Boosting Your Energy

In this report:
Aging and energy
Combating chronic fatigue
Should you take a vitamin or supplement?
Improving sleep

SPECIAL BONUS SECTION
A 7-step plan to jump-start your natural energy
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Dear Reader,

Perhaps the title of this report caught your eye because you’ve been feeling run-down or unmotivated lately. Or maybe you’re feeling weak, lethargic, worn-out, or just plain dog-tired.

There are many ways to describe how you feel when you are low on energy. As with pain, fatigue is a symptom, not a disease, and it’s experienced differently by different people. The fatigue you feel at the end of a long, stressful day or after a time zone change involves the same sensations you might feel from long-lasting fatigue resulting from an illness. The difference is that fatigue from stress or lack of sleep usually subsides after a good night’s rest, while other fatigue is more persistent and may be debilitating even after restful sleep.

Given that many people experience a dip in energy from time to time, it should come as no surprise that fatigue is one of the most common symptoms experienced by adults everywhere, and it is one of the most frequent complaints in doctors’ offices around the globe.

Often fatigue is to be expected: you may be recovering from the flu, or, like too many adults, you haven’t been getting enough sleep lately. Maybe you’re simply trying to do too much, and the resulting stress is wearing you down.

If you’re a baby boomer, your exhaustion may be due to some of the physical changes that accompany aging, such as normal reductions in the amount of deep sleep or, for menopausal women, frequent hot flashes that disrupt sleep. While no one can turn back the clock, there are steps you can take to slow or even reverse some aspects of age-related fatigue.

In other cases, though, fatigue is a sign that something is amiss and should be brought to the attention of your doctor. For example, fatigue is one of the main symptoms of a number of conditions, including depression, congestive heart failure, multiple sclerosis, anemia, hypothyroidism, and diabetes, all of which require medical attention. Often fatigue subsides when these conditions are treated.

Currently, fatigue cannot be measured scientifically. But recent advances in understanding the neurochemical processes involved with brain function are providing new insights that could, one day, pave the way for new tests to measure fatigue and new medications to treat it.

In the meantime, whatever its cause, your fatigue is telling you something important. Listen to your body. As you’ll see in this report, there is much you can do to bolster your energy. It is our hope that the strategies inside these pages help you regain the physical and mental energy you need to enjoy life to its fullest.

Sincerely,

David M. Dawson, M.D.
Medical Editor

Anthony L. Komaroff, M.D.
Medical Editor
The word “energy” can mean many things. You might use it to describe the strength you need to take on a physical challenge and the endurance to keep it up for an extended period: running a marathon, biking uphill, sightseeing all day, weeding and planting in the garden, and so on.

But energy is not just about muscles. It’s also about the mind. When you’re mentally energetic, you’re “on,” you readily absorb information by reading, listening, and watching. Another aspect of mental energy is motivation—the drive to do things like initiate a new work project, tackle those home repairs, or read a book cover-to-cover in a sitting. You may have noticed that when you’re really absorbed in an activity, you feel more energetic than when you are only half-interested in it. Motivation can be a powerful force in overcoming fatigue.

When you lack energy, you feel physically weak, mentally dull, or both. Effort of any sort can tire you out quickly. This absence of energy is often referred to as fatigue, and it’s a common phenomenon that has been viewed differently over the years (see “Changing views of fatigue,” at right).

Sometimes when you lack energy you feel tired or drowsy. Is it simply that you need more sleep? While some people can get by with more and others less, most need roughly eight hours of sleep a night. Sleepiness can also be induced by medications that have a sedative effect on the brain (see “Medications,” page 21).

But fatigue is not just sleepiness: it includes components that are physical (weariness or weakness), mental (lack of concentration and sharpness), and emotional (lack of motivation or boredom). Your muscles might ache. You might need to read a passage over three times before you understand it. You may be sluggish or bored.

You can lack energy or feel fatigued without being sleepy, and you can also be full of energy and sleepy. Most people have had times when they’ve been able to override the urge to sleep with a surge of physical, mental, or emotional energy. But sleep and energy are related. No matter how energetic you are, you can’t override sleepiness indefinitely. Eventually, lack of sleep will sap your energy and lead to fatigue (see “Sleep difficulties,” page 19).

Changing views of fatigue

In today’s multitasking, 24/7 society, fatigue is thought of as something to be avoided, conquered, or, at the very least, denied. But fatigue did not always have a negative connotation. In medieval writings, for example, fatigue is often portrayed as a positive sign that a person has reached his or her limit, and it’s time to rest.

The notion that fatigue is an unwelcome condition to be studied and overcome first became popular in the mid-19th century, with the advent of industrialization and its demand for a steady source of indefatigable factory workers. By 1900, the study of fatigue was all the rage, with fatigue laboratories cropping up throughout Europe and scholarly papers about the new science of “ergography” filling scientific journals.

Reflecting the zeal of the times, in 1909, a German scientist claimed he had identified the bodily chemical responsible for fatigue, which he dubbed “kenotoxin.” To test his theory, he sprayed a classroom of fatigued (and undoubtedly frightened) German schoolchildren with his “antikenotoxin” antidote. Not surprisingly, the antidote proved ineffective and was abandoned.

Interest in the study of fatigue grew as the military sought to understand how to boost energy and thereby increase the productivity of workers in munitions factories during World War I. Later the focus of military research shifted from physical to mental fatigue as increasing numbers of tasks—from piloting airplanes to operating radar—required sustained mental alertness.

Today, research on fatigue continues, but with the recognition that it is far more multifaceted and
How common is fatigue?

One of the significant challenges facing contemporary scientists studying fatigue is how to measure its prevalence. Unlike diabetes, obesity, or other well-defined medical conditions, fatigue is very difficult to define because it has varied symptoms and, like pain, is both an objective and subjective state.

Moreover, fatigue is part of the human experience and is, at times, entirely normal. In the absence of a clear-cut definition or objective “fatigue test,” attempts to measure how many people experience fatigue—and when it crosses the line from normal to abnormal—are imprecise at best. Despite these hurdles, researchers who have looked at the results of numerous epidemiological (population-based) studies of fatigue have been able to draw some conclusions about its prevalence.

The first is that fatigue is very common. In a comprehensive health survey of more than 9,000 adults in Britain, for example, only headaches were more common than fatigue, which affected approximately 25% of respondents. A U.S. study reached similar conclusions, with 24% of respondents reporting excessive fatigue. While the statistics vary somewhat because of differences in how fatigue is defined, studies done in France, Algeria, Germany, Taiwan, Iceland, Mexico, and elsewhere lead to the same basic conclusion: fatigue is one of the most common symptoms—and in some studies, the most common symptom—experienced by people in the general population.

Perhaps not surprisingly, fatigue is also one of the leading reasons people around the world visit primary care providers. One U.S. survey concluded that fatigue was responsible for more visits to primary care doctors than colds, rashes, headaches, or chest pains.

Studies have also shown that fatigue can have multiple simultaneous causes, and be associated with many variables, including demographic, social, cultural, and psychological factors. One study involving more than 29,000 adults found that fatigue is common in urban areas and that the highest levels of fatigue occurred among women and people with lower levels of education and less prestigious jobs. Other studies conducted in various countries have found that people in lower social classes are more fatigued than those of a higher social standing.

People who see their doctor about fatigue have generally experienced it for a considerable length of time—anywhere from six months to several years, according to numerous studies. In addition to being chronic, fatigue can be disabling. In one English study, for example, 26% of primary care patients who suffered from fatigue said it forced them to limit their usual activities. Another study found that people with

Figure 1 How food and oxygen become energy

1. Oxygen breathed into the lungs
   Food broken down in stomach and intestine

2. Oxygen carried by the bloodstream to muscle
   Nutrients absorbed by the bloodstream

3. Oxygen and nutrients transported to cells

4. Oxygen and nutrients used by mitochondria to produce ATP

5. ATP provides energy to cells

Digested in your stomach and absorbed into your bloodstream, the food you eat is delivered to cells throughout the body. Oxygen from your lungs also travels to your cells, where tiny structures called mitochondria use it to convert the food nutrients into a chemical called adenosine triphosphate (ATP), which provides energy for everything from walking to thinking.
chronic diseases such as diabetes and arthritis function better than people who are chronically fatigued.

The great majority of epidemiological studies conclude that fatigue is more common in women than in men. In the British study mentioned earlier, 30% of women said they were fatigued, compared with 19% of men. There are many theories as to why this might be so—from women's role in society and the biological differences between women and men, to the higher incidence among women of depression, which is associated with fatigue.

Studies have found that age is not a factor in fatigue, with the exception of adolescence, when it is uncommon. Whether fatigue is more prevalent in old age is controversial; some studies say yes, while others say no. One complicating issue is the role of physical illness as a cause of fatigue among older adults.

Although fatigue is difficult to define and a challenge to measure, this much is clear: if you sometimes feel weary, you are certainly not alone. Fortunately your body is geared toward generating energy as well as expending it.

### Food and energy

Like a rechargeable battery, the body stores its own energy and recharges itself. The source of energy is food; its energy potential is measured in calories. Calorie needs vary from person to person, but in general, adults need about 1,500 to 2,500 calories a day. That's

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enough to fuel normal daily activities, such as eating, working, thinking, and exercising, as well as to maintain energy reserves in the body's cells.

How many calories should you eat? Your daily calorie goal should be the number of calories it takes to maintain a healthy body mass index (BMI), as shown in Table 1. A healthy BMI for most people is 19 to 24. If your BMI is higher, you'll need to consume fewer calories, increase your physical activity, or do both in order to bring your weight into a healthy range.

Most organs in the body store sugar for use as energy. The exception is the brain. Because the brain does not store its own supply of sugar, it relies on a relatively constant supply of sugar (specifically glucose) from the blood. Blood sugar levels rise following a meal and decline thereafter. Relatively low blood sugar levels are one of several signals to the brain that cause it to create the sensation of hunger—encouraging eating, and thereby raising blood sugar levels. In some people, a feeling of fatigue and sometimes lightheadedness and headache accompany the sensation of hunger. (If this describes you, it's best to have more frequent, smaller meals so the peaks and valleys in your blood sugar level are less pronounced.) Other people feel neither hunger nor fatigue, even when their blood sugar level is relatively low.

Consuming more calories than you need won't give you extra energy. In fact, it can have the opposite effect. Excess calories are stored as excess pounds, and the heavier you are, the more effort you'll need to expend in walking, pumping blood, and so forth. The more effort you exert, the more energy you need to burn. The more energy you burn, the more fatigued you'll feel.

Nevertheless, food is the raw material for energy (see Figure 1). Food gets chopped up in the stomach and intestines into millions of microscopically small nutrient and waste molecules. The nutrients are absorbed into the bloodstream and transported along with oxygen to every cell in the body. Inside the cells, small structures called mitochondria use the oxygen to convert the nutrients into adenosine triphosphate (ATP)—a chemical that cells use as an energy source.

Because ATP provides the energy for all cells, it's tempting to ask if abnormalities in making ATP could cause something that a human being would sense as a "lack of energy." There are a few rare diseases that involve the mitochondria and production of ATP that can sap the muscles of strength and cause mental fatigue and impaired thinking. However, in most conditions and illnesses that cause fatigue, the role of ATP is more often presumed than proved.

To provide your body with the fuel it needs, it takes adequate amounts of specific nutrients: fluids, vitamins, and minerals, as well as a mix of carbohydrates, proteins, and fats.

**Are you deficient?**

Deficiencies in certain vitamins and minerals can produce fatigue by causing anemia, a shortage of red blood cells. Anemia impairs the delivery of oxygen to the body's tissues. Because oxygen is needed to create ATP, doctors assume that the fatigue that many people with anemia experience comes from reduced production of ATP in the cells.

Several vitamin and mineral deficiencies can cause anemia. The most common is iron deficiency, which prevents the bone marrow from making enough hemoglobin. Red blood cells need hemoglobin in order to carry oxygen throughout the body. Anemia is most common in menstruating women, who lose blood (and, hence, iron) with every period. When this blood loss causes iron-deficiency anemia, iron-rich foods (such as liver, eggs, rice, and beans) and iron supplements (pills or liquid) can help restore the body's iron levels and correct the anemia.

At the same time, there's no evidence that taking iron supplements will boost your energy if you don't suffer from iron deficiency. Indeed, this practice can lead to iron overload—particularly in people born with a genetic vulnerability to becoming overloaded with iron (a condition called hemochromatosis). Such iron overloads can damage multiple organs in the body, including the liver and heart, which can lead to fatigue as well as a host of serious health problems.

Deficiencies in vitamin B₁₂ and folic acid can also cause anemia. Without enough of these vitamins, the body can't produce enough red blood cells. Vitamin B₁₂ is found only in meat and dairy products. Folic acid is readily available in liver, leafy green vegetables,
and whole grains, but cooking can easily destroy it. Many packaged foods, including breads and flour, are fortified with folic acid. Even if your diet contains adequate amounts of vitamin B₁₂ and folic acid, illnesses such as inflammatory bowel disease can interfere with their absorption. Some people take vitamin B₁₂ shots for energy, but this probably won't increase your energy unless you are B₁₂-deficient.

**Are there energy-boosting foods?**

Given that food is fuel, it's only natural to wonder if certain types of food deliver energy more efficiently than others. Beyond the importance of eating a balanced diet, there's relatively little scientific information about the effects of specific foods on a person's energy level. However, certain foods can give you more energy under specific circumstances.

Because muscles burn carbohydrates first, tests of physical endurance require a steady supply. Sugar is a simple carbohydrate, which means that it's digested and absorbed into the blood quickly. When you eat a candy bar or some other sugary food, your blood sugar shoots up. Your pancreas responds by flooding your bloodstream with large amounts of insulin, the hormone that carries blood sugar (glucose) into the cells. You feel more alert and physically energized. But the effect is short-lived, lasting only about half an hour, because the insulin rapidly lowers your blood sugar. Afterward, you may actually feel less energetic than you did before eating the sweet snack, probably because of the rapid drop in blood sugar.

To keep your blood sugar and energy levels on an even keel, pick your carbohydrates wisely. Try to avoid highly refined carbohydrates, such as white bread, white rice, processed pasta, and white potatoes, which are digested and absorbed almost as quickly as refined sugar, providing the same short-lived surge of energy and subsequent energy drop. It's better to choose complex carbohydrates, such as high-fiber whole-grain bread, brown rice, whole-grain pasta, and most vegetables. These take longer to break down, so your blood sugar levels rise and fall more gradually.

**Can fatty acids keep you alert?**

Scientists have learned that essential fatty acids are highly concentrated in the brain and support cognitive performance. (They are called “essential” because your body cannot manufacture them; they must be acquired through food.)

Essential fatty acids include omega-3 fatty acids (found in fish, flaxseeds, walnuts, and canola oil). There are three main omega-3 fatty acids used by the body: alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and decosahexaenoic acid (DHA). ALA, found in plant sources, can be converted by the body to EPA and DHA. When you digest food containing these fatty acids, they are broken down into molecules of various lengths and become important components in the membranes of neurons—the nerve cells that process and transmit information.

Researchers are learning more about the role omega-3s and other fatty acids play in the brain, including the impact that fatty acid deficiency has on mental fatigue. Numerous studies have linked low intake of omega-3 fatty acids to a host of cognitive and behavioral problems, including depression, memory problems, poor mood, Alzheimer’s disease, and attention deficit hyperactivity disorder. Deficiency can also hamper the renewal of neural membranes, thus making the brain age faster.

One study that used brain imaging techniques to examine eight people with chronic fatigue syndrome (see page 24) found increased loss of fatty acids in the brains of these patients. The scans showed abnormal metabolism of the phospholipid molecules that contain omega-3 fatty acids. Researchers noted that a key group of enzymes responsible for removing omega-3s from these molecules is inhibited by other omega-3s, primarily EPA. While more research is needed to know whether consuming more omega-3 fatty acids would improve metabolism of these molecules and alleviate chronic fatigue, it certainly can’t hurt to ensure that you’re getting adequate amounts in your diet.

Omega-3s work in balance with another group of essential fatty acids: omega-6 fatty acids (found in safflower, corn, and soybean oils). The typical American
diet is overabundant in omega-6 fatty acids and deficient in omega-3s. In these cases, some experts recommend adding more omega-3 fatty acids to the diet. The American Heart Association recommends that healthy adults eat two servings of fish a week to protect against heart disease. However, thus far, physicians specializing in brain function, memory loss, or fatigue have not developed any specific recommendations.

Can stimulants help?
Certain substances in food give you an energy boost because they contain stimulants that speed up the chemical reactions inside cells. Caffeine, the best-known stimulant, occurs naturally in coffee, tea, cocoa, and chocolate. It is also added to some soft drinks and used as an ingredient in some medications.

Caffeine has many effects. When you consume a food or drink that contains caffeine, your brain cells fire messages more quickly, improving concentration and reaction time. The heart pumps blood faster and more forcefully, increasing your physical energy. Some people are more sensitive than others to caffeine. For them, a cup of coffee or a can of cola is all it takes to have some or all of the stimulating effects. But people who consume caffeine on a regular basis develop a tolerance for it, which means that they need to increase their intake to get the same effect (see “Use caffeine to your advantage,” page 42). We have all heard someone say, “I really need that midmorning cup of coffee.” As it turns out, people can become so dependent on caffeine stimulation that they feel tired and logy when the level of caffeine in their blood drops.

Nicotine in tobacco is also a stimulant, but because of the detrimental effects of smoking, it should not be used as an energy booster. Indeed, smoking can cause insomnia, which can then lead to daytime sleepiness and fatigue (see “Avoid smoking,” page 39).

Signs of fatigue
Ask any three people what fatigue feels like, and you’re likely to get three sets of answers. That’s because the experience that people call “fatigue” may refer to very different things—for example, muscular weakness, lack of endurance, slow reaction times, or poor concentration, among other qualities. The experience of fatigue is often classed as one of two general types: muscle fatigue and central (or brain) fatigue.

Muscle fatigue is the weakness you feel in your muscles when you’ve tired them out. Make a fist with one hand, then open and close it as fast as you can for one minute and you’ll feel some weakness in your hand muscles. Then repeat the experiment a few more times. Chances are, your muscles won’t contract as fast as they did when you first started the experiment. Central (brain) fatigue involves the central nervous system and is a general feeling that encompasses a lack of concentration or alertness as well as a sense of lethargy and loss of motivation.

Muscle fatigue and central fatigue are closely related. Every muscle contraction relies on stimulation from the central nervous system. When you feel fatigued, you’re usually feeling the effects of both muscle and central fatigue. But you can also experience one without the other. Although the mechanisms are not well understood, the two types of fatigue look different inside the body.
When muscles become fatigued, they don’t contract as forcefully or as quickly as muscles that are not tired. Fatigued muscles have certain characteristics, including a buildup of acid, particularly lactic acid. But it’s not known whether the acid buildup causes the muscle to become fatigued, or whether it occurs along with the fatigue. Therefore, it’s unclear whether attempts to change the acid concentration of exercising muscle—as has been proposed by some fitness professionals—would allow a muscle to work longer and harder without getting fatigued. Although some experts suggest that gradually increasing the intensity of your training and eating a combination protein-carbohydrate snack within 15 minutes of finishing a workout will help reduce lactic acid, there’s no proof that this will increase your endurance or energy level.

**Central (brain) fatigue**

Central (brain) fatigue is, to a great degree, a perception or state of mind. As a result, central fatigue is a much less objective and measurable phenomenon than muscle fatigue. Your perception of fatigue usually increases with your muscle fatigue, but the two aren’t always in sync. Experiments show that a person’s perception of fatigue can decline even as the muscles are expending ever more energy and, in all likelihood, showing more signs of fatigue. But sometimes the opposite happens: your perception of fatigue can be greater than your muscle fatigue. You can feel fatigued without having expended much energy at all. Emotional and psychological factors significantly affect how fatigued you feel.

Scientists have a method of measuring the perception of fatigue. It’s called the rating of perceptual effort, or RPE. To use this method, an exercising person is asked to pick a number on a scale ranging from no fatigue to maximum imaginable fatigue. Scientists have found that, in general, the more effort you think you’re expending, the more fatigued you will feel. Like the sensation of pain, the perception of fatigue is highly personal. It varies from one individual to the next, depending on personality as well as mood. Fatigue is greater and comes on sooner in people with mood disorders such as depression or anxiety than in those who don’t have these illnesses.

An individual’s perception of fatigue can change depending on the situation. In experiments, researchers have been able to manipulate people’s RPEs during physically challenging activities. For example, giving a subject feedback on his or her performance decreases the perception of fatigue, possibly because it helps keep the person motivated to improve.

Maintaining mental focus on an activity is one method coaches use to improve athletes’ performances. Creating a distraction tends to increase a person’s perception of fatigue. When people are distracted, their minds wander. They may think about how tuckered out they should be or anticipate how drained they’re likely to feel if they keep going. They may also think about easier, more pleasurable things they’d rather be doing and then, subconsciously, “feel” fatigued by their present activity.

Based on experiments with humans and animals, researchers suggest that certain chemical or electrical stimuli in the brain can alter perceptions of fatigue during exercise. However, none of these experiments have yet provided a fatigue-preventing treatment that can be used to improve performance.
If you’re like many people, you sometimes feel sleepy or drowsy even when you don’t exert yourself. Perhaps you feel like taking a nap in the middle of the day, or you have trouble concentrating when you watch a movie at night. Maybe just half an hour of housework leaves you feeling spent. If you haven’t used up your physical energy, why do you feel sleepy?

Before you can find out why you feel sleepy, you first need to determine whether you have abnormally low energy or are just expecting too much of yourself. No one feels alert and energetic all day. Most people have times of day when they are at their best and other times when their energy slumps and alertness fades. Being constantly busy is sometimes perceived as an indicator of a person’s self-worth, so it’s tempting to say “yes” to every work project, dinner party, and volunteer assignment that comes your way. But no matter how rewarding these activities may be, they also demand a lot of energy. Understanding your body’s natural daily rhythms will help you match your activities with the times of day when you’re feeling most alert or energetic.

Your biological clock

To a large extent, your level of alertness (or its opposite, sleepiness) is dictated by your biological clock, a cluster of cells deep within the brain. These cells, called the suprachiasmatic nucleus, are in the hypothalamus, the brain center that regulates alertness, appetite, body temperature, and other biological states. Your biological clock, or circadian cycle, controls the rise and fall of hormones and other chemicals in your body that influence whether you feel awake or sleepy. Like the other clocks in your life, the biological clock operates on a 24-hour schedule.

According to this schedule, people typically feel most energetic in the morning until early afternoon, when their energy flags after lunch (see Figure 2). Many people get a second wind later in the afternoon or early evening. Scientists have measured several types of performance, including mental alertness and short-term memory, throughout the day. These skills usually peak in late morning. Lowest performance levels are usually in the late evening. The best-known temporary decline in performance is in the early afternoon and is known as the “post-lunch dip.”
evening, but their energy level dips again after the sun goes down, and it doesn’t rebound until the next morning. In short, the biological clock helps explain why people wake up in the morning and go to sleep at night.

Not everyone follows the usual pattern, however. Some people are “night owls” who get a second wind in the evening and have trouble getting going early in the morning. But if you are more typical, it’s no coincidence that your energy level rises and falls with the sun. Although it’s largely self-regulating, your biological clock responds to daylight as an important clue to external time. Nerve fibers connect the hypothalamus to the retina in the eye. In experiments, when people live for several days in a windowless laboratory and are exposed to light at intervals that are at odds with the outside world, their biological clocks reset themselves to match the new pattern of light and darkness. The influence of light on sleep/wake patterns probably explains why as many as 90% of blind people have problems sleeping.

Your biological clock needs to reset itself when you fly to a different time zone. But the resetting takes time (see Figure 3). Until you become accustomed to the new time zone, you may suffer from jet lag, feeling tired when you need to be awake and wide awake when you should be sleeping. Fortunately you can take steps to reduce the impact of jet lag (see “Ways to minimize jet lag,” below). An-

Ways to minimize jet lag

People who cross several time zones find that ambient light and other environmental cues can make their internal clocks go haywire. They have trouble sleeping, and when they do get sleep, it’s shallow and fitful. A rule of thumb is that it takes a day to adjust for every time zone crossed, but the older you are, the longer the adjustment takes. You may not be able to avoid jet lag entirely, but here are some tips for reducing its duration and effects.

- **Don’t time-shift.** On a brief trip, just one or two time zones away, it may be possible to wake up, eat, and sleep on home time. Schedule appointments for times when you would be alert at home.

- **Gradually switch before the trip.** For a longer trip, gradually move mealtimes and bedtime closer to the schedule of your destination (see Figure 3). Even a partial switch may make the trip easier.

- **Switch as rapidly as possible.** On a long trip, wait until it’s bedtime in the new time zone to turn in. For the first day or two, spend as much time outdoors as possible to let daylight reset your internal clock.

- **Use the sun.** If you need to wake up earlier in the new setting (flying west to east), get out in the early morning sun. If you need to wake up later (flying east to west), expose yourself to late afternoon sunlight.

- **Drink plenty of fluids, but not caffeine or alcohol.** Caffeine and alcohol promote dehydration, which worsens the physical symptoms of jet lag. They can also disturb sleep.

Figure 3 Reset your biological clock

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual bedtime</td>
<td>10:00pm</td>
<td>9:30pm</td>
<td>9:00pm</td>
</tr>
<tr>
<td>9:30pm</td>
<td>9:00pm</td>
<td>8:30pm</td>
<td></td>
</tr>
</tbody>
</table>

Help reset your biological clock when you travel through time zones. If you’ll be traveling through several time zones, as when flying from the West Coast to the East Coast, you can gradually adjust your sleep time. For example, three days before you plan to travel from the West Coast to the East Coast, go to bed half an hour earlier than usual, and get up half an hour earlier the next morning. The next night, go to bed 60 minutes earlier than usual and get up 60 minutes earlier. The day before you travel, make it 90 minutes. By the fourth day, the day of your trip, you’ll find it easier to adjust to your new time zone.
other challenge to the body's biological clock occurs in people who work the night shift and sleep during the day. The biological clock can adapt to this reversal of normal wakefulness and sleep, but only if the person sleeps in a very dark room. And just as with changing time zones, the change in your body's clock does not occur instantly, but rather over several days. In the meantime, you're likely to be less alert and to function less well than usual.

Perhaps the most problems occur in people who continually switch from day hours to night hours. A 2007 study from Argentina looked at rotating shift workers, who worked during the day some weeks and during the night in other weeks. Compared to people who always worked the day shift, the rotating shift workers had lower levels of serotonin, a chemical in the brain that helps regulate sleeping and waking patterns. In addition, the rotating shift workers lost up to four hours of sleep a day on this schedule. Rotating shift workers were more likely to experience anxiety, depression, and exhaustion, the study found. A New Zealand study of medical residents, known to work long hours around the clock, found that working in the evening and having an irregular schedule were stronger predictors of fatigue and fatigue-related error than the total number of hours worked.

Melatonin and other brain chemicals

One way that light influences your alertness is through melatonin, a hormone that induces drowsiness. Melatonin is produced in a predictable daily rhythm by the pineal gland, located in the middle of the brain, between the two hemispheres. Cells in the suprachiasmatic nucleus receive signals from the eyes about the amount of light in the environment, and send signals to the pineal gland that influence the gland's production of melatonin. Levels of melatonin begin climbing after dark and ebb after dawn. Scientists think that the daily light-sensitive cycles of melatonin help keep the sleep/wake cycle on track.

In addition to melatonin, other chemicals in the body influence our state of alertness. Several neurotransmitters (chemical messengers) play a role in arousal. Norepinephrine, epinephrine (often called adrenaline), and dopamine stimulate wakefulness. Adenosine and gamma-aminobutyric acid (GABA) are believed to promote sleep. Individuals vary in their natural levels of neurotransmitters and in their sensitivity to these chemicals.

Because of these and other differences, people vary in their energy levels. Some people are naturally more energetic than others. Just because the person sitting next to you at work (or sitting across the table from you at breakfast) has more mental or physical energy than you do doesn't mean that there's something wrong with you. It could simply mean that you are at the lower end of the normal energy spectrum, or that you're not a “morning person” and your alertness rises later in the day. But it’s not normal to lack enough energy to get through the day. If you feel physically weak in the early part of the day, if you become fatigued soon after starting an activity, or if you are unmotivated or mentally weary much of the time, you need to find out why.
It's a nearly universal lament of people over age 35: they don't have as much energy as they did when they were younger. One of the most common complaints is that they can't stay up as late as they once did and still function normally the next day. People also notice that they're not as strong as they used to be or that their muscles don't move as quickly.

Circadian changes

Although increased fatigue is not inevitable with increased age, there are certain age-related factors that make you feel weaker and, in general, less energetic. For one thing, your circadian cycle advances, making you want to fall asleep earlier at night and wake up earlier in the morning. Indeed, the most important influence on sleep rhythms is aging.

Insomnia becomes more common as people get older. For reasons that are not understood, older people spend less time in deep sleep, the type of sleep that is considered the most important for restoring your energy. With less deep sleep, you wake up more often in the middle of the night. And the more often you wake up at night, the less rested you feel the next day. The amount of deep sleep that people get each night at age 30 is about half the amount they get at age 20. After age 30, the decrease in deep sleep and the increase in nighttime awakenings continue. Not only do people wake up more often in middle age, it takes longer to fall back to sleep. By age 65, people spend less than 5% of sleep time in deep sleep, compared with about 20% when they were in their 20s.

In addition, melatonin levels decline with age and virtually disappear by old age. Because melatonin helps you feel sleepy at night, its decline can make it harder to fall asleep. The reductions in melatonin and in deep sleep help explain why insomnia becomes more common with age.

As you get older, you’re more likely to make up for your nighttime sleep deficit by napping. But napping can make insomnia worse by keeping you from feeling tired enough at bedtime.

Physical changes

Aging brings a number of physical changes. The onset of menopause (see page 18) creates changes that may cause fatigue. As estrogen levels decline, many women have hot flashes, which can interrupt sleep and even lead to chronic insomnia.

In both men and women, muscle mass declines steadily. By age 70, you’ve lost 30% of the muscle mass you had at age 20. A drop in muscle mass means a decrease in strength and an increase in fatigue. As muscles shrink, they become fatigued more rapidly. With age, your ligaments and joints become stiffer, so you move more slowly. To a large extent, you can compensate for these changes by exercising regularly to maintain strength and flexibility. Weight training increases muscle strength, and stretching increases flexibility.

Along with a decline in physical energy, many people find that their mental energy falls somewhat as they age. They have a harder time concentrating and remembering things, and it takes longer to learn new information. In part, these difficulties reflect age-related chemical changes in the brain that affect memory and learning. On the bright side, staying active mentally by reading, doing crossword puzzles, and learning new mental skills can help offset this age-related decline.

Illness. Aside from normal age-related changes, illnesses that become more common with age can deplete your energy (see “Other medical conditions,” page 29). Many illnesses can interfere with sleep. For example, people with congestive heart failure may awaken feeling short of breath because body fluids accumulate in the lungs while they’re lying down. People with heartburn often find that their discomfort is greatest when they lie down and stomach acids
back up into the esophagus. And hundreds of prescription and over-the-counter drugs can make it harder for you to sleep at night (see “Medications,” page 21).

Fatigue is also a common symptom of a wide range of diseases, including anemia, kidney disease, multiple sclerosis, diabetes, and cancer. In some cases, such as in cancer, fatigue may be the earliest sign that something is wrong. If you suddenly feel listless, it's worth visiting your doctor to make sure nothing serious is wrong.

Lifestyle factors
Many people find that life only grows more complicated and demanding with age. This can be true both at home and at work.

Caregiving. With people living longer, many middle-aged and older adults find themselves providing regular care to a friend or relative who needs help mowing the lawn, grocery shopping, going to doctors’ appointments, or attending to personal needs. Although such care is usually extended with love, it can cause significant fatigue for the caregiver.

Overwork. During middle age, adults might feel as though they’re in a state of perpetual exhaustion for yet another reason: their busy schedules. Overwork is one of the main causes of ongoing fatigue (see “Overwork,” page 17).

The people hardest hit are typically those of the “sandwich generation”—middle-aged folks sandwiched between the demands of caring for young children and aging parents as well as, in many cases, the challenges of a full-time job.

Sundowning: How to cope with feeling agitated and fatigued at dusk
Some older people have trouble concentrating, grow agitated, and become especially fatigued as the sun goes down at the end of the day. This phenomenon is known as “sundowning,” because its effects tend to coincide with sunset—usually occurring in the late afternoon into the evening, then settling down late at night, only to return the next day at around the same time.

Sundowning isn’t an illness. And even though sundowning behavior commonly occurs in people with Alzheimer’s disease, it can also emerge in older people without dementia.

The causes of sundowning are not entirely understood, but there are theories. One explanation is that by late afternoon, some older people have difficulty coping with the accumulation of stress that builds over the course of the day. Declining light may also be a factor. Research shows that the volume and number of cells making up the suprachiasmatic nucleus—which controls the brain’s response to light—decreases in people between the ages of 80 and 100. This deterioration would in turn lead to deregulation of the circadian rhythm, and translate into disturbed sleep, agitation, and other symptoms of sundowning.

There are ways to help alleviate the effects of sundowning, so if you or a loved one experiences its symptoms, try the following:
• Keep a daily log and jot down events that seem to trigger symptoms. For instance, too much noise or the act of preparing dinner could be a trigger. Once you recognize these triggers, you can work on ways to avoid them.
• Stick to a regular schedule. Take walks or exercise at the same time each day, preferably early in the day. Eat an early dinner, and go to sleep at the same time each night.
• Schedule appointments, trips, and activities in the morning, and limit obligations in the late afternoon hours.
• Take a late afternoon rest. Just putting your feet up and closing your eyes for a short respite can help reserve your energy and prevent end-of-the-day fatigue.
• Prevent overstimulation by reducing noise from televisions or stereos.
• Reduce food and beverages that contain caffeine, or restrict them to early morning hours.
• When you begin to feel symptoms, either rest or do something familiar that relaxes you, such as knitting or reading the newspaper.
• If the problem is ongoing, have your doctor review the medications you are taking to be sure that your medicine isn’t causing the problem, and talk with your doctor about medications that help reduce anxiety and agitation.
The cause of fatigue is not always obvious (see Figure 4). If you have the flu, you expect to feel tired. Or you may want to nap after a big lunch. But you may feel inexplicably groggy throughout the day, not just during the biological trough that normally occurs in midafternoon. Your doctor may find nothing wrong, leaving you to wonder if your symptoms are “all in your head.”

The underlying cause of persistent fatigue can be hard to identify, but that doesn't mean the fatigue is imaginary. Fatigue often signals that something is wrong, physically or emotionally, or even with the pace and tempo of your daily schedule. This section explores some of the most common causes of an ongoing lack of energy.

### Stress

Picture yourself in a stressful situation. You’re at home waiting for your doctor to call with some test results. You can’t stop thinking about the possibilities: What are the odds that the results will indicate a health problem? What will you do? You’re nervous and anxious. To calm down, paradoxically, you keep busy—you clean out a closet, organize your desk, weed the garden. You’ve got energy to burn.

Stressful events and the emotions they elicit give you a surge of energy, but only in the short term. In such situations, the body churns out stress hormones such as cortisol, epinephrine, and norepinephrine (see Figure 5). In response, blood flow increases to the brain and heart. Your heart pumps faster, your blood pressure goes up, and you take deeper breaths. This is the fight-or-flight response, a survival mechanism that evolved hundreds of thousands of years ago to protect our early ancestors in life-threatening situations. The same response that told them to run from a dangerous wild animal tells us to flee a burning building or dodge a speeding car.

The fight-or-flight response guzzles energy, which is why it’s natural to feel fatigued after a stressful event. If you’re able to take it easy afterward, you’ll catch your breath and regain your energy. But chronic stress is far more harmful. For example, caring for a relative with a debilitating, long-term illness leaves you no chance to regroup. Instead, the stress saps your energy over time, leaving you feeling worn out (see “Caring for a family member,” page 24). Job pressures, turmoil in your relationships, and worrying about money are among the many other ongoing circumstances that can keep the stress hormones flowing.

People who regularly feel fatigued don’t necessarily have more stress in their lives than others. In some cases, what is different is their response to stress. Faced with the sorts of stressful events that everyone encounters—a rude remark by a store clerk, a traffic...
jam, a pending deadline—they may get angrier, more anxious, or more nervous. To some degree, your response to stress is genetic, but it’s also learned. The good news is that you can also learn to moderate your response with methods such as relaxation techniques or cognitive behavioral therapy and, in so doing, boost your energy level (see “Control stress,” page 36).

**Depression and anxiety**

As many as 20% to 40% of people who seek help for ongoing fatigue suffer from depression or anxiety. With depression, fatigue can manifest itself in two ways. One is mental fatigue, specifically a decreased drive or motivation to do things that you once enjoyed. Another is a change in sleep patterns—some people sleep more than usual, others develop insomnia. Either way, they grow weary during the day. Depression doesn’t have to be severe to cause fatigue. Dysthymia, a persistent low-level depression, can make a person feel tired or fatigued much of the time.

People with anxiety, on the other hand, are prone to panic, fear, and other high-stress responses, which cause fatigue by increasing levels of stress hormones. These people are also more likely to have chronic high-stress reactions, the most debilitating and energy-robbing kind. Anxiety causes a host of emotional and physical symptoms, including worry, restlessness, and irritability, as well as rapid heartbeat, hyperventilation, upset stomach, or general aches and pains. Many people with anxiety also suffer from depression.

Neither depression nor anxiety is the result of any shortcoming in a person’s character. Someone with depression or anxiety cannot simply “shake it off” or “snap out of it,” any more than a person with osteoporosis or diabetes can will the disease away.

Scientists’ developing knowledge of brain chemistry, genetics, and nerve pathways has led to a greater understanding of illnesses and has helped to ease the stigma associated with them. Only in the last decade or so have scientists actually been able to see the brain while it works, using sophisticated forms of imaging such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI). These imaging tools have led to a better understanding of which areas of the brain help regulate mood and other functions that are affected by depression and anxiety.

Research suggests that depression may arise in part from abnormalities within the hypothalamus in the brain. Studies have found that the hypothalamus is smaller in some depressed people. The hypothalamus, the pituitary gland below the brain, and the adrenal glands atop the kidneys form a trio known as the hypothalamic-pituitary-adrenal (HPA) axis. Together these organs govern a multitude of hormonal activities in the body, including a person’s perceived energy level and response to stress (see Figure 6). Research suggests that consistently having the HPA axis in over-

**Figure 5 The stress response**

![Diagram of the stress response](image)

Something stressful, such as the sight of a bus barreling toward you, causes a quick signal from your brain’s hypothalamic-pituitary system to the adrenal glands, which release the stress hormone epinephrine. This chemical speeds up your heart rate and breathing, and floods the bloodstream with glucose for energy so you can respond quickly. Other systems that are not needed for a quick response, such as the digestive and reproductive systems, temporarily shut down. The adrenal glands also slowly release glucocorticoids, which play a role in chronic stress.
drive may lay the groundwork for depression.

But that’s not the whole story. Depression often results from the interplay of several factors. For example, genes appear to influence how a person responds to stress. Certain life experiences also come into play. Trauma, whether the early loss of a parent or sexual or other physical abuse, increases the risk for depression.

Levels of chemical messengers known as neurotransmitters also play an important role. For example, the neurotransmitter serotonin influences mood while abnormal levels of the neurotransmitter GABA may make a person susceptible to anxiety.

Regardless of the cause, getting help for depression and anxiety is extremely important. Several therapies, including medication and psychotherapy, can relieve the symptoms of depression within a matter of weeks. Certain medications to treat anxiety work almost immediately.

If you suspect that you are suffering from depression or anxiety, start off by seeing your primary care doctor. He or she can assess your symptoms with the goal not only of uncovering depression or anxiety, but also of diagnosing possible underlying medical problems.

**Treating depression**

If the evaluation points to depression, the doctor may suggest some combination of antidepressant medication, psychotherapy, and lifestyle changes such as exercise.

- **Medication.** Antidepressants work by adjusting levels of brain chemicals that play a role in depression. Selective serotonin reuptake inhibitors (SSRIs), one class of antidepressants, increase the brain’s level of serotonin, a neurotransmitter that affects mood, arousal, anxiety, impulses, and aggression. SSRIs are the most commonly prescribed medicines for depression. Tricyclic antidepressants, an older class of medication, increase serotonin and also norepinephrine, a neurotransmitter that affects mood, anxiety, and drive. Tricyclic antidepressants are often the best choice for someone with sleep problems, although they should be prescribed with caution in people with known heart disease. In addition, there are some newer antidepressants that don’t fall neatly into one class or another; since side effects vary among medications, your doctor can recommend the one that’s best for you.

Controlled studies have found that 65% to 85% of people with depression get some relief from antidepressants, compared with 25% to 40% of people taking a placebo. But not all antidepressants are equally effective for everyone. People’s responses are highly individual. If one antidepressant does not help within a few weeks, the doctor might recommend that you try another one until you feel better—and that includes feeling more energetic.

- **Psychotherapy.** Another effective way to beat depression is psychotherapy with a qualified counselor,
such as a psychiatrist, psychologist, or social worker. The combination of psychotherapy with an antidepressant is often an effective strategy.

- **Exercise.** A sustained exercise program can improve the mood of people with mild-to-moderate depression. It might also augment antidepressant treatment for people with severe depression. You don’t have to exercise a lot to obtain mental health benefits: studies have found that doing an average of 30 minutes or more of moderate-intensity aerobic exercise at least three times a week can alleviate mild or moderate depression as effectively as antidepressants or cognitive behavioral therapy, which aims to correct ingrained patterns of negative thoughts and behaviors. Besides boosting your mood, exercise can also increase your energy level (see page 37).

**Treating anxiety**
As with depression, anxiety can be treated with medications, psychotherapy, or both. The most effective drugs for short-term treatment of anxiety are benzodiazepines, which calm symptoms of anxiety in about half of people with generalized anxiety disorder. But benzodiazepines are generally limited to short-term use because over the long term, people develop a tolerance for them and need increasingly larger doses to produce the same effect.

For long-term treatment of anxiety, there are two options: antidepressants or the anti-anxiety drug buspirone (BuSpar). These medications are often prescribed once a person’s anxiety is under control, in order to prevent relapse. In addition, short-term psychotherapy is at least as effective as anti-anxiety medications alone. Cognitive behavioral therapy is especially helpful.

**Overwork**
Overwork is another common cause of persistent lack of energy. Americans are working longer hours than they were 30 years ago, in contrast to people in most other developed countries. This is particularly true if work at home is added to that in the workplace, and is more true of women than of men. During the 1990s, people added an average of 36 hours of work, or nearly a full week, to their work year. Small wonder that a 2004 study found that one in three employees in the United States is chronically overworked (for more on overwork, see “All work, no play?” on page 18). When you consider commuting time, which has increased in recent years as traffic has swelled, many people are spending nearly all of their weekday waking hours either working or getting to and from work. Even if you telecommute, you may find that working at home means that you are expected to be always in touch, effectively trading commuting time for more time at your desk at odd hours.

Overwork isn’t limited to the time spent working and commuting. There’s also the “second shift” of meals and household chores, as well as social ob-

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**Spotting the symptoms of depression and anxiety**

**Signs of depression**
Doctors look for the following signs to diagnose depression. Four or more of these symptoms—in addition to feeling sad or burdened or losing interest in nearly all activities on most days for at least two weeks—may indicate major depression:

- a change in appetite that sometimes leads to weight loss or gain
- insomnia or, less often, oversleeping
- a slowdown in talking or in performing tasks or, conversely, restlessness and an inability to sit still
- loss of energy or feeling tired much of the time
- feelings of worthlessness or excessive, inappropriate guilt
- problems concentrating or making decisions
- thoughts of death or suicide, or suicide plans or attempts.

**Signs of anxiety**
Doctors look for excessive anxiety and worry occurring more days than not for at least six months, plus at least three of the following symptoms:

- restlessness
- being easily fatigued
- difficulty concentrating
- irritability
- muscle tension
- disturbed sleep.
litations and the responsibility of caring for an aging spouse, parent, or young children. This second shift is longest for women, who generally shoulder more of the home and family responsibilities even when they work full-time (see “Caring for a family member,” page 24).

**The consequences of overwork**

Where do you find the time to fit everything into one day? If you’re like most overworked people, you probably skimp on sleep, either by staying up later or getting up earlier. Even when you finally do go to bed, you may have trouble falling asleep, or you may wake up in the middle of the night worrying about something that you have to do. Lack of sleep takes its toll on your energy level.

But sleep deprivation isn’t the only way that overwork causes fatigue. When you work long hours or pack your daily schedule with one activity after another, your body remains on heightened alert by churning out stress hormones. As with a true stress response, these hormones get your heart pumping and the blood flowing to your brain and muscles, causing your body to burn a lot of energy. If you don’t give yourself the chance to unwind and refuel, you’ll become progressively more fatigued.

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**Menopause**

The hormonal changes that occur during the years leading up to and following menopause can have a profound effect on sleep and, as a result, contribute to fatigue. The most common menopausal symptom is hot flashes, which affect between 75% and 90% of women undergoing natural menopause. In addition to making you feel like you walked into a blast furnace, hot flashes often leave you flushed and soaked with perspiration. Not surprisingly, hot flashes that occur when you’re sleeping (sometimes called night sweats) can awaken you many times during the night. Even if your hot flashes don’t wake you up, they can still disrupt your sleep. And a night of insufficient or poor-quality sleep can make you feel fatigued, lethargic, or sleepy the next day, not to mention irritable and moody (see “Sleep difficulties,” page 19).

Hot flashes eventually stop, usually within three to five years and sometimes sooner. In the meantime, there are some simple lifestyle changes you can make to reduce the frequency and intensity of hot flashes, especially at night (see “Tips for improving sleep during menopause,” page 19).

If lifestyle changes are not enough, talk to your doctor about whether medication may be right for you. The most effective treatment for reducing hot flashes is hormone therapy. Studies show that short-term hormone therapy improves sleep quality in women suffering from night sweats and other menopausal symptoms. Because studies have revealed risks of taking hormone therapy for an extended period, experts recommend taking hormones at the lowest effective dose for the shortest possible duration, to minimize the potential risks.

If you can’t or don’t want to take hormone therapy, there are other hormonal and nonhormonal options, including birth control pills, antihypertensives, and the pain and seizure drug gabapentin (Neurontin). Some antidepressants can also diminish the intensity of hot flashes. Antidepressants such as fluoxetine (Prozac), paroxetine (Paxil), and venlafaxine (Effexor) affect the brain’s use of serotonin, which is believed to have a role in regulating body heat. However, the exact effect antidepressants have on hot flashes is unknown. Researchers are also eval-

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**A 2004 study of work in America, conducted by the Families and Work Institute, found the following:**

- Twenty-seven percent of Americans report being overwhelmed by the amount of work they have to do.
- More than one-third of those who feel overworked also feel highly stressed.
- People who feel overworked seem less likely to take good care of themselves. When asked if they took good care of themselves, only 41% of people who were highly overworked said they did, compared to 68% of individuals who reported low levels of overwork.
- About one-third of American workers say they do not intend to take all of the vacation days they are entitled to.
- About one-fifth of American workers sometimes or often do work while on vacation.

**Source:** Overwork in America: When the Way We Work Becomes Too Much, Families and Work Institute (2005), http://familiesandwork.org/site/research/summary/main.html.
Another potential cause of menopause-related fatigue is sleep apnea. This is a life-threatening condition in which people stop breathing momentarily during sleep, sometimes hundreds of times a night, awakening each time. While you probably won’t be aware of this tendency, a spouse or partner may observe this happening to you at night.

More often, the possibility of sleep apnea is suspected because of snoring: people with sleep apnea often snore loudly and frequently. Although sleep apnea was once believed to affect primarily overweight men, a recent study by Harvard researchers found that by age 50, sleep apnea affects men and women about equally. Researchers believe that menopausal weight gain and declining levels of estrogen and progesterone, which are believed to protect against sleep apnea, make menopausal women far more likely to have this condition than younger women.

There are a number of effective treatments for sleep apnea, including lifestyle changes and special devices. To learn more about these treatments, you can visit a doctor who specializes in sleep health. Studies are now under way to determine if hormone therapy may be an effective treatment for sleep apnea in menopausal and postmenopausal women.

Stress also contributes to persistent fatigue. In midlife, women are often dealing simultaneously with demanding careers, children leaving the “nest,” and elderly parents, as well as grappling with issues relating to their own aging—all of which can be stressful. Exercising, eating a nutritious diet, and making other healthy lifestyle changes can help keep stress-related fatigue at bay (see “A 7-step plan to jump-start your natural energy,” page 35).

Sleep difficulties
Difficult getting a good night’s sleep is a significant cause of tiredness in particular and fatigue in general. Too little or too much sleep can increase your perception of fatigue. And even if you get the right amount of sleep, you’ll probably find yourself dragging more than usual the next day if that sleep was interrupted by frequent awakenings or was of poor quality. (To determine the quality of your sleep, see “A sample sleep history questionnaire,” page 20.)

Although sleep requirements vary, most people need eight hours a night to feel refreshed during the day. It’s not surprising that getting less than you need leaves you feeling tired, but you may be taken aback to learn that getting more than you need can be just as bad. Many people find that on days when they sleep late in the morning, they don’t feel more rested and recharged; indeed, they may feel more lethargic and unmotivated than usual.

The connection between too much sleep and too little energy has been borne out in experiments. When volunteers slept longer than usual, they reported feeling more

Tips for improving sleep during menopause
If frequent nighttime hot flashes are leaving you fatigued, try taking these steps to reduce their frequency and intensity. (For more general advice on how to get a good night’s sleep, see page 39.)

Dress lightly. Trade your flannel pajamas or synthetic nightgown for a lightweight cotton nightgown or T-shirt, which will keep you cooler and also absorb perspiration. Several companies now sell nightclothes designed especially for menopausal women that are made of moisture-wicking fabrics. Use cotton, not synthetic, sheets and avoid heavy blankets or comforters.

Keep your bedroom cool, dark, and quiet. Use a fan or turn on your air conditioner to cool your bedroom and increase air circulation. One study found that women who slept in a cool (68˚ F) room had significantly fewer and milder hot flashes than women who slept in a warmer (86˚ F) room. Pull down your shades or wear a sleep mask to darken the room. Use earplugs, or decorate with sound-absorbing heavy curtains and rugs.

Watch what you eat. Say no to spicy or acidic foods (such as tomato products), which may trigger hot flashes. Also avoid large meals before bedtime. Eat foods rich in soy (such as tofu, soybeans, or soymilk) or take a soy supplement, which some studies have shown reduce the frequency of hot flashes. (If you have been or are being treated for breast cancer, first talk with your doctor about the use of soy products, which contain plant-based hormones called phytoestrogens.)

Reduce stress as much as possible. Stress can trigger hot flashes. Try relaxation techniques, massage, or exercise to reduce your stress level. If you’re depressed or anxious, talk to your primary care doctor.
fatigued. It appears that any significant deviation from normal sleep patterns can upset circadian rhythms and increase daytime fatigue. The best solution is to figure out how many hours of sleep are right for you and then stick with it—even on weekends and vacations.

Just as important as the duration of sleep is its quality. A good night’s sleep has a particular architecture comprising two alternating types of sleep, marked by distinct brain-wave patterns. In rapid eye movement (REM) sleep, the eyes dart back and forth, and the brain races and dreams. The other type is non-REM sleep, or quiet sleep, which includes deep sleep, when blood pressure falls and the pulse rate slows by 20% to 30%. While both states of sleep are important for restoring the body’s energy, sleep researchers believe that deep sleep plays the biggest role. In an experiment from the 1970s in which volunteers had their sleep interrupted briefly, everyone felt somewhat fatigued the next day, but those who were awakened during deep sleep felt the most fatigued.

Unfortunately, most people don’t get a good night’s sleep. Either their sleep time is too short, or it’s long enough but of poor quality. For example, they may sleep for four hours, lie awake, then sleep for four more hours, but not get enough deep, non-REM sleep.

Many lifestyle habits, foods, or even illnesses can interfere with the duration and quality of your sleep. This section explores some of the most common causes of sleep difficulties.

- **Caffeine.** As a stimulant, caffeine interferes with adenosine, a neurotransmitter that promotes sleep. Caffeine can also interrupt sleep by increasing the need to urinate during the night. For some people, a single cup of coffee in the morning means a sleepless night because its stimulant effect is unusually long-lasting. For most people, the best recommendation is to avoid caffeinated beverages after midafternoon.

- **Alcohol.** Although alcohol depresses the nervous system and therefore can help people fall asleep, it also has a stimulant effect several hours later. A drink before bedtime may make it easier to fall asleep, but it may cause you to awaken more easily and to spend less time in deep sleep.

### A sample sleep history questionnaire

In order to better understand your sleep habits, your doctor may ask you some of the following questions during an evaluation for a sleep problem. You may find it helpful to write down your answers to these questions and bring the completed questionnaire to the exam so you and your doctor can discuss it.

- What bothers you most about your sleep habits?
- How long have you had trouble sleeping, and what do you think started the problem? Did it come on suddenly?
- How would you describe your usual night’s sleep?
- What time do you go to bed, and when do you wake up?
- What’s your bedroom like?
- What do you do in the few hours before bedtime?
- Do you follow the same sleep pattern during the week and on weekends? If not, how are weekends different?
- How well do you sleep on the first few nights when you’re away from home? At home, do you sleep better in your bedroom or in another room in the house?
- Do you fall asleep at inappropriate times or places?
- Do allergies or nasal congestion bother you at night?
- Do you have physical aches and pains that interfere with sleep?
- What medications or drugs (including alcohol and nicotine) do you use? Have you ever taken sleep medications? If so, which ones?
- Do you often have indigestion at night?
- Do you ever feel discomfort or a fidgety sensation in your legs and feet when you lie down? Do you have to get up and walk around to relieve the feeling?
- Do you kick or thrash around at night?
- Do you ever have trouble breathing when you lie down, or do you awaken because it’s hard to breathe?
- Does your bed partner or roommate mention that you snore loudly or gasp for air at night?
- Do you ever awaken with a choking sensation or a sour taste in your mouth?
- Do you wake up with a headache or with cramps in your legs?
- How have you been feeling emotionally? Does your life seem to be going as well as you would like?
Smoking. Nicotine is a central nervous system stimulant that can cause insomnia. It speeds the heart rate, raises blood pressure, and causes the mind to race. Even after getting to sleep, a smoker can be awakened in the middle of the night by the craving for nicotine.

Sleep disorders. Perhaps the best-known sleep disorder is insomnia, a condition in which you have trouble falling asleep, or wake up and find it difficult to get back to sleep. Another sleep disorder is sleep apnea, in which people stop breathing momentarily during sleep. People with sleep apnea stop breathing as many as hundreds of times a night and wake up each time. The repeated interruption of sleep can cause drowsiness during the day. About 18 million Americans suffer from the disorder, and it’s most common among those who are overweight.

Menopause. Hormonal changes that occur at menopause may interfere with sleep (see “Menopause,” page 18).

Lack of exercise. The amount of deep, non-REM sleep that you get declines with age, but the decline is steepest in people who lead a sedentary life. Exercise is the only known way for healthy adults to boost their amount of deep sleep. Another benefit of aerobic exercise, in particular, is that it promotes restfulness by shortening the time it takes to fall asleep and reducing the frequency of nighttime awakenings.

If for any reason you aren’t getting your share of sleep, you needn’t suffer in silence or fumble about in a fog of fatigue. The first step is to make lifestyle changes such as cutting back on caffeine and alcohol and boosting your physical activity. If these steps don’t work, see a doctor for advice about other options, including medications.

Medications

Hundreds of over-the-counter and prescription drugs can cause daytime drowsiness or fatigue. The most common classes of drugs associated with such side effects are antihistamines, high blood pressure medications, antibiotics, antidepressants, and anti-anxiety drugs.

Drugs can cause sleepiness or fatigue in several ways. Some drugs, such as antihistamines for allergies and colds, do so by depressing the central nervous system. Others initially act as stimulants, but ultimately leave you tired because they keep you awake at night. Among these drugs are theophylline, used to treat asthma and other upper respiratory problems, and nicotine patches to help smokers quit. Still other medications can cause muscle weakness, including certain anti-arrhythmic agents (drugs that normalize an irregular heartbeat).

If you’re taking a drug that causes drowsiness or fatigue, don’t stop taking it without talking with your doctor. First, not all drugs that can cause such side effects do so in every person who takes them. Just because you’re using a medication that can cause fatigue doesn’t necessarily mean that it’s causing your fatigue. Second, if the drug is the cause of your sleepiness or fatigue, your doctor may be able to prescribe another medication that won’t have the same effect.

If there’s no available substitute, you might be able to reduce the side effects by taking the medication at a time of day when drowsiness or fatigue is less of a problem, such as in the evening. For example, people with allergies can often take an oral antihistamine at night, when its sleep-inducing effect isn’t a problem, and control symptoms during the day with a nasal corticosteroid spray, such as budesonide (Rhinocort, Pulmicort), which doesn’t cause drowsiness.

Alcohol

Alcohol can cause fatigue in two ways. First, as a sedative, it depresses the central nervous system. So drinking wine, beer, or hard liquor during the day can make you feel drowsy or lethargic. If you didn’t sleep well the night before, even just one drink can make you drowsy, especially if you drink during one of your usual low-energy times, for example, midafternoon or late evening.

Second, many people mistakenly think that having a nightcap will help them sleep soundly. Although a drink may help some people fall asleep more quickly because of its sedative effects, alcohol has other effects that can interfere with sleep. Several hours after drink-
ing, alcohol raises the body’s level of epinephrine, a stress hormone that increases the heart rate and generally stimulates the body, which can result in nighttime awakenings. Indeed, alcohol may account for 10% of chronic insomnia cases. Alcohol can also interrupt sleep by relaxing throat muscles, thereby worsening nocturnal breathing problems and causing sleep apnea. It also may disrupt sleep by causing the need to urinate during the night.

**Inactivity**

In addition to its contribution to sleep problems, inactivity can also cause fatigue by inducing changes in the muscles and cardiovascular system, as well as in one’s psychological state. For one thing, muscles lose bulk with inactivity, and the smaller they are, the less powerful they are. People who have a limb immobilized because of injury or illness begin losing muscle cells within just six hours, leaving the muscle weaker and more easily fatigued. With weaker muscles, you’ll expend more effort to accomplish even simple things like climbing stairs.

Lack of exercise also causes cardiovascular changes that affect your energy level during periods of physical exertion. Compared with an active person, a sedentary person has, among other signs of fatigue during exercise, a higher heart rate and lower oxygen consumption. Inactivity also has psychological effects. The less active you are, the less active you want to be. People who don’t exercise have a greater perception of fatigue than people who do.

**Nutritional factors**

What you eat or drink can influence how energetic you feel, but unless you’re malnourished, the impact of food is minor compared with stress, depression, or other causes described thus far. Nevertheless, nutritional factors can contribute to fatigue in several ways.

- **Not eating often enough.** Eating small meals and snacks throughout the day maintains your energy level better than eating one or two large meals, even if they provide the same calorie intake. Eating frequently creates a steadier level of sugar in the blood with less pronounced peaks and valleys. Steadier levels may help people whose brains are particularly sensitive to drops in blood sugar during the valleys. Without some adjustment in eating patterns, these people can have trouble concentrating or may feel mentally foggy. For most people, the ideal eating pattern is breakfast, lunch, and dinner, with light snacks in between.

- **Overeating.** Ever wonder why you feel tired after a big meal? It floods the blood with sugar, temporarily giving you a lift of energy, but the ensuing surge of insulin, the hormone that carries sugar to the cells, can pull too much sugar from the blood and into the muscle cells for storage. This leaves too little sugar available for immediate energy. The result is a feeling of lethargy. Overeating on a regular basis can also make you overweight, which promotes fatigue by forcing you to expend more energy in everything you do.

- **Lack of fluids.** As important as eating enough food is getting enough water and other fluids. Fatigue is one of the first signs of dehydration. In the typical man, water constitutes 60% of body weight; in women, it accounts for about 50%. Not only is water the major component of most cells, it carries nutrients to your cells and takes away waste products, and it helps regulate your body temperature. But your body continually loses water, through perspiration, excretion, and breathing (the air you exhale contains microscopically small drops of water). Drink when you’re thirsty to replenish what you lose. Drink extra water if you’ve consumed coffee, tea, cola, or alcohol, which draw water out of your body. Even more important is drinking plenty of water before and during exercise.

- **Vitamin and mineral deficiencies.** Although there’s no evidence that taking extra vitamins and minerals will give you extra energy, being deficient in some of these substances can cause fatigue. In prosperous societies, probably the most common deficiencies are of iron, magnesium, dietary calcium, vitamin B₁₂, and vitamin D. Women, who lose a lot of iron-containing blood in their monthly menstrual flow, are at greatest risk for becoming iron-deficient. A recent study by the Department of Agriculture’s Human Nutrition Research Center found that only 32 percent of Americans get the recommended daily allowance for magnesium,
Relief for the caregiver

Caregiving can drain your energy and lead to depression and health problems. If you are a caregiver, you owe it to yourself and the people you love to stay healthy, reasonably happy, and sane. The tips below are designed to help you take care of yourself so you can regain your vitality.

Ask for help. Tell friends and family the job is too much for you alone. Ask them to help brainstorm solutions. Always accept help when it’s offered. Some people will make specific offers of help. You can encourage others to choose from a list you create of what’s needed or assign jobs you’ve matched to their capabilities.

Tap into religious communities. A religious or spiritual community can be a strong source of assistance if you or the person you are caring for belongs to one.

Try a support group. Many organizations, hospitals, health care plans, and religious groups offer support groups for caregivers. Support groups are a good place to blow off steam and share ideas with people who are facing similar situations.

Lean on friends. Friends who listen—and offer advice only when you ask directly—are invaluable. Try to choose people who aren’t judgmental. Ask outright if you can use them as a sounding board whenever the need arises.

Bundle errands. Make a weekly master list of everything that needs to be done, including appointments, shopping, drugstore runs, trips to the gas station, and other errands. Dole out simple tasks, if possible, or do as much as you can in one time slot.

Clear your schedule. Set aside time to spend with a partner or family. Start small—just one evening a week or breakfast out together if you’re caring for someone in your home—and add to it when you can. Always let the answering machine pick up calls during certain hours.

Look for shortcuts. Could cooking happen on certain days only? If a clean house is important to you, can you make your room an oasis of clean and calm while being less strict about other areas? Can you let some jobs slide or hire help to get them done?

Refuse to do it all. Consider outside services that may give you a little more time for yourself, such as adult day services once or twice a week, or online grocery shopping. Can other family members help pay for these services?

Quell your guilt. Caregiving attracts guilt like a magnet pulls iron filings. There’s always something else you could be doing or should have done. But odds are good that you do a great deal. Pat yourself on the back for all you give; don’t excoriate yourself for failing to give more.

Eat well. Include plenty of vegetables and fruits in your diet, and choose whole grains over refined-grain products. Limit or cut out unhealthy fats and too many sweets. Keep healthy snacks available, like air-popped popcorn or fruit.

Stay active. Frequent exercise delivers proven health benefits, such as lowering cholesterol and blood pressure. Try to get 30 to 60 minutes of moderate exercise a day, most days of the week.

Enjoy yourself. Listen to music you like, enjoy a luxurious bath, take a yoga class, do an activity you enjoy, or go out to dinner. Regular time off can renew your spirit and energy and remind you that you’re neither invincible nor completely irreplaceable.

Stay connected. Catch up with friends by phone or e-mail. Establish a weekly walk with a friend or an occasional lunch or movie.

Ease stress. Take time to alleviate stress. Learn meditation or other relaxation techniques. See the stress-relieving tips and exercises on page 37. (In addition, Harvard Medical School’s Stress Management Special Health Report offers instructions for a variety of stress-relief techniques. See the back of this report for ordering information.)

Caregiving attracts guilt like a magnet pulls iron filings. There’s always something else you could be doing or should have done. But odds are good that you do a great deal. Pat yourself on the back for all you give; don’t excoriate yourself for failing to give more.

Boosting Your Energy

While we get some vitamin D in our diet, the main source of vitamin D comes from sunlight: in response to sunlight, skin makes vitamin D. Many people these days avoid the sun and use sunscreens, for good reason. Also, people living in the northern half of the United States and some other parts of the Northern Hemisphere (or in the southern part of the Southern Hemisphere) get less sunlight during winter, and as a result their bodies don’t make sufficient amounts of vitamin D. In recent years, doctors have learned that

a mineral that helps break glucose into energy. That study showed that women with magnesium deficiencies had higher heart rates and required more oxygen to do physical tasks than they did after their magnesium levels were restored. Vitamin B₁₂ deficiency can be a problem for vegetarians—particularly vegans, who consume no animal or dairy products, the main dietary sources of vitamin B₁₂—although it can occur in others besides vegans. Like iron deficiency, vitamin B₁₂ deficiency can cause a form of anemia.
vitamin D deficiency actually is very common. This is particularly true in older people and in those who are homebound. The consequences of vitamin D deficiency can be loss of bone and muscle strength, which can ultimately impair your ability to perform everyday tasks. Vitamin and mineral deficiencies are easy to diagnose and, for most people, simple to remedy with supplements. Older people who are deficient in vitamin D should take vitamin D₃, which is absorbed more easily than other forms of vitamin D.

Fatigue-inducing foods. Certain foods can have a calming effect. Milk, turkey, corn, brown rice, and legumes contain the amino acid tryptophan. The brain converts tryptophan into serotonin, a neurotransmitter that, among various actions, helps you feel relaxed and possibly fatigued. Not everyone will feel sleepy after having a turkey sandwich or a glass of milk. But if you're prone to fatigue, to be on the safe side, you might want to avoid these foods in the middle of the day. It's also a good idea to limit your intake of caffeine, which can interfere with sleep.

Caring for a family member
Perhaps you are among the one in five American adults helping an elderly or disabled family member with the daily tasks of life. The spectrum of tasks that unpaid caregivers undertake is truly vast. It runs the gamut from grocery shopping, cooking, and cleaning house to helping with baths or personal hygiene or providing hands-on medical care. As the very embodiment of love and commitment to others, caregiving is one of the most worthwhile jobs you may ever undertake, but it can be exhausting and cause undeniable strain.

About six in 10 family caregivers juggle work responsibilities while caring for someone else. And caregiving itself amounts to a part-time job: the average caregiver puts in 21 hours of “helping time” per week. Perhaps not surprisingly, many of the 44 million adult caregivers in the United States suffer from emotional and physical stress, which can lead to fatigue.

This is mostly a problem that affects women, particularly those who may be juggling child care responsibilities on top of helping an elderly parent. About 75% of caregivers are women, and the typical woman can expect to spend 17 years raising children and 18 years caring for an elderly parent. Among caregivers, women tend to provide more hours of care to a loved one than men do.

If you are a family caregiver, you frequently act with someone else's happiness and health in mind. But for the sake of your own health, try to care for yourself as well (see “Relief for the caregiver,” page 23). For starters, take a break once in a while to spend time with friends or on activities that make you happy. Check with your employer about what resources might be available to you. Try to find ways to relieve physical and emotional stress. (The Harvard Medical School Caregiver's Handbook offers additional tips. For ordering information, see the back of this report.)

Chronic fatigue syndrome
Although chronic fatigue syndrome (CFS) has drawn significant attention in the media and has been a primary focus of fatigue research in recent years, it is an unusual illness, and an uncommon cause of persistent fatigue.

About four out of every 1,000 adults in the United States suffer from the condition, which is about twice as common in women as in men. The illness also occurs in teenagers and younger children, although it is even less common in these age groups. The causes of CFS are unknown, and there is no accurate diagnostic test. However, scientists have found abnormalities in the brain and peripheral nervous system, and in the immune system, in people with CFS.

CFS: A group of symptoms
CFS is defined by a set of symptoms. The case definition of CFS was created by a group of experts, under the leadership of the U.S. Centers for Disease Control and Prevention (CDC). Specifically, CFS is characterized by severe and debilitating fatigue that lasts for six months or longer and is not relieved by rest, plus at least four of the following, also for at least six months:

- impaired memory or concentration
- sore throat
- swollen glands in the neck and under the arms
• pain in muscles
• pain in multiple joints, without redness and swelling
• headaches that are different in some way from any experienced before
• tiredness even after sleeping
• exhaustion following physical exertion.

In addition, the diagnosis of CFS can be made only if a person does not have another active medical condition that could cause chronic fatigue (such as anemia, cancer, or multiple sclerosis), nor any psychosis, melancholic depression, substance abuse, dementia, or anorexia nervosa/bulimia.

The symptoms of CFS tend to wax and wane, but most people remain impaired to some degree, even on their good days. Unlike other causes of persistent fatigue, which come on gradually, CFS often appears suddenly, with an infectious-like illness (having symptoms such as fever, sore throat, aching muscles, etc.).

CFS and depression

Some doctors have questioned whether CFS is a form of psychiatric illness, particularly depression. One reason for this is that patients with depression often develop fatigue and several of the other symptoms seen in CFS. But most people with CFS have no history of psychiatric illness in the years before developing CFS, and a substantial number—25% to 50%—don’t develop depression even after the onset of their illness.

There is other evidence that CFS is not a manifestation of depression. For example, certain brain hormone levels that are often seen in people with depression are not seen in people with CFS. In people with CFS, the brain makes lower than normal levels of two hormones that cause the adrenal glands to produce cortisol, a stress hormone. In contrast, in people with depression, the brain makes higher than normal levels of these two hormones. In addition, one well-known study found that the antidepressant fluoxetine (Prozac) did not relieve either fatigue or depression in patients with CFS.

One particular kind of medication, tricyclic antidepressants, used in doses that are too low to relieve depression, seems to help relieve CFS symptoms, perhaps because the tricyclics are muscle relaxants and also increase the amount of deep, restorative sleep.

Explaining CFS

■ The brain. Many studies indicate that the symptoms of CFS are most likely caused by abnormalities in the brain, particularly in a part of the brain called the limbic system. These differences in the brain have turned up on imaging tests, such as magnetic resonance imaging (MRI), and in studies of various brain hormones conducted on people with CFS. Several studies find that patients with CFS also have variations in genes that affect the function of the limbic system.

■ The autonomic nervous system. The autonomic nervous system is the part of the nervous system that controls vital involuntary body functions such as blood pressure, heartbeat, and body temperature. Many patients with CFS show a tendency for the blood pressure to drop and the heartbeat to race when they stand up and remain on their feet after sitting or lying down. Doctors are testing various medications that might correct this condition.

■ The immune system. Various parts of the immune system are chronically activated in CFS, as if the immune system is engaged in a battle against something it perceives to be foreign. However, there is no evidence of an immune system deficiency that would make people with CFS especially vulnerable to illness.

■ Energy metabolism. Every cell in our body makes the energy it needs to live and perform its function. In CFS, there appear to be irregularities in cellular energy production and the function of the mitochondria—the tiny “power packs” inside every cell where energy is made.

■ Oxidative stress. Oxidants, also known as free radicals, are unstable oxygen molecules that damage cell membranes, proteins, and DNA. As the mitochondria generate energy, they produce oxidants as a chemical byproduct. However, the body produces nutrients and enzymes—known as antioxidants—that help block or repair such damage. In CFS, there appears to be a state of “oxidative stress” in which levels of oxidants and antioxidants are not properly balanced.

■ Infections. CFS can follow an infection from which people usually recover promptly, such as infec-
ition with Epstein-Barr virus, Ross River virus, or the microbe that causes a disease called Q fever. Cases of CFS also have been linked to human herpesvirus-6, parvovirus, enteroviruses, and the bacterium that causes Lyme disease. It has not been proven that any of these infectious agents are the cause of the persistent symptoms of CFS. Also, there are cases of CFS that do not start with an apparent infection, and in which no evidence of chronic infection has been found. Most experts think it is unlikely that CFS is caused by a single novel infectious agent, in the way that AIDS is caused by a single kind of novel virus (HIV) that first infected humans in the mid-20th century.

Given the involvement of the brain in many patients with CFS, doctors have wondered whether an infection of the brain or autonomic nervous system could directly cause symptoms of CFS. Doctors have also speculated that an infection affecting a part of the body other than the brain could indirectly cause symptoms by triggering an immune response that alters brain chemistry.

**Treating CFS**

Some people with CFS eventually recover: perhaps 50% or more of children, but only 15% to 40% of adults. For others, certain treatments can help relieve the symptoms. If you have been told by a doctor that you have CFS, a combination of the following strategies may prove helpful.

- **Set priorities.** Make a list of the things that you want to have more energy to do, and eliminate as many nonessential activities and obligations as you can. The goal is to conserve your energy for the most important activities in your life and to reduce the psychological stress and physical exhaustion that can come from being overscheduled and overextended. At the same time, guard against becoming too passive. Push yourself to your limits, and trust your body to know when you’ve reached those limits.

- **Exercise.** An exercise program in which you gradually increase your activity level can be very effective in reducing the severity of symptoms. Before starting, keep a diary for a week or so, recording what you do and when. Many patients engage in bursts of vigorous activity when they feel able, but then pay for it afterward, becoming so fatigued that they are inactive for days or weeks. The goal of gradually increasing exercise is to eliminate such wide swings in activity. Choose exercise that is light enough that it doesn’t cause exhaustion, but challenging enough that it’s invigorating. A recent study by the Agency for Healthcare Research and Quality found that exercise may help relieve fatigue and improve quality of life for people with CFS. The type of exercise did not seem to matter. More important than the particular exercise you choose is doing it almost daily. As your stamina increases, step up the intensity of your exercise regimen or the time you devote to it.

- **Cognitive behavioral therapy.** This type of psychotherapy helps you identify and change negative thoughts and behaviors. Some of the patterns of thinking and behavior that people develop in response to their symptoms serve to aggravate those symptoms. For example, some people avoid exercise because they fear it will make them more fatigued. But lack of physical exercise can actually worsen the symptoms. Through cognitive behavioral therapy, patients explore ways to overcome such negative thought processes. But cognitive behavioral therapy requires an experienced therapist, and studies have been mixed regarding its effectiveness in treating CFS.

- **Tricyclic antidepressants.** Many doctors who care for CFS patients believe that low doses of a tricyclic antidepressant may alleviate CFS symptoms. This therapy seems to improve the quality of sleep, reduce pain, and increase energy. As yet, no scientific studies have been conducted of this treatment in patients with CFS, but studies have found a clear benefit in patients with a similar illness, fibromyalgia (see next page).

- **Other medications.** The headaches, joint pain, and muscle pain that characterize CFS can be relieved with nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil, Motrin) or naproxen (Aleve), or another over-the-counter analgesic, acetaminophen (Tylenol). CFS sufferers who also have allergies sometimes find that decongestants and other medications that help relieve their allergy symptoms also improve their CFS symptoms. But antihistamines, mainstays of allergy treatment, cause drowsiness in varying degrees and should be avoided during the day, although they
can be useful if taken at bedtime. There is some evidence that fish oil capsules (3,000 mg per day is a good dose) may also help reduce the symptoms of CFS. Low doses of the stimulant drug modafinil (Provigil) may help some patients, although this has not been proven in a scientific study.

**Experimental treatments.** Among experimental approaches currently being explored are medications to treat abnormalities of the autonomic nervous system that cause low blood pressure and rapid heartbeat. Thus far, such treatments have not proved effective.

### Fibromyalgia

Fibromyalgia, which affects 2% to 4% of Americans, is similar to CFS—so similar that many experts view them as variants of the same condition. Both disorders are more common among women; both produce symptoms of unremitting fatigue and muscle pain; and both can begin following an infection. But in fibromyalgia, pain, more than fatigue, is the predominant symptom.

People with fibromyalgia have many of the same abnormalities of the immune system, endocrine system, and nervous system found in those with CFS. However, some studies have found that, in some tests, the abnormalities within these systems differ in people who have fibromyalgia compared with people who have CFS. Psychiatric problems, such as depression and anxiety, are also more common in people with fibromyalgia than in the general population.

Fibromyalgia causes pain and stiffness in characteristic spots called “tender points” (see Figure 7). The area between the shoulder blades and the bottom of the neck tends to be the most painful. Apparently, the musculoskeletal pain of fibromyalgia reflects a heightened sensitivity to pain rather than muscular problems. People with fibromyalgia appear to have different levels of pain-sensing chemicals in the brain and spinal cord than healthy individuals do. One example is substance P, a neurotransmitter that helps transmit pain signals to and from the brain. Some research has found that they also have low levels of insulin-like growth factor (IGF), also called somatomedin–C, a chemical that helps keep muscles strong and in good repair; other studies have found no difference in IGF levels.

**Figure 7 Tender points in fibromyalgia**

Areas of tissue that become painful when pressed, particularly in the locations shown, are called “tender points.” They often develop in people with fibromyalgia, occur less frequently in people with other conditions (such as chronic fatigue syndrome), and occur rarely in healthy individuals.

### Treating fibromyalgia

Given the similarity between fibromyalgia and CFS, it’s not surprising that, in many cases, the same treatments are helpful for both. Aerobic exercise—such as swimming, walking, biking, or low-impact step classes—can reduce muscle pain and tenderness. Heat and massage can also relieve musculoskeletal pain in the short term.

Two medications used to treat seizures can reduce pain and improve function in some people with fibromyalgia. In 2007, one of these medications—the anticonvulsant pregabalin (Lyrica)—became the first drug approved by the FDA to treat fibromyalgia after two double-blind, controlled trials found that a substantial number of participants taking the drug experienced less pain. The other drug, gabapentin (Neurontin), also improved sleep and reduced pain and fatigue in a significant number of people participating in a study sponsored by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS).
The mechanism by which these drugs provide pain relief is unknown. However, researchers speculate that they work by blocking the release of molecules involved in pain signaling. Side effects for both drugs can include mild-to-moderate dizziness and sleepiness, blurred vision, weight gain, dry mouth, and swelling of the hands and feet.

In addition, several randomized clinical trials have found that low-dose tricyclic antidepressants improve sleep, elevate mood, and relieve muscle pain in patients with fibromyalgia.

### Multiple sclerosis

Multiple sclerosis (MS) is an autoimmune disease affecting about 350,000 people in the United States. With MS, the body’s immune system mistakenly attacks myelin, the substance that surrounds and protects nerve fibers. Most people experience their first symptoms of MS between the ages of 20 and 40, but a diagnosis is often delayed because of the transitory nature of the disease. People experience symptoms during “flare-ups” that could last weeks or months, followed by a period of remission before symptoms reappear.

The most debilitating part of MS can be severe fatigue. Even in the absence of muscular weakness or fatigue, there is often central (brain) fatigue in which general exhaustion and difficulty concentrating is so great that it’s difficult to engage in any activity. While most people with MS have fatigue, other symptoms can vary significantly from one person to the next, depending on the location of affected nerve fibers. Symptoms range from mild to severe and can be long-lasting or short-lived. Although most people recover completely between flare-ups, some suffer progressive loss of function, which can lead to advanced muscle weakness, paralysis, and blindness.

Other common symptoms of MS include:

- vision problems such as blurred vision, double vision, red-green color distortion, and sometimes loss of vision in one eye
- numbness, weakness, or a tingling “pins and needles” sensation in one or more extremities
- difficulty with coordination and balance
- depression
- spasticity (stiffness or spasms in certain muscles)
- sensations that are similar to having an electric shock
- dizziness
- speech impediments
- tremors
- bladder or bowel problems
- problems with sexual function.

### Recognizing MS fatigue

Fatigue in MS is sometimes the secondary effect of other symptoms. For instance, sleep disturbances caused by bladder problems or nighttime spasms—both common symptoms of MS—can lead to daytime fatigue. Depression is also a contributor. Yet these symptoms can’t explain the full extent of exhaustion experienced by most MS patients.

Imaging studies have shown a correlation between MS fatigue and reduced metabolism of glucose in certain areas of the brain responsible for processing and motivation. This may explain why MS fatigue frequently includes both muscle and brain fatigue.

In some people who are unaware that they have MS, fatigue is the most prominent red flag, because other symptoms are minimal. How can someone tell if fatigue is a symptom of MS? There are certain characteristics that set MS fatigue apart from the fatigue typically experienced by healthy individuals. They include fatigue that:

- is more intense and debilitating than what healthy people experience after sustained physical, mental, or emotional exertion
- occurs on a daily basis for at least half of all days for six weeks or more
- is exacerbated by heat and humidity
- tends to come on suddenly
- interferes with daily activities or duties
- inhibits ability to concentrate
- occurs early in the morning, even after a good night’s rest.

Usually fatigue is accompanied by another early sign of MS—such as numbness and tingling in your
arms, legs, or elsewhere in your body—but sometimes it's the only early indicator. If you are experiencing the symptoms above, talk to your doctor. He or she will be able to determine if you should be evaluated for MS. Because there isn’t a single test to detect MS with certainty, the first step is often a series of tests to rule out other illnesses, including some conditions discussed elsewhere in this report.

Magnetic resonance imaging (MRI) is the primary tool used to help establish a diagnosis of MS. An MRI can help locate areas in the central nervous system where myelin has been damaged. These areas will show up as white patches deep within the brain. It is very rare for the MRI scan to be normal if a person has MS, but it is possible. If you are fatigued and the scan is normal, the likelihood is very high that MS is not the culprit. Still, if you have severe fatigue along with other symptoms that could be caused by MS, such as dizziness or loss of vision, you may want to consider having a second MRI about a year after the initial scan.

In some people, fatigued or not, an MRI scan will reveal white spots that are not caused by MS. This is particularly true in older patients and patients who suffer from migraines or high blood pressure. These spots don't look quite the same as MS lesions, but they are sometimes confused with them. Therefore, other tests may be used, including visual evoked potential tests, which measure electrical signals sent by your brain in response to visual stimuli, and a spinal tap (lumbar puncture), in which a small sample of cerebrospinal fluid is removed from your spinal canal for analysis in the lab. If MS is present, the fluid may show cellular and chemical abnormalities.

A definitive diagnosis can take time. Even with evidence of damaged myelin and other symptoms, there must be evidence of multiple attacks producing different symptoms, since MS is an ongoing process of inflammation in different parts of the brain and can resemble other illnesses that involve the central nervous system.

**Ways to combat MS fatigue**

Even if you have MS, there are ways to boost your energy levels. The best approach is a comprehensive plan that combines lifestyle changes and medications. Your doctor can help you identify factors contributing to your fatigue, so that you can minimize their impact. The following are some general tips for increasing your stamina.

- **Exercise.** Regular exercise can improve cardiovascular fitness and muscle strength and reduce fatigue in people with MS. Be sure to start slow, and stop if you become tired. A physical therapist can help develop a regular exercise program tailored to your fitness level and individual needs (see “Exercise regularly,” page 37).

- **Stay cool.** MS fatigue can be exacerbated by heat. During warmer months, be sure to exercise in the morning or late evening when it's coolest.

- **Address sleep problems.** Treat symptoms that interfere with sleep, including spasticity or urinary problems. Talk to your doctor about sleep medications. Also, see “Get a better night's sleep,” on page 39.

- **Adjust your routines.** Plan ahead to bundle errands. Talk to your employer about reducing your workload, altering your schedule, or working at home some of the time. An occupational therapist can help you simplify tasks at work and home that may be draining your energy.

- **Medications.** Short-term clinical trials have shown that amantadine (Symadine, Symmetrel), a drug that helps restore the balance of the neurotransmitters in people with Parkinson’s disease, and modafinil (Provigil), a drug used to increase wakefulness in people with narcolepsy, are both effective in reducing fatigue in people with MS. Although these drugs are not FDA-approved for alleviating fatigue in MS patients, they are frequently prescribed for this purpose.

**Other medical conditions**

Fatigue is a symptom of numerous illnesses, from minor infections such as colds to serious diseases such as cancer and heart disease. It is a primary symptom of the illnesses discussed in this section. Some of these disorders cause fatigue directly, by sapping the body’s energy supply; others do so indirectly, as the immune system attempts to fight off the illness. Either way,
once you get treatment or the infection subsides, your energy level should rebound.

**Chronic infections**

Unlike acute infections such as a cold or flu, which go away in a week or two, chronic infections can last for months or years. During that time, the body expends large amounts of energy trying to overcome the infection, which can leave you feeling lethargic and weak. The immune system mounts an attack on the infection by unleashing a group of chemicals called cytokines. The cytokines are known to cause exhaustion, possibly by increasing the production of stress hormones.

Chronic infections that cause particularly severe fatigue include tuberculosis, Lyme disease, and any form of hepatitis. Each of these illnesses has effective treatments, and once treated, most people find that their energy level improves.

**Anemia**

Anemia is a condition in which the blood has too few red blood cells and, thus, low levels of hemoglobin, the protein inside red blood cells that delivers oxygen to tissues throughout the body. Anemia can lead to fatigue because the cells of your body need oxygen both to create ATP and to liberate energy stored as ATP (see “Food and energy,” page 4). Thus, a shortage of oxygen can mean a shortage of energy.

Anemia is a common condition, especially among women, and is most often caused by iron deficiency. This type of anemia affects about 9% to 12% of women under age 70. But iron-deficiency anemia typically does not cause fatigue unless it's severe. Another form of anemia, known as pernicious anemia, results from a deficiency in vitamin B_{12}, which causes the bone marrow to produce red blood cells that are larger and shorter-lived than normal red blood cells, reducing the number of oxygen-carrying cells.

Anemia is easily diagnosed with a blood test, and for most types, there are effective treatments. For example, anemia caused by a deficiency in iron or vitamin B_{12} can be cured with supplements of these nutrients. Generally, supplements are taken orally, but if your deficiency stems from your stomach's inability to absorb vitamin B_{12}, that vitamin can be given by injection. Whether it's from iron deficiency or vitamin B_{12} deficiency, the anemia and your fatigue should lift within three to six weeks of beginning supplements.

**Kidney disease**

Various diseases that damage the kidneys may indirectly cause fatigue by reducing production of erythropoietin (EPO), a hormone that stimulates the bone marrow to make and release red blood cells. The kidneys produce most EPO in your body, so if kidney function is impaired, you could develop anemia and the accompanying fatigue.

Your doctor can diagnose most kidney diseases with simple blood and urine tests. In many cases, your fatigue will be remedied once the underlying kidney problem is treated. If you have chronic kidney disease, the first step in treating anemia is usually iron supplements, which enable the EPO you produce naturally to promote production of red blood cells. If this is not sufficient to keep your hemoglobin levels normal, you may be eligible for injections of a synthetic form of EPO. Talk with your doctor about which options are best for you.

**Congestive heart failure**

Congestive heart failure occurs when the heart is unable to pump enough blood to meet the body's needs. Insufficient blood flow through the brain, kidneys, and muscles can cause weakness and fatigue. Compounding the problem, the failing heart works extra hard to pump blood, using up more than its share of energy.

Your doctor can detect congestive heart failure through a physical examination and diagnostic tests. The disease can be controlled by a combination of appropriate medications and lifestyle changes, such as avoiding salty foods. Depending on the person's age and the severity of the condition, treatment can, to some degree, relieve the fatigue.

**Hormonal disorders**

Hormones, chemicals produced by glands, are responsible for regulating a wide variety of physical functions, including those associated with digestion, reproduction, and blood circulation. Unusually high or low levels of specific hormones are responsible for several disorders
that can be accompanied by fatigue, including hypothyroidism, diabetes, and Addison’s disease.

- **Hypothyroidism.** This condition occurs when the thyroid gland does not produce enough thyroid hormone. If you have hypothyroidism, you may feel lethargic because your metabolism (the breakdown of food for energy) slows down. Almost 10 million people in the United States have hypothyroidism.

The condition becomes increasingly common with age, and it’s more common in women than in men. Women are five times more likely than men to experience hypothyroidism, according to the American Association of Clinical Endocrinologists.

Hypothyroidism has several causes. The most common is Hashimoto’s thyroiditis, an autoimmune disease in which the immune system attacks the cells of the thyroid, causing inflammation and cell destruction. Hypothyroidism can be diagnosed with blood tests that measure your levels of various thyroid hormones. The most commonly measured of these is thyroid-stimulating hormone (TSH). Hypothyroidism usually is treated with thyroid hormone replacement, which provides synthetic versions of natural thyroid hormones. When the dose has been adjusted properly, thyroid hormone replacement is successful and energy levels are restored.

Interestingly, particularly in people over age 60, too much thyroid hormone (a condition called hyperthyroidism) also can produce fatigue—along with jitteriness and weight loss despite a good appetite. This condition, called “apathetic hyperthyroidism,” is often overlooked by doctors. It also can be diagnosed by the TSH test.

- **Diabetes.** Blood sugar (glucose) provides energy to cells, but first it must get inside the cells to be converted to a usable energy form. The pancreas makes insulin, which helps transport sugar into cells. In type 1 diabetes, the pancreas doesn’t make enough insulin. In type 2 diabetes, the pancreas initially makes more than enough insulin, but the cells are resistant to it. In either type of diabetes, not enough sugar gets into the cells, impairing their ability to generate energy. Lack of physical and mental energy is among the many symptoms of diabetes.

Diabetes can be diagnosed with a blood test that measures levels of glucose in the blood. Although there’s no cure, a variety of treatments can help control its symptoms, including medications that supply added insulin or increase the body’s insulin sensitivity, and lifestyle changes, particularly exercise and weight loss.

- **Addison’s disease.** This rare hormonal disorder occurs when the adrenal glands don’t make enough of the hormones cortisol and aldosterone. Its most common cause is an autoimmune disease in which the immune system produces antibodies that attack and destroy the outer layer of the adrenal glands, reducing hormone production. Symptoms develop gradually and include tiredness and weakness, as well as loss of appetite, nausea, and dizziness, among others. If severe or untreated, the disease can be fatal. The treatment is replacement hormones.

**Cancer**

Many different types of cancer can cause loss of appetite and energy, even before the cancer causes other symptoms. Most likely, the fatigue is caused by increased levels of cytokines—chemicals made when the immune system is fighting an infection or a cancer. While the likelihood of cancer is fortunately small in a person with a recent loss of appetite and energy, it is likely enough that you should contact your doctor about it. This is particularly true if you are losing weight without trying to, or have other worrisome symptoms such as unexplained fevers, new pain somewhere in your body, unusual lumps in your breast or testicles, or swelling of the lymph nodes in your neck, under your arms, or in your groin.
Even though fatigue is one of the most common medical complaints, you may feel hesitant about making a doctor’s appointment just to say you lack energy. But don’t wait until you’re so tired you can’t get out of bed before seeing a doctor. If you feel so weary or lethargic that you can’t do particular activities as well or as often as you once did, it’s important to make an appointment. Perhaps you used to play tennis once a week without any problem, but now you get winded during the game. Or maybe by the end of the day you often feel too tired to cook dinner or go out to a movie. These are good reasons to see a doctor.

Describing your symptoms
Start with your internist or family doctor to find out if you have an underlying medical or psychological illness. Because fatigue is a characteristic of many illnesses, you should describe your symptoms in detail to help your doctor narrow down the possible causes. How, exactly, does the fatigue feel to you? Do you have trouble concentrating? Are you mentally fuzzy—for example, do you take longer to think of words or compute simple math problems than you used to? Do you tire more quickly? Do certain activities take more effort than they used to? Answers to these questions indicate how severe your fatigue is and whether it mainly involves muscle fatigue, central fatigue, or both.

Be prepared to tell your doctor which activities you’ve had to limit. For example:

- You used to enjoy going out to dinner and the theater with friends, but now you can’t stay awake during an evening performance.
- You no longer wake up feeling refreshed, even after you’ve slept all night.
- When you exercise, your muscles feel achy and weak in less time than they once did.
- You’ve done the newspaper crossword puzzle for years, but now your mind wanders, and you lose interest before finishing it.

This information yields further clues to the nature and severity of your fatigue. Timing is also important. Tell the doctor when you started noticing a decrease in your physical or mental energy level. Was the change gradual or sudden? When fatigue involves stress, overwork, or psychological problems, it usually comes on gradually. However, when the cause is chronic fatigue syndrome, fibromyalgia, or a side effect of medication, fatigue often starts suddenly. Did the onset of fatigue coincide with any other significant change in your life: Had you been ill? Did you have an injury? Did you start taking a new medication? Was there a death in the family or among your friends? Are you under an exceptional amount of stress? Your symptoms could be related to any of these factors.

Also, make sure to tell your doctor about any other symptoms you might be experiencing. Give details about when the different symptoms began and whether they started together or at different times. Mention physical as well as emotional symptoms. Do you get out of breath easily? Do your muscles or joints ache? Do you have trouble sleeping? Are you feeling unusually sad or anxious? Different symptoms accompanying fatigue suggest different causes. For example, feeling blue and having trouble sleeping are two signs of depression. Shortness of breath can be a sign of heart disease.

Medical evaluation
A careful description of your symptoms can help narrow down the diagnosis, but you’ll also need a physical examination. The doctor will look for physical signs of illness, such as swollen lymph nodes or enlarged organs (such as the liver or spleen) or unusual lumps in your breasts or abdomen, and will check for the tender points that occur with fibromyalgia.
The National Institutes of Health recommends certain laboratory tests as part of a routine workup for anyone with debilitating fatigue that has lasted at least six months. These tests can detect evidence of anemia, infection, and other illnesses that cause fatigue. They include the following:

- **Complete blood count (CBC).** One of the most common laboratory tests, the CBC provides information about several blood components, including red blood cells and different types of white blood cells. Abnormal findings can indicate anemia, infection, and other conditions.

- **Manual differential white blood cell count.** The body produces different types of white blood cells, which help fight infections. The relative percentages of each type can help determine the sort of infection you might have, such as whether it’s viral or bacterial.

- **Erythrocyte sedimentation rate (ESR) chemistry panel.** This test determines the rate at which red blood cells (erythrocytes) settle to the bottom of a test tube. The rate is elevated in various infections, inflammatory diseases, and cancers.

- **Thyroid-stimulating hormone (TSH) test.** Produced by the pituitary gland, TSH helps regulate the production of thyroid hormones. The TSH test is usually ordered to diagnose hyperthyroidism or hypothyroidism.

- **Test for antinuclear antibodies (ANAs).** When a person’s immune system mistakes the nuclei of certain cells in his or her own body for foreign threats, it produces ANAs. These antibodies are found in the blood of people with autoimmune diseases that cause muscle pain and weakness, such as lupus. They can be detected by examining a blood sample using an ultraviolet microscope.

- **Urinalysis.** Testing a urine sample can reveal many things about how your body is functioning. It can detect high glucose levels (a sign of diabetes) as well as evidence of kidney disease and infections.

- **Test for rheumatoid factor.** If your doctor suspects rheumatoid arthritis from your description of your symptoms or the examination, he or she may suggest this test. Rheumatoid factor is a protein that the immune system produces, usually in people who have rheumatoid arthritis.

### Specialized testing
If your doctor can’t make a diagnosis based on the standard physical exam and tests, he or she may order one or more of the following specialized tests:

- **Tests for specific infections.** If the doctor thinks a chronic infection might be causing your fatigue, he or she may order blood tests to identify problems such as Lyme disease, hepatitis C virus, and HIV.

- **Computed tomography (CT) scans.** CT scans can detect cancers deep within the body and enlargement of organs.

- **Magnetic resonance imaging (MRI) scans.** Like CT scans, MRI scans can detect deeply placed cancers and enlarged organs. In addition, an MRI of the head can be especially valuable when neurological problems are suspected. MRIs can detect multiple sclerosis and the spots of inflammation in the brain that are seen in some people with chronic fatigue syndrome.

- **Chest x-ray.** The doctor will order a chest x-ray if he or she suspects that you have heart or lung disease.

### Making a diagnosis
Diagnosing the cause of fatigue really amounts to a process of elimination. One by one, your doctor will
review the evidence about you—your symptoms, your physical examination, and the results of your tests—and compare this evidence to the possible causes. Diseases and conditions that do not fit your case will be discarded, and further testing may be done to examine the diseases that might fit your case. Your primary care physician can easily treat some conditions, such as anemia and diabetes. Others will require the care of a specialist, for example, a psychiatrist for depression or a cardiologist for heart disease.

For most people suffering from fatigue, however, a firm diagnosis can't be made. In such cases, persistent fatigue may be due not to an illness, but rather to some aspect of a person's daily life—stress, overwork, poor sleep habits, overeating, and so on. There are often several interrelated reasons for the fatigue. For example, many people with CFS also have sleep disorders. People who are overworked or under stress may also suffer from insomnia. No matter which constellation of causes is the root of your problem, there are treatments and practical strategies that can help restore your energy.
A 7-step plan to jump-start your natural energy

Unless you have an underlying illness, no pill or so-called energy booster you see on store shelves can put the spring back in your step. However, making certain lifestyle changes—outlined in the seven-step plan below—can go a long way toward improving your mood, energy, and overall health. Making changes may seem difficult when life’s demands leave you feeling overburdened and strapped for time, but the irony is that if you invest some time into adopting these strategies, you will likely wind up with more energy—a return that enables you to accomplish more in your day.

Anyone who wants to feel more energetic can adopt this seven-step program, including people who are being treated for fatigue-producing illnesses. Because these approaches address both the physical and psychological aspects of fatigue, they can improve your strength and ability to exert yourself and sustain your motivation.

You’ll want to tailor these strategies to your individual needs, so before reading through this section, get a plain notebook or journal so that you can write down each step below followed by the specific changes you can make to accomplish that item. Writing your goals down can help you stay on track. Making daily entries may help you monitor your own progress and stay focused.

1 Set goals
An important first step in motivating yourself toward making changes is to set some goals. Write these down in your journal so you can refer back to them. The primary goal for most readers of this report is to boost energy. Yet this is a perfect time to step back and consider some of the reasons why you want to have more energy. Is it simply to feel good, or is there more? Are there activities you would enjoy if only you had more time and energy?

Motivation in itself is an important aspect of energy. And reaching goals is enormously satisfying—the greater your sense of well-being, the higher your energy level is likely to be.

So get out a pencil and jot down the things in your life that have most inspired you. Have you trained for a marathon? Earned an advanced degree? Raised money for charity? Written a published article? Now make a list of the things that you most enjoy doing, such as traveling, gardening, playing a musical instrument, socializing, reading a good book, or playing bridge, golf, or tennis. Look at the two lists. Are there ways to combine the things you love with goals you can accomplish? The idea is to find something that will be stimulating and energizing, not something that’ll feel like just one more chore. Planning a trip can be
stimulating, for example, and saving the money for it can give you a goal. Or use your love of bridge playing and socializing to stage a card-playing fund-raiser.

Try to focus on your priorities, so that you channel your energy into the activities that truly matter to you.

2 Control stress
The most common cause of persistent fatigue is stress and the emotional response to it. People who feel fatigued most of the time don’t necessarily have more stress in their lives than other people, but they may be more sensitive to its effects. Stress-induced emotions consume huge amounts of energy. Some people are naturally better than others at coping with such emotions, but everyone can learn to modulate them to some degree. The following strategies, in addition to exercise (see step 4), can help keep stress in check.

■ Discuss your feelings with others. Studies show that discussing your fear, anxiety, and other stress-related emotions with another person can reduce them far more effectively than suppressing them or maintaining an upbeat facade. You can talk with a friend or relative, join a support group, or see a psychotherapist. One effective approach is cognitive behavioral therapy, in which the therapist works with the patient to identify the full range of the stress reaction, and then to unlearn or reshape negative feelings, behaviors, and thinking patterns to stop the stress response.

■ Use relaxation techniques. Relaxation therapies are effective tools for reducing stress. Meditation, self-hypnosis, yoga, tai chi, aromatherapy, and massage are all relaxation techniques. One of the easiest techniques to use is progressive muscle relaxation, which involves systematically tightening and releasing sets of muscles, beginning with your toes and progressing up your legs, torso, hands, and arms. For other simple stress-relieving exercises you can do anywhere, see “Quick and easy relaxation techniques,” on the next page.

■ Write about your stress. Putting your feelings down on paper may help relieve stressful emotions by allowing you to gain some perspective. Some studies have found that writing about stressful experiences can reduce stress-related symptoms. For example, in a study published in *The Journal of the American Medical Association*, researchers asked 70 patients with asthma or rheumatoid arthritis to take 20 minutes a day over three consecutive days to write about their stressful experiences. Almost half of them showed improvement four months later. That was about twice as many as in a control group, where only 24% showed similar improvement.

3 Lighten your load
One of the main reasons for fatigue is overwork. Overwork can include professional, family, and social obligations. A good first step toward relieving overwork is to try to streamline your list of “must-do” activities. You don’t need to accept every social invitation, volunteer for every work assignment, or run the entire community fund-raiser yourself. Some people are overloaded because they have trouble saying “no.” If you already have more responsibilities than you can comfortably handle, don’t take on any more. Set your priorities in terms of the most important tasks. Pare down those that are less important.

Overwork that’s strictly job-related is particularly hard to control. If you work in a company or a profession where very long days are the norm, it may not be easy to lighten your load. Learn efficiency techniques that

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**7 steps to improved energy**

1. Set goals
2. Control stress
3. Lighten your load
4. Exercise regularly
5. Get a better night’s rest
6. Eat for energy
7. Connect with nature
let you meet your work goals without working harder or longer than necessary. Consider asking for extra staff or temporary assistance at work. Evaluate whether your current position is a good fit or whether a different job either within your company or elsewhere might make a difference.

Would a part-time position be an option, financially or professionally? If your doctor has determined that your heavy workload is the cause of your fatigue, he or she may be able to provide a letter to your supervisor explaining the diagnosis and making some recommendations.

4 Exercise regularly
It may sound strange, but in order to get more energy, you have to do the very thing you don’t feel you have enough energy to do: exercise. Regular exercise helps in several ways. For one thing, it almost guarantees that you will sleep more soundly (see “Get a

Quick and easy relaxation techniques

Recognizing and addressing the underlying causes of your worry is an important step toward alleviating it, but you can’t eliminate all sources of stress. Luckily, there are many relaxation techniques that serve as an antidote to stress. As your tension melts away, you may find that you feel more energetic.

Deep breathing (also called breath focus), meditation, progressive muscle relaxation, and visualization can evoke something called the relaxation response, which is a state of profound rest and release. These kinds of relaxation exercises trigger physiological changes, such as lowering blood pressure, slowing heartbeat and respiration, and reducing blood lactate levels, which may be linked with anxiety attacks. You can learn these techniques in mind/body programs or through books. Harvard Medical School’s Stress Management Special Health Report includes step-by-step instructions to help you master these techniques (to order, see the information at the back of this report). For the best results, practice one of these techniques for 10 to 20 minutes a day.

If you’re pressed for time, though, mini-relaxation exercises such as the ones described below can help you manage stress. The next time you’re stuck in traffic or faced with a situation that annoys you, one of the following quick relaxation techniques may help ease your day.

When you’ve got 1 minute
Place your hand just beneath your navel so you can feel the gentle rise and fall of your belly as you breathe. Breathe in slowly. Pause for a count of three. Breathe out. Pause for a count of three. Continue to breathe deeply for one minute, pausing for a count of three after each inhalation and exhalation.

Or alternatively, while sitting comfortably, take a few slow deep breaths and quietly repeat to yourself “I am” as you breathe in and “at peace” as you breathe out. Repeat slowly two or three times. Then feel your entire body relax into the support of the chair.

When you’ve got 3 minutes
While sitting down, take a break from whatever you’re doing and check your body for tension. Relax your facial muscles and allow your jaw to fall open slightly. Let your shoulders drop. Let your arms fall to your sides. Allow your hands to loosen so that there are spaces between your fingers. Uncross your legs or ankles. Feel your thighs sink into your chair, letting your legs fall comfortably apart. Feel your shins and calves become heavier and your feet grow roots into the floor. Now breathe in slowly and breathe out slowly. Each time you breathe out, try to relax even more.

When you’ve got 5 minutes
Try self-massage. A combination of strokes works well to relieve muscle tension. Try gentle chops with the edge of your hands or tapping with fingers or cupped palms. Put fingertip pressure on muscle knots. Knead across muscles, and try long, light, gliding strokes. You can apply these strokes to any part of the body that falls easily within your reach. For a short session like this, try focusing on your neck and head.

• Start by kneading the muscles at the back of your neck and shoulders. Make a loose fist and drum swiftly up and down the sides and back of your neck. Next, use your thumbs to work tiny circles around the base of your skull. Slowly massage the rest of your scalp with your fingertips. Then tap your fingers against your scalp, moving from the front to the back and then over the sides.

• Now massage your face. Make a series of tiny circles with your thumbs or fingertips. Pay particular attention to your temples, forehead, and jaw muscles. Use your middle fingers to massage the bridge of your nose and work outward over your eyebrows to your temples.

• Finally, close your eyes. Cup your hands loosely over your face and inhale and exhale easily for a short while.
better night’s sleep,” page 39).

Exercise also increases the body’s fuel-making capacity. When you use your muscles, more energy-producing mitochondria form in your muscle cells, and your cells have more energy to burn. Exercise creates more capillaries, the tiny blood vessels that ferry oxygen to your cells. And by making you breathe deeply and increasing your heart rate, it gets more oxygen circulating. Finally, when you work out, your body releases epinephrine and norepinephrine. In large amounts, these stress hormones cause the energy-draining fight-or-flight response, but in the modest amounts induced by exercise, they make you feel energized.

Studies have demonstrated that exercise can reduce fatigue in people who have chronic autoimmune conditions or cancer. A recent review of 36 studies on fatigue and chronic autoimmune conditions found that 30 to 60 minutes of aerobic exercise three times a week (for at least three months) significantly reduced fatigue in people with diseases such as multiple sclerosis, systemic lupus erythematosus, and rheumatoid arthritis. A similar review of 19 studies involving people ages 65 and older found that physical activity eased cancer-related fatigue.

You don’t have to run for miles or work out to the point of exhaustion to get these benefits. Certain people—particularly those with chronic fatigue syndrome, those who are elderly, or those who have long been couch potatoes—should start slowly and build gradually. Some evidence indicates, for example, that aerobic exercise can aggravate symptoms in some people with chronic fatigue syndrome. And older people who have been sedentary all their lives need to start building activity levels slowly to avoid injuries. However, don’t let these warnings stop you from getting started, since moderate exercise is generally safe for ev-

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**Getting ready to walk**

If you’re starting a walking program for the first time, you may find these tips helpful.

**Find a safe place to walk.** Options include quiet streets, trails in parks, athletic tracks at local schools, or a shopping mall.

**Invest in a good pair of shoes.** Shoes for walking should have thick, flexible soles that cushion your feet and elevate your heel a half to three-quarters of an inch above the sole. The upper portion of the shoe should be constructed of “breathable” materials such as nylon mesh or leather.

**Consider choosing a partner or a group to walk with.** Having company helps some people stay motivated. Depending on where and when you walk, it can also ensure your safety. However, if you use your exercise time as an opportunity for reflection, solitude may be more appealing.

**Wear clothes appropriate to the season.** Wear lighter clothes than you’d need if you were standing still; you’ll warm up as you exercise. Dress in layers so you can peel off garments if you get hot.

**Warm up and cool down.** Include five-minute warm-up and cool-down segments as part of your total walking time. A slow walk is a good warm-up and cool-down. Or you may want to stretch for your cool-down (but not as a warm-up, since you should only stretch muscles that have been adequately warmed up).

**Practice good walking technique:**

- Walk at a brisk, steady pace. Slow down if you’re too breathless to carry on a conversation.
- Hold your head up. Lift your chest and shoulders.
- Keep your back straight, and gently contract your stomach muscles.
- Point your toes straight ahead.
- Let your arms swing loosely at your sides. If you want to boost your speed, bend your elbows at a 90° angle and swing your hands from waist to chest height.
- Land on your heel and roll forward onto the ball of your foot, pushing off from your toes. Walking flat-footed or only on the ball of the foot may lead to soreness and fatigue.
- Take long, easy strides, but don’t strain. To go faster, take quick steps instead of long ones.
- Lean forward slightly when walking faster or going up or down hills.
A 7-step plan to jump-start your natural energy

How fast is brisk?

Since humans don’t come equipped with built-in speedometers, you need some way to measure your walking speed. One way is to count your steps per minute. Provided you’re walking on level ground, you can use the following as general guidance to gauge your pace:

- Slow = 80 steps per minute
- Moderate to brisk = 100 steps per minute
- Fast = 120 steps per minute
- Race walking = More than 120 steps per minute

Get a better night’s sleep

If you suffer from a disorder such as sleep apnea, you’ll need to see a doctor who specializes in sleep disorders. But most people with sleep problems such as insomnia don’t need to visit a sleep laboratory or specialized center. They can usually help themselves by changing their habits. Occasionally, medications can also be helpful.

Avoid smoking

Smoking harms your health in many ways, including siphoning off your energy by causing insomnia. Smoking can ruin your sleep with a kind of one-two punch. As a central nervous system stimulant, the nicotine in tobacco speeds the heart rate, raises blood pressure, and stimulates brain-wave activity associated with wakefulness, making it harder to fall asleep. What’s more, once you do fall asleep, its addictive power can kick in and awaken you with cravings.

People who quit smoking fall asleep more quickly and wake up less often during the night. Although at first many former smokers experience sleep disturbance and daytime fatigue, they often report improvements in their sleep quickly.

Exercise to improve sleep

Exercise is the only proven way to increase the amount of time you spend in deep sleep, the type of sleep that restores your energy. The more deep sleep you get, the less likely you are to awaken in the middle of the night, and the more rested you’ll feel the next day. In particular, aerobic exercise, which increases your heart rate, makes it easier to get to sleep. Doctors don’t know how regular exercise leads to more hours of deep sleep, but it does. However, for a few hours after vigorous exercise, a person feels stimulated. So, if you have sleep problems, it’s wisest to avoid vigorous exercise two to three hours before you go to bed.

Restrict your sleep

If you think you may be sleep-deprived, try getting less sleep.
That’s right: get less sleep, at least for a few days. This advice may sound odd, but the goal is to determine how much sleep you actually need and to reduce the time you spend in bed not sleeping. This process makes it easier to fall asleep and promotes more restful sleep in the long run. Here’s how to do it:

- Avoid napping during the day.
- The first night, go to bed later than normal and get just four hours of sleep.
- If you feel that you slept well during that four-hour period, add another 15 to 30 minutes of sleep the next night.
- As long as you’re sleeping soundly the entire time you’re in bed, slowly keep adding sleep on successive nights.

You can thus extend the time you spend in bed until you’re getting a full night’s sleep, ideally at least seven hours. Once you’ve done so, try to establish regular times for going to bed and getting up, seven days a week. Even though your schedule may be very different on the weekends, try not to vary your routine. If you get back to a solid seven hours of sleep on weeknights, you probably won’t have as much need to “sleep in” on the weekends.

**Recondition your sleep environment**

People who have difficulty sleeping often come to associate their bedroom with the frustration and anxiety of trying and failing to get to sleep. These associations create anxiety, worsening the insomnia. Reconditioning is a behavioral technique for breaking such negative associations. Here’s what to do:

- Use the bed only for sleeping or sex. Watch TV or read reports for work in a different room.
- Go to bed only when sleepy. If you’re unable to sleep, get up and go to another room. Stay up until you’re sleepy again, then go back to bed.
- If you don’t fall asleep quickly, repeat the process. In other words, don’t lie in bed tossing and turning and worrying about not sleeping. If you’re not likely to fall asleep, get up.

**Medications for sleep**

If these techniques don’t help, talk with your doctor about sleep medications. Although such medications can be helpful in the short term to break a pattern of insomnia, when used long-term, they may actually worsen your fatigue by leaving you groggy during the day.

Prescription sleep medications should be used cautiously because they can cause tolerance (the need for progressively larger doses over time to get the same effect). Over-the-counter sleep aids (which typically contain antihistamines)
are often ineffective and, in some people, cause irritability, but when used occasionally they may work well for some individuals.

- **Melatonin.** Each day, the body releases the hormone melatonin in response to darkness, causing drowsiness (see page 11). In the mid-1980s, researchers began investigating whether oral doses of melatonin might help people reset their biological clocks, but the results have been mixed, and the FDA hasn’t approved it as a treatment for insomnia. Over-the-counter melatonin supplements are not regulated by the FDA for purity and effectiveness.

- **Benzodiazepines.** These medications work by enhancing the activity of the inhibitory neurotransmitter GABA, which calms brain activity. Some examples include temazepam (Restoril), diazepam (Valium), lorazepam (Ativan), and triazolam (Halcion). While effective at helping people fall asleep and stay asleep, benzodiazepines have several limitations. They can lead to drowsiness and sedation the next day. People who use them regularly may develop a tolerance for them, and withdrawal can lead to muscle tension, restlessness, irritability, or—in rare cases—convulsions.

- **Imidazopyridines.** These drugs enhance the sleep-inducing activity of the neurotransmitter GABA. Examples include zolpidem (Ambien), zaleplon (Sonata), and eszopiclone (Lunesta). The most common side effects of the imidazopyridines are headache, dizziness, nausea, and grogginess.

- **Antidepressants.** When depression interferes with sleep, an antidepressant may improve both sleep and mood. If depression is not the problem, older antidepressant medications known as tricyclics are still sometimes used because these drugs reduce the length of time it takes to fall asleep and improve the continuity of sleep. Tricyclics such as amitriptyline (Elavil, Endep), desipramine (Norpramin), and nortriptyline (Pamelor) also increase pain tolerance and are useful in people who have trouble sleeping because of chronic pain.

### Eat for energy

The tried-and-true advice for healthful eating also applies to keeping your energy level high: eat a balanced diet that includes a variety of carbohydrates, proteins, and fats with an emphasis on vegetables, whole grains, and healthy oils. Taking a daily multivitamin will ensure that you get the vitamins and minerals you need, but taking extra amounts of individual nutrients won’t give you more energy.

In addition, eating certain types of foods in particular amounts can help prevent fatigue. Because different kinds of foods are converted to energy at different rates, some—such as candy and other simple sugars—can give you a quick lift, while others—such as whole grains and healthy unsaturated fats—supply the reserves you’ll need to draw on throughout the day.

### Eat small, frequent meals

Where energy is the issue, it’s better to eat small meals and snacks every few hours than three large meals a day. This approach can reduce your perception of fatigue because your brain, which has very few energy reserves of its own, needs a steady supply of nutrients. Some people begin feeling sluggish after just a few hours without food. But it doesn’t take much to feed your brain. A piece of fruit or a few nuts is adequate.

Smaller is especially better at lunch. Researchers have observed that the circadian rhythms of people who eat a lot at lunch typically show a more pronounced afternoon slump. The reasons for this are unclear, but may reflect the increase in blood sugar after eating, which is followed by a slump in energy later.

### Avoid crash diets

If you need to lose weight, do so gradually, without skimping on essential nutrients or starving yourself of the calories you need for energy. Poor nutrition and inadequate calorie intake can cause fatigue.

A sensible goal is to try to lose a half-pound to a pound per week. You can do this by cutting 250 to 500 calories a day from your diet, and exercising for 30 minutes on most days. Don’t cut your food intake below 1,200 calories a day (for
Do power bars pack an extra energy punch?

It’s impossible to walk into a drugstore or supermarket without seeing shelves lined with “power bars” that claim to boost your energy. The manufacturers of such products claim that they’re superior to candy bars because they contain an “ideal ratio” of simple to complex carbohydrates, along with protein and fat. However, there’s no proof that such an ideal ratio exists.

A recent Ohio State University study compared the glycemic index of typical energy bars with other sources of carbohydrates. The power bars were no better than a candy bar at providing sustained energy.

women) or 1,500 calories a day (for men), except under the supervision of a health professional. Eating too little can endanger your health, depriving you of needed nutrients.

You need to eat regularly throughout the day, even when you’re dieting. Your brain needs a steady supply of glucose from food. When the brain's glucose levels are low, some people feel hungry, fatigued, or both, which can then trigger a bout of overeating.

Use caffeine to your advantage

As a stimulant, caffeine can increase or decrease your energy level, depending on when and how much of it you consume.

Caffeine does help increase alertness, so having a cup of coffee in the morning can interfere with their sleep at night. If you’re such a person, it’s best to avoid caffeine entirely. Caffeine is mildly addictive, but moderate consumption hasn’t been linked to disease.

Limit alcohol

One of the best hedges against the midafternoon slump is to avoid drinking alcohol at lunch. The sedative effect of alcohol is especially strong at midday, when you normally feel a bit lethargic anyway.

Similarly, avoid the five o’clock cocktail if you want to have energy in the evening to pursue a hobby, spend time with your family, or finish that report for work the next day. If you’re going to drink, do so in moderation at a time when you don’t mind having your energy wind down.

Because alcohol can have a stimulating effect several hours after you drink it, many experts advise against having a nightcap just before going to bed: it may help you to fall asleep, but two to three hours later the stimulating effect may awaken you and make it difficult to get enough deep, restorative sleep for the rest of the night.

Drink water

What’s the only nutrient that has been shown to enhance performance for all but the most demanding endurance activities? It’s not some pricey sports drink. It’s water. Water is the main component of blood and is essential for carrying nutrients to the cells and taking away waste products. If your body is short on fluids, one of the first signs is a feeling of fatigue.

Sports drinks combine water with vitamins, minerals, and electrolytes—substances that help regulate body processes. But these extras won’t give you extra energy for ordinary, everyday activities. You don’t need them unless your workout is extremely strenuous or long or if you sweat profusely and lose nutrients through perspiration.

How much water do you need? Although individual needs vary, the general advice usually provided is to drink eight glasses of water per day. But your requirements vary with the temperature, your level of physical activity, and what other foods and beverages you consume. Fruits and vegetables, for example, are loaded with water and can help meet your daily requirement. But caffeinated beverages such as colas, iced tea, and coffee can sap water and minerals through excess urination. Alco-
hol has a similar effect. So if you consume caffeine or alcohol, it's a good idea to drink extra water.

To maintain your energy level during a workout, drink two 8-ounce glasses of water before you start and two more after you finish. If you'll be exercising continuously for longer than 30 minutes, drink small amounts every 15 to 30 minutes.

Watch your glycemic load
The glycemic index is a measure of how quickly the sugar derived from a particular food is absorbed into your bloodstream. Doctors originally developed the index to help people with diabetes avoid foods that rapidly increase blood sugar, but some experts think the index is also useful in maximizing your natural energy levels.

In general, high-carbohydrate foods have the highest glycemic indexes (see Table 2). Proteins and fats have glycemic indexes that are closer to zero. Foods with a high glycemic index can give a quick jolt of energy by increasing blood sugar. But the insulin pumped into the blood in response to this rise in blood sugar often leads to an equally sudden drop in blood sugar, leaving you hungry and, in many cases, feeling unfocused or foggy.

Eating foods with a low glycemic index—whose sugars are absorbed slowly—may help you avoid such a lag in energy. Foods with a low glycemic index include whole grains, high-fiber vegetables, nuts, and healthy oils such as olive oil.

7 Use nature’s energy
Anyone who enjoys the outdoors, whether for gardening, hiking, or taking walks along the beach, knows that getting outdoors can help restore body and soul. There aren’t any scientific studies documenting that communing with nature can actually fight fatigue, but scientists are beginning to explore this theory.

Some research suggests that being in nature can have therapeutic and restorative effects. This

<table>
<thead>
<tr>
<th>Table 2 Glycemic indexes of popular foods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
</tr>
<tr>
<td>Corn flakes</td>
</tr>
<tr>
<td>Donut</td>
</tr>
<tr>
<td>Bagel, plain</td>
</tr>
<tr>
<td>Ice cream</td>
</tr>
<tr>
<td>Cheese pizza</td>
</tr>
<tr>
<td>Oatmeal cookies</td>
</tr>
<tr>
<td>Banana</td>
</tr>
<tr>
<td>Chocolate</td>
</tr>
<tr>
<td>Apple</td>
</tr>
<tr>
<td>Yogurt, low-fat with fruit and sugar</td>
</tr>
<tr>
<td>Milk, skim</td>
</tr>
<tr>
<td>All-bran cereal</td>
</tr>
<tr>
<td>Kidney beans</td>
</tr>
<tr>
<td>Milk, whole</td>
</tr>
<tr>
<td>Yogurt, low-fat with artificial sweetener</td>
</tr>
</tbody>
</table>

Table adapted with permission: International Tables of Glycemic Index, Human Nutrition Unit, Department of Biochemistry, University of Sydney.
supports a theory developed by Harvard biologist Edward O. Wilson known as “biophilia,” which holds that humans have an innate connection to the natural world and to other living things, and that contact with nature can benefit your health.

Evolution may indeed have hard-wired us to prefer natural places. Common sense tells us that time spent hiking in the hills, walking in a beautiful garden, or bird watching can help a person feel restored. Hospitals and nursing homes widely employ the concept of “healing gardens” for their patients. If nothing else, getting outdoors can help reduce stress by taking your mind off troubling thoughts. And communing with nature often goes hand in hand with exercise, a known energy booster.
Vitamins, herbs, and supplements: Do the “energy boosters” work?

Go to the store, and you’ll see a multitude of vitamins, herbs, and other supplements touted as energy boosters. Some are even added to soft drinks and other foods for this purpose. Especially popular are supplements containing ginseng, guarana, blue-green algae, chromium picolinate, vitamin B₁₂, DHEA, and coenzyme Q₁₀. Even ephedra, which was banned by the FDA several years ago, remains available on the black market.

But there’s little or no scientific evidence to support the claims for most of these substances. The fact is, the only pill that’ll boost your energy is one containing a stimulant, such as caffeine, and the effects of these stimulants wear off within hours. The same holds true for drinks touted as energy boosters. Most contain a combination of vitamins, as much caffeine as a cup of coffee, and lots of sugar (see page 46).

It’s important to tell your doctor if you are taking any supplements. Some interact with other drugs. Supplements (including herbs, vitamins, and other substances) aren’t subject to quality control by the U.S. government. The FDA doesn’t regulate their content, purity, or effectiveness. It’s up to the individual manufacturers to police the purity and content of their own products. Here’s a look at some substances commonly touted as energy boosters.

- **Ginseng.** This relatively safe and popular herb is said to reduce fatigue and enhance stamina and endurance. Data from human studies are sparse and conflicting. Some studies report that ginseng improves mood, energy, and physical and intellectual performance. Other research concludes it doesn’t improve oxygen use or aerobic performance, or influence how quickly you bounce back after exercising.

- **Guarana.** This herb induces a feeling of energy because it’s a natural source of caffeine. But consuming a lot of guarana, especially if you also drink coffee and other caffeinated beverages, could ultimately lower your energy by interfering with sleep.

- **Blue-green algae.** This supplement is promoted as an energy booster, cancer cure, and weight-loss supplement, but there’s little or no evidence that it does any of these things. There is, however, growing evidence that supplements containing blue-green algae may contain harmful toxins. The evidence of toxic contamination is sufficient to recommend avoiding this substance.

- **Chromium picolinate.** This trace mineral is widely marketed to build muscle, burn fat, and increase energy and athletic performance, but research has not supported these claims.

- **Vitamin B₁₂.** Some people take vitamin B₁₂ by injection or pills as a way to get a quick energy burst, but most experts attribute any results to the placebo effect. Unless you have a B₁₂ deficiency, taking shots or supplements is unlikely to make much difference.

- **DHEA.** Sometimes marketed as a “fountain of youth,” this naturally occurring hormone is said to boost energy as well as prevent cancer, heart disease, and infectious disease—among other things. The truth is that DHEA has no proven benefits and some potentially serious health risks, such as lowering levels of healthy HDL cholesterol and increasing levels of testosterone, which can encourage acne and facial hair growth in women. Some research shows DHEA can damage the liver. Because this hormone is related to estrogen and testosterone, there is also concern that it may increase the risk for breast and prostate cancers. It’s wise to avoid taking DHEA until further research clarifies its side effects.

- **Coenzyme Q₁₀.** This enzyme is found in mitochondria, the energy factories of our cells. Supplements have been shown to improve exercise capacity in people with heart disease and may do the same in people with rare diseases that affect the mitochondria. However, there is no persuasive evidence that healthy people increase their energy by taking coenzyme Q₁₀.

- **Creatine.** Creatine is another compound produced by the body. The supplement is said to build muscle mass and increase energy levels, but research
findings have been mixed. The supplements do increase the amount of creatine in the muscles; however, while some studies find that this translates into enhanced athletic performance, others conclude that it doesn’t. It’s best to avoid creatine supplements because the benefits are questionable and the long-term effects are unknown. Some experts warn that long-term use could harm the kidneys.

- Ephedra. Although this product was banned by the FDA in 2004 because of major safety concerns, including increased risk of heart attack and stroke, it remains available for sale on the Web. Any effectiveness ephedra may have in terms of boosting energy probably results from two substances it contains—ephedrine and pseudoephedrine—which stimulate the brain. But because of health concerns, there is no safe amount of ephedra you can consume. If you want to boost your energy by stimulating your central nervous system, a cup of coffee or another caffeinated beverage will work just as well.

### Popularity of energy drinks soars, but experts warn against overindulging

Looking for energy from a bottle? You wouldn’t be alone. So-called energy drinks have become the fastest selling category in the beverage industry. Americans spent $744 million on these beverages from June 2006 to June 2007—a whopping 34% increase in spending over the previous year.

Energy drinks are quite popular among college students, young adults, and athletes in particular. And it’s no wonder. If you need a pick-me-up, you may be drawn to names that promise vigor, like Full Throttle, Amp, Rush, or the most popular, Red Bull.

But there’s really no magic formula here. What gives these drinks their jolt is good old-fashioned caffeine. Many contain about as much caffeine as one cup of coffee, along with loads of sugar. A 2007 Consumer Reports analysis, which tested 12 popular energy drinks, found that the amount of caffeine varied from 50 milligrams (mg) to 145 mg per cup (8 ounces). But the bulk of these drinks—nine of the 12— contained between 75 mg and 85 mg of caffeine per cup. As a point of comparison, the researchers reported that coffee has roughly 100 mg of caffeine per cup while 12 ounces of Coca-Cola has 35 mg.

Energy drinks also contain a mix of herbs and substances that are marketed as “energy boosters,” such as those discussed in the section above, which haven’t actually been proven to increase energy, unless they also contain caffeine.

Some medical experts are concerned that individuals, particularly young people, may steadily consume too many of these drinks—and that so much caffeine, a diuretic, can contribute to dehydration, particularly when mixed with alcohol, which is a popular trend.

A 2007 study raised a different concern. Researchers at Wayne State University found that blood pressure and heart rates increased in healthy adults who drank two cans a day of a popular energy drink that contained 80 mg of caffeine and 1,000 mg of taurine, an amino acid found in protein-rich food. Other studies have also found that caffeine and taurine impacted heart function and blood pressure.

Although the increases did not rise to dangerous levels in the volunteers who participated in the study, researchers warned that the increase could be significant in people with cardiovascular disease or those taking drugs to lower heart rate or blood pressure. They cautioned people who are at risk for heart disease to avoid energy drinks.
Resources

Organizations

Centers for Disease Control and Prevention (CDC)
1600 Clifton Road
Atlanta, GA 30333
800-311-3435 (toll-free)
www.cdc.gov/cfs

The portion of the CDC’s Web site devoted to chronic fatigue syndrome includes information about diagnosis and treatment, and finding support groups, updates on research, and summaries of peer-reviewed articles on chronic fatigue syndrome by experts in the field.

CFIDS Association of America
P.O. Box 220398
Charlotte, NC 28222
704-365-2343
www.cfids.org

This association offers information about symptoms, diagnosis, and therapies for chronic fatigue syndrome, as well as advice on insurance, workplace issues, and related legal matters. The Web site provides a reading list and a listing of support groups by state.

Depression and Bipolar Support Alliance
730 N. Franklin St., Suite 501
Chicago, IL 60610
800-826-3632 (toll-free)
www.dbsalliance.org

This nonprofit advocacy and support organization provides information about depression, publishes brochures and newsletters for patients, and provides referrals to local support groups.

Fibromyalgia Network
P.O. Box 31750
Tucson, AZ 85751
800-853-2929 (toll-free)
www.fmnetnews.com

This organization’s Web site offers free patient and health care provider brochures about fibromyalgia and related disorders such as chronic fatigue syndrome. Members receive a quarterly newsletter providing updates on research, medications, coping strategies, and support groups.

International Association for CFS/ME
27 N. Wacker Drive, Suite 416
Chicago, IL 60606
847-258-7248
www.iacfsme.org

This organization provides information about chronic fatigue syndrome, fibromyalgia, and other causes of persistent fatigue and pain. Information about scientific studies is available on the Web site.

Mental Health America
2000 N. Beauregard St., 6th Floor
Alexandria, VA 22311
800-969-6642 (toll-free)
www.nmha.org

This organization provides information on depression, including the latest research, as well as listings of local support groups and treatment providers.

National Chronic Fatigue Syndrome and Fibromyalgia Association
P.O. Box 18426
Kansas City, MO 64133
816-737-1343
www.ncfsfa.org

This nonprofit organization is dedicated to helping both patients and physicians deal with chronic fatigue syndrome and fibromyalgia. The Web site offers links to information about diagnosis, research, treatment, and support groups.

National Fibromyalgia Research Association
P.O. Box 500
Salem, OR 97308
503-315-7257
www.nfraf.org

This nonprofit organization provides information about fibromyalgia, including updates on scientific research, links to patient organizations, and suggested books and other resources.

National Sleep Foundation
1522 K St., NW, Suite 500
Washington, DC 20005
202-347-3471
www.sleepfoundation.org

This foundation conducts research on sleep and sleep disorders and provides information on a wide variety of sleep topics, including issues relating to menopause. The Web site features an interactive sleep diary, as well as links to sleep centers by state.

North American Menopause Society
P.O. Box 94527
Cleveland, OH 44101
440-442-7550
www.menopause.org

This scientific organization serves health care providers interested in educating laypeople about menopause. Available on the Web site are a comprehensive “Menopause Guidebook,” a reading list, links to additional resources, and listings of clinicians who focus on the care of menopausal women.

continued
Resources (continued)

Books
Chronic fatigue syndrome and fibromyalgia
Fibromyalgia: An Essential Guide for Patients and Their Families
Daniel J. Wallace, M.D., and Janice Brock Wallace
(Oxford University Press, 2003)
This book provides a concise guide, written in layman's language, to the symptoms and treatment of fibromyalgia. It includes practical advice about pain relief, medications, work, and disability programs.

Living Well with Chronic Fatigue Syndrome and Fibromyalgia: What Your Doctor Doesn't Tell You… That You Need to Know
Mary J. Shomon
(HarperCollins, 2004)
This reader-friendly book provides information on risk factors, symptoms, diagnosis, and treatment of both chronic fatigue syndrome and fibromyalgia. It discusses both medical and complementary therapies.

The Doctor’s Guide to Chronic Fatigue Syndrome: Understanding, Treating and Living with CFIDS
David S. Bell, M.D.
(Da Capo Press, 1995)
This well-written book by an expert on CFS covers a broad range of information, including causes of the illness, diagnosis, and treatment. While the information is somewhat dated, it provides a good overview of the field.

Eating for energy
Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating
Walter C. Willett, M.D., with P.J. Skerrett
(Free Press, 2005)
This book discusses how foods help prevent illnesses and possibly serve as a hedge against fatigue.

Menopause
Dr. Susan Love’s Menopause and Hormone Book: Making Informed Choices
Susan M. Love, M.D., and Karen Lindsey
(Three Rivers Press, 2003)
In this book, a well-known women’s health advocate and breast surgeon provides advice about how to manage symptoms and menopause-related health issues with traditional and alternative approaches.

The Wisdom of Menopause: Creating Physical and Emotional Health and Healing During the Change
Christiane Northrup, M.D.
(Bantam Books, 2006)
This book takes a holistic, positive approach to understanding and dealing with the changes that occur throughout the menopausal transition. Topics include diet and exercise, sexuality, sleep, depression, hormones, and bone and heart health.

Sleep
The Promise of Sleep: A Pioneer in Sleep Medicine Explores the Vital Connection Between Health, Happiness, and a Good Night’s Sleep
William C. Dement, M.D., Ph.D., and Christopher Vaughan
(Dell Books, 2000)
This book is written by a respected pioneer in sleep medicine. It includes information on common sleep disorders and their treatments, as well as tips for a “sleep-smart” lifestyle.

Special Health Reports
Improving Sleep: A Guide to a Good Night’s Rest
Lawrence Epstein, M.D., Medical Editor
(Harvard Health Publications, 2007)
An authoritative discussion of the complex factors that can interfere with a good night’s sleep and lead to daytime fatigue. Offers practical suggestions for improving sleep.

Understanding Depression
Michael Craig Miller, M.D., Medical Editor
(Harvard Health Publications, 2006)
This report provides comprehensive, in-depth information on one of the main causes of fatigue. It includes the latest findings on the underlying biology of depression and the most effective treatments.

Stress Management: Techniques for Preventing and Easing Stress
Herbert Benson, M.D., Medical Editor
(Harvard Health Publications, 2006)
This report teaches you how to identify triggers for stress and explains the ways in which stress affects your body. Better still, it provides step-by-step instructions for a variety of stress-control techniques, including meditation, progressive muscle relaxation, breathing exercises, cognitive restructuring, and guided imagery.

Exercise: A Program You Can Live With
L. Howard Hartley, M.D. and I-Min Lee, M.B., B.S., Sc.D, Medical Editors
(Harvard Health Publications, 2007)
Exercise: A Program You Can Live With is a step-by-step guide to starting and maintaining an exercise program that suits your abilities and lifestyle. You’ll find advice on being a savvy consumer when it comes to fitness products, as well as useful tools and tips designed to help make exercise work for you.
Boosting Your Energy

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adenosine triphosphate (ATP): The molecule that carries energy for all cells.

anemia: A decline in the number of red blood cells or the amount of hemoglobin in the blood, which lowers the oxygen-carrying capacity of the blood.

central (brain) fatigue: Feeling that encompasses a lack of concentration or alertness as well as a sense of lethargy and loss of motivation; involves the central nervous system.

chronic fatigue syndrome (CFS): A disorder characterized by at least six months of fatigue, together with impaired concentration or memory and other symptoms.

circadian cycle: The biological clock that regulates sleep and waking and that controls the daily ups and downs of physiologic patterns, including body temperature, blood pressure, and the release of hormones.

congestive heart failure: A disorder that occurs when the heart is unable to pump enough blood to meet the body’s needs. Insufficient blood flow can cause weakness and fatigue.

epinephrine: A hormone released by the adrenal glands in response to a stressful event. It speeds your heart and breathing, enabling you to respond quickly. Also called adrenaline.

fatigue: A decrease over time in the ability to perform a physical or mental task. It includes muscle fatigue as well as central fatigue, which originates in the central nervous system and influences the perception of fatigue.

fibromyalgia: A disorder characterized by pain and tenderness in muscles and joints, as well as by fatigue. Similar in many respects to chronic fatigue syndrome.

glucose: A simple sugar that circulates in the bloodstream and serves as a source of energy for cell metabolism. It’s formed mainly by the digestion of carbohydrates.

glycemic index: A measure of how quickly sugar derived from a particular food is absorbed into your bloodstream. High-carbohydrate foods typically have the highest glycemic indexes.

hormones: Chemicals, produced by glands, that are responsible for regulating a wide variety of physical functions. Many can influence energy level.

hypothalamus: The part of the brain that controls the autonomic nervous system and that regulates sleep, appetite, body temperature, and other biological states.

insomnia: The inability to fall asleep or remain asleep long enough to feel rested.

insulin: The hormone that carries glucose from the blood into the cells.

jet lag: The tired feeling you experience when traveling to a new time zone that occurs as your biological clock resets itself.

melatonin: A hormone that induces drowsiness, produced by the pineal gland as daylight turns to darkness.

mitochondria: Often called the body’s energy factories, these small, threadlike structures within the cell’s cytoplasm are where ATP, the energy molecule, is made.

multiple sclerosis (MS): An autoimmune disease in which the body’s immune system mistakenly attacks myelin, the substance that covers nerve fibers.

muscle fatigue: Weakness you feel in your muscles when you’ve tired them out.

myelin: A fatty material that surrounds and protects some types of nerve fibers.

neuromuscular junction: A tiny space between the end of a nerve and the surface of a muscle.

non-REM sleep: The type of sleep that includes deep sleep, the period considered most important for preventing daytime fatigue.

pineal gland: A gland located in the middle of the brain, between the brain’s two hemispheres, that produces melatonin in response to declining light.

rapid eye movement (REM) sleep: A period of intense brain activity during sleep, often associated with dreams; named for the rapid eye movements that occur during this time.

sleep apnea: A sleep disorder in which people repeatedly stop breathing momentarily during sleep at night. This often causes daytime drowsiness.

stimulant: A substance, such as caffeine, contained in some foods or beverages that speeds up chemical reactions inside cells and provides a boost of energy.

stress: An innate survival response in which certain hormones are released, increasing blood flow to the brain or heart. The stress response leads to an energy surge, enabling a person to flee dangerous situations. Ongoing stress, however, can sap energy and damage health.

sundowning: A group of behaviors, such as agitation, fatigue, and difficulty concentrating, that occur routinely around sunset in some older people.

suprachiasmatic nucleus: A small group of nerve cells, located in the hypothalamus, that controls the sleep/wake cycle.