

Sleep: a business case for bedtime

The hidden global health issue impacting employee performance



Contents

1 The hidden crisis

- 1 Purpose of this paper
 - 2 Debunking sleep-related myths
 - 2 Myth #1 – You can catch up on sleep during the weekend
 - 3 Myth #2 – Needing a lot of sleep is a sign of weakness
 - 3 Myth #3 – Lack of sleep won't kill you
-

4 So, where has all our sleep gone, and why are we losing it?

6 The sleep-deprived employee — why should an employer care?

- 6 Poor sleep is a major risk factor for injuries and mistakes at work
 - 7 Lack of sleep impacts employee productivity
 - 8 Insufficient sleep increases health care costs
 - 8 Sleep-deprivation increases presenteeism and absenteeism
-

9 Why are health costs higher for the sleep-deprived?

13 What can we do to remedy the problem?

- 13 Teach, educate, beseech
 - 13 Avoid histrionics with ergonomics
 - 14 Steep sleep into your wellness programs
 - 14 Normalize the nap; consider formalizing the policy
 - 15 Make schedules more predictable
 - 15 Avoid giving short shift to shift worker
-

16 Healthy sleep tips for employees

19 A few final thoughts

Sleep deprivation – a hidden global health issue



Many work cultures remain rooted in the myth that more work is better work and, as a result, sleep is often sacrificed in an effort to do and accomplish more. Perhaps this is why coffee is the second-most widely sold global commodity after oil. Ambitious employees worldwide log long work weeks, surviving on large cups of coffee or other such stimulants, and often operate on five or six hours of sleep a night.

Employers may not realize that they likely have sleep-deprived employees negotiating sensitive contracts, producing products, managing money and even driving trucks. If the decision-making abilities and/or response times of these employees are addled by fatigue, the result may include serious harm and diminished productivity that could amount to billions of dollars in legal fees and lost profits.²

While some of us realize that sleep is important for the normal functioning of the body, fewer realize that sleep is integral to personal productivity, safety, health and well-being.

Our culture of sleeplessness has created a labor force that works long hours, but isn't necessarily as productive. This is important to recognize as companies have become more focused on factors contributing to "presenteeism" at the workplace.

Statistically, we now know that upwards of 40 percent of the U.S. working population may be sleep-deprived, averaging less than the recommended minimum of seven hours of sleep each night.³ According to the Centers for Disease Control and Prevention, 30 percent of the population sleeps less than even six hours of sleep each night.



Corporate culture often confuses long hours on the job with high performance. We seem to have a notion that 80 hours of work will yield 80 hours of productive output, but in reality, it is more like 50-55 hours, depending on the level of employee interaction with the work process.¹

40%

U.S. workers population may be sleep-deprived and averaging less than the recommended minimum **SEVEN HOURS** of sleep each night

30%

of the population sleeps less than **SIX HOURS** of sleep each night.



Debunking

Sleep-related myths...

The sad truth is that sleep deprivation is an issue too often ignored, even when it is frequently the root cause of decreased productivity, accidents and mistakes, costing companies billions of dollars each year.

Harvard researchers say that it is difficult to find any other condition that has a greater impact on productivity than sleep deprivation.⁴

In short, this paper reveals why sleep is vital to us, and why an optimal sleep environment, along with the provision of basic sleep training, can be a compelling addition to an employer's wellness and risk-management strategy, resulting in better workforce morale, as well as increased safety, health and employee performance.

**“Why should I care if employees are not getting enough sleep?
They can make up for sleep when they’re off my clock.”**

Myth 1

You can catch up on lost sleep during the weekend

FACT: It's true that if you're generally getting enough sleep, but burn the candles at both ends occasionally, then sleeping in on the weekend can help repair the damage done by infrequent sleep loss.

Chronic sleep deprivation, however, is very different. For decades, researchers believed in something called the “sleep debt,” metaphorically comparing sleep with a bank account, wherein it may be okay to deplete your balance briefly as long as you can easily replenish the funds before penalties start to accrue. The banking metaphor suggests that if you routinely lose sleep, then the penalties from this “overdraft” can quickly add up. This total sleep lost is often called a “sleep debt”. For example, if you were to lose one hour of sleep every night during the work week, this analogy would presume that your sleep debt would be five hours on a weekly basis, and earlier researchers thought it might be okay to make up for this sleep debt over the weekend. But it is easy to see how quickly a negative balance could build up after weeks, months or even years of continued.

In fact, more recent research shows that while some of the negative effects of minor sleep deprivation (e.g., stress, daytime drowsiness or low-grade inflammation) can be reversed by “catching up” on the weekend, not all negative effects can be reversed, and particularly one that is highly important within the workplace.⁵

This particular negative effect of sleep loss is referred to as “behavioral alertness” or “psychomotor vigilance,” which is the ability to focus, pay attention, remember or process information.^{6,7,8}



This white paper will provide new insights on why well-rested employees are more vital in the workplace, how sleep deprivation can lead to chronic diseases, and what employers and employees can do to prevent insufficient sleep from hijacking productivity, health and cognitive capacity.

Myth 2

Needing a lot of sleep is a sign of weakness

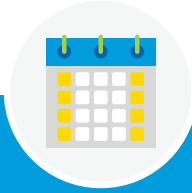
FACT: We think of sleep as a private matter, and we live in a competitive, “sleepnegative” culture where the need for more sleep is often stigmatized as a sign of weakness and lack of productive stamina. We still harbor a cultural “mind over matter” mentality where it is seen as a failure to allow ourselves to get tired to the point of being unfit for duty.¹ In our hyper-connected, 24/7 world, sleep has somehow become devalued. The fact is, the average amount of sleep we are getting in our modern world has been steadily decreasing. In our urban society, we sleep about two hours less per night than we did about 50 years ago.⁹

Myth 3

Lack of sleep won't kill you

FACT: In a seminal study done in the 1980s, rats were deprived of sleep and every single one of them died as a result of lack of sleep, despite having adequate food and water.¹⁰

Of course, it's impossible to research the effects of complete sleep deprivation on human subjects because of the extreme cruelty it would cause. Depriving someone of sleep is tantamount to torture, but what we do know is that people get paranoid and start hallucinating before the most severe physical symptoms kick in. Sleep is described by the World Health Organization as a “basic human need,” and hence is simply essential to our physical, mental and psychosocial and social wellbeing.



These skills are directly tied to performance at work, but it seems that catching up on sleep during the weekend does not repair alertness deficits. Instead, it seems that alertness deficits can continue to grow and may eventually become nearly impossible to settle.^{6,7,8}



So, where has all our sleep gone, and why are we losing it



Stress, multiple jobs, competing work-life responsibilities, shift work, international travel and increased employee workload can contribute to a growing crisis of inadequate sleep.

Modern technology, which seems particularly adept at messing with our sleep schedules, is certainly a large part of the problem. Smartphones, tablets and computer screens all emit a bluish light (most energy efficient CFLs and LEDs burn blue, as do the backlights of most screens). They are great for saving power, but are unfortunately disruptive to our body clocks. These electronic blue lights, poetically colored like enriched moonlight, in fact drastically suppress the production of melatonin, the hormone that controls the body's day-night cycle. So, reading in bed with an iPad at night, or any other backlit device, actually makes it harder to fall asleep and makes you more tired the next day.¹¹

Shifting all the blame for our sleep problems onto blue light, however, might be disingenuous.

The bigger problem is that we've created — and now live in — a world where stimulation doesn't stop when the sun goes down. Research shows that every time we check our email, Twitter feed or Facebook timeline and find a new piece of information, we get a shot of dopamine — a chemical that our brains release to simulate pleasure.¹¹ Our bodies (and brains) eventually associate texts, Twitter and Facebook with the promise of instant, pleasurable gratification.

Hence the cycle of sitting up in bed, listlessly refreshing our email instead of putting our computers and phones down, as well as our heads. Add other causes of sleep disruption — like medication side effects, certain medical conditions that negatively impact or obstruct sleep (e.g. heart disease, obesity, diabetes, high blood pressure, depression, and back pain) — and we have a compounded problem on our hands.

Of course, some people who are routinely not getting adequate sleep may be suffering from an actual sleep disorder. An estimated 50 to 70 million Americans have some type of chronic sleep-related disorder, according to a report from the Institute of Medicine. Although there are more than 90 such conditions, the most common are sleep-related breathing disorders, particularly obstructive sleep apnea, chronic insomnia, and restless legs syndrome. Reportedly, a sizable number of people with sleep disorders remain undiagnosed or untreated.²

50 to 70 million Americans have some type of chronic sleep-related disorder



1 Sleep apnea



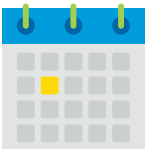
2 Chronic insomnia



3 Restless leg syndrome



In the 2008 National Sleep Foundation (NSF) Poll, about **one-in-ten workers surveyed said a doctor had told them that they have sleep apnea**, a condition involving brief interruptions of breathing during sleep, yet only half were being treated for the condition.²



Most people who struggle to sleep do not suffer from a sleep disorder. Instead, their activities before going to bed or their sleep environment present obstacles to quality sleep. Today's modern work environment can sometimes be structured in such a way that it prevents us from getting enough sleep. According to a 2010 NSF poll, 22 to 26 percent of workers reported that their current work schedule does not allow them to get enough sleep.²

The sleep-deprived employee — why should an employer care



What does this mean for employers? Sleep-deprived employees may be making riskier decisions, ignoring inherently negative implications and taking gambles in scenarios where losses can outweigh the benefits.

Sleep-deprivation leaves employees vulnerable to safety and productivity gaps. Employees who lack sufficient sleep are often sick, unproductive and absent. They have poor short-term memories, perform poorly on new tasks, and are also greater risk for mood disorders and delayed response times.¹³ The consequences of fatigue can also impact a company's operating efficiency and costs, stemming from reduced productivity and customer service quality, decreased operating profit, increased health and wellness costs, and higher overall costs and liabilities. Industrial survey data further indicates that Workers' Compensation costs per employee per year were almost five times higher in facilities with severe fatigue problems, compared to facilities where fatigue was not a problem.¹

In short, sleep deprivation is a threat to a company's bottom line. Here are critical reasons why employers need to wake up and pay attention:

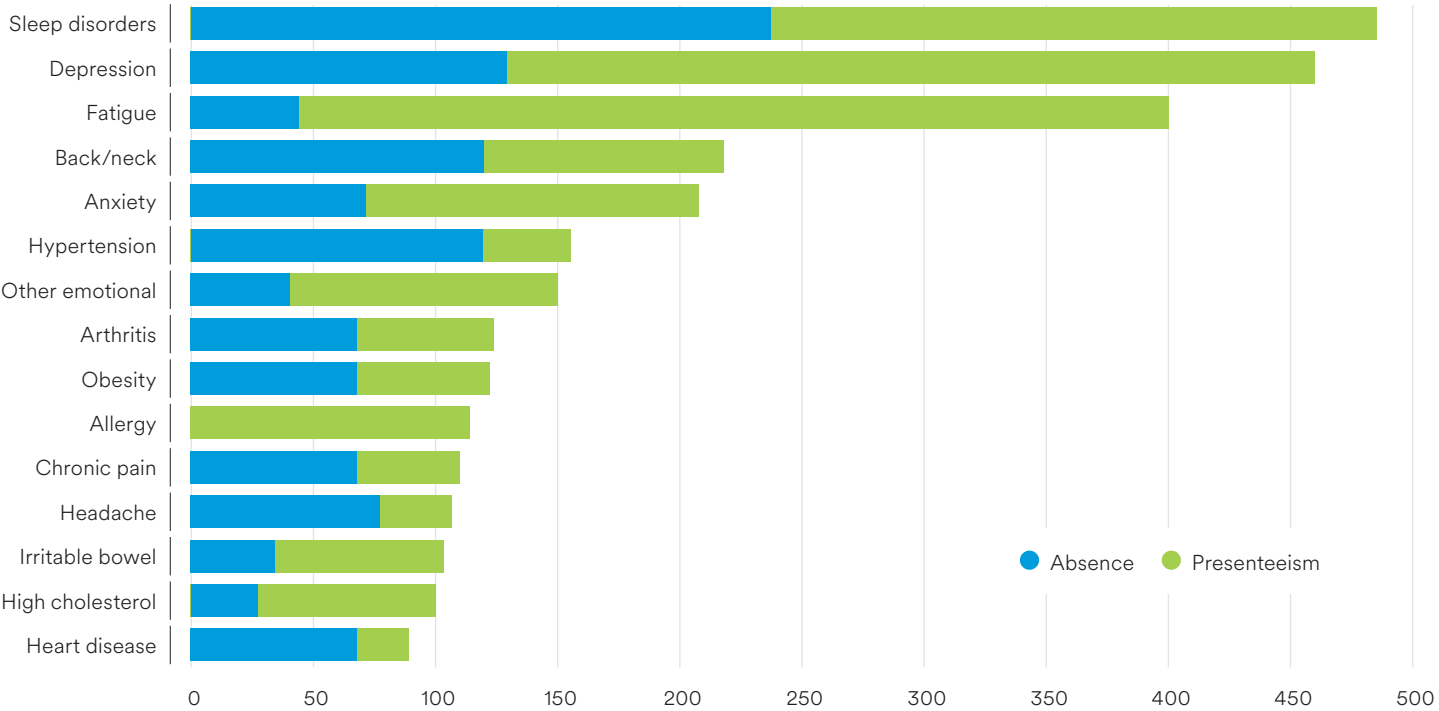
1. Poor sleep is a major risk factor for injuries and mistakes at work

Most of us are aware of the evidence that highly fatigued employees are more likely to be involved in accidents. Industries such as trucking and aviation have long implemented work rules to minimize accidents caused by lack of sleep. Recent studies have only underscored this collective knowledge. In fact, systematic review and meta-analysis, including data pooled from 27 observational studies, estimated that sleep problems increase the risk of being injured at work by 62 percent.¹⁴ Many employers, however, may not also be aware that sleep-deprived employees can put a company to risk in other ways:

- **Exhibiting greater risk-taking behavior**

Fatigued subjects display a willingness to take risks, ignoring normal checks and procedures and displaying a relatively careless attitude. Surprisingly, the very individuals involved in such scenarios might actually think they are operating at full function, even without appropriate sleep, as sleep deprivation can reduce a person's ability to self-assess their own performance. Research demonstrates that many sleep-deprived individuals will continue to insist that their processes are not impaired, when actually they are demonstrably impaired.¹⁵

Top 15 causes of lost work time



SOURCE: Ronald Kessler, Harvard Medical School 2006

2. Lack of sleep impacts employee productivity

Lost productivity is costly. In the United States, the human capital value of this loss is estimated at \$2,280 in productivity on an individual level, and \$63.2 billion across the entire American workforce.¹⁶

Looking outside of the United States, the story is similar. The economic impact of sleep disorders in Australia is estimated at \$5.1 billion per year, including \$270 million for health care conditions directly attributable to sleep loss, \$540 million for care treating sleep disorders and about \$4.3 billion attributable to productivity losses and costs (non-medical) resulting from sleep loss-related accidents.¹⁷

Employees who lack proper sleep simply do not perform as effectively. A Canadian study estimated that employees with insomnia lost an estimated 28 days a year of work productivity because of their sleepiness.²

Sleep-deprived employees also exhibit:

- **Decreased communication**
When employees are tired, they become poor communicators. In one study, researchers noted that sleep-deprived individuals drop the intensity of their voices, pause for long intervals without apparent reason, enunciate very poorly or mumble instructions inaudibly. They can also mispronounce words, slur or run words together, repeat themselves and lose their place in a sentence sequence.¹⁸
- **Inappropriate behavior**
Fatigued subjects often display inappropriate, mood-related behavior such as outbursts. These behavioral outbursts can include irritability, impatience, childish humor, lack of regard for normal social conventions and an unwillingness to engage in forward planning.¹⁸



Researchers at the Institute for Health and Productivity Studies, Cornell University, Washington, D.C., analyzed medical claims from 138,820 workers younger than 65 who were covered by self-insured, employer sponsored health insurance plans. They found that both medical and indirect costs were about \$1,253 higher for those with who had insufficient sleep (insomnia) than for those workers who got enough sleep.

High profile disasters attributed partially to sleep deprivation

- Chernobyl nuclear catastrophe
- Space shuttle Challenger tragedy
- Three Mile Island

SOURCE: Harvard Medical School and WGBH Educational Foundation. Sleep, Performance, and Public Safety

3. Insufficient sleep increases health care costs

Researchers in the U.S. estimate that a company can expect more than \$ 3,200 per employee, per year in total health costs due to sleep deprivation. The journal *Sleep and Breathing* describes these health costs as “direct, indirect, related, and intangible”.¹⁹

4. Sleep deprivation increases presenteeism and absenteeism

Studies have suggested that sleep loss can lead to the issue of higher levels of presenteeism and absenteeism at the workplace. For example, according to a Finnish study, adults who say they sleep between seven and eight hours per night miss fewer work days due to sickness than others. The researchers used data from a national survey of Finnish workers and then looked up their work absences in the data base of the Social Insurance Institution of Finland, which registers sickness absences. They found that those who slept less than 5 hours (compared with a study-defined optimum sleep of 7.76 hours for males and 7.63 hours for females) had 14.83 days per year of sickness absence for males and 13.09 days per year for females, compared to just 5.93 and 7.64 when workers were well rested and had the study-defined level of optimal sleep. This suggests that if sleep disturbances were to be eliminated, the total cost of worker sick days could be cut by 28 percent.²⁰

Researchers in France also attempted to analyze absenteeism costs related to sleep disturbance for different payers: the national health insurance system, employers, and employees. They found that in France, 88% of these costs were shouldered by employers.²¹ When they evaluated a group of workers with sleep disturbances to a matched group of good sleepers, they found that workers with sleep disturbances missed work twice as often as good sleepers. This result was particularly high for blue collar workers, who reported poor self-esteem at work, less job satisfaction, and less efficiency at work, compared with good sleepers.

Sleep-deprived employees may exhibit the following behaviors that can lead to higher presenteeism and absenteeism at work:

- **An increased risk of becoming distracted**

Sleep-deprived individuals have been shown to have trouble with maintaining focus on relevant cues, keeping track of events and maintaining interest in outcomes.

- **Poor cognitive assimilation and memory**


Short-term and working memory declines are associated with sleep deprivation and result in a decreased ability to develop and update strategies based on new information, along with the ability to remember the temporal sequence of events.²²

Why are health costs higher for the sleep-deprived



The Centers for Disease Control and Prevention states that people experiencing sleep insufficiency are more likely to suffer from chronic diseases such as obesity, diabetes, hypertension, depression and cancer. The Institute of the National Academies reports that people struggling with sleep are not only “less healthy,” but they also require more medical care. Struggling with sleep-related conditions is associated with a “10 to 20 percent increase” in healthcare utilization. Also, regularly sleeping less than five hours each night increases the chance of death — from all causes — by about 15 percent.²³

Struggling with sleep-related conditions is associated with a **10% to 20% increases** in healthcare utilization



Regularly sleeping less than five hours each night increases the chance of death — from all causes — by about 15%



Let's drill a bit deeper into some of the more surprising health consequences and increased health care costs associated with sleep insufficiency:

Immune Function

Sleep duration may be linked to immune system health. In one study, participants who got less than seven hours of sleep were 2.94 times more likely to get a cold, compared to those who slept eight hours or more. Sleep deprivation reduces cytokines, which are needed to combat stress and fight off infections and inflammations. In addition, infection-fighting antibodies and cells are reduced during periods of insufficient sleep.²⁴

Diabetes

Research has found that insufficient sleep is linked to an increased risk of developing Type 2 diabetes. Specifically, duration and quality of sleep have emerged as predictors of levels of Hemoglobin A1c, an important marker of blood sugar control. Recent research suggests that optimizing sleep duration and quality may be an important means of improving blood sugar control in people with Type 2 diabetes.²⁵



“If you sleep less than six hours per night and have disturbed sleep you stand a 48 percent greater chance of developing or dying from heart disease and a 15 percent greater chance of developing or dying of a stroke,” so states lead author Francesco Cappuccio in a statement on the findings, which were published in the *European Heart Journal*.²⁹

Obesity

The link between sleep loss and weight gain is particularly troublesome. Sleep loss alters the balance between appetite and satiety hormones, increasing hunger and requiring more food intake to make one feel full. Not only can short-term sleep loss lead to increased caloric consumption, but multiple studies have suggested a link between chronic sleep deprivation and increased obesity risk over time. Sleep length may help regulate body weight and metabolism. Among large population samples, researchers have noted associations between short sleep time and increased body mass index, or BMI. Sleeping fewer than six hours a night has been linked to changes in levels of the appetite hormones ghrelin and leptin. Production of ghrelin, which causes carbohydrate and sugar cravings that can lead to weight gain and sleep apnea, actually increases with sleep deprivation. A study from the University of Pennsylvania found that participants who were sleep-deprived for five nights in a row gained about two pounds (900 grams).²⁶ Not sleeping enough can cause people to consume an average of 549 extra calories daily, and scientists have shown that for every hour of lost sleep (below the recommended seven hours) the odds for obesity become five times higher.

Cardiovascular Disease

Chronic sleep deprivation has been associated with high blood pressure, atherosclerosis (or cholesterol-clogged arteries), heart failure and even heart attacks. Sleep-disordered breathing increases risk of high blood pressure and heart disease, because of stress placed on the heart due to multiple oxygen deprivation events throughout the night. In a 2011 study from Warwick Medical School, researchers found that inadequate sleep was tied to increased heart attack risk, as well as cardiovascular disorders and stroke. The risk of stroke doubles with less than six hours of sleep.

Mental Health

Sleep deprivation can have damaging effects on mental health, because sleep regulates the brain's flow of chemicals such as epinephrine, dopamine and serotonin, which are closely linked to mood and behavior. Because mood and sleep rely on the same neurotransmitters, it can be difficult to determine whether a patient is suffering from sleep loss or depression. Scientists have shown that sleep deprivation negatively impacts the parts of the brain that are associated with “depression, anxiety, stress and other psychiatric disorders.”²⁷

Fertility

Among men, specifically, lack of sleep reduces testosterone levels and lowers sperm count. It also decreases sex drive. All of these have an effect on fertility and can lead to conception issues.²⁸



The consequences of disrupted sleep cycles on other chemicals in the brain^{30,31,32}

Hormones	What it does	Normally	Interrupted sleep cycle
Leptin	<ul style="list-style-type: none"> Decreases appetite 	<ul style="list-style-type: none"> Released during sleep 	<ul style="list-style-type: none"> Decreased leptin production = increased hunger
Ghrelin	<ul style="list-style-type: none"> Increases appetite Slows metabolism and fat burning 	<ul style="list-style-type: none"> Sleep keeps ghrelin production in check 	<ul style="list-style-type: none"> Less sleep = less suppression and higher ghrelin levels Increased ghrelin release = increased hunger
Cortisol	<ul style="list-style-type: none"> Necessary for fat, carbohydrate metabolism Responsible for life saving “fight or flight response” Increases blood sugar Suppresses your immune system 	<ul style="list-style-type: none"> Cortisol production is limited or suppressed when sleeping 	<ul style="list-style-type: none"> Less sleep = less suppression and higher cortisol levels Increased cortisol production can cause insulin resistance (so your blood sugar stays higher and contributes to fat) Can contribute to fat deposits in abdomen and upper back
Serotonin	<ul style="list-style-type: none"> “Feel good” hormone, helps with sleep cycle and feelings of contentment and happiness 	<ul style="list-style-type: none"> Normally released during sleep Also released after eating carbohydrates 	<ul style="list-style-type: none"> Less sleep = less circulating serotonin Less serotonin = depression, anger, anxiety and trouble sleeping Need for serotonin may drive to overeat carbohydrates
Growth hormone	<ul style="list-style-type: none"> Stimulates muscle growth and cell regeneration, supports the immune system and other important healing pathways in the body 	<ul style="list-style-type: none"> Normally released during sleep 	<ul style="list-style-type: none"> Decreased growth hormone may make muscle growth more difficult
Melatonin	<ul style="list-style-type: none"> Known as the “Hormone of Darkness” Secreted by a small gland located behind our eyes and sensitive to light/dark cycles A powerful antioxidant Associated with decreased estrogen, and altered testosterone 	<ul style="list-style-type: none"> Released in response to darkness Also found in small amounts in certain foods such as meats, grains, fruits and vegetables 	<ul style="list-style-type: none"> Prolonged light exposure at night may inhibit melatonin production Since melatonin affects estrogen, tumors may be inhibited by melatonin Lower levels may be associated with increased rates of breast tumors and cancers

Cancer

Chronic lack of sleep may increase the risk of some cancers. A study of 1,240 participants who underwent colonoscopies found that those who slept fewer than six hours a night had a 50 percent spike in risk of colorectal adenomas, which can turn malignant over time.³³

Another 2012 study identified a possible link between sleep and aggressive breast cancers. These are specific risks, but researchers have also suggested a correlation between sleep apnea and increased cancer risk of any kind.³³

Alzheimer's

During sleep, the brain works to eliminate toxic chemicals, one of which is a protein that accumulates in the human brain during waking hours and has been linked to the onset of Alzheimer's disease. Sleep deprivation has thus been identified as contributing to a greater risk of dementia and accelerating disease onset.³⁴



The Dangers of Sleep Deprivation

Just one week of insufficient sleep alters the activity of our genes, which control our response to stress, immunity, inflammation and overall health. Here are the hidden health hazards caused by sleep deprivation.



Higher levels of Anxiety

Lack of sleep amplifies the brain's anticipatory reactions, raising overall anxiety levels.

Higher Levels of Depression

Lack of sleep causes a decrease in neurotransmitters which regulate mood.

Impaired Cognition

Excessive sleepiness impairs memory and the ability to think and process information.



Disruption of Circadian Rhythm (Natural Time Clock)

Leading to poor white blood cell health, which weakens our physical stress response.



Increased Risks of Breast Cancer

Late night exposure to light is linked to reduced melatonin production, which disrupts estrogen production. Too much estrogen promotes the growth of breast cancer.



Higher Risk of Stroke

Lack of sleep negatively affects cardiovascular health, increasing the risk of restricting blood flow to the brain.

Higher Risk of Hypertension

Sleeping between 5 and 6 hours a night increases the risk of having high blood pressure.

Higher Risk of Heart Disease

When we sleep our blood pressure drops. Not experiencing this nightly drop in pressure is a risk factor for heart disease



Higher Risk of Diabetes

Lack of sleep triggers our stress response, leading to the release of the stress hormones cortisol and norepinephrine, which are associated with insulin resistance.



Unhealthy Cravings

Sleep helps maintain a healthy balance of the hormones that make you feel hungry (ghrelin) or full (leptin). Lack of sleep causes ghrelin levels to increase and leptin to decrease.

Sources:

Health Central:

<http://www.healthcentral.com/sleep-disorders/cf/slideshows/5-healthissues-that-arise-from-sleep-deprivation/hypertension-risk-increases/>

<http://www.nhlbi.nih.gov/health/health-topics/topics/sdd/howmuch><http://www.nhlbi.nih.gov/health/health-topics/topics/sdd/signs>

<http://www.medicalnewstoday.com/articles/256912.php>

What can we do to remedy the problem



We need to make fundamental alterations to our work culture. Change is already afoot, and in some places, the changes have been surprising. The Huffington Post has installed nap rooms in its offices, while Treehouse now mandates four-day workweeks. But companies do not have to go to these lengths to address the problems of sleep-deprivation. There are some simple solutions that employers and employees can implement to tackle this issue:

Low or no-cost employer strategies

1. Teach, educate, beseech

Begin by educating your workers about what you've learned in this paper, and encourage them to put practices in place to improve their sleep (please see the employee section for more details on increasing awareness about this issue).

Educational suggestions include:

- Seminars, in-services, guest speakers, newsletters, flyers and intranet articles that: (1) spell out the negative effects of sleep loss; (2) teach how to recognize signs of illness related to sleep debt and (3) offer tips for improving "sleep hygiene," which are readily available at the American Sleep Association Healthy Sleep Tips.
- Talk about sleep problems and solutions in regular meetings or training sessions.
- Help managers create reasonable policies for their people who travel a lot and work long hours. Be a role model – refrain from emailing after hours and extol the virtues of productivity gained by having alert, well-rested workers.
- Share sleep travel tips with those workers who fly a lot. A simple search on the internet of "flight sleep tips" brings up a wealth of material that you can use.

2. Avoid histrionics with ergonomics

- Physical pain can be a big sleep disrupter, especially if it's back pain — whether caused by injury or sitting for long hours at a computer. Learning proper ergonomic principles (the study of the workplace as it relates to the worker) can go a long way in preventing chronic pain from disturbing sleep.



Germany has banned after-hours emails to government workers; and a law passed in Brazil in 2012 says workers who have to take calls or emails from employers after work can charge their bosses overtime.



Notable nappers³⁶

- Albert Einstein
- John F. Kennedy
- Leonardo DaVinci
- Napoleon Bonaparte
- Salvador Dali
- Thomas Edison
- Winston Churchill

3. Steep sleep into your wellness programs

- Use your in-house or vendor-offered wellness program to focus on the importance of good sleep hygiene. Evaluate the depth of the problem in your workforce by including questions related to sleep loss in your health risk assessment. Offer tips and advice on how to improve sleep — and why it's so important — not just for the bottom line, but also for worker health and wellbeing.
- Celebrate sleep! Champion a “Take Back Our Sleep Week” at your office(s) to foster education. Build “healthy sleeps” into your culture of wellness. Share the science behind sleep deprivation, and let workers know you care about them. This will also boost morale.

4. Normalize the nap; consider formalizing the policy

- More and more businesses are promoting on-the-job napping as a way to improve productivity. According to a 2010 study published in the journal *Cognition*, even short breaks at work — like naps — significantly increase employee engagement with their work.³¹ Where once frowned upon, employers are now encouraging workers to snooze during the day by establishing nap policies, and implementing flexible work arrangements. While your company may be ambivalent about encouraging napping in the workplace, there are still several initiatives that an employer can engage in to drive home the message of adequate sleep. If, however, short breaks or naps at work are something that your organization has already implemented, or is thinking to implement, then you might be interested in knowing that to get the most out of a nap, it should occur between approximately 1:00–3:00 PM. Any earlier, and your body may not be ready to sleep; any later and you risk disturbing your nighttime rest. The ideal nap length is no longer than 20 minutes. Knowing this, some experts have come up with innovative advice on how to make a short nap even more productive. Since 20 minutes is also about how long it takes for caffeine to kick in, sleep experts have even suggested drinking a caffeinated beverage right before taking a nap, so that when you awaken, you'll not only be refreshed from the nap, but the caffeine will have kicked in to further increase productivity. It's possibly a winning combination, but just don't try it late in the day or if you are particularly susceptible to caffeine's effects when trying to sleep at night.³⁵

6 companies that accommodate napping

Google

High-tech napping pods

Ben & Jerry's

Nap rooms

AOL

Nap pods

Zappos

Evolved from nap pods to couches

Nike

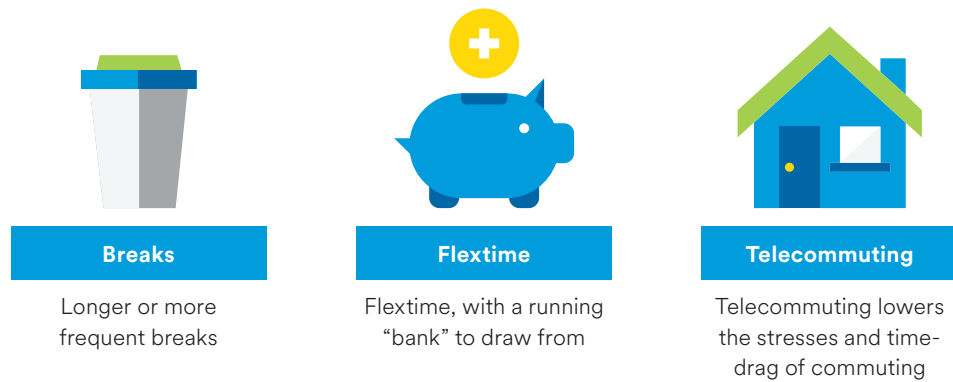
Nap room

Time Warner

Nap spa – “Yelo”

5. Make schedules more predictable

Since working long hours can disturb sleep, simply restructuring workloads and schedules can have a big impact. The top three methods:



6. Avoid giving short shift to shift workers

Because shift work disrupts the "circadian rhythm," do whatever you can to minimize variable shift work to prevent the extreme fatigue that comes with schedules requiring workers to frequently switch their sleep patterns: sleeping during the day and working at night, or vice versa, within a short timeframe. We see many shift workers who are well-trained and skilled at their jobs, but who have never been taught how to deal with fatigue, manage their sleep or adapt to the inherent physical and social challenges of shift work. These people develop bad habits and/or become victims of common shiftwork pitfalls that compromise their ability to perform to their fullest capabilities.



A few suggested strategies for shift workers will go far in protecting your company from sleep-deprived worker errors and accidents:

- Limit the number of night shifts worked consecutively
- Provide training for employees and empower them to take more control over reducing their personal levels of fatigue, as well as better coping with shiftwork
- Educate supervisors on how to identify and intervene with tired shift workers
- Avoid double shifts and excessive overtime
- Incorporate fitness-for-duty impairment screening programs
- Provide a predictable schedule rather than frequent rotations
- If permissible, consider screening workers for obstructive sleep apnea and other sleep-related disorders

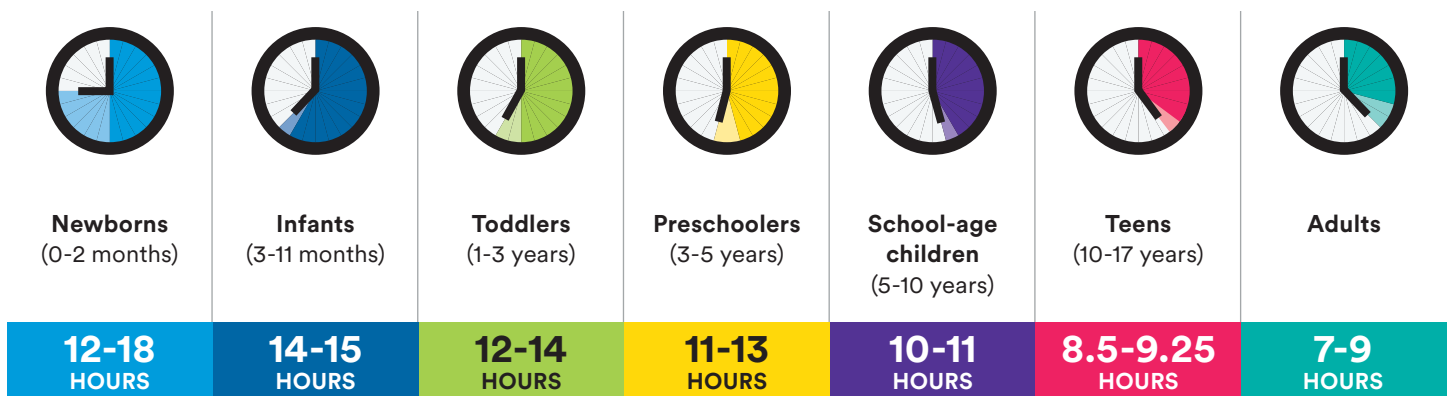
Healthy sleep tips for employees



Once properly educated, empower your employees to control the factors within their own lives that contribute to poor sleep habits.

A variety of tips, including those from the National Sleep Foundation, to help workers overcome insomnia and sleep loss, include the following:

Recommended hours of sleep by age group



SOURCE: National Sleep Foundation

1. Keep a regular sleep schedule

- **Stick to a sleep schedule** of the same bedtime and wake-up time, even on the weekends. This helps to regulate your body clock.
- **Wake up at the same time every day.** 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. As with your bedtime, try to maintain your regular wake-time even on weekends.
- **Nap to make up for lost sleep.** If you need to make up for a few lost hours, opt for a daytime nap rather than sleeping in late. This way, your natural sleepwake rhythm will not be disturbed.
- **Be smart about napping.** While taking a nap can be a great way to recharge, especially for older adults, it can make insomnia worse. If insomnia is a problem for you, consider eliminating napping. If you must nap, do it in the early afternoon, and limit it to thirty minutes.

2. Naturally regulate your sleep-wake cycle

Melatonin is a naturally occurring hormone controlled by light exposure that helps regulate your sleep-wake cycle. Melatonin production is controlled by light exposure. Your brain should secrete more in the evening, when it's dark, to make you sleepy, and less during the day when it's light and you want to stay awake and alert.

Bright lights at night – especially from hours spent in front of the TV or computer screen – can suppress your body's production of melatonin and make it harder to sleep. However, there are ways for you to naturally regulate your sleep-wake cycle, boost your body's production of melatonin, and keep your brain on a healthy schedule.

Increase light exposure during the day:

- **Remove your sunglasses** in the morning and let light onto your face.
- **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 light into your home/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 can simulate sunshine and can be especially useful during short winter days when there's limited daylight.

Boost melatonin production at night:

- **Turn off your television and computer.** Many people use the television to fall asleep or relax at the end of the day, which can be detrimental to your sleep quality. Not only does the light suppress melatonin production, but television can actually stimulate the mind, rather than relaxing it. Try listening to music or audio books instead, or practicing relaxation exercises. If your favorite TV show is on late at night, record it to view the following day.
- **Don't read from a backlit device at night like a tablet.** If you use a portable electronic device to read, use an eReader that is not backlit (i.e., one that requires an additional light source such as a bedside lamp).
- **Change your bright light bulbs.** Avoid bright lights before bed. Instead, opt for low-wattage bulbs.

3. When it's time to sleep, make sure the room is dark.

The darker it is, the better you'll sleep. Cover electrical displays, use heavy curtains or shades to block light from windows, or try a sleep mask to cover your eyes. Exercise daily. Any time of day is great for exercise, except right before bedtime.

4. Evaluate your room.

Keep it cool — between 60 - 67 °F (i.e. 16 - 19 °C) is optimal — and quiet.

5. Ensure you have a comfortable mattress and pillow.

Use a hypoallergenic pillow and an adequately supportive mattress.

6. Avoid cigarettes and heavy meals in the evening.

A light snack 45 minutes before bed — if hungry — is often the healthiest option.



Spending long days in an office away from natural light can impact your daytime wakefulness and make your brain sleepy.



Finally, don't forget to speak with your pharmacist about medications that might make you feel sleepy, or with your doctor about addressing arthritis, back problems or other conditions which cause pain or discomfort, and which could be preventing you from getting a good night's rest.

Many common foods also help promote or disrupt slumber. AARP offers this "food for thought":³⁷

Foods that harm your sleep

What?	Why not?	When to stop?
Celery and other high-water-content fruits and veggies like watermelons and cucumbers	Natural diuretic; will cause a full bladder in the middle of the night	90 minutes before bedtime
What?	Why not?	When to stop?
Tomato, eggplant, soy sauce, red wine, aged cheese	Rich in tyramine, an amino acid that triggers the brain to release norepinephrine, a stimulant that boosts brain activity and delays sleep	After dinner
What?	Why not?	When to stop?
Cheese pizza	Foods high in fat and fried foods take longer to digest and can cause discomfort that interferes with sleep	Three hours before bedtime
What?	Why not?	When to stop?
Black bean chili, broccoli, cauliflower, tacos	Gas-inducing food; hard to digest	Have it for lunch
What?	Why not?	When to stop?
Dark chocolate	Contains caffeine	4-6 hours before bedtime

Optimal foods for enhanced sleep

What?	Why
Almonds, almond butter	Contain the mineral magnesium, which contributes to relaxation and sleep regulation relaxing mineral that plays a key role in regulating sleep.
Bananas	Contain the amino acid tryptophan, an amino acid which is linked to sleep quality, and natural relaxing magnesium and potassium.
Hummus	Garbanzo beans (chick peas), the main ingredient, are rich in the natural sleep promoter tryptophan, but also in folate, which helps to regulate sleep patterns, and vitamin B-6, which helps to regulate your body clock.
Cherries, walnuts	Two of the few food sources of melatonin, the sleep hormone that regulates the internal clock. Tart cherries are chock-full and recent studies have found that drinking tart cherry juice every day helped people fall asleep sooner and sleep better and longer. Walnuts can help manage stress, a known culprit in insomnia.
Peanut butter	Another natural source of tryptophan.

A few final thoughts



We need a full-throttle reversal of society's notion that being awake for more hours makes us more productive, or that there are no health and occupational repercussions from sleep deprivation. Employers can and should take a number of steps to reduce the financial, legal and health impacts of a sleep deprived workforce.

But the solutions for stopping this problem should be shared by both employers and employees. In particular, employers can successfully take on an influential role with employees, so that they incorporate sleep-inducing strategies into their daily lives.

If we think that we don't have time for sleep, we are wrong. The reality is that we do not have time for all of the negative consequences associated with this hidden hazard.

End Notes

1. Circadian 24/7 Workforce Solutions, The Myths and Realities of Fatigue whitepaper, 2009
2. HealthAdvocate, "Sleep Deprivation: A Wake Up Call for Business," 2011
3. Centers for Disease Control and Prevention: Short Sleep Duration Among Workers – United states, 2010. Morbidity and mortality Weekly Report, 61(16), 281-285, 2012. S.E. Sluckhaupt. Retrieved from June 5, 2013, from <http://www.cdc.gov/mmwr/pdf/wk/mm6116.pdf>
4. Harvard Gazette, "Wake-up Call," September 2011
5. Psychologytoday.com, "Can You Ever Really Catch-up on Sleep," November 2013
6. Forbes.com, "The Good and Bad News About Your Sleep Debt," February 2014
7. PubMed.gov, US National Library of Medicine National Institutes of Health, "Effects of recovery sleep after one work week of mild sleep restriction on interleukin-6 and cortisol secretion and daytime sleepiness and performance," October 2013
8. Michelle A. Short Ph.D., Siobhan Banks Ph.D., "The Functional Impact of Sleep Deprivation, Sleep Restriction, and Sleep Fragmentation," October 2013
9. The Washington Post, "5 Myths About Sleep", Nov 2012
10. bbc.com, "How Long Can We Stay Awake," February 2013
11. Newsweek.com, "Our Sleep Problem And What To do About It," January 2015
12. Center for Disease Control and Prevention, "Insufficient Sleep Is a Public Health Epidemic," January 2014
13. Carol Connolly, Marian Ruderman, et al., Center for Creative Leadership Whitepaper, 2013
14. Uehli, Miedinger, et al. "Sleep problems and work injuries: a systematic review and meta-analysis," 2013
15. New York Times, "How Little Sleep Can You Get Away With?" April 2011
16. US National Library of Medicine National Institutes of Health, "Insomnia and the Performance of US Workers: Results from the America Insomnia Survey," September 2011
17. Sleep Health Foundation, "Re-awakening Australia – The Economic Cost of Sleep Disorders in Australia," 2012
18. Harrison, Y., & Horne, J. A. (2000), "The Impact of Sleep Deprivation on Decision Making: A Review," *Journal of Experimental Psychology: Applied*, 6(3), 236
19. Sleep and Breathing 6(2): 85-102: "The Prevalence, Cost Implications, and Management of Sleep Disorders: An Overview," Hossain JL, Shapiro CM., 2002.
20. Journalsleep.org, "Sleep and sickness absence: A nationally representative study," Volume 37 Issue 09, 2015
21. Godet-Cayré V; Pelletier-Fleury N; Le Vaillant M et al., "Insomnia and absenteeism at work. Who pays the cost?" *SLEEP* 2006;29(2): 179-184.
22. Durmer, J. S., & Dinges, D. F. (2005, March), "Neurocognitive Consequences of Sleep Deprivation," In *Seminars in neurology* (Vol. 25, No. 1, pp. 117-129)
23. Optisom.com, "Sleep Benefits," 2014
24. Mayoclinic.org, "I'm having trouble sleeping lately. Does this increase my chances of getting sick?"
25. Knutson KL, Ryden AM, Mander VA, Van Cauter E. "Role of Sleep Duration and Quality in the Risk and Severity of Type 2 Diabetes Mellitus," *Arch Intern Med* 2006;166:1768–176
26. Pennsylvania State University Research, *Journal of the Academy of Nutrition and Dietetics* (1996-2011)
27. Dr. Joyce Walseben, *The Atlantic*, Sleep Deprivation Decays the Mind and Body, 2013
28. Fertility American Journal of Epidemiology, 2013
29. Harvard Health Publications, Harvard Medical Sleep, "Sleep Problems, Heart Disease Often in Bed Together"
30. Prague Medical Report / Vol. 109 No. 4, p. 275–285, "The Effects of Sleep and Sleep Deprivation on Metabolic, Endocrine and Immune Parameters," 2008.
31. Sleepdex.org, "Sleep and Human Growth Hormone"
32. Breastcancerfund.org "Shift Work, Light-at-Night and Melatonin"
33. Cheryl L. Thompson PhD, Emma K. Larkin PhD et. al, "Short Duration of Sleep Increases Risk of Colorectal Adenoma," October 2010
34. Atsunori Ariga, Alejandro Lleras, Brief Article, "Brief and rare mental "breaks" keep you focused: Deactivation and reactivation of task goals preempt vigilance decrements," 2010
35. Sleep Research Lab Loughborough University in the UK, G. A. Spiller, ED., Caffeine (CRC Press New York) .
36. HuffingtonPost.com, "Famous Nappers: Historical Figures Known"



This white paper is intended for employers' general informational purposes only and should not be relied upon for medical or health advice. The white paper is not intended for distribution to employees and any such distribution is at the discretion of the employer.

The MAXIS Global Benefits Network ("Network") is a network of locally licensed MAXIS member insurance companies ("Members") founded by AXA France Vie, Paris, France (AXA) and Metropolitan Life Insurance Company, New York, NY (MLIC). MAXIS GBN, registered with ORIAS under number 16000513, and with its registered office at 313, Terrasses de l'Arche – 92 727 Nanterre Cedex, France, is an insurance and reinsurance intermediary that promotes the Network. MAXIS GBN is jointly owned by affiliates of AXA and MLIC and does not issue policies or provide insurance; such activities are carried out by the Members. MAXIS GBN operates in the UK through UK establishment with its registered address at 1st Floor, The Monument Building, 11 Monument Street, London EC3R 8AF, Establishment Number BR018216 and in other European countries on a services basis. MAXIS GBN operates in the U.S. through MetLife Insurance Brokerage, Inc., with its address at 200 Park Avenue, NY, NY, 10166, a NY licensed insurance broker. MLIC is the only Member licensed to transact insurance business in NY. The other Members are not licensed or authorised to do business in NY and the policies and contracts they issue have not been approved by the NY Superintendent of Financial Services, are not protected by the NY state guaranty fund, and are not subject to all of the laws of NY.