

Wake Up to the Power of Sleep

New products and technological advances have created a range of new sleep-optimizing products. How does your sleep stand to benefit? BY MO PERRY



Sleep is big business these days. The cultural conversation has shifted away from how little sleep we can get away with in the interest of maximizing productivity, toward how we can prioritize and protect it for the sake of our health. From Arianna Huffington's campaign to raise awareness of sleep deprivation to emerging research into the critical role that sleep plays in every aspect of our well-being, a range of factors are contributing to a new focus on sleep: why we need it, how it works and how we can get more of it.

Advances in modern technology may have a lot to do with our current state of collective sleep deprivation (which brain researchers say is nothing short of a public health crisis). With

video streaming services on our TVs and phones, bottomless social media feeds and endless digital rabbit holes to explore—not to mention the blue light that emanates from our devices, messing with our circadian rhythms—it's easy to conclude that technology is the enemy of sleep. But a slew of companies and researchers are putting sleep technology to work for good, using cutting-edge brain science to uncover sleep's mysteries as well as advances in development and manufacturing to deliver novel solutions to common sleep problems.

Luxury bedding brand Beautyrest, developed by the Serta Simmons Bedding company, has its own advanced research center where scientists study sleep to develop groundbreaking innovations (including the introduction of the queen-sized mattress in 1958 and high-quality cooling foams more recently)

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to help people get the best sleep possible.

“It’s an exciting time for the sleep industry, with new studies emphasizing the importance of sleep as a restorative means to maintain good health and well-being,” says JD Velilla, head of sleep experience at Beautyrest. “We want our products to unlock the true potential behind a great night of rest. It’s about understanding and exploring new ways to design a sleep experience as unique and individualized as the person using our products.”

In one sign of the sleep industry’s growth, the National Sleep Foundation held its first consumer expo in March 2019, featuring everything from mattresses and sleep trackers to baby sleep products and sleep supplements from roughly 200 brands.

Companies such as Saatva are pioneering the direct-to-consumer mattress model, making luxury, ecofriendly mattresses available for a fraction of what comparable products cost at retail. And brands such as Sleep Number are using proprietary algorithms and AI to enable consumers to track their sleep data through its 360 smart bed. Meanwhile, Ebb Therapeutics is mining insights from brain imaging studies on patients with sleeplessness to design a wearable device that targets a racing mind.

According to Sarah Moe, a Minneapolis sleep educator and sleep study technologist who founded Sleep Health Specialists in 2015, the recent interest in all things sleep-related springs from a rising awareness of the financial cost of sleep deprivation.



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— SARAH MOE, FOUNDER OF SLEEP HEALTH SPECIALISTS IN MINNEAPOLIS

COMPANIES AND PRODUCTS TO HELP YOU SLEEP SOUNDLY

Beautyrest

Beautyrest champions the power of sleep by relentlessly exploring the physical, emotional and mental science of better sleep to inspire products and behaviors that have demonstrable sleep benefits for the consumer.

Carlson Labs

Carlson Melatonin Gummies promote relaxation and a healthy sleep pattern, so that you can fall asleep and stay asleep. Help restore your body clock, so that you can sleep soundly and wake up feeling refreshed and revitalized.

Ebb Therapeutics

Ebb Therapeutics aims to improve sleep through the power of cooling technology. It offers a first-of-its-kind wearable sleep device that targets a racing mind, using precise cooling to reduce metabolic activity in the frontal cortex of the brain and relieve sleeplessness.

Saatva

The largest online retailer of luxury mattresses and bedding products in the United States, Saatva offers six ecofriendly mattress styles, designer bed frames, organic sheets and pillows and premium foam and latex mattress pads and toppers.

Sleep Number

As a purpose-driven company, Sleep Number’s mission is to improve lives by individualizing sleep experiences. Its revolutionary Sleep Number 360 smart beds deliver proven, quality sleep through effortless, adjustable comfort.

Vitafusion

America’s No. 1 gummy vitamin brand, Vitafusion fuses taste and nutrition to deliver the best vitamin experience. Its Melatonin Max Strength gummies provide 3 mg of melatonin with natural white tea and passionfruit flavors.

“Our sleepy society is costing employers and institutions money,” she explains. “More companies are emphasizing sleep education because they recognize the cost of sleep deprivation to both their employees’ well-being and the bottom line.” Moe says the increase in sleep aids and technologies is also linked to the growing focus on self-care. “We have higher standards these days for how we expect to feel,” she says, “and people are realizing sleep is a huge part of their ability to feel joy, energy and happiness throughout the day.”

Saatva founder and CEO Ron Rudzin agrees: “We’re excited about the growing awareness of the importance of quality sleep and its benefits for physical and emotional well-being,” he says, adding that it’s gratifying to see high-profile people such as Huffington and LeBron James help bust the myth that people need to skimp on sleep to be successful, when all the available research shows the opposite to be true.

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Why We Need Sleep

In his 2017 *New York Times* best-selling book *Why We Sleep*, sleep researcher Matthew Walker, Ph.D., describes sleep as the “universal health care provider.” No matter what ails us physically or mentally, he writes, sleep can help treat it. He speculates about how much people would be willing to pay for a drug that delivered all the benefits that sleep already offers for free: enhancing memory and creativity; limiting food cravings; protecting against cancer and dementia; warding off colds and flu; lowering risk of heart attack, stroke and diabetes; lessening depression and anxiety; and improving mood.

Despite all these benefits, the Centers for Disease Control and Prevention reports that 1 in 3 American adults gets less than the recommended minimum of seven hours of sleep per night. *Fortune* reported in 2016 that lack of sleep costs the United States about \$411 billion in lost productivity each year.

Sleep often is described as one of the three main pillars of health, along with diet and exercise. But Walker claims that even this description fails to convey how deeply critical it is to our proper functioning. “Sleep is more than a pillar,” he writes in *Why We Sleep*. “It is the foundation on which the other two health bastions sit. Take away the bedrock of sleep, or weaken it just a little, and careful eating or physical exercise become less effective.”

In his book *How to Be Well*, integrative physician Frank Lipman, M.D., warns that losing just two hours of sleep causes inflammatory markers to appear, and healthy people can start to express diabetic-like symptoms after chronic poor sleep. Skimping on sleep also can leave us wired for stress, increasing our fight-or-flight reactions to mild difficulties or conflicts.

“Sleep is important for both brain and body health,” says Michael Howell, M.D., sleep researcher, educator and cofounder of the Sleep Performance Institute in Edina, Minnesota. “It lets cells recover energy, helps our brains clear out toxins and rewires our circuits so we remember what’s meaningful while less important memories are pruned away.” While there’s some variation in how much sleep each individual requires, Howell says the average is about eight hours, though some may need slightly more or less. The National Sleep Foundation recommends that adults (age 26-64) get between seven and nine hours of sleep each night, while those 65 and older should aim to get between

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seven and eight.

While these recommendations reflect a slight decrease in the amount of sleep required as we age, it’s a widely held misconception that we need significantly less sleep when we enter the AARP years. Older adults appear to need about the same amount of sleep that they did in midlife, but are less able to generate it, writes Walker in *Why We Sleep*. As we get older, our sleep tends to change in a few ways, including an increase in sleep fragmentation. We tend to wake more frequently as we age due to a range of factors, including medications and weakening bladders. As teenagers, we enjoyed a sleep efficiency of about 95 percent, meaning for every eight hours we spent in bed, we slept about 7.2. By the time we reach our eighties, sleep efficiency often drops below 70 or 80 percent, meaning we may spend one to one and a half hours out of eight staring at the ceiling.

This lack of sleep has profound consequences for seniors’ mental and physical health. The number of age-related ailments that tie back to sleep impairment is much higher than “either we, or many doctors, truly realize or treat seriously,” writes Walker. With a wave of baby boomers moving into (and through) their senior years, improving the quality and quantity of sleep for older adults may represent one of the most urgent opportunities for sleep researchers and developers of new sleep aids and technologies.

How Sleep Works

Ideally, tonight you’ll crawl into bed, turn out the lights and slip into blissful unconsciousness. The next thing you know, it’ll be eight hours later and you’ll leap out of bed refreshed and renewed. What will have happened during that time? First, you will have dropped into shallow nonrapid eye movement, or NREM, sleep. This type of sleep comprises three stages. As you drop through the first two lighter stages of NREM and into stage 3, brain wave activity slows down to a rate roughly 10 times slower than your waking brain activity. The slow, synchronized NREM waves sweep across your brain, allowing distant regions of your brain to communicate and move memories from short-term storage into long-term safekeeping. These waves also bathe the brain in cerebrospinal fluid that removes toxins and metabolic byproducts such as beta amyloid (a plaque heavily associated with Alzheimer’s disease).

Next, your brain will have moved into rapid eye movement, or REM, sleep, which you probably know as the dreaming stage of

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SLEEP BY THE NUMBERS

- A consistent sleep schedule can make you **1.5 times** more likely to feel well-rested during the day.
- It takes the average person between **10 and 20 minutes** to fall asleep.
- The average sleep duration in the U.S. is **7 hours and 6 minutes**.
- An estimated **83.6 million** U.S. adults sleep less than the recommended minimum of 7 hours.
- **Seventy percent** of Americans report insufficient sleep at least one night per month; **11 percent** report insufficient sleep every night.
- The global market for sleep aids and technologies is expected to reach **\$84.9 billion** by 2021.
- A study in the *Journal of Chiropractic Medicine* found that a new mattress reduced back pain by **48 percent** and improved sleep quality by **55 percent**.
- Queen is the most popular bed size, used by **47 percent** of Americans.

sleep. During this sleep stage, your brain wave activity resembles that of wakefulness. In fact, MRI imaging has revealed that some parts of the brain are up to 30 percent more active during REM sleep than when we are awake.

Our emotions, motivations and memories take advantage of REM sleep to dance and collide in parts of the brain that process vision, hearing and movement. It's this integration of the day's new impressions with your storehouse of memories and emotions that powers REM sleep's ability to spark new creative insights. Both REM and NREM sleep are critical for proper brain function. NREM sleep helps us sort and store new information, while REM sleep improves our ability to solve problems, make intelligent decisions and regulate our emotions.

While you go through all the stages of sleep in roughly 90-minute cycles throughout the night, the majority of NREM sleep is front-loaded into the early part of the night, while REM sleep dominates the later morning hours. Missing out on the bulk of either type by going to bed too late or rising too early can rob the brain of critical nourishment.

When Sleep Won't Come

So there you are, lying in bed, thinking of all the urgent reasons you really need to fall asleep. It's not that you're not trying. But

sleep just won't come. What gives?

"When you go to bed and lie there awake, trying to fall asleep, it's stressful," says Howell. "Spend more than 10 minutes awake in bed trying to relax and you'll start thinking about deadlines or your to-do list or issues in your relationships. That's normal, even for someone without anxiety or depression. Add those things in and then you're really struggling."

Eric Nofzinger, M.D., founder and chief medical officer of Ebb Therapeutics, set out to address just this problem after watching his patients search for a solution to their sleeplessness. While serving as the director of the sleep neuroimaging research program at the University of Pittsburgh's School of Medicine, Nofzinger concluded that the root cause of sleeplessness is overactivity in the frontal cortex of the brain, which produces the "racing mind" that many of us know all too well.

Remember those slow, synchronized waves of deep NREM sleep? That same area of the brain, where Nofzinger observed overactivity in sleepless patients, is where they originate. About 2 inches above the bridge of your nose you'll find the middle of your frontal lobes.

"When you go to bed tonight, this is where most of your deep sleep brain waves will be generated," writes Walker in *Why We*

Sleep. "It is the epicenter, or hot spot, from which most of your deep, slow-wave sleep emerges."

Nofzinger discovered that when the forehead is cooled, activity in the frontal cortex is reduced and a person is better able to reach restorative sleep. "Over the years, I saw so many of my patients unsatisfied with things they had tried," he says. "They either didn't work or had bothersome side effects. After decades of research, I'm proud to be able to offer a natural, clinically validated option that truly gets to the root cause of sleeplessness: that overactive mind that won't stop."

Ebb is a scientifically engineered, fluid-filled headband that wraps softly around the head and uses precise cooling to reduce metabolic activity in the frontal cortex, calming the mind and allowing the body to fall asleep naturally. Nofzinger says that the device offers particular benefit for frequent travelers, who face the added sleep challenges of unusual environments and time changes.

"The mind's normal way of dealing with these challenges is to be on guard or more vigilant and aroused—the reverse of what's needed for a restful night of sleep," he says. "Ebb is designed to counteract the way the mind reacts to stressful situations, allowing one to reach restorative sleep more quickly so they can be at peak performance the next day."

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Find Your Rhythm

Lipman asserts in *How to Be Well* that sleeping in sync with one's natural body clock is the factor that is most often overlooked. "In our world of persistent connectivity, global travel and on-demand everything, it can feel baffling that there are some fundamental biological laws of timing that you can't outthink or outmaneuver," he writes.

Howell says that he's often asked about the optimal amount of sleep, but he thinks the better question is: When is the optimal time to be sleeping? Each of us is governed by our own unique circadian rhythm—the internal clock that signals to our body when it's time to sleep, wake and eat. "If you have 12 people in a room, you'd have 12 different circadian rhythms," he says. "For each of those people, the goal is to align their sleep with their body's natural rhythm."

Of course, our society is organized around one particular version of a circadian rhythm—one that says you should fall asleep between 10 and 11 p.m. and get up between 6 and 7 a.m. "That's great for someone who has that rhythm," says Howell, "but say you're a person who'd rather go to bed at midnight or 1 a.m. and sleep until 9. If you can find a way to do that, your blood pressure will be more normal, you'll be better able to handle stress, you'll have quicker reaction times and make fewer errors."

Ideally, we'd all be able to adhere to our own naturally endowed circadian rhythm, but the realities of work and family life often make that impossible. Howell says that the next best thing to adhering to your natural circadian rhythm is gently adjusting it. The strongest factor influencing your sleep-wake cycle is light exposure, particularly bright light in the morning. People trying to move their rhythm earlier (going to bed and getting up earlier than they would prefer to) can use a light box in the early morning hours while brushing their teeth, getting dressed and making breakfast. And supplementing with a low dose of melatonin, a hormone naturally secreted by the pineal gland in response to darkness, can help prepare the body for sleep at night.

Melatonin can be particularly useful for jet lag. Your brain's master clock—the suprachiasmatic nucleus, or SCN—is located in the hypothalamus. It governs all other peripheral clocks in your body, such as those that trigger digestion and immune function. When you quickly travel to a distant time zone on an airplane, your SCN doesn't have time to adjust and leaves you

feeling strangely out of sync with the time in the new location. Walker writes in *Why We Sleep* that the SCN can only readjust by about one hour for each day. So if you fly from San Francisco to London (an eight-hour time difference), it will take you eight days to fully adjust to London time. Using melatonin before bed to signal to the body that it's nighttime can help ease that transition and increase the likelihood of being able to fall asleep in London even though your body is still wide awake on San Francisco time.

Invest in Your Bedroom Environment

Honoring or adjusting your circadian rhythm is arguably the

TIPS FOR BETTER SLEEP

Sleep experts offer the following tips for encouraging a successful transition into slumber:

- Stick to a regular sleep/wake schedule, even on the weekends.
- Get regular exercise, but try to wrap it up two to three hours before bedtime if you tend to struggle to fall asleep.
- Cut back on caffeine, especially after noon.
- Avoid nicotine. It's a stimulant and can cause early waking due to withdrawal.
- Avoid alcohol before bed. It can inhibit REM sleep and impair breathing throughout the night.
- Avoid large meals close to bedtime as well as supplements or medications that can disrupt sleep patterns.
- Keep naps limited to 20 or 30 minutes before 3 p.m.
- Enjoy a hot soak or shower before bed.
- Keep your bedroom cool, dark and free of technological gadgets.
- Invest in a quality mattress and consider an eye mask and white noise machine.
- Use daylight (or a light therapy lamp) and/or circadian supplements in the evening to reset your circadian rhythm when traveling.
- Limit blue light exposure from screens close to bedtime.
- If you can't fall asleep after more than 20 minutes, get up, move to a different space and do something relaxing until you feel sleepy.

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most important aspect of getting good sleep, but designing a space conducive to sleep is a close second. “We spend a third of our lives asleep,” says Moe, the Minneapolis sleep educator. “It’s important to continue to invest in the comfort of the space where it happens.” She recommends getting a new mattress every seven years, as our bodies’ physiology—and needs in terms of

firmness and support—evolve as we age.

“There’s a lot of variation in preference when it comes to mattress firmness,” says Howell. “For some people, a different mattress can make a big difference.”

Saatva, the largest online luxury mattress brand in the United States, offers a range of mattress types so sleepers can

find the one that works for their specific needs. Its Loom & Leaf memory foam mattress, for instance, eliminates motion transfer so one sleeper won’t disturb the other when getting in or out of bed. Beautyrest also has pioneered pocketed coil technology that provides maximum support and diffuses movement for undisturbed rest, as well as high-quality foams that offer cooling and comfort.

Sleep Number’s 360 smart bed offers the ability to determine an optimal level of firmness (a consumer’s Sleep Number setting). The bed’s integrated operating system automatically adjusts support throughout the night in response to movement to deliver quality sleep. In the future, the company says the bed may be able to detect changes in health through biometrics such as heart rate, breathing rate and movement, enabling preventive and proactive health care.

As promising as these new sleep innovations are, Moe says that the most exciting development is simply that we’re talking about sleep more, particularly given the high percentage of Americans with undiagnosed sleep disorders who stand to benefit from a sleep study (which are also growing in popularity and accessibility). “It’s great that people are learning more about sleep, the third pillar of health along with diet and exercise,” she says. “It’s a vital part of our health, so learning about it is very important.” ▼

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