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InFLUenza

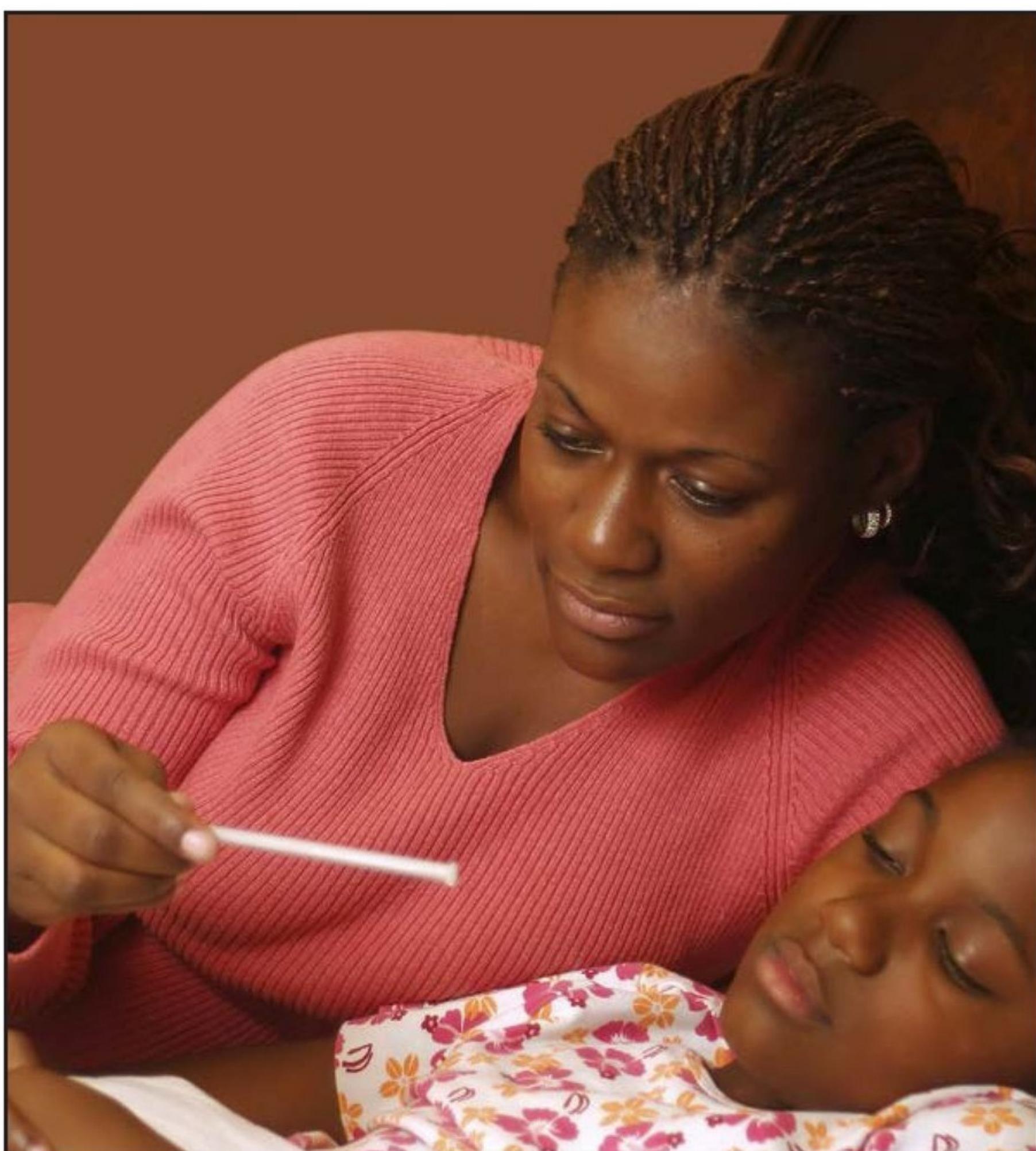
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A close-up photograph of a young child's face. The child has dark hair and is looking slightly upwards and to the side. A person's hand is visible, resting on the child's forehead. The background is dark.

Written by Ned Jensen

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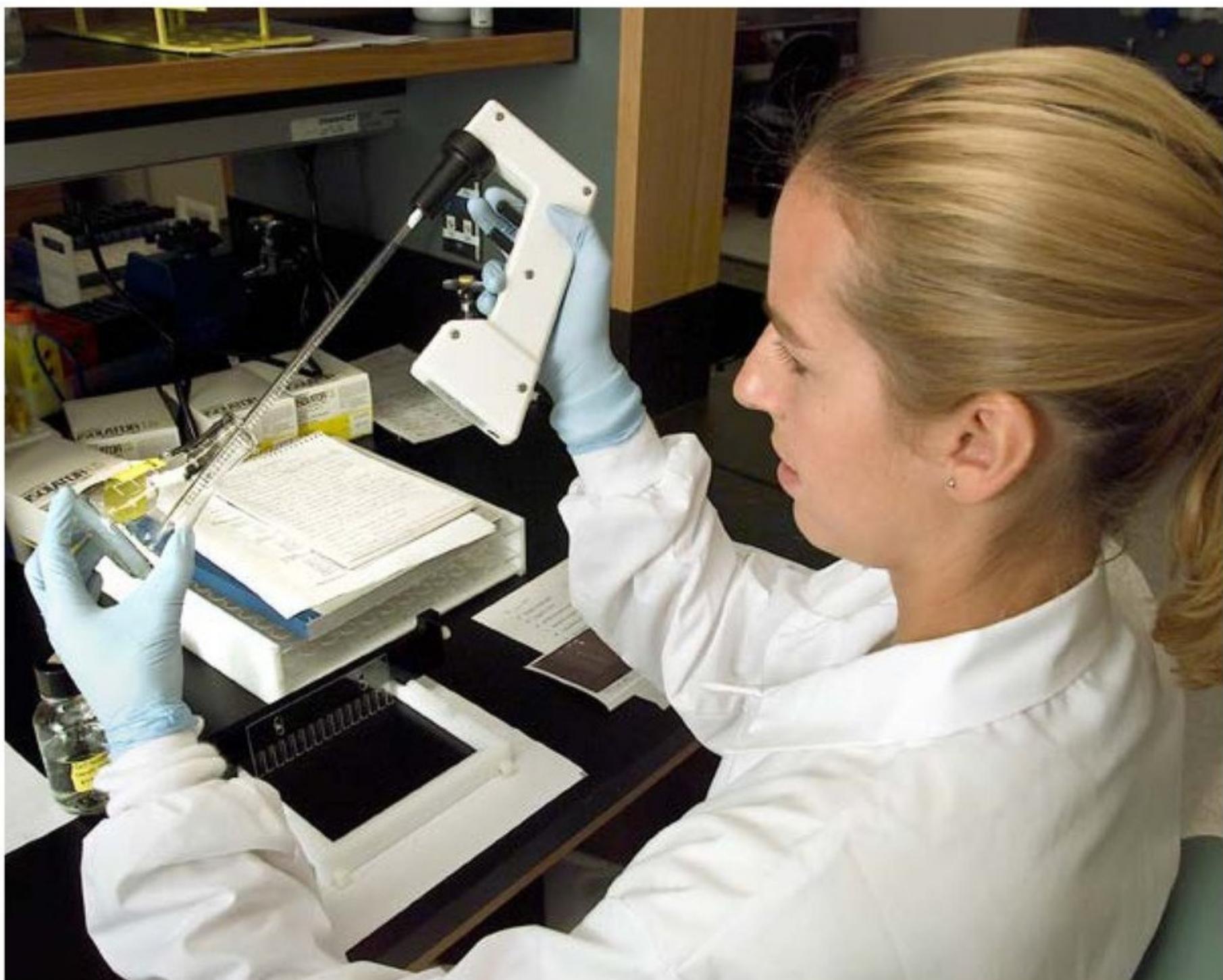


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Introduction

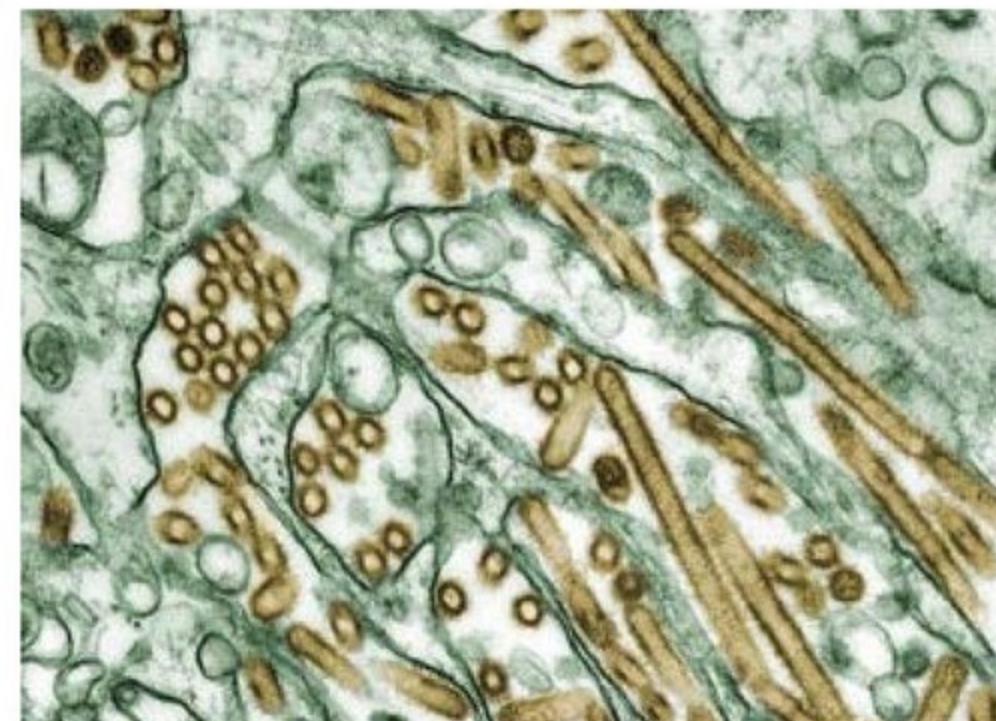
Have you ever shivered with chills or burned up with a fever? Have you ever had a sore throat, a stuffy nose, a pounding headache, and muscle aches? Have you ever felt really tired and sleepy, even though you've just woken up in the morning? If you feel symptoms such as these, flu **germs** may have invaded your body. By learning about the flu—what it is, what causes it, what its symptoms are, and how to treat it—you can fight back against this illness and stay healthy.



A water bottle
and a blanket
can help when
you have the flu.

What Is the Flu?

The flu is also called influenza (in-floo-EN-zah). It's caused by a **virus** that has the ability to quickly spread between people. A virus is a tiny **microorganism**—a **microbe**, or germ—that is invisible to the naked eye. Very simply, a virus is a little bit of **genetic material** surrounded by a hard **protein** shell that protects it. Viruses are **submicroscopic**—so small that scientists must use powerful microscopes to see them. Even when viewed through a microscope, a virus can only be seen after its image has been magnified to one thousand times its original size. In fact, viruses are so small that hundreds of thousands of them can live on the head of a pin.

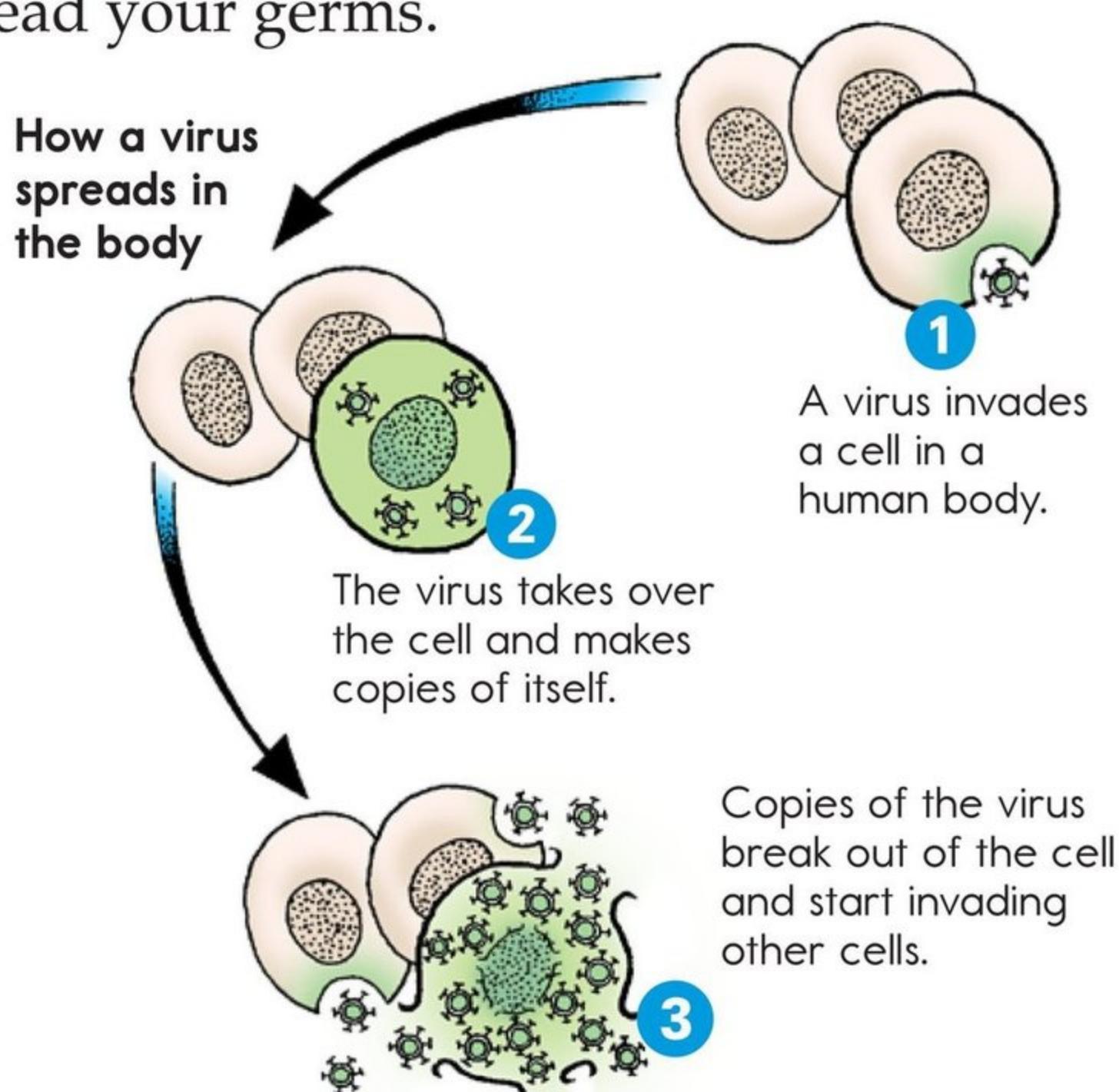


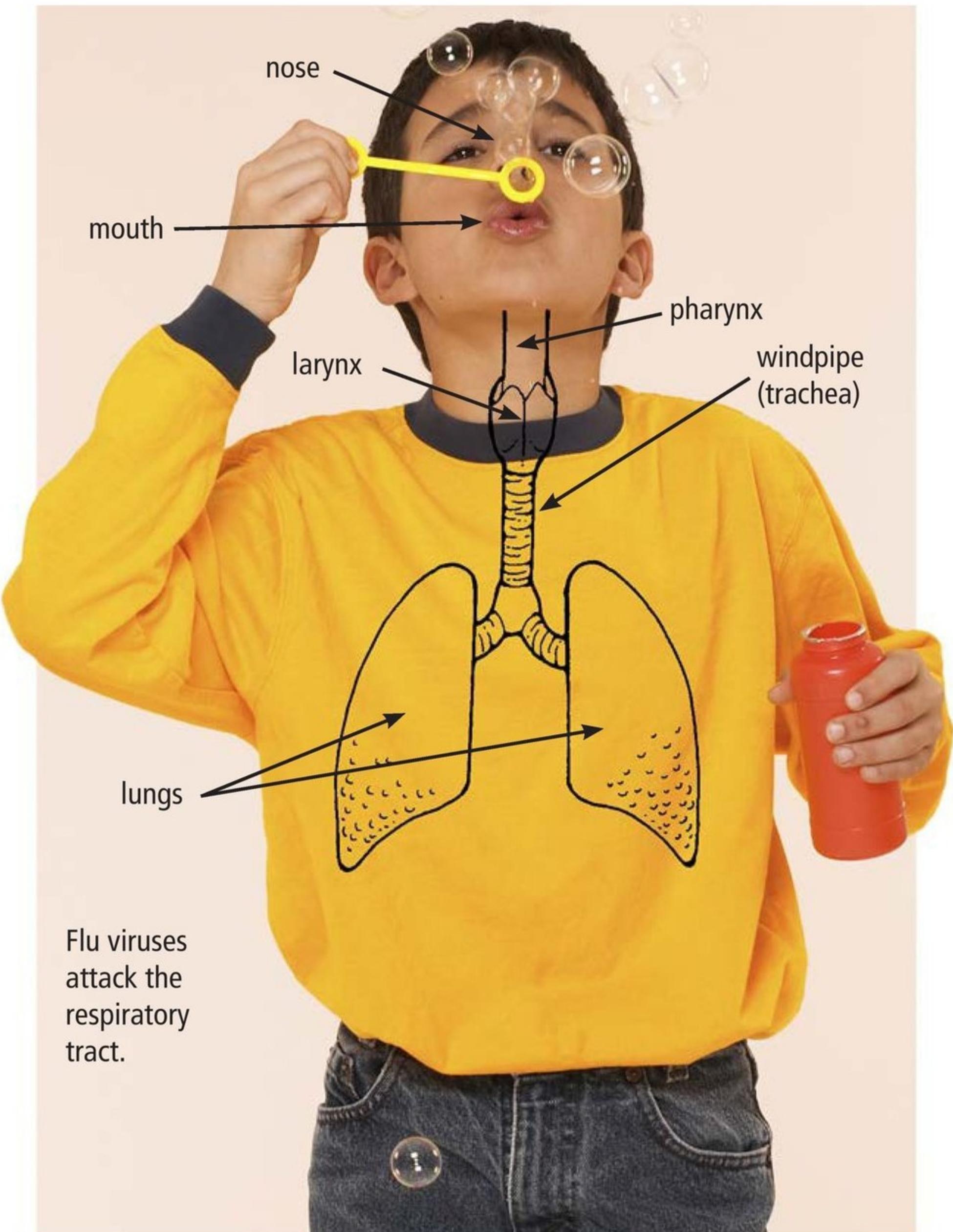
Avian influenza virus

Viruses are everywhere. Some won't bother you at all, but some can be dangerous to people and other animals. During flu season, which lasts from October to May in the northern hemisphere, viruses are particularly widespread. Like many other organisms, viruses need a particular type of home. Viruses survive by making their homes inside animals.

Viruses act like **parasites** in your cells. Although they can survive for long periods on their own, they must eventually find organisms to serve as **hosts**. Viruses use the cells of the hosts to reproduce. When a virus infects a human being, it uses its hard protein shell to make a hole in a cell, which it then invades. Once inside a cell, the virus rapidly makes copies of itself. One to four days after infection, the host may begin to feel sick.

Influenza is spread through the passing of viruses from one person to another. For this reason, it is always important to wash your hands and to cover your mouth when you cough or sneeze. If you are infected, it is important that you stay home, away from other people, so you don't spread your germs.





Flu viruses
attack the
respiratory
tract.

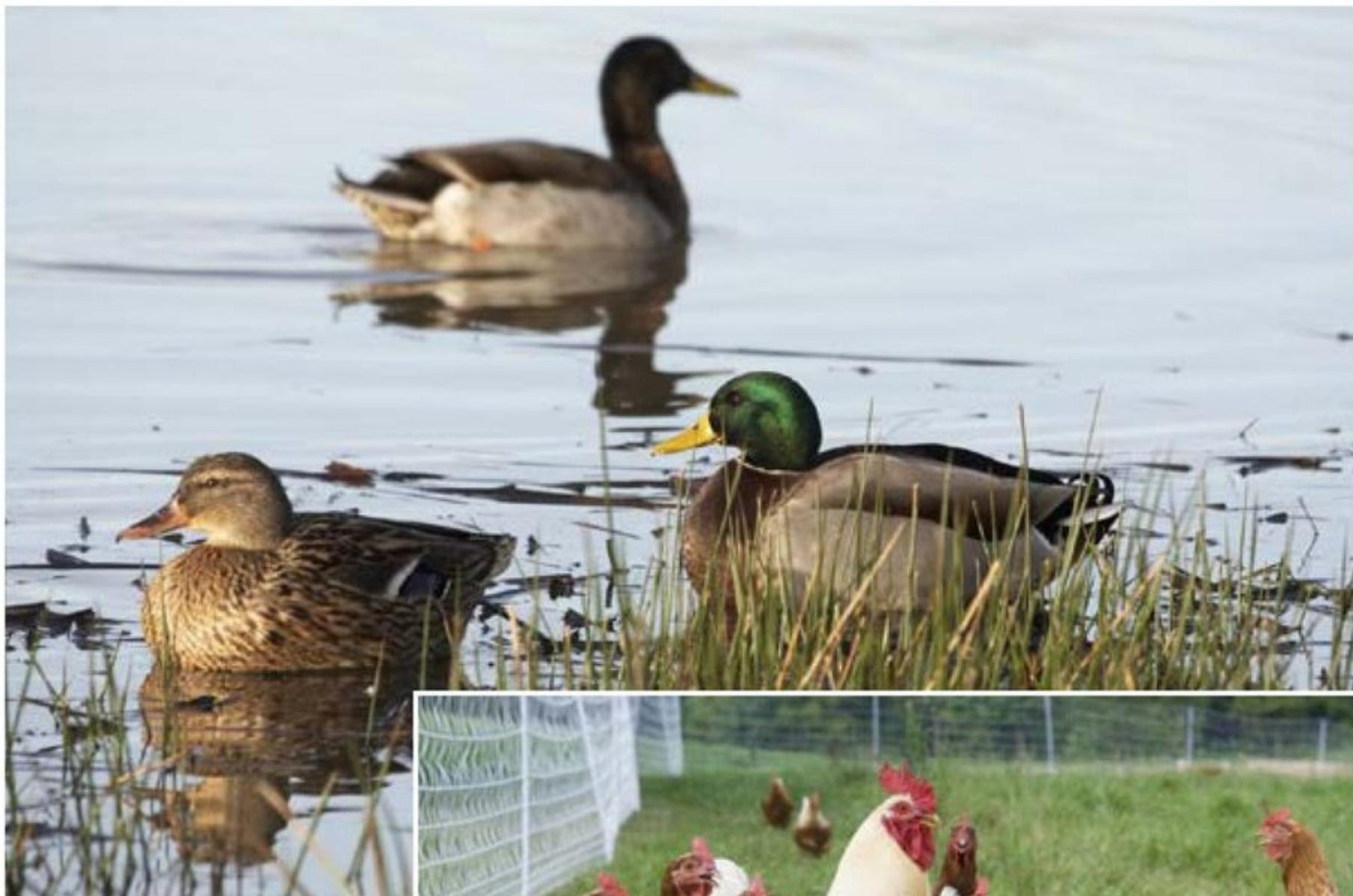
Different viruses cause the many different kinds of flu, but the symptoms are similar. Influenza is an infection of the **respiratory tract** that usually causes you to feel achy, feverish, **congested**, sick to your stomach, and worn down.

Influenza has three basic types: Influenza A, Influenza B, and Influenza C. Influenza A, which can cause serious illness in humans and other animals, is usually responsible for large outbreaks. Influenza B is milder, causes smaller outbreaks, and affects only humans (mostly children). Influenza C usually causes only mild illness in humans.



Tiny drops of saliva and mucus fill the air when you sneeze.

All types of influenza can be passed from an infected person to a healthy person through the air or on objects such as eating and drinking utensils. The flu virus is carried in saliva from an infected person's mouth and on droplets of mucus sneezed or coughed into the air.



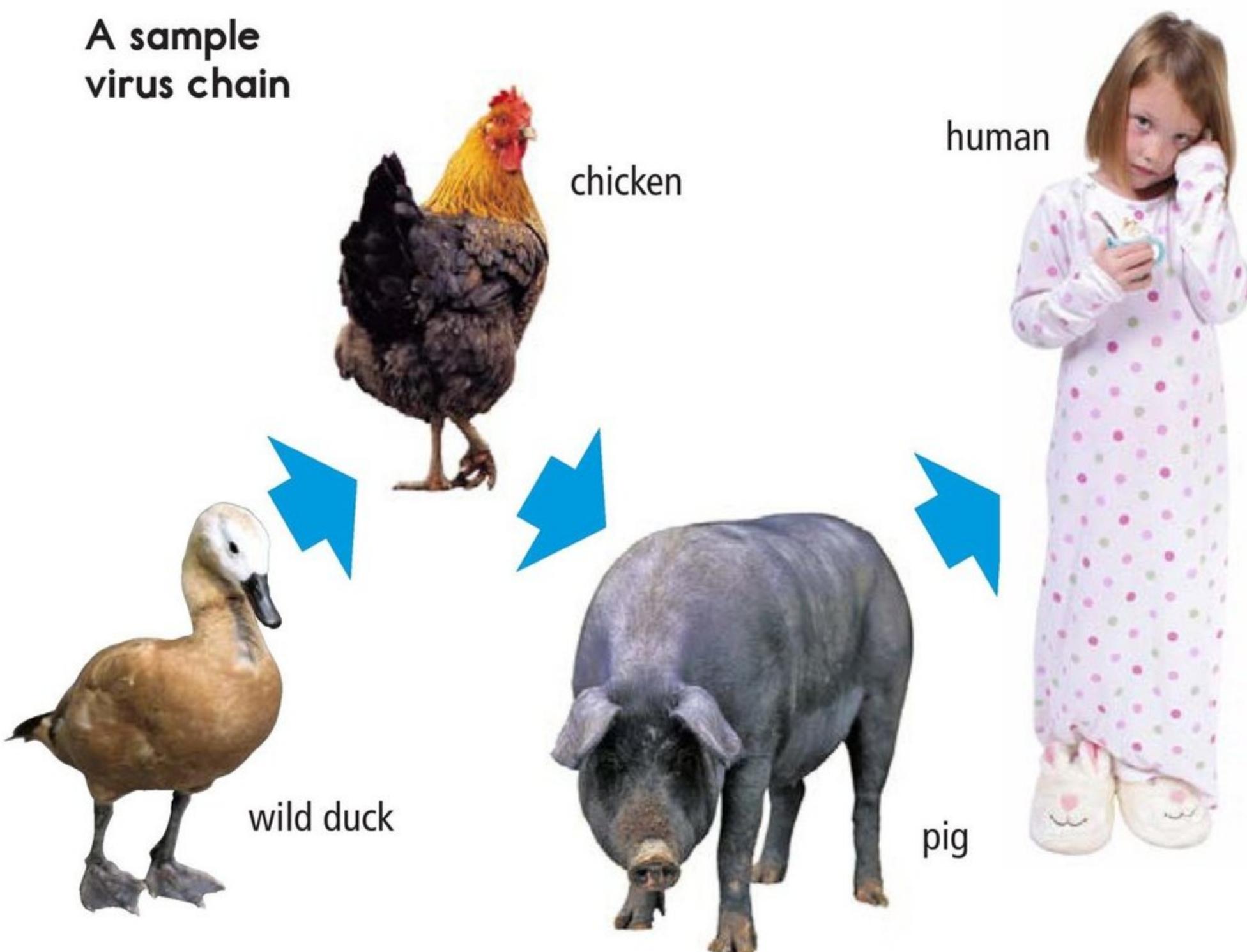
Wild birds (above) often pass viruses to farm chickens (right), which come into more contact with people.

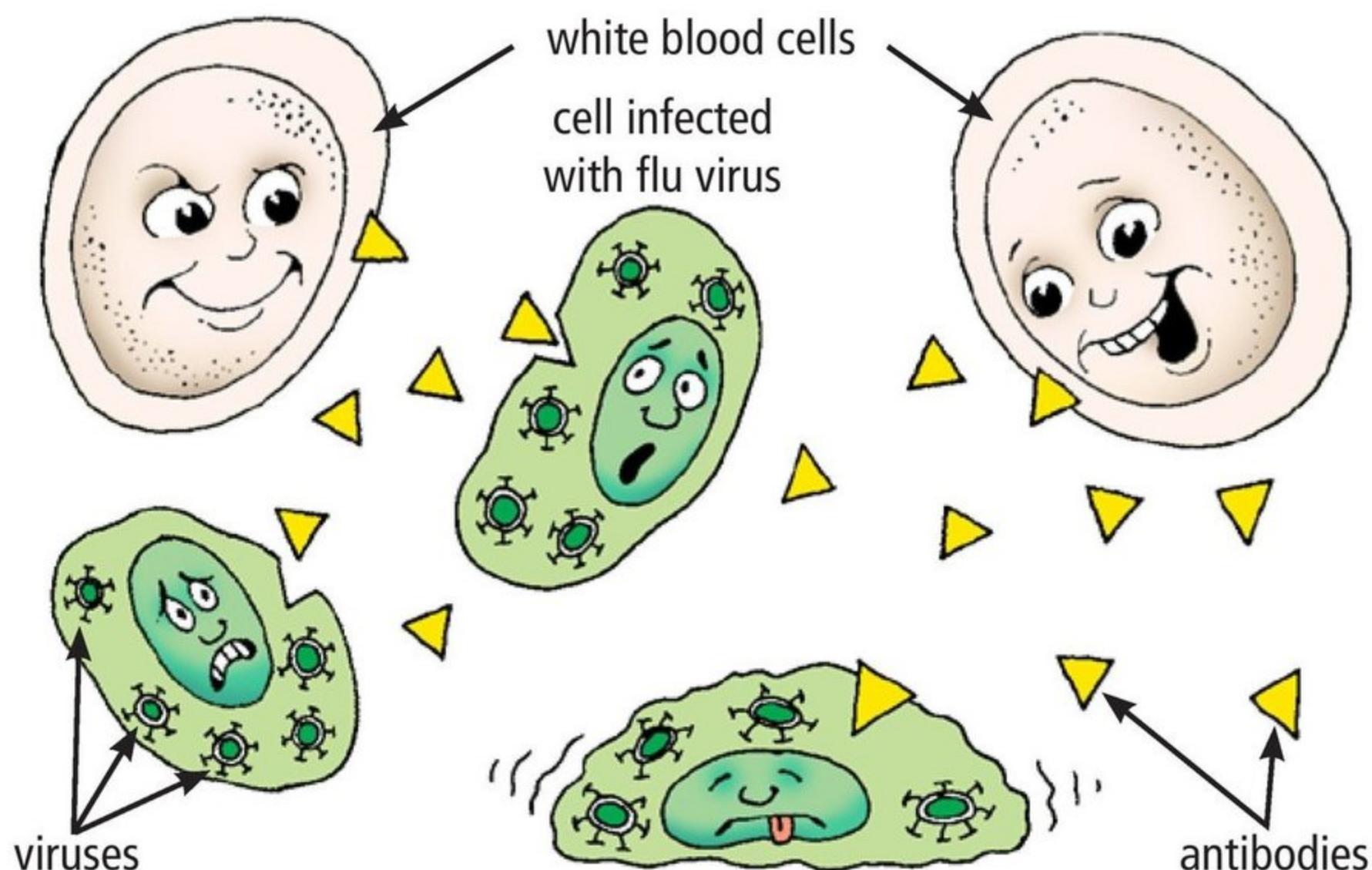
Changing Viruses

Viruses are capable of changing, or **mutating**, and flu viruses are among the most changeable of all viruses. Each type of virus that mutates from another virus is called a **strain** of that virus. Many influenza viruses start in wild animals, most often in birds. These viruses can easily mutate into strains that infect ducks and chickens on farms. Once a virus has infected birds on farms, it can further mutate into strains that infect animals such as pigs, and even humans.

The chain of animals infected varies from virus to virus. A single virus chain may include animals as different as dogs and whales. Since chickens, pigs, and humans come in close contact on farms, the spreading and mixing of viruses can have deadly consequences. Sometimes a virus takes a shortcut in the chain, such as the avian virus of 1997, which jumped directly from birds to humans.

Influenza can pose a serious threat to humans. Even if your body fights off the illness, the virus can mutate into a different strain. Then your body must start all over again, learning how to fight the new strain. Scientists always worry that the next new strain will be even more deadly than previous ones.





The Body Fights Back

The human body has ways of fighting back against an invasion of flu viruses. The immune system protects against the invasion of harmful microbes by producing chemicals called **antibodies**, which travel in the blood and patrol the body in search of invaders. When they find an **invasive** microbe, antibodies attack and destroy any cells that contain the virus.

However, if the immune system of a human body invaded by a virus is already weak, viruses can gain a foothold and begin reproducing themselves faster than antibodies are able to destroy them. When this happens, the body comes down with flu symptoms that quickly get worse without medical care.

Preventing the Virus from Taking Over

You can take some commonsense actions to prevent a flu virus from entering your body. Two of the best ways to stay healthy are by getting plenty of rest and eating well. Avoid contact with objects used by infected people for eating and drinking. To reduce your **exposure** to the influenza virus, wash your hands frequently and keep your fingers out of your mouth. Remember that an infected person can be **contagious** before showing any symptoms. The person may not know he or she has been infected and is about to get sick. Avoiding people who have flu symptoms, such as sneezing and coughing, will also help protect you from the virus.



Washing your hands often will help keep you from getting the flu.



Scientists study ways to help your body fight the flu.

However, even the most cautious people can become infected. Fortunately, medical scientists have found a way to keep the flu virus from taking over your body: **vaccines**. Vaccines are weakened or dead flu viruses that are injected into a person's body. These weakened viruses cause the body to produce antibodies that attack and destroy the weakened or dead germs. Once the body has produced antibodies to destroy the viruses in the vaccine, it is on alert and prepared to attack stronger viruses that may invade during flu season.

Each strain of a virus requires a different vaccine. Some flu vaccines contain several strains. When these strains are injected into the body, each one causes the body to produce a particular antibody to destroy it. In this way, the body is prepared to defend against many strains of viruses that doctors think might be present during flu season.

Vaccines for most viral strains have an eighty-percent prevention rate, which means that eighty percent of the time, you won't get sick from a strain you have been vaccinated against. That's pretty high, but it's not perfect, so you might still get the flu even if you've been vaccinated. But if you've had the vaccine, your symptoms will be milder—you won't ache so much, and you won't feel so hot. However, if you are infected with a strain different from those in your flu shot, you can still get very sick. Scientists must be good detectives to guess which strains to put into the flu shot each year.

Not everyone has the same risk of catching the flu, and some people get more seriously ill than others. People who are very young or very old, or who already have health conditions such as diabetes and heart disease, are at greater risk of catching the flu than others.

High-Risk Populations

People over 65	
Babies and very young children	
Pregnant women	
People with diabetes	
People with heart and lung disease	
People who are sick and exhausted	
Healthcare workers	

Do You Know?

I bet you didn't know that many vaccines are made in hundreds of millions of specially grown chicken eggs! Can you imagine that many eggs? They would fill up about fifty football fields.

Scientists and doctors begin by separating viruses to isolate the selected virus. Then, as you might expect, they kill or weaken the virus and combine it with two other dead virus strains that have been similarly grown in chicken eggs. Then they combine the dead and weakened viruses to make a vaccine to protect you from each strain.



Treating the Flu



Preventing the flu is not always possible. However, once viruses infect your body, you can still do several things to fight back. Pharmacies offer many over-the-counter medicines that can help relieve the effects of the flu. These medicines can take away the achy feeling in your head and muscles. They can also help reduce a fever.

Drinking plenty of fluids, such as water or fruit juices, is also important when you have the flu. You should also get plenty of rest so your body can better fight the viruses that have invaded your cells.





A doctor gives children shots of vaccine in 1941.

History of the Flu

Many outbreaks of influenza have occurred throughout history. Some of them have been mild and not very widespread. Other outbreaks have been severe, spreading throughout the world and killing millions of people. Once a flu virus develops and infects a few people, it can spread rapidly and become an **epidemic**. Flu epidemics have been recorded as far back as four hundred years ago, and each has killed thousands of people or more.

The history of any influenza outbreak begins with a single person. On March 11, 1918, a young man in the U.S. Army reported to a hospital with a fever, sore throat, and a headache. Shortly after, many other soldiers at his base developed the same symptoms. In one week, the Army hospital was treating more than five hundred sick soldiers. By the end of spring, forty-eight of those people had died. At first, no one knew why, not even the doctors and scientists. Doctors later learned that the illness was caused by a particular strain of the influenza virus.

In total, this strain of influenza, known as the Spanish flu, killed more than 600,000 Americans and 25 to 40 million people worldwide. When an outbreak reaches this size, it is known as a **pandemic**—a disease that spreads rapidly around the world.



1918 Spanish flu patients



This map shows an example of how pandemics, such as the Asian flu of 1957–1958, might spread from one area to many others.

But the pandemic of 1918 was not the only major influenza outbreak in history. The Asian flu, which appeared in 1957, caused about 70,000 deaths in the United States. It got its name because it first appeared in China before coming to the United States in June 1957. Another strain of flu, the Hong Kong flu, was first detected in Hong Kong, China. In 1968, this virus caused another pandemic, resulting in 34,000 deaths in just the United States—as many people as live in a small city. And in 2009, the H1N1 swine flu became the first pandemic in 41 years, infecting people in over 70 countries.

Other outbreaks have caused widespread concern without developing into pandemics. These include the Russian flu in 1977 and the avian flu in 1997 and 1999. Both of these strains of flu began in regions of China and spread to other countries. Doctors are always on the lookout for the next major outbreak. They believe that if they can detect outbreaks quickly enough, they can keep them from becoming worldwide pandemics.



Masks that fit around the nose and mouth are sometimes worn to help prevent the spread of viruses. However, the masks do not work all the time.

Conclusion

Because flu viruses can change and develop into new strains, influenza may never be eradicated. When you have the flu, the most important thing to do is take care of yourself and prevent others from getting sick. Keep your germs to yourself by staying away from other people and covering your nose and mouth when you cough or sneeze. Drink water like a thirsty camel and sleep like a hibernating bear. Getting a flu vaccine each year can also help. Most importantly, remember to attack back! Good food and rest will help the healthy cells in your body win the battle.



Glossary

antibodies (<i>n.</i>)	chemicals produced by the body that attack invading germs (p. 11)
congested (<i>adj.</i>)	filled up or blocked (as with mucus in the nose and throat) (p. 7)
contagious (<i>adj.</i>)	able to spread from one organism to another (p. 12)
epidemic (<i>n.</i>)	the rapid spread of a disease within a community (p. 18)
exposure (<i>n.</i>)	unprotected contact with something harmful (p. 12)
genetic material (<i>n.</i>)	the part of a cell that carries the basic information about an organism's characteristics (p. 5)
germs (<i>n.</i>)	microorganisms that often cause sickness or disease (p. 4)
hosts (<i>n.</i>)	organisms in or on which another organism lives (p. 6)
invasive (<i>adj.</i>)	relating to moving into a new area or body with harmful or disruptive effects (p. 11)
microbe (<i>n.</i>)	See <i>microorganism</i> (p. 5)
microorganism (<i>n.</i>)	a microscopic organism, such as a virus or single bacterial cell (p. 5)

mutating (<i>v.</i>)	changing into a different form (p. 9)
pandemic (<i>n.</i>)	the rapid, worldwide spread of a disease (p. 19)
parasites (<i>n.</i>)	organisms that grow in and feed off other organisms (p. 6)
protein (<i>n.</i>)	an essential nutrient found in the cells of all living things (p. 5)
respiratory tract (<i>n.</i>)	the passages in the nose, mouth, throat, and lungs through which air travels during breathing (p. 7)
strain (<i>n.</i>)	a group of microbes of the same type (p. 9)
submicroscopic (<i>adj.</i>)	too small to be seen with an ordinary microscope (p. 5)
vaccines (<i>n.</i>)	medicines made of weak or dead viral strains that teach the body to fight stronger viruses of the same type (p. 13)
virus (<i>n.</i>)	a microorganism that infects the body; a disease caused by a virus (p. 5)

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