-term, if used nightly
- be intermittent, if used long-term
- be used only in combination with good sleep practices and/or behavioral approaches

Prescription medications that promote sleep are called hypnotics.

These are the most effective sleep aids available.

The particular medication prescribed to treat insomnia should depend on a patient’s diagnosis, medical condition, use of alcohol or other drugs, age, and need to function when awakened during the usual sleep period. If the cause of the sleep problem is depression, an antidepressant may be the best solution. Anti-anxiety drugs (anxiolytics) are prescribed if anxiety is related to insomnia.

Note: Some antidepressants cause insomnia, so patients should be sure to discuss their sleep problems with their doctor. Also,
some antidepressants (the tricyclics) may worsen restless legs syndrome and periodic limb movements (characterized by jerking legs during sleep).

Increasingly, some sedating antidepressants have been prescribed in low doses for insomnia. However, many experts believe that in the absence of clinical depression, there is little evidence to support the use of these drugs for insomnia.

Among the prescription hypnotic drugs, a group of hypnotics called benzodiazepine agonists were developed in the 1960’s. These sleep-promoting drugs have since proven effective and safe. Benzodiazepine agonists can be either benzodiazepines or nonbenzodiazepines; each has a different chemical structure. All hypnotics induce and maintain sleep.

The benzodiazepines agonists work by acting at areas in the brain believed to be involved in sleep promotion. They are the drugs of choice because they have the highest benefit and the lowest risk as sleep-promoting drugs.

Hypnotics differ by half-life as well as chemical structure. Half-life refers to how long a drug is active in the body. Drugs that have a shorter half-life are effective in the body for a shorter time. Shorter half-lives are usually preferred so that daytime functioning is not impaired the next day or after waking. The benzodiazepine triazolam has a short half-life, as do the non-benzodiazepines zolpidem and zaleplon.

Hypnotics also differ in the dose range over which they are effective. Scientists have established the effective dose range for each hypnotic. Dose becomes a problem when higher doses than those established as effective are used. Use of high doses increases the risk of rebound insomnia. Rebound insomnia occurs when a person stops taking the medication and experiences one or two nights of insomnia that is worse than they experienced before treatment. It only occurs with short half-life hypnotics and can be avoided by gradually tapering the dose. Consult your physician before increasing your dose or stopping high dose treatment.
Studies have examined data on the effectiveness of hypnotics and have concluded that they are effective and reliable for:

- shortening the time it takes to fall asleep
- increasing total sleep time
- decreasing the number of awakenings
- improving sleep quality

This conclusion is based on studies of short-term use of hypnotics at appropriate doses in comparison with a placebo or sugar pill. Some studies demonstrate little decrease in the effectiveness of hypnotics over the course of months.

The length of treatment depends on various circumstances:

- Accepted insomnia guidelines call for short-term treatment, but long-term use of sleep aids is not uncommon.
- Four weeks is the recommended limit.
- *Not* prescribing hypnotics may cause unnecessary patient distress, particularly when the person does well on the same dose and has no side effects.
- Still, most sleep specialists share the belief that sleep aids shouldn’t be a long-term answer to poor sleep for most people who have trouble sleeping.

More studies are needed on long-term effects of the use of sleep aids. All individuals who take sleep aids need to also focus on improving their sleep practices. The sedating or calming effects of hypnotics may lead to falls for those awakening at night. Hypnotics may also increase the risk of sleepwalking in some people.

One study also found a higher risk for car accidents in older adults taking long-acting sleeping medications, particularly during the first week of use.

Besides, a number of people taking hypnotics need to understand that sleep aids should be gradually decreased rather than stopped all at once. Without gradual tapering, stopping hypnotic use may cause insomnia to come back. Individuals should work with their doctors to discontinue medication gradually.
People at risk while taking hypnotics include:

- Individuals who drink alcohol. **Why?** The two drugs taken together intensify the action of both.
- The elderly, and anyone who
  - needs to get up during the night. **Why?** The sedating effects of hypnotics increase the risk for falls. Doses should be lower for the elderly.
- Those who have to operate machinery soon after awakening. **Why?** In medications with long half-lives, the risk of accidents may be increased.
- People who have *sleep apnea*. **Why?** Breathing may be further impaired.

While several of us worry about prescription sleep aids, believing them to be addictive (or habit-forming), researchers offer a reassuring picture. Studies show that people with insomnia don’t tend to abuse sleep aids. They don’t tend to take higher doses than prescribed.

Negative effects or abuses tend to be linked to excessive doses or to individuals who abuse other drugs or alcohol. Side effects of prescription sleep aids are related to the person’s age, dose and half-life. Selecting the proper dose is especially important for older people. When hypnotics stay in the body longer, they remain active and can cause daytime sleepiness or forgetfulness.

Younger people can be at risk for side effects too. People who use higher doses and hypnotics with longer half-lives tend to experience more side effects. To avoid these side effects, sleep specialists often advise the use of hypnotics with short half-lives. Any change in dosage should be discussed with your doctor.

Numerous people use sleep medications that are available without a prescription. These sleep aids are available “over-the-counter” (OTC) because they have been found to be safe when used according to their directions. However, OTC sleep aids may be less effective and they may have been subjected to less rigorous testing.
Many non-prescription sleep products include antihistamines. These substances are designed to block chemicals released during a cold or allergy attack, not to promote sleep. However, many have sedating (calming) effects. Some OTC sleep aids may also include pain relievers.

As with hypnotics, OTC sleep aids should not be used by individuals who are also taking alcohol or other drugs with sedating effects. Older persons should be cautious about these drugs because of their slower metabolisms. Drugs stay in the body longer and can then cause daytime sleepiness. In addition, OTC sleep aids should be avoided by people with breathing problems, glaucoma, chronic bronchitis, and difficulty urinating because of an enlarged prostate gland, or women who are pregnant or nursing.

Other products sold to promote sleep include:
- valerian (a root that may be steeped in hot water for tea)
- melatonin (an artificial or animal form of a substance produced by humans that is linked to sleep)

Herbal products and nutritional supplements (such as melatonin) are not required to undergo the same rigorous testing as drugs do in order to meet government standards. Their long-term impact, side effects and possible interactions with other drugs or medical conditions are often not known. More research is needed.

Other Types Of Treatment

Fortunately, sleep specialists have devised a variety of approaches for treating insomnia. Behavioral approaches involve actions you can take. Medication may help you sleep as you try these sleep-friendly practices. Combining behavioral and medical approaches works well for many people. Behavioral approaches range from limiting the time spent in bed to making a stronger mental connection between bed and sleep. This latter approach is called stimulus control. Studies suggest that these two strategies are the most effective behavioral approaches.

Stimulus control focuses on the association between your bed and sleep. Do you find yourself balancing a checkbook or writing
a letter in bed? In this way you link bedtime with alerting activities rather than sleeping. The stimulus control approach helps you think more about your bed as a place for sleeping.

Also, put relaxation back in your bedroom by using your bed only for sleep and sex, getting in bed only when you’re tired, and getting out of bed if you don’t fall asleep within 15 minutes. Try a relaxing activity.

A sleep specialist may help you use stimulus control and sleep restriction strategies properly. If you suffer from insomnia, consider the following guidelines for better sleep:

• Exercise regularly, about six hours before you want to sleep.
• Avoid napping.
• Go to sleep and wake at the same time every day.
• Save your worries for daytime. (If concerns come to mind in bed, write them down in a “worry” book, then close the book until the morning).
• Select a relaxing bedtime ritual, like a hot bath or listening to calming music.

If sleep problems persist, it may be time to seek professional help. Your doctor can help determine how to treat your problem and may refer you to a sleep specialist.

TREATING INSOMNIA WITH PRESCRIPTION MEDICINES

Getting a short-term prescription from your doctor for sleeping pills may help your insomnia when over-the-counter remedies don’t work. Learn about the different options for insomnia treatment. Once again, it’s 2 a.m. and you’re lying awake, tossing and turning. Soaking in a warm bath, reading a book, sipping chamomile tea, and taking over-the-counter sleeping pills haven’t done the trick. If you’ve read all about non-prescription insomnia options and none are helping, the next step might be prescription medication for insomnia treatment.
“There are more prescription medications available for insomnia than ever before, but the way they work and the side effects vary,” says Paul Selecky, MD, medical director of the Hoag Sleep Disorders Center in Newport Beach, Calif.

Here’s a look at the most commonly prescribed sleeping pills, their benefits, side effects, and risks.

Prescription Sleeping Pills: Benzodiazepine Hypnotics

This type of sleep medication acts on receptors in the brain to slow down the nervous system, allowing you to fall asleep and stay asleep. “They’re thought to boost the activity of the neurotransmitter GABA, which calms brain activity,” says Dr. Selecky. Benzodiazepines are also used to reduce anxiety, which can help ease insomnia.

If your main problem is getting to sleep, your doctor may prescribe a quick-acting sleeping pill that won’t stay in your body long, such as triazolam (Halcion). However, according to Selecky, if your problem is staying asleep, a sleep medication that lasts longer, such as flurazepam (Dalmane), clonazepam (Klonopin), temazepam (Restoril), or lorazepam (Ativan), may be more appropriate.

These insomnia medications are not designed for long-term use because you can quickly start to develop a tolerance, creating the need for more and more drugs to be able to sleep. This can start to happen within just a few weeks. Other side effects include daytime sleepiness, fuzzy thinking, dizziness, and headaches. They can also reduce the amount of deep REM sleep. While “benzos” used to be commonly prescribed to help people relax or get to sleep, these days they are recommended much less frequently due to their side effects and the availability of other options.

Prescription Sleeping Pills: Non-Benzodiazepine Hypnotics

This class of sleep medication acts on the same neurotransmitters as benzodiazepines, but the chemical structure
of these drugs is different “They’re newer than benzodiazepines and are thought to have a lower risk of dependency,” says Selecky.

Insomnia treatment drugs within this class include zolpidem (Ambien), eszopiclone (Lunesta), and zaleplon (Sonata). In recent studies, Lunesta has been shown effective for people with sleep problems due to arthritis pain. One study of rheumatoid arthritis patients found that almost half had no insomnia at all after taking the medication for four weeks. Side effects are similar to those of benzodiazepines, but are generally less severe. Plus, they don’t interfere with REM sleep the way benzodiazepines can. Some people taking Ambien have done things like drive and eat while still asleep, but this is rare.

Stopping non-benzodiazepines quickly can cause withdrawal symptoms, such as nausea, vomiting, sweating, shaking, and extreme anxiety, so discontinuing long-term use should be done under a doctor’s supervision. To decrease the risk of dependency and unpleasant withdrawal symptoms, doctors typically don’t prescribe these drugs for more than four weeks, says Selecky.

**Prescription Sleeping Pills: Sedating Antidepressants**

Some antidepressants can help ease insomnia when taken in low doses by reducing the amount of time it takes to fall asleep and allowing deeper, uninterrupted sleep.

Antidepressants used for this purpose are typically those in the older classes of drugs (tricyclics, tetracyclics) that carry the side effects of drowsiness and sedation. Examples of these sedating antidepressants include amitriptyline (Elavil, Endep) and trazodone (Desyrel). For people with depression, sedating antidepressants can do double duty, relieving depression and insomnia. Additionally, these drugs have been shown to help ease pain from certain chronic conditions such as arthritis and fibromyalgia.

Other side effects of sedating antidepressants include weight gain, dizziness, blurred vision, constipation, and prolonged drowsiness. They can also worsen restless legs syndrome.
The appropriate medication for you will depend on the type of insomnia that’s keeping you awake and its cause, so discuss your shut-eye struggles with your doctor. And because most sleep medications are recommended only for limited periods of time, you probably will want to explore non-drug therapies as well. If you have chronic insomnia, talk to your doctor about behavior changes and other non-drug treatments like cognitive-behavioral therapy — these lifestyle approaches may be your best bet for long-term relief.

**SLEEP MEDICATIONS BY PRESCRIPTION**

In the past, the most commonly prescribed medications for sleeping problems included two classes of sedative-hypnotic drugs: the benzodiazepines and the “non-benzodiazepine, benzodiazepine receptor agonists.”

In addition to these categories, a new medication (Ramelteon, under the brand name Rozerem) became more widely available in 2006 that aids sleep with a unique mechanism of action.

**Benzodiazepine Sleep Aids**

Although all of the benzodiazepines are used for the treatment of insomnia, the first 5 in the list are used most commonly for sleep disorders.

- Dalmane (Flurazepam)
- Doral (Quazepam)
- Halcion (Triazolam)
- ProSom (Estazolam)
- Restoril (Temazepam)
- Klonopin (Clonazepam)
- Ativan (Lorazepam)
- Xanax (Alprazolam)

The benzodiazepines have been the most commonly used medications in the treatment of insomnia and are certainly safer than some of the older sleeping medications such as the barbiturates.
(Amytal, Nembutal, Seconal). However, there have been concerns regarding inappropriate use and abuse of these medications.

These medications are generally recommended only to be used on a short term basis since physical tolerance and dependence can develop. In addition, these medications can often produce a “hangover” effect the following day.

Non-Benzodiazepine Sleep Aids

In recent years, a newer class of medications has been developed often termed the “non-benzodiazepine, benzodiazepine receptor agonists.” These newer medications appear to have better safety profiles and less adverse effects. These medications are associated with a lower risk of abuse and dependence than the benzodiazepines. Examples of medications in this class include:

- Ambien (Zolpidem)
- Sonata (Zaleplon)
- Lunesta (Eszopiclone, formerly known as Estorra)

These medications are known to reduce the time it takes to fall asleep and, thus, their effects are quite similar to those in the benzodiazepine class. These medicines appear to have different characteristics and may be used in different ways. Again, although these medications are safer than the benzodiazepines, it is not recommended that they be used on a long term basis.

Ambien. This sleeping pill has effects that persist later into the night and may help the individual stay asleep longer. Thus, it must be taken at bedtime and may be used when the individual has trouble falling asleep and/or staying asleep.

Sonata. This sleep aid is generally used for those individuals having trouble falling asleep. Therefore, it is often taken at bedtime or later such as when awakening during the night as long as there are at least four or more hours left to sleep.

Lunesta. This sleep aid was approved by the FDA in December of 2004 as a new, longer lasting sleeping pill. Clinical trials have demonstrated that Lunesta helps people get to sleep faster, similar
to Ambien and Sonata. However, it appears that it also helps the individual stay asleep through the night.

The FDA has approved Lunesta for patients who have difficulty falling asleep as well as those who are unable to sleep through the night. Lunesta has about a six hour half life, so it is more likely to maintain sleep. Due to its long half life, Lunesta must be taken immediately before bedtime and the individual should make sure that he or she has a full eight hours devoted to sleeping before taking it.

As with the other medications, side effects can occur, including daytime drowsiness, dry mouth, and dizziness. Unlike the other medications in this class which are recommended only for use on a temporary basis, Lunesta is approved for longer term use.

**Benefits of Non-benzodiazepine Sleeping Aids**

Non-benzodiazepine hypnotics like Ambien, Sonata, and Lunesta have advantages over previous generations of sleep medication. These include such things as:

- A relatively short half life so one does not wake up with a “hangover” the following day
- Having little effect on sleep staging, allowing the individual to obtain approximately the same amount of time in each stage of sleep as one would without the medications
- Less likely to cause addiction, withdrawal, or tolerance relative to older sleeping medications.

However, it should be kept in mind that these medications will not address any underlying medical problems causing the insomnia, such as sleep-related breathing disorders (sleep apnea), restless legs syndrome, and of course, chronic pain. Therefore, they should only be used in conjunction with other treatments that are focusing on the primary medical problem.
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The Effortless Sleep Method
Cure for Insomnia and Chronic Sleep Problems
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Preface

The side effects of the prescription sleeping pills are much like their benefits. At night, we want our brain cells to stop working (unless we need to get up in the middle of the night), so sleeping pills make the brain less active. If the sleeping pill is in the blood during the day, it will make the daytime brain less active and less functional. The problem is that no sleeping pill remains in the blood all night, impairing consciousness, and then suddenly evaporates at the moment of awakening.

Most sleeping pills are “sedative hypnotics.” That’s a specific class of drugs used to induce and/or maintain sleep. Sedative hypnotics include benzodiazepines, barbiturates, and various hypnotics.

Studies of sleeping pill effects on insomniacs show that they often describe a greater improvement in their sleep than EEG recordings measure. Although the hypnotic medication may hasten sleep onset rather little and decrease awakenings only modestly, the patient feels that the benefit is greater. It often appears based on objective recording that insomniacs are mistaken in their estimate of whether the sleeping pills are helping with sleep. An example was the Dalmane-midazolam study, where the insomniacs said that the drug was helping, even when after 14 days, there was no benefit either by EEG measurement or even by their own estimates of how long they had slept.

Sleep Restriction Therapy (SRT) is a non-drug method for addressing insomnia, and has had success with several problem sleepers. Like an exercise or diet program it needs dedication by the patient who may find it easy to fall away from the program. But if SRT is incorporated into a insomniac's life, it can work.
Although it might sound counterintuitive, forcing your available sleep time into a fixed window can help you beat insomnia. That's the idea behind sleep restriction therapy. The sleeper sets a bedtime and wake-up time and sticks to those times closely. The total time in bed is probably shorter than what the sleeper had been doing.

Insomnia is a general term referring to any difficulty in falling asleep or staying asleep, such that the sufferer is still tired, unrefreshed and unrested on waking. Left untreated, it may lead to irritability, memory problems, depression, anxiety, and, in the longer term, to an increased risk of accidents, heart disease, hypertension, diabetes, immune system problems, etc.

The book will be highly useful for students, teachers and all those concerned.

—Author
ABOUT THE BOOK

Sleep restriction is a method of curing insomnia by limiting a person’s total time in bed. It is often associated with related treatments in cognitive behavioral therapy for insomnia. Sleep restriction is intended to consolidate nightly sleep so that it is continuous and not fragmented. A doctor may instruct a patient to avoid napping during the day and only get in bed when he/she is very tired and truly ready to sleep. Sleeping pills pose a serious threat of dependence, as they are oft-prescribed and commonly abused. Many people who develop an addiction to sleeping pills have reported increasing their dose after the effects had diminished. Over time, they developed a tolerance that turned into an addiction. The first step in overcoming this powerful addiction is recognizing that there’s a problem. The book will be highly useful for students, teachers and all those concerned.

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