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You Will Start to Feel Very Sleepy ...

... And you should go to bed, because shortchanging your rest can hurt your health

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Jan. 19 issue - We don't need a scientist or a study published in The New England Journal of Medicine to tell us that there's a price to be paid for losing sleep. You sag after lunch, maybe get a little hypnotized by the centerline on the ride home or just plain feel crummy. Remember when your parents shooed you to bed with "Because you need your sleep, that's why!"? Your parents were right—even more than they knew.

Research now suggests that regular, ample sleep is one of those indispensables, ranking right up there with eating right and exercising. It's not a huge surprise that lack of sleep makes people more vulnerable to infection. But recent experiments have shown that when you shortchange sleep, the human immune system also seems to nod off and produce fewer infection-fighting antibodies.

Inadequate sleep may make us vulnerable to many other important diseases. Researchers at the University of Chicago studied volunteers who slept just four hours a night for six straight days. They found hormonal and metabolic systems in disarray. The researchers' conclusion: chronic sleep loss might both hasten the onset and increase the severity of diabetes, high blood pressure and obesity. And a study published early last year showed for the first time that getting less sleep may increase your risk of having a heart attack.

Then there are the brain benefits. "I need to sleep on it" isn't just an English-language expression—people all over the world say something like it. Now sleep researchers are beginning to prove the truth of that folk wisdom with experiments testing sleep's influence on "complex cognitive procedural" thinking. In Canada, researchers used a logic game called Wff N' Proof to test it. If people get drunk shortly before going to bed, after they learn the game in the afternoon (all in the name of science, of course), they do 40 percent worse the next time they play it than those who stayed sober. One explanation for this finding is that alcohol suppresses the REM (rapid eye movement) cycle of your sleep, and you need a certain amount of REM sleep to learn well.

Here at Harvard, we've used computer games like Tetris and Alpine Racer, along with simpler tests, to see how sleep affects memory. Remember that old joke: "How do you get to Carnegie Hall?" Punch line: "Practice, practice, practice." That's certainly true. But sleeping between practice sessions may also be helpful. Our experiments have shown that people's scores on certain types of memory tests improve without any additional practice as long as they sleep soundly and for at least six hours the night after first learning the task.

We've also found that if you deprive people of sleep that night, they never show the additional improvement that comes with sleep, even if they sleep normally on subsequent nights. Israeli researchers have shown that depriving subjects of REM is as effective as depriving them of all sleep. What's more, the amount of improvement tracks closely with the amount of REM in the final two hours of sleep.

Memories are created by strengthening the connections among networks of brain cells. Sleep may be the brain's way of tinkering with those connections—boosting some, dampening others. It may also be an important finger on the brain's DELETE button. Each waking moment bombards your brain with scores of sensations, thoughts and feelings. If your brain tried to store them all as memories, you might experience terminal overload and be able to remember nothing. Undoubtedly, you're editing out some impressions as they hit you during the day. But sleep also

seems to help. In fact, one theory of post-traumatic stress disorder is that it is caused by disordered sleep: after a bad experience has filled the brain with vivid impressions during waking hours, inadequate sleep prevents the normal sifting and winnowing that moves these impressions into more integrated and less emotional memory systems, and so all the emotions and sensations of the trauma keep coming back untamed.

So how much sleep do you need? From diaries, letters and literature, we know that a century ago most Americans got about nine hours of sleep a night. Now the average is about seven, and a third of us try to get by on six hours or less. Based on lab experiments that allow people to "find" their natural amount of sleep, researchers say that many people have body clocks set so that they need a little more than eight hours a night. There are the long and short sleepers among us. But just because you aren't sleepy during the day doesn't mean you wouldn't benefit from more sleep. Studies have shown that even when people who haven't slept much say they aren't sleepy, their mental agility slips in several ways they don't realize, and then improves after they've gotten adequate sleep.

There are a lot of reasons not to get eight hours of sleep these days. Midnight—it used to be the middle of the night. Today it's the time we turn off Jay Leno. The computer is a 24/7 enticement to no-doze, particularly for IM-ing teenagers and workaholics, who can now send flurries of e-mails as a nightcap.

Even the light bulb is trouble. For 1 million years, the human species lived with bright light in daytime and darkness at night. Our circadian rhythms adapted accordingly: nighttime darkness triggered a surge of melatonin, leading to sleep, and dawn triggered awakening. But for the past 100 years, humans in the developed nations have been illuminating their evenings with electric light. At first, sleep physiologists assumed that such evening light would not affect circadian rhythms, since the amount of light is so much less bright than sunlight. But recent studies from Harvard have shown that assumption to be wrong: our artificially illuminated evenings are disrupting our sleep and (although this is less clear) may be producing sleep pathology in at least some of us.

Age is another factor. It's not true that you need less sleep as you get older, but it is true that you get less sleep. There are various reasons: the aches and pains of arthritis, bouts of depression, multiple medications, those nighttime trips to the bathroom because it is harder to fully empty the bladder. A few age-related diseases have a direct effect on sleep. People with Alzheimer's disease, for example, spend more time awake at night and get less REM sleep.

Nine hours of sleep a night—slumberwise, those were the good old days. But somehow in our plugged-in, overworked, present-day lives, we have to find ways to get more sleep. Sleep-advice books have joined the mountains of volumes dispensing nutrition and exercise tips. The National Sleep Foundation's Web site (www.sleepfoundation.org) has several useful, if familiar, pointers. Don't use alcohol as a sleeping pill. Yes, it's sedating, but alcohol disrupts normal sleep patterns and leaves you awake later in the night. The bed should be a sleep- and sex-only zone. Caffeine can linger in your body for up to 12 hours, so to be on the safe side, avoid caffeinated coffee, tea, soft drinks and chocolate after noon.

Sound, practical suggestions like these are always welcome. But more fundamentally, we need to change our attitudes. We've associated sleep with laziness or lack of drive. But science is now showing us that sleep may make you demonstrably smarter and appreciably healthier. Rather than stigmatizing it as a moral failing, we need to promote sleep as a necessary ingredient of a long and healthy life.

Adapted from "Improving Sleep: A Guide to Getting a Good Night's Rest," published by Harvard Medical School. For information on sleep, go to health.harvard.edu/NEWSWEEK.

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