

NIH News in Health

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Inside News: 3 Cholesterol 4 Vaping and Teens 4 Wellness Tips in Spanish 4 Weight Management

From A to Zika Understanding Emerging Diseases

West Nile virus. Lyme disease. Zika. Dengue fever. Eye-catching headlines warn us about new diseases seemingly every year. But how much of a danger do these diseases really pose? What can you do to reduce the risk from new diseases in your community?

Emerging diseases are caused by microbes, usually bacteria or viruses, that haven't infected people before or that already infect people but have moved to new places.

"New diseases emerge all the time from the animal world," explains Dr. David Morens, an infectious disease expert at NIH.

Part of the reason is that the **genes** in bacteria and viruses are always changing. These gene changes, called mutations, help microbes survive and spread. Some make it possible for bacteria or viruses that once only infected animals to infect people.

Bacteria and viruses often get from animals to people by way of insects and parasites. The most common of these are mosquitoes and ticks. NIH is funding research into where and how new diseases might



arise, as well as ways to prevent and treat them.

Changing the Disease Map •

The modern world has changed how animals, insects, and people encounter each other, says Dr. Desiree LaBeaud, an NIH-funded emerging disease researcher at Stanford University.

"Deforestation increases the chances that humans come in contact with forest-dwelling creatures and insects," she explains. As people move further into undeveloped areas, they become more likely to encounter animals and insects that carry microbes they haven't been exposed to before.

More people moving to large cities also plays a role in the spread of disease, adds Dr. Scott Weaver, who

studies emerging diseases at the University of Texas Medical Branch. When millions of people live close to each other—and close to mosquitoes that like to live in cities—diseases can move quickly.

Changes in the environment can also contribute. Most microbes—and the insects that carry them—can only live within a narrow range of conditions. "What happens when you have a warming planet is that these infections are going to shift geographically into new areas," LaBeaud says.

Compounding all this, Weaver says, is trade and the ease of global travel.

"Airplanes don't have to carry mosquitoes with them; they just need one person who's been infected to introduce a disease to a new location."

Weaver and his colleagues are studying all of these factors to better understand what areas might be at risk for new disease outbreaks. They also want to understand which new diseases may become local threats.

"There's a lot of chance involved in when and where these diseases spread around the globe," he says.

continued on page 2

Definitions

Genes

Stretches of DNA that instruct cells how to make proteins and perform other tasks.

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continued from page 1

“The focus of our work is understanding why outbreaks happen when they do.”

Awareness Not Panic • On the surface, the numbers look alarming. Between 2004 and 2016, nine new diseases that are spread by mosquitoes and ticks were found in the U.S.

The number of people exposed to these diseases is also rising. For example, the Centers for Disease Control and Prevention (CDC) reported a record number of tickborne-disease cases nationwide in 2017: almost 60,000.

But new insect-borne diseases are still less frequent than some other better-known diseases. In comparison, experts estimate that over a million people get the flu every year in the U.S.

Most people who catch a disease carried by mosquitoes or ticks fight off the invaders quickly.

“A large proportion of people who are infected with mosquito-borne viruses don’t actually reach the clinic, because they don’t have any symptoms or their symptoms are mild,” LaBeaud says.

NIH News in Health

ISSN 2375-6993 (Print) ISSN 1556-3898 (Online)

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It’s still important to know what new diseases are in your area. Many of these diseases have vague symptoms, such as fever, a rash, body aches, or feeling very tired. People and their doctors may not always suspect exposure to an insect-borne disease.

Different new diseases tend to cluster in certain areas. Most cases of Lyme disease occur in the Northeast and upper Midwest. Dengue fever has been seen in warm areas such as Florida and Texas.

“If people educate themselves about what’s a risk in their particular region, there’s a lot that they can do to protect themselves,” Weaver says. See the Wise Choices box for tips on how to avoid mosquito and tick bites.

Your local public health office can give you information about what new diseases are found in your area.

Protect Yourself • Depending on where you travel, you may come into contact with diseases that are rare in the U.S. Before you travel, talk to your doctor about getting vaccinated. It will help keep you safe and healthy. It will also help make sure that you don’t bring any serious diseases home to your family, friends, and community.

NIH is funding research into vaccines for several emerging diseases. One study has already begun testing a vaccine for West Nile virus. NIH is also funding vaccine research for Zika and Ebola.

For people worried about emerging diseases, Morens notes, one vaccine already exists. It’s the flu shot.

“The flu is a continually emerging virus, because it’s always mutating,” he explains.

And because the flu is always changing, people need a flu shot every year. The flu shot you get one year will not help protect you the next year.



Wise Choices

Fight Emerging Diseases

Reduce your risk of diseases spread by mosquitoes and ticks:

- **Check your yard.** Pour out standing water in old tires, flower pots, buckets, toys, or any other place where mosquitoes can breed. This includes even the tiniest places where water can collect.
- **Use insect repellent when going outside.** Find effective ones at www.epa.gov/insect-repellents.
- **Wear long sleeves and pants.** Fabric can help prevent bugs from getting to your skin. Tuck your pants into your socks when walking in an area with ticks.
- **Use screens on open windows.** Screens can keep mosquitoes from getting in the house. Use air conditioning instead, if possible.
- **Check your body for ticks.** After being outside in an area with ticks, check your body in the mirror. Have a family member look at areas you can’t see.
- **If you find a tick, remove it immediately.** Find out how to remove a tick at newsinhealth.nih.gov/2014/05/tick-talk.
- **Treat your pets with flea and tick preventative.** This can keep them from bringing bugs into the house.

Although things like Zika grab the headlines, flu kills thousands of people in the U.S. each year—from 3,000 to 79,000 yearly over the past few decades.

“In terms of emerging infectious diseases, it’s one of the major killers worldwide,” Morens says. “It’s not something to sneeze at, no pun intended.” ■



Web Links

For more about emerging diseases, see “Links” in the online article: newsinhealth.nih.gov/2019/02/from-zika

Control Your Cholesterol

Protect Yourself from Heart Attack and Stroke

Have you had your cholesterol checked? Most adults should have a cholesterol test every 4 to 6 years. That's because nearly 78 million American adults have high levels of the type of cholesterol that's linked to heart disease and stroke.

Cholesterol is a waxy, fat-like substance that your body needs to function properly. It travels through your bloodstream to reach the cells that need it. Your cells use cholesterol for many important functions, like making hormones and digesting fatty foods.

But too much cholesterol in your blood can cause waxy buildup called plaques in blood vessels. "These plaques can eventually become inflamed and rupture, leading to a clot," explains cholesterol expert Dr. Ronald Krauss at UCSF Benioff Children's Hospital Oakland.

If a clot blocks blood flow through an artery in the heart, it can cause a heart attack. "Or, if this happens in the artery of the brain, it can cause a stroke," he says.

Cholesterol travels through the bloodstream in particles called lipoproteins. There are different types of lipoproteins that have different effects.

Low-density lipoproteins, or LDLs, contribute to plaques. LDL

cholesterol is sometimes called "bad" cholesterol.

"Many people in this country have too many of these LDL particles in the blood," Krauss says. Studies have found that lowering LDL cholesterol levels reduces heart disease and stroke.

The most common cause of high LDL cholesterol is an unhealthy lifestyle. Excess body weight and eating a lot of animal fats are linked to high levels of LDL cholesterol. The genes that you inherit from your parents, other medical conditions, and certain medicines can also cause high cholesterol.

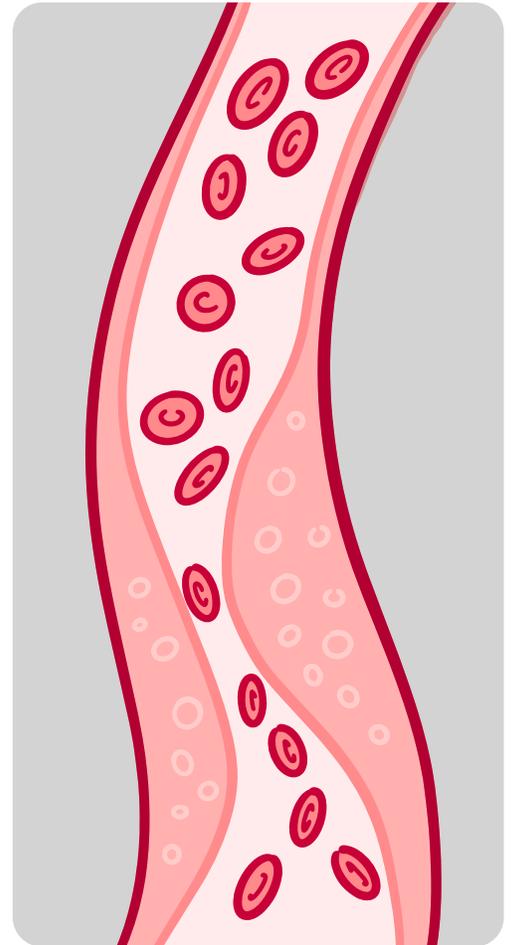
You may also have heard about "good" cholesterol: high-density lipoproteins, or HDL. HDL particles absorb cholesterol and carry it to the liver. The liver then flushes it from the body. That's why scientists previously thought that raising levels of HDL cholesterol might lower your risk for heart disease and stroke.

But recent research suggests that HDL cholesterol works better in some people than others. And clinical trials haven't found that medicines aimed at raising HDL cholesterol reduce the risk of heart attack. There's still a lot to learn about HDL.

Lab tests can measure the different types of cholesterol in your blood. How often you should get tested depends on your age and other risk factors, including a family history of high cholesterol or heart disease.

If tests show that you have a high level of LDL cholesterol, your doctor may order additional tests. You can try to lower it by eating a heart-healthy diet, being physically active, and losing excess weight.

For some people, lifestyle



changes aren't enough to lower LDL cholesterol. Your biological makeup can be a strong influence on cholesterol buildup, too. In these cases, a type of drug known as a statin is the usual treatment. Doctors may combine statins with other drugs.

If your LDL cholesterol is very high, Krauss says it's important that your family members get tested, too. If your genes put you at risk for high cholesterol, your close relatives might have a similar risk.

Talk to your doctor about getting tested. And remember that heart-healthy lifestyle changes can not only lower cholesterol levels but also bring many long-term health benefits. ■



Wise Choices

Keep Cholesterol in Check

- Maintain a healthy weight.
- Choose a nutritious diet. Limit red meat and get plenty of fish, nuts, whole grains, beans, fruits, and vegetables.
- Get enough physical activity. Before starting, ask your doctor what level is right for you.
- Talk with your doctor to see if medication is right for you.



Web Links

For more about cholesterol, see "Links" in the online article: newsinhealth.nih.gov/2019/02/control-your-cholesterol

Health Capsules

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

Vaping Rises Among Teens

A new survey found an alarming rise in the number of American teens who tried vaping last year. The study suggests that vaping may be driving an increase in nicotine use for teens.

In vaping, a battery powered device called an e-cigarette heats a liquid into a vapor that can be inhaled. The vapor may contain nicotine (the addictive drug in tobacco), flavoring, and other chemicals. E-cigarettes can also be used with marijuana, hash oil, or other substances.

Vaping may pose serious and avoidable health risks. Exposure to nicotine during youth can lead to addiction and cause long-term harm

to brain development. The vapor can also contain toxins (including ones that cause cancer) and tiny particles that are harmful when breathed in.

More than 44,000 students took part in the 2018 annual survey of drug, alcohol, and cigarette use in 8th, 10th, and 12th graders.

About 37% of 12th graders reported vaping in 2018, compared with 28% in 2017. Vaping of each substance that was asked about increased. This includes nicotine, flavored liquids, marijuana, and hash oil.

“Vaping is reversing hard-fought declines in the number of adoles-

cents who use nicotine,” says Dr. Richard Miech, who led the study at the University of Michigan. “These results suggest that vaping is leading youth into nicotine use and nicotine addiction, not away from it.”

“Teens are clearly attracted to the marketable technology and flavorings seen in vaping devices,” explains Dr. Nora D. Volkow, director of NIH’s National Institute on Drug Abuse. “However, it is urgent that teens understand the possible effects of vaping on overall health, the development of the teen brain, and the potential for addiction.” ■

Wellness Tips in Spanish

Good health means more than preventing and treating disease. It also means striving for well-being in all areas of your life.

“Your Healthiest Self: Wellness Toolkits” provide simple ways to prevent disease and improve your relationships, emotional well-being, physical health, and surroundings. NIH has now released a Spanish version, “Su Versión Más Saludable: Herramientas de Bienestar.”

Find out about eating right, getting enough physical activity, and guarding yourself from germs and bugs. Get advice for managing stress and adapting to change. And learn how to improve your relationships. Scientists are finding that our connections with others can have powerful effects on our health.

You can print out checklists of tips as a quick reminder for yourself, family, and friends. Find the toolkits

at salud.nih.gov/recursos-de-salud/herramientas-de-bienestar. The English versions are at www.nih.gov/wellnesstoolkits.

“Su Versión Más Saludable” is part of salud.nih.gov, the NIH Spanish Health Information Portal. The portal captures Spanish materials from across dozens of NIH websites. ■

Featured Website

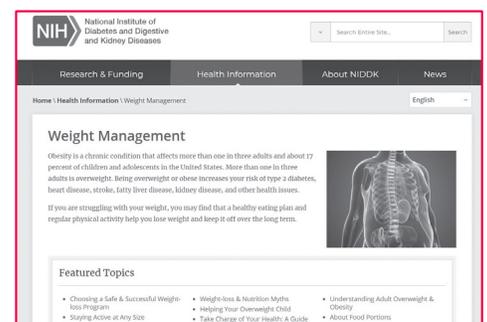
Weight Management

www.niddk.nih.gov/health-information/weight-management

Do you struggle to lose weight? Being overweight or obese increases your risk of type 2 diabetes, heart disease, stroke,

fatty liver disease, kidney disease, and other health issues.

Discover tips and tools to help you lose weight and keep it off.



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