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FDITOR IN CHIEF Kristy Hammam

EDITORIAL DIRECTOR Colleen Paretty

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SENIOR MEDICAL EDITORS Hansa Bhargava, MD Arefa Cassoobhoy, MD,

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VICE PRESIDENT. PUBLISHER

Vanessa Cognard SALES OPERATIONS ANALYST

LaTeisha Clay

ADVERTISING SALES

NEW YORK Claudia Fern cfern@webmd.net 212-624-3728 Patria Rodriguez prodriguez@webmd.net 212-417-9542 WEST COAST

Nicole Jones njones@webmd.net 213-718-5550

SVP. CORPORATE Jeremy Schneider

DIRECTOR, POLICY & GOVERNANCE

Theresa Saladino

CHICAGO Tracy Kennedy tkennedy@webmd.net 312-758-6919

Anna Novinger

312-523-3171

anovinger@webmd.net

mxn

Accenture Interactive

PRESIDENT Georgine Anton CHIEF CLIENT OFFICER Tom Sebok

CHIEF CREATIVE OFFICER Roald van Wyk

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PROJECT MANAGER Kellie Kramer SENIOR MARKETING SERVICE MANAGER Annie Gormley

ACCOUNT EXECUTIVE Oscar Buitrago

Missy Bergwall

ASSISTANT ART DIRECTORS Amber Hanson, Jessica Johnson,

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ACCOUNT SUPERVISOR Wenona Williams-Fassinou

CREATIVE

GROUP DESIGN DIRECTOR

ASSOCIATE CREATIVE DIRECTOR Ioni Breese

Brittany Long

diabetes Wire



SHIFT YOUR FOCUS

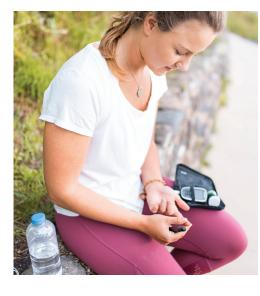
When you have type 2 diabetes, the fitter you are, the lower your risk of death. That's a big deal, since diabetes doubles death risk when comparing sedentary people with diabetes to those without it. Regular exercise chips away at that risk. But it can be hard to stay motivated. That could be because you're focusing on the wrong thing, new research says. Exercise alone is unlikely to lead to noticeable weight loss. But it will lead to lower blood sugar, lower blood pressure, and lower cholesterol. Keep your eye on those numbers instead. Source: European Journal of Preventive Cardiology

10.5% Percentage of Americans who have diabetes. That's up slightly from 9.9% in 2016. Source: America's Health Rankings

SENSITIVITY TRAINING For some people with type 2 diabetes, the body becomes resistant to insulinthe hormone that

processes sugar so the body can use it for energy. University of Texas is one of five sites to test a device in U.S. patients that could re-sensitize the body to insulin and stop or reverse type 2 diabetes without medication. The device removes a thin layer of the stomach's lining so that new cells grow, leading to corrections in hormones secreted during meals. The goal is that blood sugar will return to normal levels, without medication. after the procedure is complete.

> Source: University of Texas Health Science Center at Houston



GOOD TIMING

You know that exercise is important for your diabetes selfcare. When you exercise might matter, too. In an experiment, a small group of men ages 45 to 68 with type 2 diabetes worked out every morning for two weeks. Another group worked out every afternoon. Both groups then took two weeks off. then switched to the other workout schedule for two weeks.

For both groups, afternoon exercise lowered blood sugar while morning exercise raised it. The timing of exercise can affect blood sugar differently in different people. Consider checking your blood sugar after exercise to see which time is best for you. Note that this was a small study, and most people but not all were on medication and were only mildly overweight. Source: Diabetologia

Number of ER visits by people older than age 45 who have diabetes. Source: CDC WHAT'S YOUR SUBTYPE? Source: PLOS Medicine

150 Number of minutes of moderateintensity physical activity—such as brisk walking recommended for adults each week. Source: American Heart Association



Do you need a little extra help controlling your blood sugar? Fiber supplements may help. In multiple studies, researchers looked at 1,394 people with type 2 diabetes, an average dose of 13.1 grams of soluble fiber per day, in addition to usual care, had serious benefits. The supplements significantly lowered fasting blood sugar and improved the body's sensitivity to insulin-the hormone that breaks down the sugar in your blood. Ask your doctor before you try fiber supplements. They might interfere with some of your other medications. Source: Diabetes Care

diabetes Wire

Doctors rely a little on trial and error to find just the right medication for type 2 diabetes. New research may take the guesswork out of prescribing. When genetics experts studied the genes of people with type 2 diabetes, they found five different subtypes of the disease. In two subtypes, insulin-producing cells don't work properly to different degrees. In the other three subtypes, the body doesn't respond to insulin (which is insulin resistance), but for three different causes. The ability to identify the diabetes subtype could help doctors choose a medication that treats the root cause of the disease on the first try.

FIBER FOCUS



diabetes Wire



I5.2%

Percentage of people in West Virginia—the state with the highest rate—who have diabetes. In Utah, less than half that many—7.1%—have the condition. Source: America's Health Rankings/CDC

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REMISSION FACTS

In type 2 diabetes, some theories suggest that after insulin-producing cells stop working, they can never work again. New research challenges that idea. In a study, everyone with type 2 diabetes who stuck to a diet of 850 calories a day for one year lost about 22 pounds. Half of them went into remission. What set the remission group apart? They had diabetes for less than three years, and after they lost the weight, their insulin-producing cells started working again. For new diagnoses of type 2 diabetes, significant weight loss could be enough to reverse the disease. Source: *Cell Press*

diabetes 101

Plan Ahead

→ Search for the slideshow What Are the Complications of Diabetes? at WebMD.com.

Ask your doctor some key questions to help avoid serious complications BY BARBARA BRODY



You might have heard that type 2 diabetes is the "better" form of diabetes to have (compared to type 1), but that's not exactly right. While some people with type 2 can control the condition with oral medication and simple lifestyle tweaks, others require more intensive treatment. What's more, the long-term consequences of having type 2 can be very serious. The upshot: You have a lot of power to determine what your future with type 2 looks like.

"Keeping good control of your blood sugar really helps reduce your risk of complications," says Meg Crook, MD, an endocrinologist at the University of Virginia Health System. That means making the necessary changes to your medication regimen and lifestyle habits in order to keep your A1C down. You'll be much less likely to develop serious problems if you keep your A1C below 7%, but if you can get it below 6% that's even better, she says. You should also be sure you understand what the possible complications of the disease are so you can catch them right away if they do crop up. To that end, ask your doctor these questions.

Q. How can I make sure my feet stay healthy?

Chronically elevated blood sugar can cause nerve damage, often in the feet. That means you might not feel calluses and sores, which can become infected. Crook advises checking your feet regularly (perhaps before you put on your socks), as well as seeing your doctor once a year for a monofilament test to check your sensation.

Q. How will I know if I am developing kidney disease?

You might not know, because it rarely has noticeable symptoms in the beginning, says Crook. Your doctor should order a microalbumin test annually to check for protein in the urine that might indicate early kidney damage.

Q. Is it true that I have a higher-thanaverage risk of heart disease?

Absolutely, says Crook. "Someone who has diabetes has an equivalent risk of having a heart attack as someone who's already had a heart attack," she says. Diabetes and heart disease are closely linked.

Q. How often should I get my eyes checked?

See an ophthalmologist at least once a year for a complete exam so that you can be monitored for conditions including glaucoma, cataracts, and retinopathy (damage to blood vessels in the retina). "If you have branching blood vessels that are likely to bleed, [the doctor] can laser them to prevent that," says Crook.

Q. What other complications should be on my radar?

People with diabetes also face an elevated risk of gum disease, sexual problems, bladder issues, sleep apnea, dementia, and depression. They're more apt to develop certain types of cancer, too. But seeing your doctor regularly, taking your medication as prescribed, and maintaining a healthy lifestyle can make all the difference.

"Drink lots of water, no soda, eat plenty of vegetables, and stay as active as you can. Your goal should be about 150 minutes of moderate activity a week," says Crook. "I like to tell patients that what you do with your lifestyle has two to three times the impact of what a drug can do."

REVIEWED BY BRUNILDA NAZARIO, MD, WEBMD SENIOR MEDICAL EDITOR

fitness matters

Stay in Motion

EXPERT TIPS

Manage your workouts with these tips from fitness expert David Weingard.

Carry fast-acting

carbs. Have energy bars, electrolyte drinks, and glucose tabs to treat low blood sugar during or after exercise.

Pushing hard? Tap into your stash. Hypoglycemia is more common for workouts that are vigorous or last longer than an hour.

Drink up. Dehydration may cause your blood glucose to rise. Sip water before, during, and after workouts, especially in warmer weather.

Monitor your levels. Bring a meter and check your blood glucose regularly, especially if you're trying a new activity.

Test more often in water or cold air. If you're swimming or exercising in the cold, you may not notice lows as much, so test more frequently.

Search for the article What to Know Before You Exercise With Diabetes at WebMD.com. Give your motivation to exercise a boost with these tips BY KARA MAYER ROBINSON



You know exercise is great for managing diabetes, so you've made it a priority and settled into a groove. Congratulations! But what do you do when it feels like a drag? Conquer roadblocks and stay on course with these tips.

Just lace up

David Weingard, CEO of the diabetes coaching platform Fit4D, knows how it feels to want to bail on a workout. His trick: Simply lace up.

"Lots of days I wake up with a high blood sugar and just get myself out the door to exercise," he says. "By the time I get back, I've brought my blood sugar levels under control, and I'm mentally pumped up for the day."

Slip but don't slide

Expect days when you want to slack off. Highs and lows are normal. The trick is to accept them and get back on track tomorrow. Avoid the trap of focusing on negative thoughts. Tell yourself one down day is fine—if it doesn't become a string of them.

Have fun

If you dread exercising, you may be doing the wrong activity. Find something you like. Cardio choices go beyond running and spinning. Try swimming laps or loading your video console with dance games. Not a gym lover? Walk, bike, or run outdoors. Love walking but ditch your plans whenever it rains? Drive to the mall and do laps indoors.

Try zigzagging

Doing the same thing day after day can be a slog. Change your patterns and choices. Exercise indoors one day, outdoors the next. Push yourself extra hard today, go easier tomorrow. Do an elliptical workout one day, a Zumba class the next. Bonus: Switching it up works different muscles and prevents overuse injuries.

Join forces

"Having a good training partner will make workouts more fun and enjoyable," says Weingard. Recruit friends, family, or others in your community to exercise together. Join a group and sign up for regular workouts. Next time you go walking, invite a neighbor to tag along.

Log it

"Detailed record keeping is a key factor in realizing the benefits of exercise and minimizing blood sugar swings," says Weingard. Start a fitness journal. Record when and how much you exercise, your blood sugar levels, and how exercise impacts them. Look for patterns and find what works best for you. Maybe you do better in the morning but not so great at night. Maybe you stick with certain workouts but not others.

Time travel

Remember how amazing you'll feel when your workout's in the bag. You'll carry a sense of accomplishment and pride with you all day—and keep your glucose in check.

If that doesn't work, says Weingard, envision tomorrow: "Hang in there on the tough days. Easier moments are right around the corner."

REVIEWED BY MICHAEL W. SMITH, MD, CPT, WEBMD CHIEF MEDICAL EDITOR

GETTY IMAGES

body shop

Save Your Skin

Diabetes can turn simple skin issues into serious problems. Learn how to keep it healthy.

BY AMANDA GARDNER

As Karen Murphy struggled to lift a heavy wooden desk out of her car one fall afternoon, the desk did exactly what she had hoped it wouldn't: It crash landed on her big toe. The injury wouldn't have been good for anyone. But for Murphy, a nurse who had been diagnosed with type 2 diabetes just three months before, the stakes were even higher.

People with diabetes are prone to skin problems. Cuts, scrapes, and common infections like athlete's foot can explode into serious issues. "Often, it's a double whammy," says Erin Kelly, a diabetes nurse educator at the Joslin Diabetes Center in Boston. Along with a higher chance of skin issues, diabetes can cause nerve damage, called neuropathy. So people may not feel anything when something is wrong with their skin. They may also have circulation problems, meaning blood can't get healing nutrients to the area.

Murphy's doctors had already stressed the importance of skin care. That spurred her to see one right away. "In the past I put things off. I thought, *It's not a big deal until it turns into a big deal*," she says. "But if something ever happens with my skin or wounds or feet now, it is a big deal."

Murphy had no lasting damage from her accident and makes sure to take care of her skin every day. Here's what you can do to prevent damage from diabetes.

Moisturize

If you have diabetes, you're more likely to get dry skin. This can lead to cuts and cracks, which can let bacteria inside and cause infections. Moisturizing is an easy way to prevent this. There's no hard-and-fast rule for how often to do it, although putting cream or lotion on your whole body after a shower is a good start. "Your skin is more willing because more pores are open," Kelly says.

You don't need any special products for diabetes, but do try to keep it simple. "Stay away from products that have ... a lot of chemicals in them," Kelly says. They can dry your skin even more. Instead, go for hypoallergenic products.

REVIEWED BY NEHA PATHAK, MD, WEBMD MEDICAL EDITOR



Pay attention to your feet

"The first place you find neuropathy are the feet and hands because those are the extremities of the body," says Sandra Barnaby, a chronic disease nurse manager at Montefiore Care Management Organization in New York City. So be sure to check them every day for sores, blisters, or cuts. That way, you can treat them before they get worse.

Make sure the spaces between your toes are dry, especially after a shower and before you put on socks (which should also be dry). Don't moisturize between your toes. "Any moisture is a hot spot for bacteria growth and infection," Kelly says.

You should also keep dry other places where water can gather, like between and under your breasts, between your legs, and under your arms.

Take care of your nails and cuticles

Include them in your daily moisturizing routine and keep your nails straight and smooth so they can't catch on anything and tear. Never cut your cuticles. It could leave space for fungus and bacteria to invade. And resist the temptation to get a pedicure. "That can be tricky if you have neuropathy," Kelly says. "You really should avoid getting treatment from anyone other than a podiatrist because of the risk of infection."

Avoid hot water

Hot water may dry out your skin. But if you have neuropathy, you also may not be able to feel how hot it is and burn yourself. "You should never put your hands or feet directly into the water without checking another body part or having another person check," Kelly says. "And one shower a day is sufficient."

Use sunscreen

Sunburns can also dry your skin. That's why you should always use sunscreen, especially on your head, neck, and hands. Choose a broad-spectrum formula (which protects against UVA and UVB rays) with an SPF of 30 or higher.



Hansa Bhargava, MD, WebMD Senior Medical Editor

RECIPES BY Kathleen Zelman, MPH, RD, LD

PHOTOGRAPHY BY Rick Lozier FOOD STYLING BY Charlie Worthington

AS TEMPERATURES RISE, SIMPLIFY SUMMER SUPPERS USING FOIL PACKETS. THIS VERSATILE **TECHNIQUE ALLOWS YOU TO COMBINE** YOUR FAVORITE VEGGIES AND PROTEINS ON THE GRILL WITH DELICIOUS RESULTS.



116-ounce can low-sodium	21
black beans, rinsed and drained	1t
1 large <u>tomato</u> , chopped	1t
1 cup <u>fresh corn</u> ,	1t
cut from the cob	41
1 red sweet pepper, finely chopped	1⁄4
8 green onions,	Fr
thinly sliced	11
Asmall jalapeño, minced (optional)	1/4
2 tbsp <u>lime juice</u>	
4	

Preheat grill to medium-high heat. In a medium bowl, combine beans, tomato, corn, red pepper, green onions, and jalapeño, if using; set aside. In a small bowl, whisk together lime juice, vinegar, olive oil, cumin, and garlic.

On each piece of foil, place one piece of fish. Sprinkle with salt and black pepper. Top with one-fourth of the bean mixture and dressing mixture. Fold the packet as directed to close. above.

Grill, covered, over medium-high heat for 15 minutes, or until the fish is cooked through. Serve with fresh lime and cilantro.

Summer 2019

PACKET PRIMER

For each packet, tear off a 12×18" sheet of heavy-duty foil and place on a fla surface. Arrange ingredients in the center of the foil. Bring up the short end of the foil and seal with a double fold, leaving space in the packet for expansio (it will be hot!),

2 tbsp balsamic vinegar tbsp extra-virgin olive oi tsp <u>cumin</u> tsp minced garlic 6-ounce tilapia filets tsp <u>sea salt</u> reshly ground pepper, to taste lime, quartered

cup coarsely chopped fresh cilantro

PER SERVING:

288 calories, 45 g protein, 388 carbohydrate, 8 g fat (2 g saturated fat), 84 mg cholesterol, 11 g fiber, 6 g sugar, 246 mg sodium. Calories from fat: 17%

FIVE SPICE ASIAN Topu

Foil packets are always flexible, as this recipe demonstrates: If you're not fond of tofu, use chicken or firm fish instead. This one calls for five spice powderavailable in the spice section of large supermarkets-and miso, a flavorful paste found in the refrigerated section. It also includes daikon radish, a crisp, mild vegetable popular in Japanese cuisine. If you can't find it, try chopped turnip or red radish instead. **SERVES 4**

Preheat grill to medium-high heat. In a medium bowl, whisk together olive oil, vinegar, soy sauce, ginger, miso, five spice powder, and honey; add tofu and toss to coat. In another bowl, toss radish, yellow pepper, carrots, leek, and snow peas.

On each piece of foil, place one-fourth of the tofu. Top with onefourth of the vegetables and any remaining dressing. Fold the packets as directed to close, page 11.

Grill, covered, over medium-high heat for 5 to 10 minutes or until vegetables are crisptender. Carefully open packets, garnish with peanuts, and serve.

PER SERVING

2 tbsp extra-virgin olive oil 1 tbsp rice vinegar 1 tbsp low-sodium soy sauce 1 tbsp grated fresh ginger 1 tbsp miso 1 tsp five spice powder 1 tsp honey 116-ounce package firm tofu, drained, patted dry, and cubed daikon radish, peeled and julienned yellow sweet pepper cut into thin strips 1 cup shredded carrots 1 leek, white part only, sliced into rings 16 snow peas, cut into thin strips 2 tbsp chopped, unsalted roasted peanuts



2 tbsp finely chopped sun-dried tomatoes 4 tbsp chopped fresh basil, divided 2 cups riced cauliflower (about one small head) 1 large lemon, thinly sliced 1 small red onion, thinly sliced 12 stalks Broccolini, coarsely chopped

8 skinless, boneless chicken thighs 1 tbsp extra-virgin <u>olive oil</u> 2 tsp lemon zest 1 tbsp fresh lemon juice 1 tsp turmeric 1/4 tsp sea salt Freshly ground pepper, to taste



TURMERIC LEMON BHICKEN

The sunny color of this chicken comes from turmeric, a root popular in Indian cooking. To make the cauliflower "rice" in this recipe, use a food processor (or box grater) to cut cauliflower into tiny pieces. (Some supermarkets sell cauliflower rice in the freezer section, which can save a step as you prep.) The recipe calls for chicken thighs, but you can use boneless, skinless chicken breasts instead. SERVES 4

Preheat grill to medium-high heat. In a small bowl, mix sun-dried tomatoes and 2 tbsp basil with the cauliflower rice.

chicken thighs.

In a small bowl, whisk together oil, lemon zest, lemon juice, and

PER SERVING:

On each piece of foil, place one-fourth of the cauliflower mixture and top with lemon slices, red onion, Broccolini, and

turmeric. Drizzle evenly over the four packets, sprinkle each with salt and pepper, and fold the packet as directed to close, page 11.

Grill, covered, over medium-high heat for 15 to 20 minutes or until an instant-read thermometer inserted into the chicken reaches 165°F. Open packets carefully.

Garnish with remaining 2 tbsp basil and serve.

HACKS

Cookouts with family and friends are a highlight of the summer—and a common time to take a vacation from healthy habits. Registered dietitian Cheryl Reitz, certified diabetes educator at the Cleveland Clinic, suggests these fresh, tasty alternatives to standard cookout fare and offers a few ways to keep yourself on track during summer festivities.



MAKE IT MAYO-FREE

Mayonnaise is loaded with fat and calories, so look for alternatives to the creamy stuff. For example, Reitz tosses coleslaws with vinegar-based dressings. She also makes a low-carb version of potato salad by substituting lightly steamed cauliflower for potatoes and coating the florets in a sauce made with ½ cup protein-rich plain Greek yogurt, 1 tablespoon mustard, 1 tablespoon pickle relish, and ½ teaspoon celery salt.

ADD AVOCADO

For a simple but satisfying salad, Reitz cubes ripe avocado—a source of heart-healthy monounsaturated fats—and tosses it with chopped fresh tomato, green onions, lime juice, and olive oil.

BUILD BETTER BURGERS

Reitz makes lean burgers with ground turkey or chicken, adding her own spice mixes. One of her favorite combos is ground fennel, a little salt, black pepper, cayenne pepper, and sage. She sprays the grill rack with olive oil to prevent the burgers from sticking. She also pops some of the patties in the freezer to have on hand for quick weeknight grilling.



CELEBREIE SUMMER FRUITS

In place of cookies and other treats, Reitz makes a sweet salad with seasonal fruits such as melons and berries tossed with fresh mint and lemon zest.

View the slideshow Easy, Tasty Grilled Foods for Dinner Tonight at WebMD.com.

FIRE UP THE SLOW COOKER

In place of fatty grill fare, Reitz makes pulled pork in the slow cooker using a lean pork roast or pork chops trimmed of visible fat. She simmers them in 2 cups low-sodium beef broth, 1/4 cup black coffee, and 1 teaspoon of minced garlic. (Really!) "The coffee tenderizes the meat, and it basically falls apart," Reitz says. After shredding the cooked meat, she tosses it with a little barbecue sauce (she likes sugar-free varieties) and serves the pork on whole-grain buns.

USE YOUR PLATE STRATEGICALLY

"It can be hard to gauge what we eat during a social event like a cookout," Reitz says. She recommends using a smaller, dessert-size plate, given the common urge to fill it up. Each time you put food on the plate, pause and make a mental note of what you're about to eat. And use the plate method as you make food choices, Reitz says. Fill half your plate with non-starchy vegetables, onefourth with a protein such as chicken, and the other fourth with fruit or other veggies such as potatoes and corn.

FOCUS ON THE COMPANY

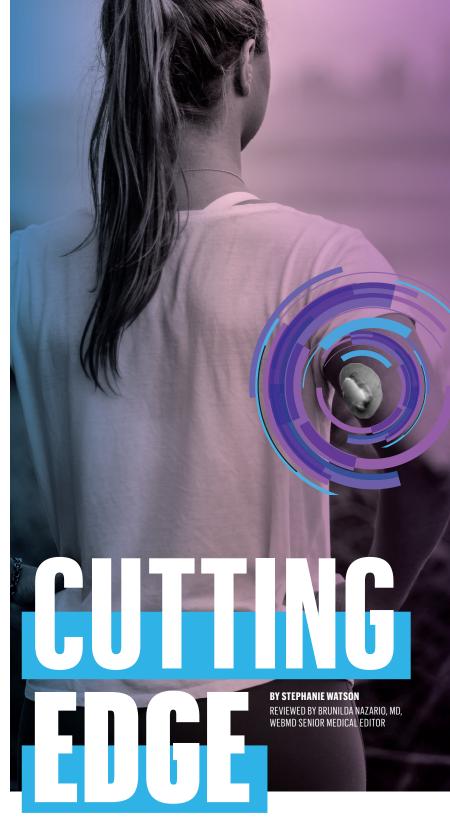
"The most important reason we're at an event like a cookout is to enjoy the company of others," Reitz says. "I often tell people to focus on enjoying the socializing and the opportunity to be together, rather than focusing on the food."

GO FOR LEAFY GREENS

ONE OF REITZ'S FAVORITE SUMMER SALADS—DRESSED IN FRESH LEMON JUICE AND OLIVE OIL—INCLUDES PEPPERY ARUGULA, A CUP OF CUBED WATERMELON, AND A SPRINKLE OF REDUCED-FAT FETA.



For a twist on the usual pasta salads. use a spiralizer tool to make noodles from zucchini, a plentiful summer vegetable. (You can also find pre-made zucchini noodles in your supermarket freezer section.) Reitz adds "zoodles" to chopped tomatoes, peppers, and onions and tosses with a light dressing.



TECHNOLOGY HAS TRANSFORMED HOW WE COMMUNICATE, WORK, AND SHOP. NOW IT'S CHANGING THE WAY WE MANAGE DIABETES.

Sign up for the **Diabetes Newsletter** at WebMD.com.

Innovative devices have automated and streamlined much of the work that goes into diabetes management. Here are just a few of the new gadgets that have made life easier for people with type 1 and type 2 diabetes.

STICK-FREE GLUCOSE MONITORING

Frequent needle sticks are a ritual of life with diabetes. Blood sugar testingoften using a blood sample taken from your finger-is a critical part of diabetes management. It helps you make decisions about the foods you eat, how you exercise, and how much medicine you take. You may need to stick your finger several times a day.

Continuous glucose monitoring, or CGM, helps you avoid the stick. It measures your blood sugar every few minutes via a tiny sensor inserted under your skin and can send the results wirelessly to a pump, smartphone, or other device.

The Freestyle Libre was the first continuous glucose monitoring system to not require a fingerstick. To get your blood sugar number, you simply wave a reader over the sensor. The original Freestyle Libre, approved in 2017, was wearable for up to 10 days, but a new version accommodates 14-day wear. "The longer you can keep something in your body and not have to change it is a good thing," says Deborah Greenwood, PhD, RN, a certified diabetes educator and diabetes care consultant at Deborah Greenwood Consulting in Sacramento, California.

In March 2018, the FDA approved the Dexcom G6-a quarter-size device that continuously monitors your blood sugar level and sounds an alarm if it rises or falls too much. The newest Dexcom incarnation is the first device to be approved as both a standalone continuous glucose monitor and for integration with automated insulin dosing systems. It doesn't need to be calibrated with a fingerstick, which makes it easier to use, Greenwood says.

IMPLANTABLE SENSOR

One new CGM system essentially lets you forget about the sensor for three months at a time. After the Eversense CGM sensor is implanted under your skin, it continues to monitor your blood sugar every five minutes for the next 90 days. The sensor works by generating a light signal in response to the amount of glucose in your interstitial fluid-the fluid just under your skin. That light signal is converted into a blood sugar reading, which is transmitted wirelessly to a compatible mobile device.

The advantage of a long-term wear sensor is that you don't have to re-stick yourself every couple of weeks. Once your qualified healthcare provider implants the device, the sensor stays under your skin. However, long-term wear could also be a disadvantage. "Some people think that's really exciting and other people say, 'No way," Greenwood says.

NON-INVASIVE MONITORING

The ultimate aim is to create a CGM device that monitors blood sugar continuously without sticking anything under your skin. The UK-based company Nemaura is trying to achieve that goal with its SugarBEAT CGM, which it plans to submit to the FDA for approval this year. The device uses a sticky skin patch to painlessly pull a small amount of glucose from the interstitial fluid. In early study results, SugarBEAT wasn't quite as accurate as CGM systems from Dexcom and other companies.

Greenwood is cautious about SugarBEAT and other non-invasive CGM products in development, some of which she says have oversold their capabilities. "People get excited, and the products turn out not to be what anyone thinks," she says. Whether SugarBEAT lives up to its claims remains to be seen.

LOW BLOOD SUGAR PREVENTION

Diabetes treatments are designed to lower high blood sugar, but taking too much insulin or other medicines can cause a big plunge. Low blood sugar makes you feel shaky, tired, sweaty, and pale. A precipitous drop could be life-threatening.

Tandem's t:slim X2 Insulin Pump with Basal-IQ Technology predicts

"THE ULTIMATE GOAL IS [THAT] THEY CAN JUST LIVE THEIR LIFE AND NOT CONSTANTLY BE THINKING ABOUT DIABETES."

whether your blood sugar levels are going to drop and stops insulin delivery when it senses an impending fall. This helps prevent the up-and-down swings that can plague people with diabetes. "One of the big benefits of these newer systems is the quality of life," Greenwood says. "When people don't have swings, they feel better."

AUTOMATED INSULIN DELIVERY

Insulin is a mainstay of therapy for

people with type 1 diabetes, and one way to deliver it is through a pump. Pumps are programmed to release a continuous dose of insulin (basal insulin) throughout the day. Users can also release insulin manually (a bolus dose) to adjust for the carbohydrates in their meals and snacks The future of insulin pumps is an automated, closed-loop system—also called an artificial pancreas because it acts more like your real organ. In this system, a CGM constantly checks your blood sugar level. The pump would then use an algorithm to determine how much insulin you need to lower your blood sugar to a target range or deliver glucagon (a hormone that releases sugar from your liver) to raise your blood sugar. It would automatically deliver the correct dose to keep your blood sugar steady day and night. "The ultimate goal is to take away the decision-making from people with diabetes, so they can just live their life and not constantly be thinking about

diabetes," Greenwood says.

Manufacturers haven't achieved a true closed-loop system yet, but they're close. The Medtronic MiniMed 670G was the first hybrid closed-loop system meaning that it continuously monitors blood sugar levels and automatically delivers insulin, but you still have to input the bolus insulin dose based on

what you eat.

True closed-loop systems that deliver both insulin and glucagon are in development. The trouble has been finding a form of glucagon that's stable enough to work in the pump. Beta Bionics is developing an iLet Bionic Pancreas System with insulin/glucagon, which it plans to test in clinical trials by late 2019/early 2020. The company will seek FDA approval for an insulin-only version later this year.

"Right now, the way the artificial pumps are working, they can predict when your blood sugar is going to go low or high, but when you do go low, they can't give you the glucagon to raise you back up. That's what this pump is trying to do," Greenwood says. "Once you have a dual-hormone system, that's getting closer to the real closed loop."

SMART PENS

Pumps record your blood sugar levels and insulin doses over time as they deliver insulin, but some people get tired of being connected to a pump, Greenwood says. The solution is a smart pen, which offers all the memory capability of a pump, without tethering you to your device.

Smart pens like InPen and Gocap connect via Bluetooth to a smartphone app that keeps track of your insulin dose and timing. InPen also helps you calculate the right dose. You can then share your dosing history with your doctor.

A new reusable insulin pen, called NovoPen Echo Plus, is on the way later this year. It will be able to store and download your last 800 injections (about 3 months' worth) to another device and display the most recent dose on the cap. The data will connect with several diabetes monitoring systems, including Dexcom and Glooko to help you better manage your diabetes.



Fasting 101 Ask your doctor if alternating eating and not eating could work for you BY STEPHANIE WATSON

The route to weight loss has traditionally been to cut calories. Swap that regular soda for diet, grab an apple instead of a cookie. You'll trim pounds, the idea goes. But instead of going for such calorie cuts, many people now take more intense steps to lower their average daily calorie counts.

Called intermittent fasting, this way to diet takes a different approach. Rather than change how much you eat, you change when you eat. "Intermittent fasting is loosely defined as periods of non-eating, followed by periods of eating," says Krista Varady, PhD, an associate professor of nutrition in the department of kinesiology and nutrition at the University of Illinois at Chicago.

The origins of fasting are rooted in religion. Several faiths, including Islam, Judaism, and Christianity, observe periods of food restriction for spiritual reasons. Somewhere along the line, researchers discovered that skipping meals may also have a few health benefits, including weight loss and lowered blood pressure and cholesterol.

HOW DOES IT WORK?

Normally after you eat, your pancreas releases the hormone insulin. That burst of insulin helps move sugar from your bloodstream into your cells to be used for energy.

Whatever sugar is leftover goes into your muscles or is metabolized and stored in fat cells as triglycerides. When fasting, your insulin levels drop and your body burns stored fat for energy.

TYPES OF INTERMITTENT FASTING

You can fast in a few different ways. Some methods are more extreme than others:

- Alternate-day fasting is the most intense version. You eat nothing and drink only water or calorie-free beverages one day, and then you basically eat what you want the next day.
- Modified alternate-day fasting switches between one low-calorie day (about 500 calories) and one day of normal eating.
- The 5:2 diet (also called the Fast Diet) involves eating normally five days a week, and then cutting down to about

500 calories on the two other days.

- The fasting-mimicking diet has you eat a very low-calorie diet for just a few days and then go back to a normal diet. It offers many of the benefits of fasting without the time investment.
- Time-restricted feeding focuses on the timing of your meals. You eat only within a certain time window each day-for example, from 10 a.m. to 6 p.m. Then you fast for the rest of the day.

CAN IT HELP ME LOSE WEIGHT?

Some evidence suggests that alternating fasts with periods of eating helps you lose weight, but not much more than you would by cutting calories.

Varady did a study comparing the effects of alternate-day fasting with calorie restriction in 100 obese adults. After one year, people on the alternate-day fast had lost about 6% of their body weight. The calorierestriction group had lost a little less weight, about 5.3%.

OTHER ADVANTAGES TO FASTING

Intermittent fasting has a few other benefits beyond weight loss. After you eat, your body is tied up with the digestion process. Taking a break from food shifts the focus to other areas, like maintaining optimal performance and repairing cell damage. "It gives our bodies time to heal, because they're not constantly dealing with the influx of nutrients," Varady says.

And that's good for your health in general. Early research finds intermittent fasting could help ease things that could harm your heart, like high blood pressure, blood sugar, and cholesterolsometimes significantly.

Courtney Peterson, PhD, an assistant professor in the University of Alabama's department of nutrition sciences, studies the effects of intermittent fasting on conditions like diabetes, blood pressure, and heart disease. She says some of her study subjects had their blood pressure drop 10 to 11 points from the practice: "That's a huge effect. It's about equivalent to a blood pressure-lowering medicine."

Most of the health benefits from fasting are likely due to weight loss, and some people with type 2 diabetes could also benefit, she says. "There is research that suggests that intermittent fasting improves blood sugar levels in people with type 2 diabetes," Peterson adds. "However, they need to be more careful about blood sugar drops. Episodes of hypoglycemia [too low blood sugar] are more common than usual."

Intermittent fasting might also slow the aging process and improve longevity, but so far, the only evidence of this is from studies of mice, worms, and other animals. "We're still in the early phases of doing intermittent fasting research in humans," Peterson says. "There probably will eventually be a study in older adults to see whether it can slow some indicators of aging, such as the loss of muscle mass."

HOW TO GET STARTED

Intermittent fasting can take some adjustment. "It takes your body a little while to get used to that up-down pattern of eating," Varady says. You're

likely to be hungry at first. But after about two weeks, most people get used to the routine.

In time, fasting could actually help control your hunger. "It may be because your blood sugar levels are more stabilized throughout the day," Peterson says. And time-restricted feeding causes less hunger than alternate-day fasting, which could make it more sustainable long-term, she says.

One way to avoid hunger during your fast is to drink more water. Extra fluids will also help prevent the headaches some people get when they don't eat. You might also need to change what you eat. Get more protein from sources like lean poultry, tofu, beans, and nuts. "That helps keep your muscle mass up, because you can lose muscle mass while fasting," Varady says. It also helps you feel full longer.

Although many of these diets let you eat what you want during your feast days, don't go wild and binge. You'll get the best results if you eat healthy every day.

WHO SHOULDN'T FAST?

Intermittent fasting is safe for some healthy people. Any side effects are usually mild, like constipation and bad breath. Drinking more water can help with both issues.

Certain groups of people shouldn't fast, though, including women who are pregnant or breastfeeding. Fasting is also not recommended for some people with diabetes, because it can lower your blood sugar to dangerous levels. Definitely consult your doctor before trying it. And avoid fasting if you're recovering from an illness or being treated for cancer and you need to maintain or gain weight, Peterson says.

This style of eating isn't a good fit for everyone. Varady doesn't recommend it for people with binge eating disorder, who could overeat during their "on" days. And if you're a snacker who can't go more than a few hours without food, other eating plans might be better for you.

ASK YOUR DOCTOR

Could fasting help treat type 2 diabetes?

In one very small study of three people, intermittent fasting helped people with diabetes lose weight, improve their blood sugar level, and go off insulin-essentially reversing their disease. But more research is needed to determine how intermittent fasting affects diabetes.

What are the risks of fasting?

Not eating for an extended period of time could lead to a plunge in blood sugar for people on insulin or certain diabetes medications. Extremely low blood sugar, called hypoglycemia, causes shakiness, fatigue, sweating, and serious symptoms like seizures.

How can I fast safely?

Ask your doctor how to balance your nutritional needs with your diabetes medications. Check your blood sugar levels often, so you can guickly treat any drops.

What if my blood sugar drops during the fast?

Eat or drink something that contains carbohydrates to bring your glucose level back into a healthy range. Work with your doctor to determine what that range is for you.

Search for the slideshow Fasting: What You Should Know at WebMD.com.

inside **out**

ASK YOUR Doctor

Are my liver enzymes elevated? If blood work shows that your liver enzymes are above 30 IU/L, ask your doctor to consider the possibility of nonalcoholic fatty liver disease (NAFLD), says endocrinologist Kenneth Cusi, MD. Other possible causes of elevated liver enzymes include alcohol abuse, hepatitis B and C, and medications.

Is there fat on my

liver? Anytime you undergo an ultrasound or other imaging technique, "if there's fat in the liver, that should be a huge red flag," Cusi says. "Many times doctors are not doing anything about it, but they should."

Can you check me for fatty liver disease? Some hospitals now have

a specialized ultrasound device called a FibroScan which can check for evidence of liver disease, including fat on the liver.

Can you help me achieve a healthy

weight? Losing weight is the best way to halt NAFLD and its more aggressive form, NASH. Your doctor may refer you to a registered dietitian and support groups to aid your weight loss journey. Bariatric surgery might also be effective, Cusi says.

Search for the article Liver Disease: What You Should Know at WebMD.com.

Liver Risks

People with type 2 diabetes have a higher risk of a serious but symptom-free form of liver disease

BY ERIN O'DONNELL

If you have type 2 diabetes, a growing body of research suggests that it's important to monitor your liver for a condition called nonalcoholic fatty liver disease (NAFLD). The name pretty much sums it up: Excess fat accumulates in the liver, the football-size organ located under the ribcage and over the stomach. NAFLD is especially common in people who are obese or have type 2 diabetes (or both), explains endocrinologist Kenneth Cusi, MD, FACP, FACE, of the University of Florida College of Medicine.

As scientists build their knowledge of NAFLD, they're learning that it may play a role in the development of prediabetes and type 2 diabetes, Cusi says. One of the liver's many jobs is regulating blood sugar, but fat in the liver makes that organ less responsive to insulin, leaving too much glucose in the blood, which can lead to type 2 diabetes.

Having type 2 diabetes increases your risk of developing a more severe form of NAFLD known as nonalcoholic steatohepatitis (NASH). In this case, liver fat triggers harmful inflammation that creates scar tissue there. "This can lead over time to cirrhosis and end-stage liver disease," Cusi says. But many people who have NAFLD or NASH don't know it. "About three in four patients with type 2 diabetes or prediabetes have too much fat in their liver, and about half of them have this inflammation and scarring, but in many cases they're unaware of it," Cusi says. Unfortunately, NAFLD has few symptoms,



making it tough to diagnose. Some people feel pain in the upper right part of the abdomen, just below the rib cage. Sometimes blood work will show an unexplained elevation in liver enzymes that prompts the doctor to take a closer look. Or patients might undergo a scan for another problem that reveals the presence of excess fat in the liver. A new type of ultrasound used by liver specialists can estimate fat content of the liver and check liver tissue for stiffness, a sign of scarring.

If NAFLD and NASH are caught early, it's possible to stop and in some cases reverse them, mainly through weight loss, Cusi stresses. Studies show that losing 10% of your body weight can halt NAFLD and NASH, but Cusi says losing at least 7% has benefits, and bariatric (weight loss) surgery could be one route to achieve that. Cusi also conducted a study that showed that an inexpensive type 2 diabetes drug called pioglitazone reverses NASH in some cases. Cusi also is studying new drugs for this purpose.

Cusi urges patients with type 2 diabetes to talk with their doctors about liver disease. "There is a lack of awareness among doctors and their patients, and very little is being done to treat the disease," Cusi says. Given the dangers of cirrhosis and end-stage liver disease, "there's a real urgency to identify patients who have this problem and consider treatment with lifestyle [changes] and medications," he adds.

REVIEWED BY HANSA BHARGAVA, MD, WEBMD SENIOR MEDICAL EDITOR

expert insight



Myth Busters

Seven misconceptions about diabetes, debunked

Despite advances in the diagnosis and treatment of diabetes, misconceptions persist about this condition. I often hear these from my patients:

1. Eating sugar causes diabetes

Sugar does not cause diabetes. It can be confusing because sometimes people even refer to diabetes as "I have the sugar." Our bodies turn the food we eat into glucose, which the body uses as energy or stores as fat. Too much fat-especially around the belly-can cause the body to become resistant to insulin. So, eating too much food from any source-not just sugary food-can increase your risk of developing diabetes.

2. Genetics determine if you get diabetes

Genes do play a role, but it may be difficult to figure out

JOHN WHYTE, MD, MPH, CHIEF MEDICAL OFFICER

if your diabetes is due to lifestyle or genetic susceptibility or both. Lifestyle choices, such as how you eat and how active you are, play a major role.

3. You can't play sports if you have diabetes

Many professional athletes-even Olympians-have diabetes and excel in sports. And most doctors recommend that people with diabetes participate in an exercise program. The key is to make sure you closely monitor your blood sugar level. Glucose is a major source of energy, and when you are active, you use more of it.

4. I need to do everything I can to avoid insulin

People are often fearful of starting insulin. To be fair, doctors are often guilty of scaring patients, suggesting that if they don't control their blood sugar with diet, exercise, and medicine, they will have to start insulin. Some people are also fearful of needles. But insulin is a very effective drug for managing blood sugar, and new delivery systems (such as pens, patches, and pumps) eliminate much of the pain that used to exist with needles.

5. You don't usually have any symptoms before you are diagnosed

The classic symptoms for diabetes are the three Ps: polyuria, polydipsia, and polyphagia. Simply put, you urinate frequently, you are thirsty all the time, or you are always hungry. Most people don't have all these symptoms, but they often have one or two-and sometimes it can be subtle. That's why it is so important to get screened for diabetes, and if you are diagnosed, to educate yourself about what you can do to help treat it.

6. It's dangerous for women with diabetes to become pregnant

Most women with diabetes deliver healthy babies with no

That is true for type 1 diabetes, but eating healthy foods and engaging in physical activity can often reverse or slow the progression of type 2 diabetes. There's ongoing debate about whether this is truly a cure. For some obese patients, bariatric surgery can eliminate the need for any medication. And maintaining blood sugar levels in a normal range will reduce the risk of stroke and eye, kidney, and heart disease.

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complications. If you already have diabetes (as opposed to developing diabetes during pregnancy, which is different), be sure to control your blood sugar even before you get pregnant and then watch it very closely during the time you carry your baby to term. Most experts recommend you plan your pregnancy and talk to the doctor six months before you start trying to conceive.

7. Diabetes has no cure

➡ Take the quiz Myths and Facts About Type 2 Diabetes at WebMD.com.







Food on the Go

Eating healthy on the fly can be a challenge when you have diabetes. Try these expert-approved tips to make it easier.

BY COLLEEN OAKLEY

Between work, family, and other commitments, life often feels like one big juggling act—trying to fit 25 hours of activity into a 24-hour day. And when you have diabetes, all the meal planning, grocery shopping, and food prep can feel like one more thing you just don't have time for. On those days, however, you don't have to resort to a burger and fries from the nearest drive-through or the break room doughnuts, which can wreak havoc on your blood sugar. These five expert tips can help you stick to a healthy eating plan even when life gets hectic.

Plan ahead

When you have a busy day ahead, plan what you're going to eat the night before. Pack preportioned meals and snacks to take with you, or if you're planning to go to a restaurant, study the menu and decide what to order. "Failure to plan ahead can have you reaching for every tempting snack or meal in sight," says registered dietitian Allison Childress, PhD, chief clinical dietitian of nutrition and metabolic health initiative at Texas Tech University.

Create snack arsenals

Keep non-perishable foods such as nuts, beef jerky, low-calorie granola bars, and dried fruit in your bag, purse, desk, and car so you always have a healthy snack in reach when hunger strikes. "Look for options that are proteinand fiber-packed rather than high in carbohydrates," says Childress.



Eat frequently

"If you go long periods of time without eating it could wreck your blood sugar and cause you to binge when you are around food again," says Childress. Shoot for five to six smaller meals throughout the day, eating every three to four hours.

Order the kids' meal

Despite all your best planning efforts, you will likely find yourself at a drive-through every now and then. When that happens, remember that most fast food "value" meals contain several servings of food. "The kids' meals are the correct portion size for most adults," says Childress. Other options: a salad (ask for dressing on the side) or a grilled chicken sandwich (eat only half the bun). Substitute unhealthy sides (french fries) for healthier ones (fruit or side salad) or ditch the sides altogether.

Keep calm

Studies show stress can elevate blood sugar levels for some people with diabetes, so if all the planning and prepping gets overwhelming, just breathe. "Many people who have diabetes think that there are foods that they can't eat, but it's not true," says Childress. "All foods can fit in your diet if you know the correct portion sizes." Keep a cheat sheet in your purse or wallet that can help you eyeball portion sizes and make the best choices possible on the go without the stress.

food Ia

DRINK UP

Hydration is important for everyone—but especially for those with type 2 diabetes. "When your body is dehydrated, it will try to pull fluid from wherever it can, including the bloodstream, leaving glucose behind and raising blood sugar even higher," says registered dietitian Allison Childress, PhD.

Not all liquids are created equal, however. Steer clear of juices, sodas, and sweet teas that are high in empty calories—meaning they won't make you full and could cause you to overeat later on—and will cause your blood sugar to rise quickly. Instead, keep a water bottle with you at all times and shoot for drinking eight cups a day—or more during these hot summer months and on days when you're more active than usual.

Not sure if you're getting enough? Check your urine. "It should be clear or a pale yellow color," says Childress.

Read the article Tips for Dining Out With Diabetes at WebMD.com.

REVIEWED BY HANSA BHARGAVA, MD, WEBMD SENIOR MEDICAL EDITOR

who's who

BY THE NUMBERS

NUMBER OF

undergraduate

degrees and

residencies-

a podiatrist.

NUMBER OF

colleges of podiatric

medicine in the U.S.

PERCENTAGE OF

in their lives.

250

NUMBER OF sweat glands in your feet.

Americans who have foot health problems

years of education

and medical school

required to become

and training—including

Meet the Podiatrist

This health care professional puts your feet firstmake sure you've got one on your diabetes team BY JODI HEI MER

Together, your feet contain 66 joints, 52 bones, 38 muscles, and 214 ligaments-and podiatrists care for all of them.

A podiatrist, or doctor of podiatric medicine (DPM), specializes in conditions that affect the ankles and feet, including fractures, tumors, ulcers, heel spurs, bunions, calluses, and ingrown toenails. Their expertise in diagnosis and treatment can help you take a big step toward better health.

On the frontlines of care

Podiatrists work in private medical practices, hospitals, nursing homes, and departments of public health and prescribe medication, order physical therapy, set fractures, and perform surgeries. These highly trained medical professionals are also among the first to spot the signs of health problems: Swelling, stiff joints, and numbness or tingling in the feet and ankles are associated with issues such as diabetes, arthritis, and heart disease, which often cause foot-related symptoms.

Devoted to diabetes care

For the 30.3 million Americans living with diabetes, appointments with podiatrists are an essential part of routine care. Diabetes can take its toll on your feet, causing issues such as foot ulcers, infections that are slow to heal, and permanent nerve damage known as diabetic neuropathy. Making an annual appointment with a podiatrist is an important part of managing the disease and preventing complications.

Prioritizing prevention

Most common foot problems can be prevented. Podiatrists educate patients about the importance of maintaining a healthy weight, choosing the right shoes for activities such as work and sports, and practicing good foot hygiene.

The better your feet and ankles feel, the more likely you are to walk, run, dance, or skip out of the podiatrist's office until it's time for your next appointment.



REVIEWED BY AREFA CASSOOBHOY, MD. MPH. WEBMD SENIOR MEDICAL EDITOR



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Age Well

For seniors, living with diabetes can get complicated. Here's what you need to know.

BY COLLEEN OAKLEY

With age comes many things: wisdom, great early-bird discounts, adorable grandchildren—but unfortunately it can also bring a greater risk of health problems. According to the American Diabetes Association, nearly a quarter of seniors age 65 and older live with type 2 diabetes. And these seniors are more at risk for complications from the disease, like neuropathy, cardiovascular disease, and cataracts.

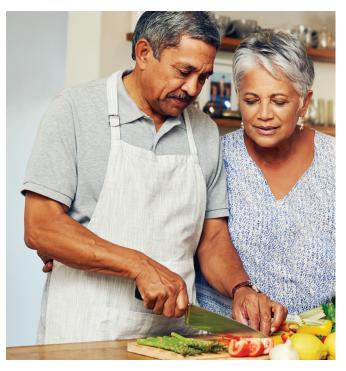
"Most of those complications stem from undiagnosed or unmanaged cases," says Nodar Janas, MD, medical director at the Upper East Side Rehabilitation and Nursing Center in Manhattan. In other words, by taking a few precautions and working with your doctor, you can continue to live a full happy and healthy life with diabetes.

Q What should seniors understand about diet and its role in managing diabetes?

JANAS: Studies show that low carbohydrate diets are the best for managing diabetes, which means eating more vegetables, fruit, and lean proteins. When you do eat carbs, look for unprocessed whole grains that are high in fiber. Rather than big meals, try to eat small portions more frequently. And remember that any lifestyle modifications that are geared toward health—eating less red meat, quitting smoking, increasing physical activity—can be helpful.

Q How can seniors safely incorporate exercise into their daily routine?

JANAS: Start small. Even just 15 to 20 minutes of low-



pace walking is better than doing nothing. But make sure you talk to your doctor before embarking on any exercise routine. Cardiovascular disease is the number-one complication of diabetes, and seniors especially should undergo an evaluation and a stress test to make sure their heart can take the physical exertion.

Q What about complications to be aware of?

JANAS: Neuropathy, or nerve damage in the legs and feet. Along with your primary care physician, seniors with diabetes should see their podiatrist at least once a year. They should also see an optometrist for an annual examination to check for blood vessel damage in the eyes—another possible complication of diabetes—and look for evidence of cataracts and/or retinopathy. While cataracts are irreversible, they can be slowed down or stopped when caught in time.

Q How should seniors work with their doctor?

JANAS: It's important to develop a trusting relationship with your doctor—he or she will know the best and newest medications to recommend for your specific needs and be able to refer you to specialists as needed.

Patients should come armed with a list of prescription drugs, over-the-counter medications, and supplements they're already taking to avoid possible interactions and ask any questions they have about their condition. Together, you can make the best decisions about your health care moving forward.

REVIEWED BY BRUNILDA NAZARIO, MD, WEBMD SENIOR MEDICAL EDITOR

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