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Keep an Eye on Your Eyes

Technologies For Protecting Vision

The eyes are more than windows to the soul. With advances in eye health technology, they can also give a unique look into your health.

"The eye is a real window into what's happening in your body," says NIH eye health expert Dr. Houmam Araj. It's a convenient way for a doctor to get a clear view of your blood vessels, nerves, and connecting tissue without surgery.

Researchers are working on new technologies to help doctors get a better look into the eye and catch diseases earlier. They're also designing new tools to help people with vision loss get around in their daily lives.

What Doctors See Now • Getting regular eye exams is important, even if you think your vision is fine. Eye exams allow an eye care professional to monitor your eyes for common vision problems and signs of disease.

"There aren't early warning signs for the most common eye diseases," says NIH eye specialist Dr. Rachel Bishop. "By identifying diseases early, you have the best treatment options and the best chance of preserving good vision."

A comprehensive exam will often include eye dilation. After checking your vision sharpness, the doctor places drops in your eyes to dilate (widen) the dark center of your eyes, called the pupil. This allows more light into your eyes, just like opening a door lets light into a dark room. Then the doctor can examine the inside of the eye.

A special magnifying lens is needed to examine the tissues at the back of the eye. These tissues include the retina (light-sensitive tissue), the macula (central part of the retina for sharp vision), and the optic nerve (carries visual messages from the eye to the brain). Damage to these areas may be a sign of an eye disease.

"The eyes can also reflect illness that begins in another tissue far from the eyes themselves," Araj explains. Eye exams may reveal health problems like **diabetes**, high blood pressure, **autoimmune disorders**, sexually transmitted diseases, and cancers.

For example, eye doctors often detect diabetes by observing damage to the retina and blood vessels in the eye. The disease may show up in eye tissue before a blood glucose (sugar) test reveals it. Early detection can prevent not only vision loss but other serious complications.

Advances in Imaging • "Today's clinical technologies to image the eye are pretty amazing, but they are undergoing tremendous advances," says Dr. Donald Miller, an expert in eye imaging technology at Indiana University. "Future eye health practitioners will have incredibly more powerful imaging tools than anything we have now."

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Definitions

Diabetes
A serious disease that happens when your body has trouble managing and using blood glucose, a sugar that your body uses as fuel.

Autoimmune Disorders
Conditions in which the body's immune system mistakenly attacks the body's own cells and tissues.

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With new tools, eye health professionals may be able to catch disease even earlier. For example, Miller and his research team created a type of microscope to improve the diagnosis and treatment of glaucoma.

Glaucoma causes blindness by damaging nerve cells at the back of the eye. "The cells that get damaged by glaucoma are hard to see in the early stages of the disease," Miller says. "With current technology, thousands of cells must die before it's detected."

His team's new method would allow eye doctors to see the damage earlier. In glaucoma, early treatment can often protect you against serious vision loss.

Other eye imaging technologies are being developed to better detect age-related macular degeneration (AMD). AMD is the leading cause of vision loss and blindness nationwide among people age 50 and older. A current NIH-led study is tracking retinal degeneration in 500 people over five years to look for early signs of the condition.

The team is using a high-resolution imaging technique called spectral domain optical coherence tomography (SD-OCT) to visualize different sections of the retina. "It is sensitive enough to detect very small changes that other images of the eye cannot see," says Bishop.

Another new imaging technology allows scientists to track a specific protein in the eye. The approach may help doctors catch cataracts (a clouding of the eye's natural lens) and presbyopia (the inability to focus up close) earlier.

Other research groups are studying ways to treat cataracts. They've identified a chemical that could potentially be used in eye drops to reverse cataracts.

"Cataracts are the number one cause of blindness worldwide," Araj says. "If you live long enough, you will get them. New methods of detection and treatment can impact people everywhere."

Improving "Sight" • New technologies may also help people with low vision and blindness get around more easily in their day-to-day lives.

For example, an NIH-funded eye doctor recently improved a miniature telescope technology that can be mounted on regular eyeglasses. Called Ocutech bioptic telescopes, these devices help people with low vision see better while driving. This gives them the chance to stay behind the wheel.

Another scientist developed a partially robotic cane that can detect a person's surroundings. The cane has a camera to "see" what's nearby. The motorized roller tip then moves the cane toward a desired location, acting as a guide for the person to follow.

Sound can also act as a guide for those with low vision. A new smartphone app gives sound prompts to help visually impaired people identify the safest crossing location and stay within a crosswalk.

These and other new technologies are helping people with vision problems. But Bishop says, "While technologies can help keep your eyes healthy, there's a lot you can do, too."

Simple actions can go a long way to protect your eye health. These include not smoking, eating a healthy diet (especially dark leafy greens like spinach or kale), and maintaining a healthy weight. Also, know your family's eye health problems. Certain diseases can run in families. And make sure to wear sunglasses to block harmful sun rays and protective eyewear for activities like sports and home improvement projects.

Don't forget to get a regular eye exam to catch issues early. If your eye care professional finds a problem early, often there are things you can do to keep your good vision.

"An ounce of prevention is worth a pound of cure," Araj says. ■

Ask Your Doctor

- Am I at risk for an eye disease?
- What tests do I need?
- How often should I get eye exams?
- What are the benefits and risks of any medications or treatments?
- Are there new technologies that can help correct or manage my eye disease?
- Am I at risk for diabetes?
- How can you help me quit smoking?
- Would a clinical trial (research study) be right for me?

Web Links

For more about eye health, see "Links" in the online article: newsinhealth.nih.gov/2018/05/keep-eye-your-eyes

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Struggling to Hear?

Tiny Devices Can Keep You Connected

Many people slowly lose their hearing as they get older. Not being able to hear well can make it hard to communicate. That can affect your relationships, emotional well-being, and work performance.

For those who need them, hearing aids can help. These electronic devices are worn in or behind the ears. They make sounds louder. Close to 29 million adults could benefit from hearing aids, yet only 1 in 4 of them has ever used one.

An exam of your ears, nose, and throat might detect a physical reason why you're not hearing as well. You may want to start by talking with your primary care provider or an ear, nose, and throat doctor, also known as an ENT or otolaryngologist. A doctor can look for ear wax, an infection, injury, or other reason for hearing loss. A hearing test can show the type and amount of hearing loss. For a hearing test, your doctor may refer you to an **audiologist** or other hearing professional.

If ear wax or an ear infection is the cause, the hearing loss may be temporary. Other causes, such as nerve damage, may lead to more permanent hearing loss. Nerve damage can be caused by loud noises, as a side effect of certain medicines, or for other reasons. Hearing aids may help in these cases.

Some people don't want to try hearing aids because of how they think it might look to others. "Hearing loss is far more obvious than a hearing aid," says Dr. Kelly King, an NIH hearing health expert. "The hard work people do to compensate for their hearing loss, and the mistakes they sometimes make when communicating, make the loss more noticeable to those around them than a hearing aid."

And now, advances in technology are making hearing aids less visible. "One of the biggest changes that has taken place in the last 15 years is a major reduction in the size of these devices," King says. Some can be hidden inside the ear canal. Others are worn over the ear.

Choosing the best device for you will depend on factors like cost, features, and your amount of hearing loss. Today's hearing aids offer different features. For example, some can connect to your mobile phone, TV, and other devices using Bluetooth technology. That means you can talk on your phone and stream music directly to the speakers within the hearing aids without wires.

It's important to understand that hearing aids can't restore your hearing the way that reading glasses correct vision. Instead, a hearing aid can help you make the most of your remaining hearing by making sounds louder. If it's been a while since you've heard the soft sounds of speech, your brain may need time to re-learn and translate those sounds for you.

Do you think you may need a hearing test? Take the quiz in the Wise Choices box to help you decide. ■

Definitions

Audiologist
A hearing care professional who can identify hearing loss, measure it, and suggest treatment options.

Wise Choices

Do You Need Your Hearing Tested?

If you answer yes to several of these questions, you may want to get a hearing test:

- Is it hard to hear or understand others?
- Do you get frustrated trying to hear things?
- Do people get frustrated because they need to repeat what they say to you?
- Do you turn up the TV or radio louder than those around you would like?
- Do you have trouble hearing what people are saying in restaurants or at the movies?
- Is your social life, school, or job limited by your problem with hearing?

Web Links

For more about hearing loss, see "Links" in the online article: newsinhealth.nih.gov/2018/05/struggling-hear

Health Capsules

For links to more information, please visit our website and see these stories online.

Bystanders Can Save Lives During Cardiac Arrest

Have you noticed an AED device in an airport or other public place? An AED is an automated external defibrillator.

You can use this portable device to quickly shock someone's heart and try to save their life if they collapse, have no pulse, and stop breathing. This condition is known as sudden cardiac arrest.

If a cardiac arrest isn't treated within minutes, the person will usually die. When the heart stops beating, blood and oxygen can't get to the brain. The brain can't function long without oxygen.

A recent study of people who had cardiac arrest found that bystanders can help save lives if they use an AED while waiting for emergency medical services. Each year, experts estimate, more than 18,000 Americans have a shockable cardiac arrest that occurs in public with witnesses.

If you think someone is having a cardiac arrest, call 911. While you wait for emergency medical services to arrive, you can do CPR (cardiopulmonary resuscitation) and use the AED device.

After you apply two electrode patches to the person's chest, the AED will check the heart rhythm. If a shock to the heart is needed, the AED will deliver the shock. The shock can restore a normal rhythm.

"We estimate that about 1,700 lives are saved in the United States per year by bystanders using an AED," says Dr. Myron Weisfeldt of Johns Hopkins University. "Unfortunately, not enough Americans know to look for AEDs in public locations, nor are they trained on how to use them."

For those who want to learn CPR and how to use an AED, training is easy. You can contact groups like the American Heart Association or the American Red Cross to sign up. ■

Palliative Care For Serious Illness

Palliative care is more than end-of-life care. It's an added layer of care to support and improve the quality of life for someone with a serious illness. You receive palliative care in addition to your treatments. This type of care is also known as comfort care, symptom management, or supportive care.

Palliative care considers all aspects of your care. It isn't only for treating pain and physical problems. It also provides help for coping with the psychological, spiritual, and social challenges of a serious illness.

NIH offers a text-messaging service for people who want to learn more about palliative care. The service is for those who need palliative care, family members, and other caregivers, too.

The text messages provide information about the benefits of palliative care and resources on how to manage the symptoms of a serious illness.

Visit medlineplus.gov/palliativecaretexts.html to learn how to sign up. The service is free, but standard message and data rates may apply. Your phone number won't be sold, shared, or used for any commercial purposes. ■

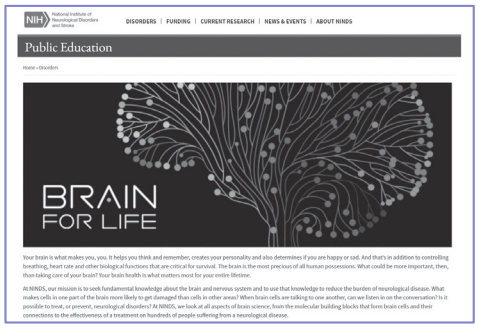
Featured Website

Brain for Life

www.ninds.nih.gov/disorders/brain-life

About 50 million Americans have a brain or nervous system disorder. NIH's Brain for Life website is a one-stop shop to learn about the brain and the nervous system.

You can also find answers to your questions about more than 400 disorders, including migraines, stroke, epilepsy, Parkinson's disease, and head injuries.



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