

SPRING 2020

NIH MedlinePlus

MAGAZINE

Trusted Health
Information from the
National Institutes
of Health

IN THIS ISSUE

At-home testing for
HPV on the horizon

5 things you
should know about
intermittent fasting

NIH breakthroughs in
early autism diagnosis

Tips for preventing
Lyme disease this season



The next
generation
of medical
technology

COVER STORY

Actress and producer **Viola Davis** shares her
prediabetes story and work to educate others about

TYPE 2 DIABETES



In this issue

Our spring issue cover star, actress Viola Davis, is one of the 88 million Americans living with prediabetes. People with prediabetes have higher blood sugar levels and are at higher risk of type 2 diabetes. Read our cover feature to learn how Davis has embraced health education and worked to improve her diet and exercise to prevent type 2 diabetes.

The article also includes the latest research updates from the institute leading diabetes research, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). NIDDK researchers are focused on developing better treatments for people with and at risk of type 2 diabetes, especially younger people.

Also in this issue, National Institute of Biomedical Imaging and Bioengineering (NIBIB) Director Bruce J. Tromberg, Ph.D., talks about five of the many exciting medical technologies the institute is supporting and what's next for bioengineering research.

As you enter spring and summer, we provide health overviews about what triggers seasonal



Bruce J. Tromberg, Ph.D., became director of the National Institute of Biomedical Imaging and Bioengineering in January 2019.

allergies and how to better protect yourself from ticks this season. Additionally, find out how researchers are improving early autism diagnosis tools, and learn about a young cervical cancer survivor's journey and message to others. ■

NIH MedlinePlus MAGAZINE

WHO WE ARE

The National Institutes of Health (NIH) is the **nation's premier medical research agency**, with 27 different institutes and centers. The National Library of Medicine (NLM) at NIH is a leader in research in biomedical informatics and data science research and the world's largest medical library.

NLM provides **free, trusted health information** to you at medlineplus.gov and in this magazine. Visit us at magazine.medlineplus.gov

Thanks for reading!

CONTACT US

Email
NLMScommunications@nlm.nih.gov

Phone
508-907-7000

CONNECT WITH US

Follow us on Facebook
www.facebook.com/nationallibraryofmedicine/

Follow us on Twitter
[@NLM_News](https://twitter.com/NLM_News)



NIH MedlinePlus magazine is published by the National Library of Medicine (NLM) in conjunction with the Friends of the NLM.

Articles in this publication are written by professional journalists. All scientific and medical information is reviewed for accuracy by representatives of the National Institutes of Health. However, personal decisions regarding health, finance, exercise, and other matters should be made only after consultation with the reader's physician or professional advisor. Opinions expressed herein are not necessarily those of the National Library of Medicine.



Actress and producer Viola Davis, with her sisters Dolores Grant (left) and Dianne Davis-Wright (right), at the premiere of the documentary "A Touch of Sugar."*

FEATURES

08 20 years of the National Institute of Biomedical Imaging and Bioengineering

Director Bruce J. Tromberg, Ph.D., shares research highlights and plans for 2020

14 Actress Viola Davis on how prediabetes has empowered her

Since her diagnosis, Davis has embraced health education and advocacy

20 Eye tracking technology shows promise for earlier autism diagnosis

NIH research works to make autism diagnosis, support more accessible

24 Cervical cancer survivor urges people to get HPV vaccine

Vaccination and regular Pap smears can help prevent cervical cancer deaths

DEPARTMENTS

04 To your health

News, notes, & tips from NIH

28 From the lab

Latest research updates from NIH

30 NIH on the web

Find it all in one place!

31 Contact us

NIH is here to help

What triggers seasonal allergies?

4

* The National Institutes of Health was not involved in the creation of the project and reference to it does not constitute or imply endorsement by any federal agency.



health

NEWS,
NOTES,
& TIPS
FROM NIH

What triggers seasonal allergies?

Trees, grasses, and weeds are often to blame

HEALTH TIPS Ah, spring. It's the time of year when the cold starts to wane, and trees and flowers blossom. But if you're one of the many people who suffer from seasonal allergies, those pretty trees and plants may make you feel worse, not better.

That's because of pollen, a powdery substance made by trees, weeds, and grasses.

Pollen is harmless, but if you have seasonal allergies, your body mistakes the pollen for something dangerous and tries to attack it. This reaction causes symptoms like coughing, a runny or stuffy nose, and itchy, watery eyes. You might feel like you have a cold.

Diagnosing seasonal allergies

Unlike colds, seasonal allergies usually last longer than a week or two. If you have some or all of these symptoms and are looking for relief, check with your health care provider.

Often, a skin test or allergen-specific blood test can help confirm which type of pollen you're allergic to. Providers can also diagnose seasonal allergies based on when your symptoms develop. For example:

- Tree pollen (especially from birches, oaks, elms, and maples) typically appears in spring.
- Grasses shed pollen in late spring and summer.
- Ragweed produces pollen in the fall.
- Mold spores often cause seasonal allergies during the spring, summer, and fall. They may also cause year-round allergies for people who live in buildings with too much moisture. Signs of excess moisture include high indoor humidity, water damage, or poor ventilation.

All in the family

Seasonal allergies often run in families. If both your parents or your siblings have them, you're more likely to suffer from them, too.

Many people with seasonal allergies also have asthma. They may experience shortness of breath, wheezing, and coughing, in addition to other symptoms.



Ragweed, which grows throughout most of the U.S., produces pollen in the fall.

IMAGE: ADOBE STOCK



Easing your symptoms

Although it's difficult to predict how bad an allergy season will be, paying attention to your local weather forecast can help. Here are some other useful tips:

- Stay indoors as much as possible on days with peak pollen counts.
- Save outdoor activities for late afternoon.
- Wear a face mask when you work outdoors.
- Close the windows and, if needed, use an air conditioner.
- Wear wraparound glasses to keep pollen out of your eyes.
- Keep the grass cut short and avoid gardening chores that may stir up allergens.
- Rinse off after being outside to remove pollen from your skin and hair.
- Brush off your pets after they've been outside to prevent allergens from coming inside with them.

Medication and other treatments

Your health care provider may suggest saline rinses to ease nasal congestion or antihistamines to relieve a runny nose, sneezing, and itchy eyes. Some antihistamines include decongestants, which can reduce congestion, but those medicines are not for everyone. Your provider may also suggest a nasal steroid spray.

For more serious cases, your health care provider may prescribe allergy shots. Over time, these injections can provide relief by reducing your immune system's reaction to a specific pollen or other allergen. ■

SOURCES: MedlinePlus; National Institute of Allergy and Infectious Diseases; National Center for Complementary and Integrative Health

April is Testicular Cancer Awareness Month

Most common cancer among men ages 20 to 35

BY THE NUMBERS This April, during Testicular Cancer Awareness Month, spread the word about the most common cancer among men ages 20 to 35.

Testicular cancer affects the testicles, or testes, which make sperm and are organs of the male reproductive system. This cancer is more common in white men and men who have had abnormal testicle development, had an undescended testicle, or a history of the cancer.

Most cases can be treated successfully, even if diagnosed late. But, for better outcomes, awareness and regular health checkups are important.

Symptoms of testicular cancer can include pain, swelling, or lumps in the testicles or groin area. If you or someone you love notices any of these signs, talk to a health care provider as soon as possible, to rule out other conditions.



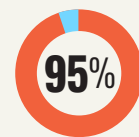
In 2016, there were an estimated **263,137** men living with testicular cancer in the U.S.

Testicular cancer represented approximately **0.5%** of all new cancer cases in the U.S. in 2019.



From 2012 to 2016, there were **four times as many cases** of testicular cancer in white males as compared to black males.

From 2009 to 2015, there was a **95.2% survival rate** after 5 years.



SOURCE: National Cancer Institute

On the front lines against Lyme disease

Dr. Adriana Marques shares new NIH research and recommends self-education

HEALTH TIPS Blacklegged ticks, or deer ticks, are tiny. But the problems they cause, like Lyme disease, can be big.

Most humans are infected through the bites of immature deer ticks called nymphs. Nymphs are difficult to see; they're no bigger than a poppy seed. Adult ticks are no bigger than a sesame seed.

Lyme disease, a bacterial infection you can get through a bite from an infected blacklegged tick, affects an estimated 300,000 Americans a year. The number of counties in areas at high risk for Lyme disease has increased more than 300% in the past 20 years.

The infection, in its early stages, can cause flu-like symptoms and an expanding circular rash that can be solid red or appear like a bull's-eye. In later stages, people can have additional rashes, paralysis of the muscles of the face, and arthritis with joint swelling.

The National Institute of Allergy and Infectious Diseases (NIAID) supports research aimed at both preventing Lyme disease and finding faster, more accurate tests for detecting it in its early stages, when it's easier to treat.

"It's a complicated, thought-provoking task," says infectious disease expert Adriana Marques, M.D. Dr. Marques, who is chief of NIAID's Lyme Disease Studies Unit, discusses the most recent research on Lyme disease and how people can protect themselves.

What progress has been made toward a better, quicker test for Lyme disease?

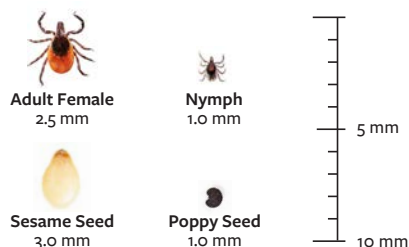
Among some of the new technologies being studied is a test of skin taken from the characteristic red rash that many people get with Lyme disease. There's also research into a more sensitive blood test that can detect the germs not only from Lyme disease, but also several other tick-related illnesses.

Going outside? How to protect yourself from ticks

Ticks like to hide in grassy, brushy, or wooded areas, so if you're doing things outside, remember to:

- Use Environmental Protection Agency (EPA)-registered insect repellents marked to work against ticks. Always follow product instructions.
- Take a shower as soon as possible after coming indoors.
- Do a full body check for ticks when you're inside. Ticks can attach anywhere on the body.
- If you do notice a tick, use pointy tweezers to grab it firmly right where the mouth parts enter the skin and pull the tick out slowly. Clean the area with rubbing alcohol.

Blacklegged Tick



Blacklegged ticks are very small. Nymphs are about the size of a poppy seed, while adult ticks are about the size of a sesame seed.

There was a Lyme disease vaccine that was pulled from the market in 2002. Are there any efforts toward a new vaccine?

We do have Lyme disease vaccines for dogs, but unfortunately no vaccine for human use is currently available. There is one vaccine that is being studied in clinical trials. Other new products are still several years away.

Can people become immune to Lyme disease, especially if they live in an area with a large tick population, such as the Northeast or Upper Midwest in the U.S.?

The best advice is don't count on becoming immune. You can get Lyme disease multiple times. There is some evidence that people might become immune if they get exactly the same bacteria they got before, but the chances are very low. Some Lyme disease-carrying ticks can be infected with other diseases as well.

What's the most important thing people can do to protect themselves?

Read about the disease. If you are in an area where Lyme disease is frequently diagnosed, learn how to protect yourself and how to recognize symptoms. Get antibiotic treatment started quickly if you or your doctor suspects you might have early Lyme disease—do not wait for lab test results. In most cases, people with Lyme disease will recover with no problem. ■

5 questions about intermittent fasting

Is time-restricted eating right for you?

RESEARCH Intermittent fasting has gotten a lot of attention recently—everyone from celebrities to social media influencers is talking about it. The idea is that by limiting the time during the day when you can eat, you can lower your calorie intake and maybe lose weight. But does it actually work? Is it healthy? We answer these questions and more in a roundup from the National Institutes of Health (NIH).

What is intermittent fasting?

Also called time-restricted feeding, intermittent fasting is when people restrict the time during the day when they can eat. For example, someone may eat only during a 12-hour time period, such as 7 a.m. to 7 p.m.

Can it help you lose weight?

Many people choose intermittent fasting as a way to lose weight. And some early NIH research supports this, says Charlotte Pratt, Ph.D., RD, of the National Heart, Lung, and Blood Institute. “In studies, people were able to demonstrate some changes in terms of body weight following a time-restricted eating plan,” Dr. Pratt explains. Research in animals has shown that calorie reduction can slow down aging and prevent some diseases. However, more research needs to be done in humans before the health benefits—and risks—are fully understood.

Does what you eat when fasting matter?

The timing of meals should not be the only factor in trying to lose weight or becoming healthier, Dr. Pratt notes. What and how much you eat are also important. Current U.S. dietary guidelines recommend eating a diet rich in fruits, vegetables, and whole grains. Dr. Pratt says that most adults should also do at least 150 to 300 minutes a week of moderate-intensity, preferably aerobic activity that is spread throughout the week.

Is it safe?

It is not safe for everyone, especially those with health conditions like diabetes, kidney disease, or heart-related issues. “Intermittent fasting should be approached individually and with the help of a dietitian or physician,” Dr. Pratt says. As with all diets, you should talk with your doctor or other health care provider before you try it. Your provider can review your health history and medication list and help you decide which eating plan and exercise schedule is best for you.

What future research is NIH planning to do?

One NIH clinical trial that is currently recruiting participants focuses on the effects of intermittent fasting on nonalcoholic fatty liver disease. Participants will be allowed to eat a set number of calories between 8 a.m. and 4 p.m. every day. Throughout the study, researchers will look for changes in certain fat levels, body weight, and other health indicators.

Another NIH-supported clinical trial will study whether time-restricted feeding can help improve insulin resistance and reduce weight in women with polycystic ovary syndrome, or PCOS. Dr. Pratt notes that this study will take place over 16 weeks and is expected to be completed at the end of 2021. ■



Celebrating 20 years of the National Institute of Biomedical Imaging and Bioengineering



For the National Institute of Biomedical Imaging and Bioengineering (NIBIB), 2020 is an important year. It marks the 20th anniversary of public law establishing the institute, as well as the one-year anniversary of the leadership of NIBIB Director Bruce J. Tromberg, Ph.D.

Dr. Tromberg became the director of NIBIB in January 2019, but his connection to the National Institutes of Health (NIH) started long before then. As a student in the early 1970s, Dr. Tromberg had an opportunity to work as an intern with Stan Shackney, M.D., in the National Cancer Institute (NCI). Dr. Shackney was developing a model simulating the growth of cancer cells and their response to chemotherapy treatment. This pioneering example of how cutting-edge technology could be used to both understand biology and improve patients' lives helped shape his future career.

Dr. Tromberg's area of expertise is optics and photonics, the study of light and light-based technologies—think lasers and fiber optics. He is a pioneer in “biophotonics,” the application of these technologies to biology and medicine. Photonics is not just an area of study for Dr. Tromberg; it's also a passion. He can talk about a wide range of technologies, from the lasers and detectors found in high-powered microscopes to the sensors and light sources in consumer cameras and smartphones.

“What’s happened in the two decades since NIBIB was formed is an explosion of technologies driven by the disruptive power of consumer electronics, computing, and the internet.”

– Bruce J. Tromberg, Ph.D.



Dr. Tromberg brings that passion to all the work he and his staff do at NIBIB. He shared highlights of some of that work, information about the field, and advice for future bioengineers.

What’s important for NIBIB right now and going into this next decade?

Our major areas of focus revolve around math—computation, modeling, and artificial intelligence. The NIBIB community is leading the development of these tools to understand all kinds of health-related information, whether it is coming from blood chemistries, the genome, or sensing and imaging technologies. A big challenge for us is integrating all of this data into better models of life processes that we can use to give doctors and patients more powerful and practical tools for personalized health and medicine.

What’s an example of how life processes can be engineered?

Engineers and physical scientists have been developing methods to mathematically represent complex cellular processes. This is helping accelerate the growth of engineered biological systems that span from one single cell all the way to multicellular systems, like engineered organs. In general, researchers are developing these approaches to replace or repair tissues and organs, as well as provide “organ simulators” for testing drugs and understanding how the body works.

Why are technology and engineering so important in medicine?

When you go to the doctor’s office or hospital and have imaging done, say, an MRI, CT scan, or an ultrasound, there’s a lot of beautiful and complicated technology that goes into creating that image. The big impact for patients is that we can routinely form very sophisticated images, and this has virtually eliminated the practice of “exploratory surgery.” We can also compare images and follow changes in people over time to detect, diagnose, and treat disease more effectively.

How has this field changed over time?

Technology has always been part of medicine, both as a way to understand life processes as well as a way to provide practical solutions to hard problems. Think of the bypass machine—that was introduced by engineers in the early 1950s. What’s happened in the two decades since NIBIB was formed is an explosion of technologies driven by the disruptive power of consumer electronics, computing, and the internet. Our world has changed from being dominated by mechanical tools to electronic- and photonic-based tools. It’s not surprising that these tools have been integrated into virtually every aspect of our lives, including new sensing, imaging, and therapeutic technologies for medicine.

How can we continue improving this area of research?

We need to continue to nurture the growth of the engineering and physical science community in biology and medicine. It’s well known that new discoveries are almost always connected to new tools. In addition to constantly improving existing technologies, our community is always thinking about doing even better. This is how the next generation of “game-changing” biomedical technologies will be developed.

What do you recommend for young people interested in the field?

Keep exploring, keep digging, and keep pursuing things you’re interested in, even beyond science. Read a lot of books to help refine your communication skills and learn about great ideas from all disciplines. Seeing connections between scientific fields and between science, engineering, and the humanities will help inspire and inform you throughout your career as a bioengineer. ■

FAST FACT

The act creating the **National Institute of Biomedical Imaging and Bioengineering** was signed into law in 2000 by President Bill Clinton.

National Institute of
Biomedical Imaging and
Bioengineering

5

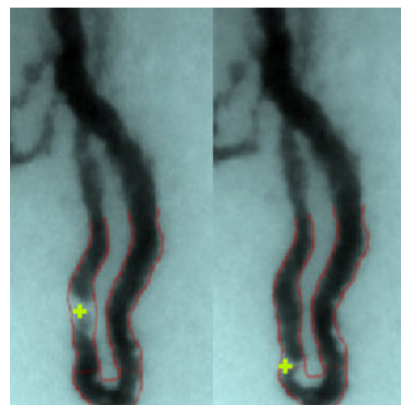
Breakthrough Technologies your tax dollars are funding

A 15-second, painless mammogram. A laser-powered blood sugar monitor. These are just some of the many breakthrough technologies supported by researchers at the National Institutes of Health (NIH).



Laser-powered blood sugar monitor

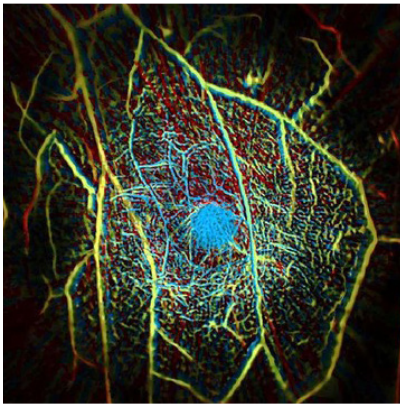
More than 30 million people in the U.S. have diabetes, a condition that requires them to constantly monitor their blood sugar to stay healthy. This new monitor could help people check their blood sugar levels without having to prick their finger, which can be inconvenient and painful. Instead, the monitor painlessly reads glucose (blood sugar) levels by focusing a laser on the skin. “There are a lot of people with diabetes who would like to have a noninvasive, continuous sensor,” Dr. Tromberg says. “That’s been a long-standing challenge for the technical community and need for people with diabetes.” The technology is currently delivered through a brace, shown here. Researchers are working to make a smaller, mobile version.



At-home white blood cell monitoring

For people on chemotherapy, infections can be dangerous. While chemotherapy treats conditions like cancer, it can reduce a person’s ability to fight other infections. That ability is shown by the number of white blood cells a person has. This new monitor allows people to quickly check their white blood cell count from the comfort of their own home. Patients place their finger in the device and in just one minute, a video of their blood cells is created. Using this information, people on chemotherapy can know when to take antibiotics to increase their white blood cell production. A screenshot from a video (above) shows red blood cells in black, and white blood cells highlighted with a yellow X.

NIH's National Institute of Biomedical Imaging and Bioengineering (NIBIB)—which spearheads biomedical technology research—released a video of recent innovations in action. NIBIB Director Bruce J. Tromberg, Ph.D., highlighted some especially promising ones, which we've summarized below.



15-second, painless mammogram

“Mammograms work well in a portion of the population; for example, postmenopausal women,” Dr. Tromberg says. “But we would like to have more versatile and effective methods to detect, diagnose, and guide treatment of breast cancer for everyone.” Up to 50% of women skip getting a mammogram, in part because it squeezes the breasts and can be painful. But mammograms are an essential step in breast cancer detection. That's why a new breast-scanning method that creates images through light and sound technology could be a game changer. This technology may also hold promise for tracking blood vessel damage in people with diabetes. An example image from the tool, highlighting blood vessels in the breast, is shown here.



Wearable blood pressure patch

A new small blood pressure patch, roughly the size of a U.S. nickel, could one day monitor blood pressure on the go. The patch is made of flexible fabric placed on the skin and uses ultrasound technology to measure sound waves that bounce off blood vessels. This technology could be an important tool for the more than 75 million Americans who have high blood pressure. The condition increases the risk of stroke and heart disease. But it can be improved through blood pressure monitoring, lifestyle changes, and medication. Dr. Tromberg notes that the technology could transform how blood pressure is managed. “There is huge potential to meet an urgent need that could save lives and reduce suffering in an enormous population,” he says.



Sensory prosthetics

A new technology for prosthetics could drastically improve the day-to-day lives of people missing lower limbs or hands because of trauma or medical conditions. Current prosthetics don't allow a sense of touch. But this technology gives users more feeling and control and could help make tasks like drinking coffee and brushing their teeth easier. As part of this research, wires and sensors that can “speak” to prosthetics were put on patients' upper limbs. ■

SOURCE: National Institute of Biomedical Imaging and Bioengineering



How a tablet computer
and mobile van are

Improving Cancer Detection

*NIH-funded technology brings cervical
and oral cancer testing to more people*

Rebecca Richards-Kortum, Ph.D., of Rice University, has devoted her career to understanding how technology can improve health and save lives. Her recent research focuses on creating affordable screening tools for cervical cancer, the fourth most common cancer among women worldwide.

Imaging technology has helped turn this goal into reality. The technology was developed with support from the National Institute of Biomedical Imaging and Bioengineering and the National Cancer Institute.

Improving cervical cancer detection

There are two main challenges in testing for cervical cancer and human papillomavirus (HPV), the virus that causes cervical cancer: It requires costly tools and extensive lab work.

“Both of these challenges are really important for patients who are medically underserved,” Dr. Richards-Kortum notes. “Those could be patients who live in rural areas or poor areas of the U.S. or in low- and middle-income countries around the world.”

More than 90% of cervical cancer deaths happen in low- and middle-income countries, according to the World Health Organization. That’s where Dr. Richards-Kortum and her colleagues come in.

A portable microscope

They’ve developed a low-cost fiber optic microscope that allows health care providers to see the same things they would during a tissue biopsy. A biopsy is the most effective way to diagnose cervical cancer.

90%

More than **90% of cervical cancer deaths** happen in low- and middle-income countries.

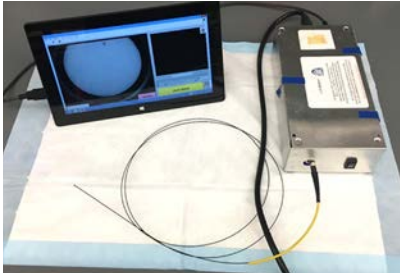
SOURCE: World Health Organization

“We can make this technology for very low cost, it runs on a tablet computer, and it’s completely portable and battery powered,” she says.

It also requires less training and expertise to use. Usually, women with an abnormal Pap smear have to have

“We can make this technology for very low cost, it runs on a tablet computer, and it’s completely portable and battery powered.”

– Rebecca Richards-Kortum, Ph.D.



Rebecca Richards-Kortum, Ph.D., studies how technology can improve health. She and her team developed a low-cost, portable fiber optic microscope that allows doctors to easily test for cervical cancer.

a procedure called a colposcopy. During this procedure, a provider takes a small tissue sample from the cervix. The sample is sent to a lab to be examined for cancer cells. With the new technology, providers can take a tissue sample, examine it, and follow up with the patient—all at the same time.

First, a drop of dye is put on the tissue in a woman’s cervix. A small fiber-optic probe, about the size of a pencil, is gently placed on the dyed tissue. The probe creates an image of the tissue and cells that it sends back to a “microscope” on the tablet computer, where the provider can review the image for cancer.

Improving follow-up rates

Dr. Richards-Kortum and her colleagues tested the technology in mobile diagnostic vans. They traveled around the Rio Grande Valley in Texas and in Brazil, bringing screening to women where they live.

“It was really exciting to us to see the potential of something not just in a middle-income country like Brazil, but to look right here in our own backyard,” she says.

In addition to being affordable and easy to transport, the microscope is also effective. Dr. Richards-Kortum says that during field testing, the technology had a level of accuracy very similar to an expert gynecologist performing a tissue biopsy.

In a clinical trial in Brazil, teams found that easier screenings helped to dramatically improve follow-up rates. “In women who had access to this mobile van, there was almost a 40% increase in the diagnostic follow-up,” Dr. Richards-Kortum says.

Dr. Richards-Kortum and her colleagues are also testing the technology with oral cancer.

The future of medical technology

Dr. Richards-Kortum notes that imaging technology has more than just physical health benefits. She has seen how it can improve patients’ understanding of their own health.

“It’s really interesting to see the power of imaging to help patients better understand the changes that are taking place,” she says. “When a provider can point out images and say, ‘This is what I see and this is why

I’m concerned,’ it’s very rewarding.”

As a leader and mentor in the field of medical technology, Dr. Richards-Kortum is also focused on empowering future generations of bioengineers. She encourages more people to study bioengineering and to take on leadership roles in the field, especially women.

“I think for me, many of my colleagues, and the students we work with, it’s an amazing opportunity and privilege to think of how you can use science and engineering to really make people’s lives better.” ■

SOURCE: World Health Organization

Find Out More

- ▶ **MedlinePlus:**
Diagnostic Imaging
<https://medlineplus.gov/diagnosticimaging.html>
- ▶ **National Institute of Biomedical Imaging and Bioengineering**
<https://www.nibib.nih.gov/>



“Knowing that I have prediabetes has empowered me.”

- Viola Davis

Acclaimed actress and producer Viola Davis is a true triple threat as a performer.

Her work has won her the very rare “triple crown of acting”—an Academy Award, an Emmy, and a Tony, which she has won twice.

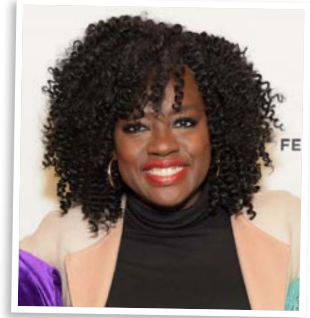
Recently diagnosed with prediabetes, Davis has taken on a new role as an advocate for diabetes education and awareness.

She spoke with NIH MedlinePlus magazine about her new outlook on health and her passion for educating others.

Viola Davis

on confronting prediabetes and becoming her own health advocate

Actress emphasizes importance of health education



How did you react to your prediabetes diagnosis?

I was frozen and in shock when I got the diagnosis. I considered myself to be a very healthy woman. I thought I watched what I ate. I exercised. I was not overweight.

Looking back now, I see I probably had a lot of preconceived notions about diabetes. I have a history of diabetes in my family. My sisters, my great aunt, and other members of my family have type 2 diabetes.

Did you discuss diabetes in your family?

My sisters would talk amongst themselves about getting diabetes and taking medication. But no one ever talked about what could be done to prevent it. There were a lot of fallacies and old wives tales about it. They would refer to diabetes as “You got the sugar.” And people would say things like, “Stop eating too much sugar before you get the sugar.”

We never had that proactive conversation about steps to prevent getting the diagnosis.

What have you done since your diagnosis?

Knowing that I have prediabetes has empowered me. I didn’t want to get full-blown type 2 diabetes. Thankfully, I had the resources and the presence of mind to do the research to learn what to do to lower my blood sugar levels.

I started to look at everything I was eating. Because I’m such an extraordinarily busy person, I wasn’t always thinking about what I was putting in my mouth. I am a mother of a young daughter, and sometimes I would eat what she ate because I’m on the run. Then there was snacking. Even though I don’t consume much alcohol, I needed to factor that in too.

And I didn’t know that I should be tracking my blood sugar levels and checking my A1C levels every three months. I didn’t even know what that was. It is hard to keep track of it all and stay on top of it all. But I have managed to do it.

What is your message to those who are facing type 2 diabetes?

Education is freedom. It is. Go to your health care provider and get your blood glucose levels tested. And if you have diabetes, press them to help you manage it. If you have prediabetes, ask them to arm you with what you need to do to prevent getting diabetes. You may be genetically predisposed to it, but there are things that are within your power that you can do to prevent or manage the disease. That’s why I worked with Merck on the documentary “A Touch of Sugar” to help raise awareness and empower others.*

It is also important that we stop stigmatizing people who have a prediabetes or diabetes diagnosis. There is a stigma that it only afflicts those who bring it upon themselves. And there is a stigma that people with diabetes are just eating what they want, are out of control, and don’t care about their bodies. That is just not the case.

Look at me. I worked out four, five, six times a week, watched what I ate, and I got it. It is a chronic disease that should not be dismissed by myth and stigma.

Can you talk about the importance of diabetes research, like that supported by the National Institutes of Health?

More research to find improved treatments and new tools for prevention is so important because of the sheer number of people who have the condition and the problems it causes. That is proof positive of the desperate need for more research.

What other professional projects are you working on?

I’m working on my final season of the TV series “How to Get Away with Murder.” I’m also working on the movie “Suicide Squad 2.”

And I’m really excited about a new movie I just completed for Netflix. Like “Fences,” this one, “Ma Rainey’s Black Bottom,” is an adaptation of a play by August Wilson. I’m also working on being the best wife and mother I can be! ■

* The National Institutes of Health was not involved in the creation of the project and reference to it does not constitute or imply endorsement by any federal agency.



The hidden epidemic of prediabetes

88 million Americans are prediabetic but most are not even aware of it

You could have prediabetes and not even know it. More than one in three adult Americans—approximately 88 million—have the condition, but 90% don’t realize it.

Recent research by the Centers for Disease Control and Prevention also reports that nearly one in four young adults (ages 19 to 34) and half of people over the age of 65 are living with prediabetes.

What is prediabetes? And if so many people don’t realize they have it, what can you do—especially if diabetes runs in your family?

Prediabetes means your blood sugar levels are higher than normal. The levels are not high enough to be diagnosed as type 2 diabetes, but it’s a warning sign that, over time, you could develop the disease. That’s why learning about risk factors is so important.

Prediabetes indicates a problem with the cells in your body. It means that those cells are not responding in a normal way to insulin, an important hormone that helps sugar in the blood get into cells and be used for energy. If a person’s body can’t make or respond to insulin, blood sugar levels rise.

Certain factors can make you more likely to develop prediabetes. You are more at risk if you have a parent or sibling with diabetes and are age 45 or older. Race and ethnicity are also factors: African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans are at higher risk for type 2 diabetes. Additionally, you’re more at risk if you are overweight or obese and are physically inactive. This is just a short list of risk factors. To see more and to take a test to learn about your own risk factors, visit the National Institute of Diabetes and Digestive and Kidney Diseases website.

.....

Eating healthier food and becoming more physically active can help you lose weight, feel better, and lower your risk of developing type 2 diabetes.

.....

Getting more exercise and losing a small amount of weight can help prevent diabetes if you are at risk. Eating healthier food and becoming more physically active—taking a brisk walk for 30 minutes a day, five days a week, for example—can help you lose weight, feel better, and lower your risk of developing type 2 diabetes. Even small steps—losing just 5% to 7% of your body weight (10 to 14 pounds for a 200-pound person)—can make a big difference in preventing type 2 diabetes. ■

SOURCES: National Institute of Diabetes and Digestive and Kidney Diseases (<https://www.niddk.nih.gov/>); Centers for Disease Control and Prevention

3 key research highlights from NIH's diabetes branch

Latest on prevention in adults, treatment in children, and vitamin D use

More than
1 in 3 adults in
the U.S.
have prediabetes

Can taking a daily vitamin D supplement prevent diabetes? Which is better for lowering your risk of diabetes: lifestyle changes or just medication? Is diabetes harder to treat if you're under age 20?

Recent national studies funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) have shed some light on these questions. Christine Lee, M.D., M.S., who helps oversee diabetes research at NIDDK, explains what you should know.



Taking vitamin D fails to prevent type 2 diabetes in adults

Vitamin D helps your body absorb calcium, one of the main building blocks of bone. It may also play a role in your nerve, muscle, and immune systems. Some studies had reported that low levels of vitamin D were associated with a higher risk for diabetes. But a new national study of more than 2,400 adults at high risk for diabetes, funded by NIDDK, found no added protection from taking the vitamin in preventing type 2 diabetes.



Lifestyle changes are best for preventing type 2 diabetes

A landmark national NIDDK-sponsored trial, the Diabetes Prevention Program, found that making lifestyle changes to lose some weight and become more active does a better job of reducing the risk of type 2 diabetes for adults at high risk for the disease than just taking the medication metformin.

Compared with study participants who took a placebo (a pill without medicine), the lifestyle group reduced their risk by nearly 60%, while those taking metformin reduced their risk by only 30%. More recently, the study found that the adults who made lifestyle changes lost more weight in the short term, although taking metformin seemed to help patients who had lost at least 5% of their weight to maintain that loss over the long term.



Type 2 diabetes is more aggressive in youths than in adults

Among recent NIH research findings, type 2 diabetes is increasing, especially among young adults of minority racial and ethnic groups. Type 2 diabetes progresses faster in young people than in adults and also results in a high rate of diabetes complications. Additionally, metformin, the most common diabetes medication for adults, fails to keep type 2 diabetes from progressing in young people and fails to help achieve good blood sugar control in approximately 50% of youngsters, especially among African American youths.

But there is some good news. A 2019 NIDDK study showed that gastric bypass surgery, although riskier, is more effective at reversing type 2 diabetes in teens with severe obesity compared with adults. And the U.S. Food and Drug Administration recently approved a new diabetes drug called liraglutide for young people over the age of 10. ■



SOURCES: National Institute of Diabetes and Digestive and Kidney Diseases; U.S. Food and Drug Administration; NIH News Releases

Turning things around:

An 18-year-old's inspiring advice for managing type 2 diabetes

Getting active and eating better help Chris Davenport improve his health

Chris Davenport is only 18, but he understands how hard it can be to improve your health when you're also trying to deal with other tough challenges in your personal life.

Eighteen months ago, Chris was depressed. "I knew I had prediabetes, but my eating habits were bad and my motivation to take care of myself wasn't high," he says.

He knew he was at risk for type 2 **PERSONAL STORY** diabetes, and was later diagnosed with the condition.

"There were warning signs, plus it runs in my family," he says. Chris also admits that he would skip meals and then overeat "greasy, unhealthy food."

Dealing with depression and anxiety made it harder for him to care about his health. "I wouldn't take medicine or eat to help myself. I wasn't active, and with my eating habits, it all made for a bad version of me."

Making changes

Today, all that has changed, and Chris is proud of his hard-won successes.

He is back in school, taking classes at a Washington, D.C., alternative high school. And his blood sugar levels are under control, thanks to regular, healthful meals and exercise.

Chris has frank, practical advice for others—of any age—who need to manage their diabetes.

"I know it sounds like a cliché, but, honestly, I had to learn that this is a process," he says. "You have to take it a day at a time. Once you get into the habit of doing the right thing each day, you won't remember the days you didn't want to do it."

Finding help through NIH

Chris says that things began to change for him when he started going to the diabetes clinic run by Stephanie Chung, M.B.B.S., at Children's National Hospital. During a physical, Chris's doctor recommended the clinic and put him in touch with Dr. Chung, who conducts research on type 2 diabetes funded by the National Institutes of Health (NIH).

At the clinic, he began working with Dr. Chung, who also helped him enroll in a major NIH study of young people with diabetes.

Today, he typically eats special microwaveable prepared meals for breakfast, lunch, and dinner. They help him regulate his blood sugar levels. Breakfast, for example, might be an egg, ham, and cheese scramble with a side of blueberries and applesauce.

"They include nutrition facts on each meal, so I know how many good calories and bad calories, like carbs and fat, I've eaten," he explains.

"You have to take it a day at a time.

Once you get into the habit of doing the right thing each day, you won't remember the days you didn't want to do it."

– Chris Davenport

Staying motivated

Chris also goes to the gym regularly, spending an hour on the treadmill, followed by weight lifting.

These changes, he says, "have given me more energy." They've also given him confidence and helped his optimistic attitude shine through.

When asked to name the biggest lesson he's learned in the past 18 months, Chris doesn't hesitate.

"The hardest thing about working at achieving something is just getting started," he says. "Once you understand that, you can feel more comfortable taking it slow, training your body to do it more." ■





NIH clinical researcher Stephanie Chung, M.B.B.S., helps children who have, or are at risk for, type 2 diabetes.

New options for treating type 2 diabetes in kids and teens

NIH research focuses on prevention and better outcomes for young people

of Diabetes and Digestive and Kidney Diseases (NIDDK). Her recent research has focused on African American youths with the disease.

These days, there's a new urgency to her research and her clinical work. Recent studies have shown an alarming increase in type 2 diabetes in children and adolescents. Specifically, there are more than 5,000 new cases every year among those under 20, particularly among African Americans and Hispanics.

"We focus on partnering with patients and their families, empowering them from the beginning."

– Stephanie Chung, M.B.B.S.

Recent NIH-funded research adds to the growing evidence that diabetes is more aggressive in youths. It has shown that metformin, the standard drug used to control the disease in adults, is much less effective in those under 20.

The Treatment Options for Type 2 Diabetes in Adolescents and Youth (TODAY) study, funded by NIDDK, recently found that metformin fails 50% of the time in those ages 10 to 17.

"Metformin is not preventing the disease from progressing in kids," Dr. Chung says. "It's like a Band-Aid over the problem."

All this makes it more urgent to treat children who have prediabetes. Dr. Chung notes that there is an opportunity to control the disease early, before it worsens and medication is needed.

"I explain prediabetes to them by drawing a line that represents the A1C test cutoff for type 2 diabetes. The A1C test measures the average blood sugar levels over the last two to three months, and a reading of 6.5% or higher is used to diagnose diabetes," Dr. Chung says. "Then I draw a line below that that represents a normal blood sugar reading of 5.7%. I then shade in the area between the two lines and tell them that's where they are and explain what they can do to keep from getting the full-fledged disease."

The good news is that in 2019 the U.S. Food and Drug Administration (FDA) approved the drug liraglutide in children age 10 or older. It's the first non-insulin drug approved by the FDA to treat type 2 diabetes in pediatric patients in nearly 20 years.

"It gives us a second drug to try," says Dr. Chung. "It's very exciting." ■

SOURCES: National Institute of Diabetes and Digestive and Kidney Diseases; U.S. Food and Drug Administration; NIH News Releases

Find Out More

- ▶ **MedlinePlus: Diabetes Type 2**
<https://medlineplus.gov/diabetestype2.html>
- ▶ **National Institute of Diabetes and Digestive and Kidney Diseases: Diabetes Prevention Program**
<https://www.niddk.nih.gov/about-niddk/research-areas/diabetes/diabetes-prevention-program-dpp>
- ▶ **ClinicalTrials.gov: Type 2 Diabetes**
<https://clinicaltrials.gov/ct2/results?cond=Type+2+Diabetes>

Helping kids with diabetes is a passion for National Institutes of Health (NIH) clinical researcher Stephanie Chung, M.B.B.S. You can hear it in her voice when she talks about "my kiddos" at the clinic she runs at Children's National Hospital in Washington, D.C.

There, she and a team of specialists help children who either have type 2 diabetes or are at high risk for getting the disease.

She says, "We focus on partnering with patients and their families, empowering them from the beginning" to improve their health.

From her many years of treating minority children, Dr. Chung understands the challenges her patients can face.

"Minority youth can have so many additional factors that affect their health, such as the family food budget, neighborhood safety, and access to transportation," Dr. Chung says.

For example, being physically active is important for managing diabetes. "But what if they don't feel safe going outside? That just adds to their burden and stress," she says.

Dr. Chung also helps lead diabetes research at NIH's National Institute

Karen Pierce, Ph.D., plays with a toddler referred to her program by a local pediatrician.



Eye tracking technology holds promise for earlier autism diagnosis

NIH-funded research shows new, simpler testing has 86 percent accuracy rate

What if you could diagnose autism just by looking at how a child's eyes move?

While the technology is not quite that simple, an eye tracking system created by National Institutes of Health (NIH)-supported researcher Karen Pierce, Ph.D., and her team is paving the way for a simpler, more affordable tool for earlier diagnosis of autism spectrum disorder (ASD).

Dr. Pierce works at the University of California San Diego's Autism Center of Excellence. Her lab receives funding from the National Institutes of Health's National Institute of Mental Health (NIMH).

The screening tool, known as the GeoPref test, uses infrared light to follow a baby's eye movement as they watch a series of movies showing geometric shapes moving around. The tool has successfully helped diagnose children with autism at just 12 months of age, and in only minutes instead of hours.

Why early diagnosis matters

Despite the findings of Dr. Pierce and other researchers that autism can be diagnosed in the first year or two of life, the

average age of diagnosis in the U.S. is still 4 years of age. Diagnosis can occur even later in some racial and ethnic minority groups and in underserved communities, says Lisa Gilotty, Ph.D.

Dr. Gilotty is chief of the NIMH research program on autism spectrum disorders. Prior to her current role in overseeing funding for autism research at NIMH, Dr. Gilotty studied the disorder for decades and is dedicated to helping the more than 3.5 million Americans living with autism.

A major concern of researchers is helping children with autism get support fast—which comes from early diagnosis.

“A delay in diagnosis can have a profound cascading effect across development,” says Dr. Gilotty. “We know that early intervention has been demonstrated to improve outcomes for young children with autism. So, there's a need to develop tools that are sensitive and valid to screen children earlier and engage them in services earlier.”

That's why technology like what Dr. Pierce developed is key. It can take place right in a pediatrician's office with help from a trained provider and doesn't require hours of testing at a specialist's office.

“The ultimate goal is to give people with autism the same opportunities, to live the life they choose to live.” – Lisa Gilotty, Ph.D.



Eye tracking tests can monitor a baby's eye movements as they watch movies of moving objects and human figures to diagnose autism.

“For the test, the baby sits on his mother's lap and is looking at a screen similar to a computer monitor, but at the bottom of the monitor there's an invisible, infrared light beam that's not visible to the baby,” Dr. Pierce says. “The light beam bounces off the baby's cornea and the angle that the light is reflected back into the machine tells it where the baby's looking.”

Some babies with autism do not examine the images they are seeing in the manner that is expected. So, if a baby shows abnormal eye gaze, 86% of the time they receive a diagnosis of ASD. Dr. Pierce hopes to roll it out to more pediatricians' offices and other health centers throughout the country in the coming years.

Paying attention

For parents who are concerned that their child may have ASD, Dr. Pierce says some common signs to look out for are restricted interests, activities, or repetitive body movements such as flapping hands or flicking wrists.

Other signs include reduced shared attention with parents. Shared attention includes things like looking at the same thing mom or dad is looking at—or checking to see if their parents are watching them play. Children with ASD have a hard time

Boys are four times more likely than girls to be diagnosed with autism spectrum disorder.

Centers for Disease Control and Prevention

with these types of joint attention behaviors and often are delayed in doing things such as pointing, which is important for orienting other people's attention.

“Another early marker is challenges with shared enjoyment with someone other than the parent, say if you're playing peekaboo or tickling. Most typical children will show some enjoyment, but in children with autism, they often have a tough time with this level of engagement and enjoyment with people that are not their parents,” Dr. Pierce adds.

She emphasizes that parents should meet with their pediatrician or other health care provider if they suspect their child may have autism.

Other research

Another important research area for NIH is adult autism support.

Researchers are developing strategies that promote employment, job training, health care advocacy, independent living, and social relationships for adults.

“It's an important area because research has demonstrated that outcomes for autistic adults are generally worse than for other disorders,” Dr. Gilotty says. “It's clear that they have a steep decline in their engagement and community once they leave secondary school and that can lead to further isolation.”

Other promising NIH-funded studies are looking at how subtle changes in babies' brains as early as 6 months can show signs of autism and how that could one day be translated into screening. Additionally, researchers are looking more closely at the causes of autism and how autism can co-occur with other conditions like ADHD, anxiety, or depression.

“Understanding more about the causes of autism allows interventions and services to become more tailored and precise,” Dr. Gilotty says. “The ultimate goal is to give people with autism the same opportunities, to live the life they choose to live.” ■

SOURCE: National Institute of Mental Health

Embracing autism diagnosis helps family take charge

Mother says sooner you know, the more tools and options you have

Luca is in fifth grade. He loves playing video games, building things, and learning about space. He can tell you the name of all of the planets and every space shuttle. Luca also has autism spectrum disorder (ASD), or autism for short.

Luca's mom, Tracy Sekhon, says autism is something that makes Luca shine—not something that holds him back. His diagnosis journey started back in 2010, when he was just 18 months old. Tracy and her husband noticed that Luca was having some developmental issues.

PERSONAL STORY

“Not only did he stop progressing, but he started going backwards. He had started making sounds that weren't appropriate to what he was seeing,” Tracy says.

For instance, he called his dad “bye-bye” instead of “da-da.”

At first, Luca's parents thought it was a problem with his hearing. It turned out he did, in fact, have a hearing issue. But after he had surgery to resolve it and then received speech therapy, some things were still not right. For instance, he wasn't responding to noises like he had previously. He also started banging his head and wouldn't respond unless someone was in front of him, Tracy recalls.

Listening to your gut

After visiting Luca's pediatrician, who told Tracy that this behavior was probably related to Luca's hearing impairment, she still wasn't convinced. Tracy and her husband did lots of research, and Tracy went back to her pediatrician. She asked for a referral to a specialist who could tell her for sure if something else was affecting her baby.

“My mommy gut was telling me there's something more going on with my son,” Tracy says.

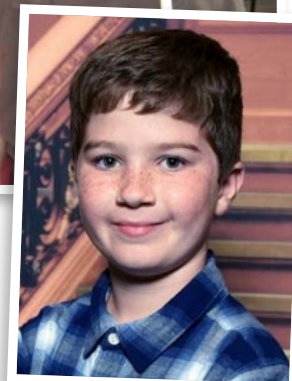
Their pediatrician recommended the University of California San Diego's (UCSD) Autism Center of Excellence in La Jolla, California, which turned out to be close to Tracy's home in San Diego. The center also focused on early autism intervention. At the center, they met with Karen Pierce, Ph.D., and other doctors.

After two days and several hours of testing, Luca was diagnosed with autism. He was 22 months old.

“We not only got a diagnosis of autism, but he was moderate to severe on the spectrum,” Tracy says.



Tracy Sekhon helped support her son Luca, who is now 10, through his autism diagnosis journey.



“My baby had lost his speech. He had gone backwards in his development. We had lost him. It was terrifying.”

After the diagnosis

Tracy quickly enrolled Luca in behavioral, speech, and occupational therapy through UCSD. She also enrolled Luca in therapy research studies, which Tracy says was a way to not only help Luca, but also to help others learn from Luca's experience.

Some key steps of Luca's therapy happened outside of the UCSD center. For instance, over the course of a month, Tracy took Luca to a nearby mall for short amounts of time so he could get more comfortable in that type of social situation. She also spent a lot of time researching and asking questions.

“I just got as educated as I could, because the more I learned, the more empowered I felt and knew that I could effect change for him,” Tracy says.

When Luca turned 3, he was enrolled in the California public school system and has been there ever since.

Today, he is 10 years old and learns right along with the rest of his fifth grade class. He gets some additional support in the classroom through an individual education program, but the majority of his learning takes place just as it does with his peers.

“Educate to empower yourselves first and foremost, focus on what’s possible, and make sure that you get real with the diagnosis in the very beginning.”

- Tracy Sekhon

As a result of her experience, Tracy has become heavily involved in the autism community and even started her own nonprofit, Autism Resource & Treatment Center (ARTC), based in San Diego. ARTC focuses on early autism intervention and awareness, as well as teen and adult support, which Tracy says needs more attention and resources.

Empowerment through education

Looking ahead, Tracy says that Luca’s early diagnosis and support have led her family to feel that while things will change, they know they have the tools to help him succeed.

“I know that through his lifetime, there will be additional challenges, but we now understand what that means,” Tracy says. “It’s just a matter of providing those tools. Where he is today, that is a result of all of the hard work that we did in the very beginning.”

Though not all stories are like Luca’s, Tracy wants people to know that early diagnosis is key to making a difference in a child’s development throughout their life, not just at the time of diagnosis.

“It’s easy for us as parents to look at our children and explain the challenges away because we want so badly for them to be perfect,” Tracy says. “Educate to empower yourselves first and foremost, focus on what’s possible, and make sure that you get real with the diagnosis in the very beginning.” ■

6 key facts about autism spectrum disorder

Each person is affected differently and symptoms can change over time



Autism spectrum disorder (ASD) is a developmental disorder, meaning that symptoms are present early in life. However, ASD can be diagnosed at any age. Here are some other things to know:

1. It affects each person differently. Autism is also known as a spectrum disorder. That’s because not everyone who has autism has the exact same symptoms with the same severity. However, there are some core symptom areas that people with ASD have. These include problems with social communication, like avoiding eye contact; difficulty with the back and forth of conversation; or trouble understanding other people’s points of view. Other symptoms include repeating certain behaviors or having unusual or restricted behaviors.

2. Symptoms can change over time. Some symptoms can change and may become more or less severe as people with ASD age. Symptoms can also change with behavioral intervention or medication.

3. ASD isn’t specific to one race or ethnicity. Autism occurs in people of all ethnic, racial, and economic backgrounds. People who have older parents, a sibling with ASD, or a genetic condition like Down syndrome are more likely to be diagnosed with autism. Also, boys are four times more likely than girls to be diagnosed with ASD.

4. There’s still much to learn. While scientists don’t know the exact causes of ASD, research suggests that genes can act together with environmental factors to affect development in

ways that can lead to ASD. That’s why researchers funded by the National Institutes of Health (NIH) are working to better understand the condition and diagnose it early.

5. ASD isn’t a weakness. While people with autism do experience challenges, they can also have great strengths. Those include performing well in math, the arts, and science; remembering specific details for long periods of time; and being strong learners.

6. It’s a lifelong journey. While people are often diagnosed with ASD as children, they are affected throughout their lives. That’s why NIH also funds research to understand how to best support those with ASD as they become adults. For example, helping them to enter the workforce and live independently. ■

SOURCE: National Institute of Mental Health

Find Out More

- ▶ **MedlinePlus: Autism Spectrum Disorder**
<https://medlineplus.gov/autismspectrumdisorder.html>
- ▶ **National Institute of Mental Health: Autism Spectrum Disorder**
<https://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd/index.shtml>



Cervical cancer survivor

urges young people to get HPV vaccine

After her cancer diagnosis at 26, Lily Taylor finds strength through advocacy

Think of someone you know who loves to laugh and make those around them laugh. Now, imagine that person is unable to laugh like they used to.

That's what it was like for Lily Taylor, now 32, who was diagnosed with cervical cancer six years ago.

"I was heartbroken. I couldn't laugh or make others laugh anymore," she says.

Noticing symptoms

When Lily was 25, she began having pain in her pelvis, abdomen, and legs. At first, she thought it was from being on her feet at her job as a restaurant server.

She also had frequent minor kidney infections and bleeding during sex. Lily didn't think much about those problems until the pain and bleeding got worse.

Getting a diagnosis

Lily went to her doctor, who did a Pap smear to check for abnormal cells in her cervix. The doctor quickly called in a gynecology specialist, a doctor who focuses on women's reproductive health, to examine Lily.

Then Lily had to go to another specialist to have a biopsy, or sample, of her cervical tissue examined. "It was a very painful procedure," she says. "I cried. The nurse had to hold my hand the entire time."

The biopsy was an important step in getting her diagnosis. After a weekend of worrying and crying while she waited for the biopsy test results, Lily's doctor called and told her that she had cervical cancer.

"I was in a complete fog—just in shock—when I found out," Lily recalls.

**PERSONAL
STORY**

Intensive treatment

At just 27 years old, Lily immediately underwent intensive treatment: chemotherapy for five weeks, daily radiation, and another 12 weeks of chemotherapy.

During treatment, she had to stay in bed because she was constantly nauseous or vomiting.

Before Lily began treatment, her doctors asked if she wanted to freeze her eggs, in case she wanted to give birth some day. They told her that chemotherapy would make her infertile.

“I was 27 years old and didn’t take the time to think about it,” she recalls. “I was unsure at the time and just wanted to quickly get on with the treatment plan.”

Having cervical cancer was difficult in several ways for Lily. In addition to the pain and treatment, Lily also had to deal with losing her hair, not being able to give birth to children someday, and judgmental comments from people who didn’t know much about the HPV vaccine or cervical cancer.

Finding strength

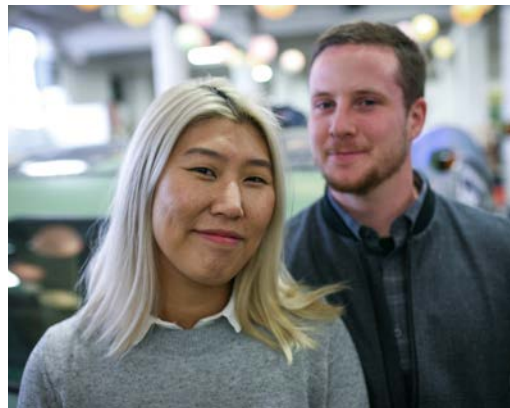
Treatment was difficult but successful, and Lily and her family were thrilled to hear that the cancer was finally gone. Five years later, she is cancer free and happy to have her strength, and sense of humor, back.

Lily says that she wishes she had listened to doctors—and her body—years earlier. She had a Pap smear when she was 21, but she never replied to a follow-up call from her doctor about an abnormal result.

“Today, I would call the doctor back. I’d be my own advocate,” she says. She wants other women to be their own health advocates and to listen to their bodies.

“Don’t be ashamed to get the vaccine or to have your children vaccinated. HPV and cervical cancer can be prevented.”

– Lily Taylor



Lily Taylor and her boyfriend, Kevin. Kevin supported Lily through her difficult cervical cancer treatment and recovery.

Wisdom for others

Overall, Lily says that her cancer experience has made her a stronger person. She’s an active member of cervivor.org, an advocacy resource and community of people who have, have had, or know someone with cervical cancer. She also spreads awareness of the HPV vaccine and cervical cancer and has her own support group in Minnesota called At Your Cervix MN.

Lily encourages everyone between ages 11 and 26 to get the vaccine.

“Don’t be ashamed to get the vaccine or to have your children

vaccinated,” she advises. “HPV and cervical cancer can be prevented.”

Most importantly, Lily wants people, especially women, to feel comfortable talking about their sexual and reproductive health to help prevent what she and many others have gone through.

“Don’t be afraid or embarrassed to talk about your private parts—with partners, parents, or health care providers,” Lily says. “We’re all the same.” ■

Preventing HPV: When should I get vaccinated?

Dosage recommendations for children and young adults

These are general recommendations from the Centers for Disease Control and Prevention. Talk with your health care provider about the right schedule for you or your family members.

HPV Vaccine Schedule and Dosing

Start Early	Ages 9–10	2 doses
On Time	Ages 11–12	2 doses
Late	Ages 13–14	2 doses
Extra dose	Ages 15–26	3 doses

HPV and cervical cancer: What you need to know

A quick look at causes, symptoms, and treatment



A 3D rendering of human papillomavirus

Human papillomavirus (HPV) is the most common sexually transmitted infection in the U.S., and there are more than 400 strains of the infection.

Forty of those are known as high-risk HPV, which can lead to cervical cancer in women. Low-risk HPV usually causes symptoms that are not life threatening, such as genital warts.

It's important to know that high-risk HPV by itself is not cancer. Eight out of 10 women will have high-risk HPV at some point in their lives, but few of them will get cervical cancer.

Luckily, there is a vaccine that protects people against some high-risk strains of HPV.

How do you get HPV?

You can get HPV by having vaginal, anal, or oral sex with someone who has the virus. Anyone who is sexually active can get HPV, even if you have had sex with only one person. HPV can be passed on even if the infected person has no symptoms.

Who can get HPV?

Both men and women can get HPV. It's important to know that women can be tested for HPV, but men can't. However, men can get the HPV vaccine, which helps prevent them from getting genital warts and some types of cancer, including penile, anal, and throat cancer. The vaccine also helps protect their partners.

The Centers for Disease Control and Prevention does not recommend routine testing for men for these cancers because they're much less common. However, if you think you may have HPV or cancer, contact your health care provider.

What are the symptoms of HPV and cervical cancer?

Genital warts can be a sign of HPV in men and women. However, many strains of HPV, especially those that cause cancer, have no noticeable symptoms. These strains can be detected only by a Pap smear, which tests a woman's cervix, the lower part of her uterus, for any cell changes.

Symptoms of cervical cancer in women can appear years after an HPV infection. They include:

- Bleeding and spotting between menstrual periods
- Bleeding after vaginal sex
- Bleeding after menopause
- Heavier than usual menstrual periods
- Bleeding after a pelvic exam
- Unusual discharge from the vagina
- Pain during sex

80% About **80% of people** will get an HPV infection in their lifetime.

SOURCE: Centers for Disease Control and Prevention

How are HPV and cervical cancer treated?

There is no cure or treatment for HPV, but there are treatments for the complications it can cause, such as genital warts, cancer-causing cells, and cervical cancer.

Treatment for cervical cancer is based on how advanced the cancer is, but it can include chemotherapy, radiation, and surgery.

Getting regular Pap smears and HPV testing helps your doctor know whether you have HPV and, if you do, monitor it. Early detection often prevents cervical cancer. Make sure to ask your health care provider about the best screening schedule for you. ■

SOURCES: MedlinePlus; National Cancer Institute; Centers for Disease Control and Prevention



Sarah Kobrin, Ph.D.

New HPV test brings screening to your doorstep

NIH and Dr. Sarah Kobrin work to make HPV vaccination and detection more widely available

Important research by investigators at the National Institutes of Health (NIH) and beyond has shown that the human papillomavirus (HPV) vaccine can prevent cervical cancer, which is caused by HPV.

And the latest NIH research has taken another important step in cervical cancer treatment: developing at-home HPV testing for people who may be at risk.

Sarah Kobrin, Ph.D., talked about this research and about key prevention tools. Dr. Kobrin is the chief of the Health Systems and Interventions Research Branch at the National Cancer Institute.

What can you tell us about HPV vaccine research today?

The Centers for Disease Control and Prevention has been researching the HPV vaccine for about 15 years. They are constantly reviewing when you should be vaccinated, how effective the vaccines are, and who should receive them.

There is more evidence now that the long-term effects of the HPV vaccine will benefit everyone. The

schedule of when people should be vaccinated may change from time to time. But this is because we are constantly learning more about the safety of the vaccine.

We hope to soon have Food and Drug Administration-approved home tests for HPV. People may feel more comfortable taking an HPV test in the privacy of their own home and mailing in a sample. This would make the process easier and more convenient for everyone.

What can be done to make cervical cancer prevention easier?

Awareness is a necessary first step. But awareness is not enough. In general, people are more aware of the HPV vaccine. The most important challenge is giving everyone access to it.

People have to actually get vaccinated and get regular cervical cancer screening tests, like the Pap smear and HPV tests, to prevent cervical cancer. Talk with your health care provider and get the vaccine (for you or your children), according to the recommended timetable.

What should people know about cervical cancer?

It's important for all women to get regular cervical cancer screening tests. These include the Pap smear and HPV tests—what's best for each woman depends on her age and past experience with these tests. The tests help detect [cervical] cells that have been changed by HPV. A Pap smear can detect early stages of cancer that

can be treated. When found early, the cells can be treated before they become cervical cancer. The HPV vaccine is a preventive step.

Do we have less cervical cancer today?

We are measuring this as closely as we can. Because it takes a long time for an HPV infection to cause cancer, the first change we can see is a large reduction in the number of HPV infections. That is already happening. This means that the number of people with cervical cancer will be going down in the future. Therefore, the people who are not getting the infection now will not get cervical cancer later. ■

Find Out More

- ▶ **MedlinePlus: HPV**
<https://medlineplus.gov/hpv.html>
- ▶ **MedlinePlus: Cervical Cancer**
<https://medlineplus.gov/cervicalcancer.html>
- ▶ **National Cancer Institute: Human Papillomavirus (HPV) Vaccines**
<https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-vaccine-fact-sheet>
- ▶ **ClinicalTrials.gov: Cervical Cancer**
<https://clinicaltrials.gov/ctz/results?cond=Cervical+Cancer>

92%

As many as **92% of cervical cancers** could be prevented by screening and HPV vaccination.

SOURCE: Centers for Disease Control and Prevention

from
the

lab

LATEST
RESEARCH
UPDATES
FROM NIH

Asthma medicine may not be one size fits all

New study focuses on treatment options for African American kids

THE SYMPTOMS ARE ALL TOO FAMILIAR for parents of kids with asthma: coughing, wheezing, and chest tightness. About 6 million kids in the U.S. have asthma, which may make it hard for them to breathe. Asthma is especially common in African American children.

The standard treatment for persistent asthma is a low-dose inhaled corticosteroid, and if this does not fully control the symptoms, a long-acting bronchodilator may be added.

However, some studies suggest that African Americans may respond differently to medications for asthma.

FAST FACT

People **may have an increased risk of asthma** based on their environment, family history, medical conditions, race or ethnicity, or sex.

National Heart, Lung, and Blood Institute

Researchers supported by the National Institutes of Health (NIH) wanted to find out if bronchodilators would provide similar help to African Americans with asthma or if increasing the dose of inhaled corticosteroid would be better.

NIH recently helped fund two clinical trials, one with African American children and one with African American adolescents and adults. The results of the study with African American adolescents and adults were similar to those of past studies. More people had improved asthma symptoms with the addition of the bronchodilator than a higher dose of steroids.

The results of the study with African American children were different, though.

About half of the children in the study had improved asthma control with the bronchodilator. The other half did better with the higher dose of steroids alone. Researchers didn't find a link between percentage of African ancestry and response to treatment,



About 6 million kids in the U.S. have asthma, which may make it hard for them to breathe.

so it's unclear why the children responded differently.

More research needs to be done, but these early findings suggest that if African American children do not respond to the first treatment, there may be an equal chance that the alternate treatment could work better. ■

SOURCES: National Heart, Lung, and Blood Institute; NIH Research Matters

IMAGE: ADOBE STOCK

Could one woman help researchers find a cure for Alzheimer's?

Research into a large South American family offers hope

ALZHEIMER'S DISEASE is the most common cause of dementia, which contributes to a decline in memory, thinking, and social skills. More than 5 million people in the U.S. live with Alzheimer's, which currently has no cure.

But results from a study funded by the National Institutes of Health offer a new direction for developing a treatment.

Researchers looked at a large, extended family in Colombia, South America. Many members of that family have a gene difference that causes Alzheimer's symptoms early, usually in their 40s, rather than after age 65.

Of the more than 6,000 people in the family, about 20% had this gene difference. Everyone who had it developed problems with thinking early—except one woman.

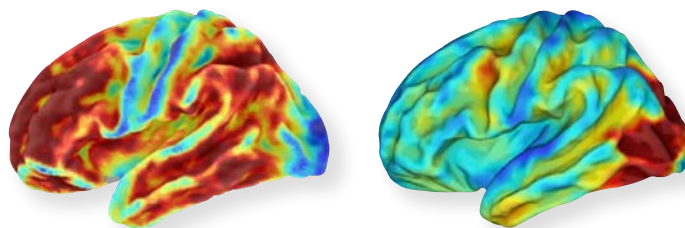
Unlike her family members, this woman didn't have symptoms until she was in her 70s. This interested the researchers, and she volunteered for brain imaging and genetic testing to help them understand why her Alzheimer's developed later.

Images of her brain showed less damage than is normally seen in people with the disease. The results of the genetic testing were also intriguing. It turned out that the woman had two copies of a rare variation in the APOE gene, called APOE3ch.

This discovery could go a long way in helping to advance Alzheimer's research, for example, by mimicking how this gene variation affects the brain.

"Sometimes close analysis of a single case can lead to discovery that could have broad implications for the field," says National Institute on Aging Director Richard J. Hodes, M.D. ■

SOURCES: National Institute on Aging; National Institute of Neurological Disorders and Stroke; NIH Research Matters



Brain images of a woman with an inherited condition that causes early-onset Alzheimer's disease.



Older Hispanic adults may be more prone to frailty

Risk factors include diabetes, obesity, and disability

PAIN IS ONE OF THE MOST COMMON and expensive health problems in the U.S. In older adults, chronic pain can lead to frailty. This can mean anything from unintentional weight loss to slowness, weakness, and exhaustion.

In the U.S., pain may be a bigger problem for older Hispanics, who make up the nation's fastest growing segment of older adults. They have a higher risk of diabetes, obesity, and disability—which are all risk factors for pain. They also tend to have less access to medical care and to health information or support.

A study funded by the National Institutes of Health tracked 3,000 older Mexican American adults from 1995 to 2013. One important finding was that those who suffered from pain were 1.7 times more likely to become frail. In addition, people in the study who were older, were depressed, had hip fractures, and had difficulty with daily tasks were also more likely to become frail.

Researchers want to learn more about the link between pain and frailty in Mexican Americans. They hope that this information will help provide better health support earlier in life to this population and Hispanic Americans more generally. ■

SOURCES: National Institute on Minority Health and Health Disparities; National Institute on Aging; National Institute of Child Health and Human Development; NIH News Releases

NIH on the web

SciBites

Bite-sized research videos made just for you

➔ ALLOSTERIC MODULATOR? ZINC FINGER NUCLEASE?

If these terms leave you scratching your head, you're not alone. Science can be tricky to understand, but the National Institutes of Health's Intramural Research Program (IRP) has you covered.

The IRP is the largest biomedical research institution on earth and has more than 5,000 researchers working hard to improve human health. Get a taste of this research from SciBites videos.

They're quick videos explaining complex science topics—like how our cells fight cancer and recover from injury—in straightforward ways.

All the videos are under two minutes long and feature the very researchers studying these topics.

Find it all in one place!

magazine.medlineplus.gov/otw



Learn about environmental health the fun way

➔ WHAT DOES A BEE USE TO BRUSH ITS HAIR? A HONEYCOMB!

If you're a kid, or a kid at heart, the Kids Environment Kids Health website is a great resource for you. It has jokes, like this one, as well as engaging games, videos, and experiments. All the information is vetted by experts at the National Institute of Environmental Health Sciences.

Topics include everything from how pollution affects our health to recycling, and more. It even has lesson plans and other resources for K–12 teachers.



Easy-to-read drug facts from NIH

➔ **FINDING RELIABLE INFORMATION** about drug misuse and addiction can be a challenge. But the National Institute on Drug Abuse makes it easier with Easy-to-Read Drug Facts. The online resource organizes useful information in many forms, including videos, health topics, and personal stories of people who have struggled with these issues.

Learn about common drugs that people misuse—like e-cigarettes, alcohol, marijuana, and painkillers—and what effects drug misuse can have, for example, impacts on families and kids.

The site also provides advice on treatment and recovery for people struggling or loved ones who want to help. All content is available in English and Spanish.

NIH is here to help

The National Institutes of Health (NIH)—the nation’s medical research agency—includes 27 Institutes and Centers and is a part of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical, and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

Institutes

National Library of Medicine (NLM)

www.nlm.nih.gov
888-FIND-NLM 888-346-3656

National Cancer Institute (NCI)

www.cancer.gov
800-4-CANCER 800-422-6237

National Eye Institute (NEI)

www.nei.nih.gov
301-496-5248

National Heart, Lung, and Blood Institute (NHLBI)

www.nhlbi.nih.gov
301-592-8573

National Human Genome Research Institute (NHGRI)

www.genome.gov
301-402-0911

National Institute on Aging (NIA)

www.nia.nih.gov
Aging information 800-222-2225
Alzheimer’s information 800-438-4380

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

www.niaaa.nih.gov
301-443-3860

National Institute of Allergy and Infectious Diseases (NIAID)

www.niaid.nih.gov
301-496-5717

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

www.niams.nih.gov
877-22-NIAMS 877-226-4267

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

www.nibib.nih.gov
301-451-6772

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

www.nichd.nih.gov
800-370-2943

National Institute on Deafness and Other Communication Disorders (NIDCD)

www.nidcd.nih.gov
800-241-1044 (voice)
800-241-1055 (TTY)

National Institute of Dental and Craniofacial Research (NIDCR)

www.nidcr.nih.gov
301-480-4098

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

www.niddk.nih.gov
NIDDK Health Information Center
1-800-860-8747

National Institute on Drug Abuse (NIDA)

www.nida.nih.gov
301-443-1124

National Institute of Environmental Health Sciences (NIEHS)

www.niehs.nih.gov
919-541-3345

National Institute of General Medical Sciences (NIGMS)

www.nigms.nih.gov
301-496-7301

National Institute of Mental Health (NIMH)

www.nimh.nih.gov
866-615-6464

National Institute on Minority Health and Health Disparities (NIMHD)

www.nimhd.nih.gov
301-402-1366

National Institute of Neurological Disorders and Stroke (NINDS)

www.ninds.nih.gov
800-352-9424

National Institute of Nursing Research (NINR)

www.ninr.nih.gov
301-496-0207

Centers & Offices

Fogarty International Center (FIC)

www.fic.nih.gov
301-496-2075

National Center for Complementary and Integrative Health (NCCIH)

www.nccih.nih.gov
888-644-6226

National Center for Advancing Translational Sciences (NCATS)

www.ncats.nih.gov
301-435-0888

NIH Clinical Center (CC)

clinicalcenter.nih.gov
301-496-2563

Office of AIDS Research (OAR)

www.oar.nih.gov
301-496-0357

Office of Behavioral and Social Sciences Research (OBSSR)

www.obssr.od.nih.gov
301-402-1146

Office of Communications & Public Liaison (OCPL)

www.nih.gov/institutes-nih/nih-office-director/office-communications-public-liaison
301-496-5787

Office of Rare Diseases Research (ORDR)

www.rarediseases.info.nih.gov
Genetic and Rare Disease
Information Center
888-205-2311

Office of Research on Women’s Health (ORWH)

orwh.od.nih.gov
301-402-1770



Take the **pressure off**

Your kidneys and your health

High blood pressure is the second leading cause of kidney failure in the U.S. The good news is that you can help **protect your kidneys by managing high blood pressure** with healthy lifestyle habits.

Visit niddk.nih.gov for more information.