

NIH News in Health

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Don't Just Sit There! Move for Your Health

Had an exhausting day? Think you deserve to kick back and relax? You might want to think again. If you're like most people nationwide, you've spent more than half of your waking hours sitting or inactive for long stretches of time—at work, at school, in the car or watching TV or another type of screen. Maybe it's time to try standing up instead of putting your feet up.

Scientists estimate that Americans ages 12 and up now spend most of their time—about 8 to 10 hours a day—sitting and doing things that require little energy. The groups who sit the most are teens and older adults.

What's so bad about sitting? Sedentary behavior—which usually means sitting or lying down while awake—has been linked to a shorter lifespan and a wide range of medical problems.

Studies have found that any time you get up and move, you're improving your chances for good health. "Some of us are sort of forced into sedentary lifestyles by our jobs, by school or by commuting," says Dr. Donna Spruijt-Metz, who studies childhood obesity at the University



of Southern California. "But research suggests that breaking up sedentary time with even short bouts of activity—like getting up from your desk and moving around—is associated with smaller waist circumference and other indicators of good health."

When you're upright and active, even briefly, your body is at work. "You're engaging a wide range of systems in your body when you move throughout your day," says Dr. Charles E. Matthews, who studies physical activity and cancer risk at NIH. "Your muscles are contracting, you're maintaining your balance, and you're resisting the force of gravity."

When you're sitting, Matthews says, "muscle contractions go way down, and your body's resistance to gravity decreases."

When you sit for long periods, your body adapts to the reduced physical demand and slows down its **metabolism**. When metabolism slows, you burn fewer calories and boost the chance that extra energy will be stored as fat.

The best way to raise your metabolism is simply by moving. The more you move, the better. A new study led by NIH's Dr. Steven Moore looked at data on more than 650,000 adults, mostly age 40 and older. The researchers found that leisure-time physical activity was linked to a longer life expectancy, regardless of how much people weighed.

"We found that even a low level of physical activity—equivalent to about 10 minutes a day of walking—was associated with a gain of almost 2 years in life expectancy. High levels of activity—equivalent to about 45 minutes a day of walking—were associated with a gain of 4 years or more," says Moore.

The outcomes weren't so positive for those who were both overweight and did no exercise. "People who were obese and inactive lost about 7 years of life compared to normal

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Definitions

Metabolism

Chemical changes within the body that create the energy and substances you need to grow, move and maintain your health.

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weight people who were active," Moore says.

The many benefits of moderate to vigorous activity have been much studied. Moderate to vigorous exercise gets your heart pumping and boosts blood levels of "good" cholesterol. Moving at moderate to vigorous intensity also strengthens your bones and muscles and lessens your risk for a wide range of health problems, including stroke, diabetes, certain types of cancer, osteoporosis and arthritis.

That's why the experts recommend that adults aim to exercise

at least 2 and a half hours a week at moderate intensity or 75 minutes a week at a vigorous level. You might exercise at moderate intensity for 30 minutes, 5 days a week, or try 45 to 60 minutes, 3 days a week. If your goal is to exercise for a half hour a day, you might break that up into shorter periods (of at least 10 minutes at a time) that add up to 30 minutes.

Although the benefits of intense activity are clear, less is known about the long-term impact of sedentary behavior. Since most people engage in a range of activities throughout each day, it can be challenging to tease apart the effects that sitting and non-exercise activity can have over time.

An NIH-funded study by Matthews and colleagues found that extended periods of sitting might take a toll on your lifespan even if you exercise. The decade-long study looked at more than 240,000 adults. "Even those who were exercising a lot—7 or more hours per week—had an elevated risk for death from all causes or from cardiovascular disease if they also watched a large amount of TV (more than 7 hours per day)," says Matthews. "It suggests that a substantial amount of exercise may not always protect against the adverse effects of prolonged sitting."

"Sedentary behavior is not simply the opposite of physical activity," says Dr. John Jakicic, who studies the biology of exercise at the University of Pittsburgh. "It's not as if you're either sitting and doing nothing or



Web Links

For more about sedentary behavior and your health, click the "Links" tab at: <http://newsinhealth.nih.gov/issue/Dec2012/Feature1>

you're physically active. There's a gray zone that includes light activity," such as standing up, casual walking or grocery shopping.

Scientists have had difficulty accurately monitoring how long and at what intensity people are actually moving each day. More than a decade ago, most studies of everyday activity relied on self-reports—like questionnaires or diaries of physical activity—which can be inaccurate.

Today, mobile technologies—such as smart phone apps and electronic activity monitors—are helping scientists gather better data. Study participants wear these small devices all day long. They provide data on what people are actually doing as they move throughout their day.

"Is it really the sedentary behavior that causes harm? Or is it the lack of physical activity at the right intensity that's the problem? I don't think we have the answers yet," says Jakicic. With the help of new technologies, Jakicic and others are working toward answers.

"Based on findings we've seen in several studies to date, I think it's a combination of lower levels of sedentary behavior and higher levels of activity that provide the most benefit," says Matthews.

"You can alter your routine just a little bit every day so you'll move more and sit less," says Spruijt-Metz. "Don't use the phone or email if you can take a walk and talk to someone in person. Get yourself a step-counter and try to get in 10,000 steps a day. There are many ways to add movement without going to the gym."

The bottom line is, look for opportunities to be active throughout your day. Get moving as much as you can! ■



Wise Choices Sit Less, Move More

- Take the stairs instead of the elevator. Park your car at the far end of the street or parking lot.
- Have "walking meetings" with colleagues at work.
- Rearrange your home so you can stand upright or walk on a treadmill while watching TV or using the computer.
- Set an alarm on your computer to go off every hour and prompt you to move around for a minute or 2.
- Try walking as if you're already late for the bus or an important meeting.
- Have small weights in your office or around your home for doing arm exercises.

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Counting Carbs?

Understanding Glycemic Index and Glycemic Load

You've probably heard of **glycemic index** and **glycemic load**. Some studies suggest that sticking to foods with a low glycemic index may help prevent diabetes, cardiovascular disease and cancer. Some claim it helps with weight loss. The truth is, we don't know all the answers yet. Here's what you need to know.

The glycemic index and load concern carbohydrates, or carbs—one of the main types of nutrients in our diets. Carbs with a simple chemical structure are called sugars. Sugars are found naturally in foods like fruits, vegetables and milk products. They're also added to many foods and drinks. Complex carbs, like starches and fiber, are found in whole-grain breads and cereals, starchy vegetables and legumes.

Your digestive system changes the carbs you eat into glucose, a type of sugar that your body uses for energy. Simple carbs are more quickly digested and absorbed than complex ones, so simple carbs can raise your blood glucose levels faster and higher.

People with diabetes need to manage their blood glucose levels. High blood glucose can damage tissues and organs. In time, it can lead to heart disease, blindness, kidney failure and other problems. If you have diabetes, controlling your blood glucose will prevent or delay these health complications. So it's important to understand how foods and drinks affect your blood sugar.



Definitions

Glycemic Index

Used to compare the quality of carbs. It shows how equal amounts of carbs in different foods raise blood sugar.

Glycemic Load

Used to compare how single servings of different foods affect blood sugar. It takes into account both the quality and quantity of carbs in a serving.

"The evidence seems to support the concept that the more complex carbohydrates will lead to better blood sugar control than the more simple sugars," says Dr. Myrlene Staten, an NIH diabetes expert.

Researchers developed the glycemic index to measure the quality of carbs in foods. It shows how the carbs in different foods raise blood sugar. White rice, for example, has a higher glycemic index than brown rice, which has more complex carbs.

But it's not just the types of carbs that matter. The more carbs you eat, the more your blood sugar rises. "The glycemic index really doesn't take into consideration how much you eat," explains Dr. Somdat Mahabir, who studies cancer risk at NIH.

That's why researchers came up with the concept of glycemic load. It captures both the types of carbs in a food and the amount of carbs in a serving. Essentially, it shows how a portion of food affects your blood sugar. Many things affect the glycemic load, including food processing, how ripe a fruit is, how a food is prepared and how long it's been stored.

Studies of people using these concepts to guide their diets have found mixed results. "There's evidence to



show that glycemic index and glycemic load are not associated with body weight," says Dr. Catherine Loria, an NIH expert on nutrition and heart health. "There's really not enough evidence to show if glycemic index is related to heart disease." A possible link to cancer is also being explored.

Glycemic index and glycemic load aren't things you'll see on a label, so they're not easy to use. But labels do show helpful information: calories, total carbohydrates, sugars and fiber.

"It makes sense for everybody, not only diabetics, to eat the more complex carbohydrates because they will be more gradually absorbed, and blood sugar highs and lows will be smaller," Staten says. Whole foods with complex carbs will give you more minerals and vitamins, too, and are usually good sources of fiber. ■



Wise Choices Choose More Complex Carbs

- Choose cereals high in fiber (5 or more grams per serving).
- Switch to whole grains. Look for whole-grain bread, whole-wheat pasta, brown or wild rice, barley, quinoa and bulgur.
- Eat more fresh fruits and vegetables and drink less juice.
- Don't forget legumes. Try different kinds of beans and lentils.
- Snack on fruit and small portions of nuts and seeds. Limit candy and other junk food.



Web Links

For more information about carbs and blood sugar, click the "Links" tab at: <http://newsinhealth.nih.gov/issue/Dec2012/Feature2>

Health Capsules

For links to more information, see these stories online:
<http://newsinhealth.nih.gov/issue/Dec2012/Capsule1>

Technique May Improve COPD Detection

An experimental method can distinguish between different types of chronic obstructive pulmonary disease (COPD) and track disease progression. The method may eventually lead to more accurate diagnoses and more effective treatments for COPD.

COPD is a lung disease that makes it hard to breathe. Airway tubes to the lungs narrow, making it hard to get air in and out. COPD is a major cause of disability. It's also the third leading cause of death nationwide.

COPD can involve damage to the small airways of the lungs, called functional small airways disease. It can also involve more extensive destruction of lung tissue, called emphysema. If doctors could diagnose the extent of lung damage, they could track COPD and personalize

treatments. An imaging technique called CT scanning can assess the extent of emphysema. But measuring functional small airways disease has remained a challenge.

To address this problem, NIH-funded researchers adapted an image analysis method called parametric response mapping (PRM). In PRM, a computer matches CT scans taken when a patient breathes in fully with scans taken when a patient breathes out fully. By comparing the two, a program can create 3-D maps of damage throughout the entire lung.

The scientists analyzed whole-lung CT scans of people with COPD acquired at both full inhalation and full exhalation. They found that PRM could successfully identify the extent of both functional small

airways disease and emphysema. The researchers then analyzed images from people who had undergone CT scanning over time. The analysis showed that PRM could be used to monitor COPD progression.

"We believe this offers a new path to more precise diagnosis and treatment planning and a useful tool for precisely assessing the impact of new medications and other treatments," says lead author Dr. Brian D. Ross of the University of Michigan. ■

Videos Highlight Behavior and Health

Behavior and social factors play key roles in illness and health. NIH has released new videos that highlight outstanding findings in behavioral and social science research.

"Understanding our behavior and making better decisions puts us in charge of our own health," says Dr. Robert Kaplan, director of NIH's Office of Behavioral and Social Sciences Research. "These short films highlight some of the benefits of behavioral and social science research—both for us as individuals and for society as a whole."

The videos, called Research Highlights, feature prominent

scientists describing their work. They focus on mindless eating, risk-taking related to substance abuse, diabetes management and the evolution of skin pigmentation. The videos are available at <http://obssr.od.nih.gov/video/> and on the NIH YouTube channel at <http://www.youtube.com/user/NIHOD>.

"There are personal take-aways in each of these films," Kaplan says, "but they also demonstrate both the excitement and reward of behavioral and social science research. I hope every viewer learns something useful. And I hope we're engaging the next generation of researchers to enter this dynamic and productive field." ■



Featured Website NIH Director's Blog

<http://directorsblog.nih.gov/>

In his new blog, NIH Director Dr. Francis Collins highlights discoveries in biology and medicine that are game changers, noteworthy or just plain cool. Depending on what's going on in the world of biomedical research, he may tell you about an interesting study in a journal, or share his thoughts about a news item or public health issue.

The screenshot shows the NIH Director's Blog interface. The main article is titled "Tracking a Deadly Virus" by Dr. Francis Collins, dated November 19th, 2012. The article text reads: "If you think that studying the deadly Ebola virus is all about donning a biohazard suit in a high-tech lab, think again. Check out these scientists from the National Institute of Allergy and Infectious Disease and their collaborators as they travel to a remote village in the Republic of the Congo to search for Ebola and other emerging viruses. Watch them set up camp in the jungle and take blood samples from animals that may harbor these viruses." Below the text is a video player with a play button and a thumbnail image of a forest scene. To the right of the video is a sidebar with a "Subscribe" button and a link to "About the NIH Director".

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