

Sleep and Technology Don't Mix: Why You Need to Set an Electronic Curfew

June 26, 2014 | 27,431 views

By Dr. Mercola

About 95 percent of Americans use an electronic device within one hour of going to sleep, according to a National Sleep Foundation poll. Furthermore, nearly all adults (89 percent) and the majority of children (75 percent) have at least one electronic device, such as a television, tablet, or smartphone, in their bedrooms.¹

This has a major implication on the quality of your sleep, in ways you might not even imagine. Certainly, such devices can keep you awake by making noises, but they also interfere with your sleep-wake cycle, or circadian rhythm, in far more insidious, and damaging, ways.

Light from Electronic Gadgets Interferes with Your Sleep

The quality of your sleep has a lot to do with light, both outdoor and indoor lighting, because it serves as the major synchronizer of your master clock. This master clock is a group of cells in your brain called the suprachiasmatic nuclei (SCN).

As a group, these nuclei synchronize to the light-dark cycle of your environment when light enters your eye. You also have other biological clocks throughout your body, and those clocks subsequently synchronize to your master clock.

In the non-artificial light environment of our historical past, people experienced greater light exposure only during the day between when the sun rose and when it set. Now with the advent of the light bulb, artificial light, high-definition televisions, and any number of lighted electronic gadgets, we're exposed to a lot more light over a 24-hour period, and a lot less darkness.

This creates a very novel situation for your internal time keeping and the biological pace setting mechanisms of your body; in other words, your circadian rhythms. As reported by the National Sleep Foundation:²

"There is robust scientific data documenting the role of light in promoting wakefulness. Photoreceptors in the retina sense light and dark, signaling our brain about the status of the outside world and aligning our circadian rhythms (centered in a small region of the hypothalamus called the suprachiasmatic nucleus) to the external day-night cycle.

This signaling of light and dark helps us to be alert in the morning and be able to fall asleep at the appropriate time at night. The power of light as an alerting agent is easily conceptualized when we think of the sun, but may be more difficult to appreciate when considering the light emitted from a tablet or smartphone."

Even the Small Amount of Light Emitted by Your Smartphone Can Keep

You Awake

Normally, your brain starts progressively increasing the hormone melatonin around 9 pm or 10 pm, which makes you sleepy. This helps regulate your sleep cycle as well as provide other important health benefits, including helping to prevent cancer.

Melatonin acts as a marker of your circadian phase or biological timing. In a nutshell, this hormone influences what time of day or night your body thinks it is, regardless of what time the clock on the wall displays.

Somewhere between 50-1,000 lux is the activation range within which light will begin to suppress melatonin production. However, wavelength is important here as red and amber lights will not suppress melatonin while blue, green, and white lights will. So if you use a clock in your bedroom, make sure it has red LEDs.

Melatonin is a regulator of your sleep cycle, and when it is suppressed, there is less stimulation to promote sleepiness at a healthy bedtime. This contributes to people staying up later and missing valuable sleep, as well as missing out on melatonin's health potential (research indicates it also helps protect your brain health and fights against cancer, diabetes, Alzheimer's, heart disease, and more).

Whether you have the light on for an hour or for just a second, the effect is the same. It would be nice if your melatonin production resumed when you flip the light back off, but unfortunately, it doesn't. So remember, when you turn the light on at night, you are seriously short changing your melatonin production. Not to obsess about it, but certainly don't make it a regular pattern.

One 2011 study compared daily melatonin profiles in individuals living in room light (<200 lux) vs. dim light (<3 lux).³ Results showed that, compared with dim light, exposure to room light before bedtime suppressed melatonin in 99 percent of individuals, and shortened the time period when the body has an elevated melatonin level by about 90 minutes.

Furthermore, exposure to room light during the usual hours of sleep suppressed melatonin by more than 50 percent. Even the light from your computer screen or smartphone is enough to interfere with your circadian rhythm and melatonin production. Computer screens and most light bulbs emit blue light, to which your eyes are particularly sensitive simply because it's the type of light most common outdoors during daytime hours. As a result, they can easily disrupt your melatonin production and keep you awake.⁴ Research shows, for instance:⁵

- Children who use electronic media at night go to bed later, get fewer hours of sleep per week, and report more daytime sleepiness
- Adolescents with a television in their bedroom go to bed later, have more difficulty falling asleep, and have a shorter total sleep time
- Sending texts or e-mails after initially going to bed increases daytime sleepiness among teens (even if it's done only once a week)

Computer and Cell Phone Use Before Bed Linked to Insomnia

The research is quite clear that people who use their computer for playing, surfing, or reading on the Web, or those who use their smartphones for the same purpose, as well as texting, are more likely to report symptoms of insomnia.⁶ This is an enemy to your sleep for multiple reasons, in addition to the problems with light exposure explained above. It can be difficult, for instance, to slow your mind down after surfing the Web, leading to racing thoughts when you should be in slumber.

Plus, when you're connected to the Internet, your phone or computer are communicating with nearby cell towers, which means they're also emitting low levels of radiation.

One 2008 study revealed that people exposed to radiation from their mobile phones for three hours before bedtime had more trouble falling asleep and staying in a deep sleep.^{7, 8} The following infographic, created by BigBrandBeds.co.uk, illustrates how your electronic gadgets wreak havoc on your sleep when used before bedtime.⁹

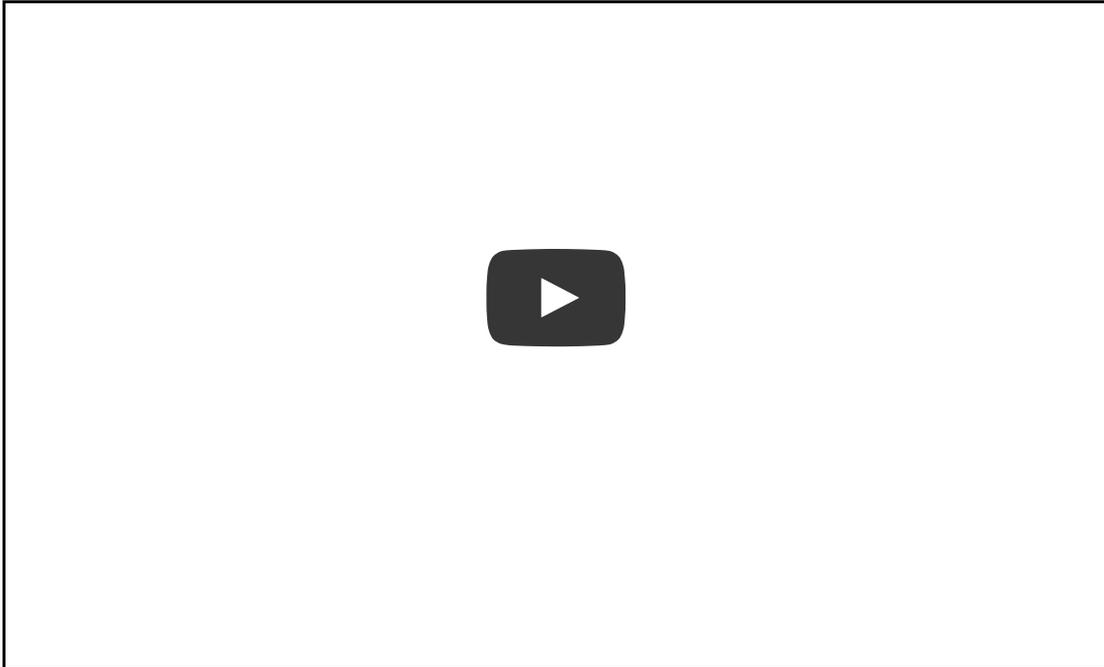
People Who Turn Off Their Gadgets Report Excellent Sleep

According to the 2014 Sleep in America Poll, 53 percent of respondents who turn electronics off while sleeping rate their sleep as excellent, compared to just 27 percent of those who leave their devices on.¹⁰ This is why I recommend avoiding watching TV or using a computer or tablet at least an hour or so before going to bed.

An alternative, you can try a free computer program called f.lux (see JustGetFlux.com), which alters the color temperature of your computer screen as the day goes on, pulling out the blue wavelengths as it gets late. You can also wear yellow-tinted glasses, which block the blue wavelengths of light.

Since humans evolved in the glow of firelight, yellow, orange, and red wavelengths don't suppress melatonin production the way white and blue wavelengths do. In fact, the range of light that inhibits melatonin is fairly narrow — 460 to 480 nm. If you want to protect your melatonin, when the sun goes down you would shift to a low-wattage bulb with yellow, orange or red light. [Dr. Russel Reiter](#) suggests using a salt lamp illuminated by a 5-watt bulb in this color range.

Remember, You Can't Cheat Sleep



...at least, not without consequences. You can have the healthiest diet on the planet, doing vegetable juicing and using fermented veggies, be as fit as an Olympic athlete, be emotionally balanced, but if you aren't sleeping well, it is just a matter of time before it will adversely, potentially seriously affect your health. Sleep deprivation is such a chronic condition these days that you might not even realize you suffer from it. Science has now established that a sleep deficit can have serious, far-reaching effects on your health, and once you're deficient, lost sleep can be difficult to "make up." For example, interrupted or impaired sleep can:

- Dramatically weaken your immune system
- Accelerate tumor growth—tumors grow two to three times faster in laboratory animals with severe sleep dysfunctions, primarily due to disrupted melatonin production. Melatonin inhibits the proliferation of a wide range of cancer cell types, as well as triggering cancer cell apoptosis (self-destruction). The hormone also interferes with the new blood supply tumors require for their rapid growth (angiogenesis)
- Cause a pre-diabetic state, making you feel hungry even if you've already eaten, which can wreak havoc

on your weight

- Seriously impair your memory; even a single night of poor sleep—meaning sleeping only 4 to 6 hours—can impact your ability to think clearly the next day. It's also known to decrease your problem solving ability

Earlier this year, I interviewed Dan Pardi on the topic of how to get restorative, health-promoting sleep. Pardi is a researcher who works with the Behavioral Sciences Department at Stanford University and the Departments of Neurology and Endocrinology at Leiden University in the Netherlands. According to Pardi, the following three factors are key to determining how restorative your sleep is:

1. **Duration**—i.e. the number of hours you sleep. Sleep requirements are highly individual, and can change from one day to the next, depending on factors like stress, physical exertion, illness, and pregnancy, just to name a few. But, on average, most people need about eight hours of sleep per night.
2. **Timing**—i.e. the habit of going to bed at approximately the same time each night. Even if the duration of sleep is the same, when the timing of your sleep is shifted, it's not going to be as restorative.
3. **Intensity**—This has to do with the different stages that your brain and body goes through over the course of the night, the sequence of them, and how those stages are linked.

Some medications will suppress certain phases of sleep, and certain conditions like sleep apnea will lead to fragmented sleep. With these scenarios, even if you're sleeping for an adequate duration and have consistent timing, your sleep will not be as restorative.

One of the easiest ways to gauge whether you've slept enough is to assess your level of sleepiness the next day. For example, if you had the opportunity, would you be able to take a nap? Do you need caffeine to keep you going? Answering yes to these two questions would indicate you need more and/or better sleep.

How to Get a Truly Restful Night's Sleep

Small adjustments to your daily routine and sleeping area can go a long way to ensure uninterrupted, restful sleep. I suggest you read through my full set of [33 healthy sleep guidelines](#) for all of the details, but to start, consider implementing the following changes. Number one on my list? Turn *off* your electronic gadgets and keep them out of your bedroom:

- **Avoid watching TV or using your computer/smartphone or tablet in the evening, at least an hour or so before going to bed.**
- **Make sure you get BRIGHT sun exposure regularly.** Your pineal gland produces melatonin roughly in approximation to the contrast of bright sun exposure in the day and complete darkness at night. If you are in darkness all day long, it can't appreciate the difference and will not optimize your melatonin production.
- **Get some sun in the morning.** Your circadian system needs bright light to reset itself. Ten to 15 minutes of morning sunlight will send a strong message to your internal clock that day has arrived, making it less likely to be confused by weaker light signals during the night.
- **Sleep in complete darkness, or as close to it as possible.** Even the tiniest glow from your clock radio could be interfering with your sleep, so cover your clock radio up at night or get rid of it altogether. Move all electrical devices at least three feet away from your bed. You may want to cover your windows with drapes or blackout shades, or wear an eye mask when you sleep.
- **Install a low-wattage yellow, orange, or red light bulb if you need a source of light for navigation at night.** Light in these bandwidths does not shut down melatonin production in the way that white and blue bandwidth light does. Salt lamps are handy for this purpose.
- **Keep the temperature in your bedroom no higher than 70 degrees F.** Many people keep their homes too warm (particularly their upstairs bedrooms). Studies show that the optimal room temperature for sleep is between 60 to 68 degrees F.

- **Take a hot bath 90 to 120 minutes before bedtime.** This increases your core body temperature, and when you get out of the bath it abruptly drops, signaling your body that you are ready to sleep.
- **Avoid using loud alarm clocks.** Being jolted awake each morning can be very stressful. If you are regularly getting enough sleep, you might not even need an alarm.
- **Be mindful of electromagnetic fields (EMFs) in your bedroom.** EMFs can disrupt your pineal gland and its melatonin production, and may have other negative biological effects as well. A gauss meter is required if you want to measure EMF levels in various areas of your home.

[+] Sources and References

[+] Comments (28)