[Narrator] What does it mean to be healthy? Health is not just the absence of disease. Health is a person's physical, mental, and social well-being. A person's health is affected by many factors, including their biology, their choices and behaviors, and their environment.

Some diseases are influenced by genes inherited from parents. People may also be at risk due to their age, previous medical history or biology. People can strive for good health by making positive choices and choosing health-promoting behaviors whenever possible. Positive choices can include regular exercise, healthy eating, self-care, and having healthy social connections with others. Often, these choices and behaviors are influenced by the people closest to a person, such as their family and friends.

Conditions in the environment where people live, work, and play can also affect a person's health. Stress, now recognized as an important risk factor, can stem from family relationships, school, living and societal conditions. These environmental conditions, also called social determinants of health, include things like safe housing, discrimination, pollution, language skills and access to education, nutritious foods, and health care.

When a person feels unwell, they might see a healthcare provider such as a medical doctor, nurse practitioner, or therapist to help them get better. Healthcare providers focus on the individual's health. They use their knowledge and experience to diagnose and treat health problems to help individuals improve and maintain their well-being.

When a health problem affects a group of people, public health workers can help solve or reduce the problem. Epidemiologists, laboratory scientists, health educators, and other public health experts use their expertise to improve and protect the health of communities.

Public health experts protect and improve the health of communities through programs, policy recommendations, health education and outreach, and research for disease detection and injury prevention.

These can include creating public programs like restaurant inspections, vaccination clinics, or laws, like limiting smoking areas, that reduce public exposure to harmful materials. They also include investigating and preventing disease outbreaks. In essence, public health can be described as "what we as a society do collectively to assure the conditions in which people can be healthy."

Meet Ezra, an epidemiologist. As a public health professional, Ezra monitors the patterns and frequencies of diseases, conditions or behaviors that affect health. He tries to understand disease causes and the individuals who are at a higher risk than others for being affected. His goal is to use what he learns to help control or prevent disease in the community.

For example, Ezra may investigate a pattern of lung problems among young people. Data may indicate an association between these lung problems and use of vaping devices or e-cigarettes. He uses what he learns to help control the problem by taking actions with the help of other public health experts, and health and government organizations. These might include creating health messages explaining the dangers of vaping, promoting policies to reduce access to vapes for young people, or offering training classes to parents on the risks for vaping among teens.

Depending on what is happening in the community, Ezra may examine different types of health problems, such as harmful exposures to chemicals or toxins in the environment, injuries, natural disasters, and diseases.

Some diseases are infectious, which means they are caused by an infectious agent that lives and multiplies in the infected individual. Some infectious diseases are considered contagious. Contagious diseases are infectious diseases that are easily spread through contact with other people. For example, measles is a contagious disease. Other diseases, like asthma or cancer, are not infectious or contagious.

Infectious diseases are caused by infectious agents such as bacteria, viruses, parasites, and fungi, which multiply within an individual host and cause damage. You may be most familiar with infectious diseases like influenza (flu) or salmonellosis (which you might know better as food poisoning).

Sometimes an infectious disease is caused by an infectious agent that is new to science or is an agent we know about but has not infected humans before. If the agent is a virus, we call it a novel virus. Not novel like a book, but novel as in new or unusual in an interesting way.

When novel viruses arise, few if any people have any natural resistance to the infections they cause. If these novel viruses can spread rapidly from one person to another, infection may become widespread across countries and continents.

For example, the common cold can be caused by a type of coronavirus that is already familiar to science and produces mild illness. However, in late 2019 the world began to experience another type of coronavirus. This type was one that had not been seen before and led to the COVID-19 pandemic. The virus that causes COVID-19 is a novel virus. It is a new, previously unrecognized type of coronavirus.

Part of Ezra's job is to detect and control outbreaks of disease in his community. He monitors disease levels by counting cases of specific diseases. Ezra looks for patterns in the location of cases as well as changes in the number of cases over time. Decreases may indicate that prevention strategies for certain diseases are working, while increases may indicate problems that need to be addressed. Ezra may want to classify the disease levels in the community. Common levels of disease occurrence used by epidemiologists include endemic, cluster, outbreak, epidemic, or pandemic.

We say a disease is endemic when there is a constant amount of that specific disease present in a geographic location, like a state or country.

For example, malaria is endemic in Nigeria where the particular mosquito that carries the malaria parasite is normally found. Because both the mosquito and the parasite can be found there, and because prevention strategies are limited, malaria continues to spread at constant levels each year.

Malaria is not endemic in areas where the malaria-carrying mosquitoes and the malaria parasites are not found together. For example, in the United States, malaria is not endemic. Although the malaria-carrying mosquitos are found there, the malaria parasite is nearly absent due to previous public health preventative measures. Therefore, malaria spread is not expected to occur within the United States. There are a few cases of malaria reported in the United States

each year, but these mostly occur in people returning from travelling in countries where malaria is endemic.

Sometimes the number of people experiencing the same health problem in an area rises unexpectedly, so Ezra would investigate to find out why. Ezra would compare this number to the expected level of the problem in the community.

Sometimes one case of a disease is enough to trigger an investigation, especially if the disease is unusual and severe — like human rabies — or can spread easily and quickly — like measles.

On the other hand, some increases in disease numbers are expected during the year. Going from 100 to 300 cases of influenza in some areas during November through December would not be unusual for a seasonal disease that is endemic in the United States during the wintertime.

A cluster is a group of cases of the same health issue that occur in a limited geographical area — like a school or neighborhood. The expected number and specific details of the source and cause of the cases might not be known yet. For example, several students may present with food poisoning symptoms at a local high school in the same month — or three children may be diagnosed with cancer in a particular community during the past two years. Ezra's job is to investigate the clusters to determine if the number of cases is above expected, and, if so, why. The number of students with food poisoning symptoms is likely more than expected, but the cancer cases may not be, particularly if the children have different types of cancer.

Epidemiologists often compare the number of current cases of a disease to the expected level, or baseline number of cases that is usually present in a particular location. The expected level may be known through past and present records or public health surveillance.

If the number of cases is more than expected, a cluster is called an outbreak. An outbreak is a greater number of cases than expected in a location within a certain time period. Usually, cases are presumed to have a common cause or be related in some way.

During an outbreak, Ezra would gather information to look for a cause. For example, in the food poisoning scenario, Ezra interviewed the students and determined that the common source was cookie dough from the school's fundraiser. Ezra worked with school officials to stop sales of the fundraiser cookie dough, share the dangers of eating any raw cookie dough and make recommendations on how to safely make, store, and consume cookie dough.

An epidemic is an outbreak either with a larger number of cases or occurring over a greater area or both. For example, the local cases might be part of a larger epidemic if the cookie dough was a commercial fundraising product sent to high schools all over the country, leading to food poisoning cases in multiple states.

Typically, a pandemic is bigger than an epidemic and includes spread over several countries or continents. Usually, for this to occur, the disease is spread easily from person-to-person. When a disease spreads at this level, declaring a pandemic makes resources more available to governments around the world to work together to share knowledge, learn from each other, and cooperate to overcome the global challenge.

So, as a recap, let's answer the question "What exactly is a pandemic?" A pandemic refers to a disease event in which there are more cases of a disease than expected spread over several

countries or continents, usually involving person-to-person transmission and affecting a large number of people.

Pandemics often remind us of all the people who work in the background to keep us healthy. These include not only healthcare providers who care for and treat health problems in individuals, but also public health workers who protect and improve the health of our communities.

Epidemiologists are public health experts who monitor and study patterns in disease occurrence data. These data come from counting cases described by person, place, and time. Patterns in data tell us the level of disease: endemic, cluster, outbreak, epidemic, and pandemic.

Endemic is when cases are generally constant and occur regularly and in a specific location.

Cluster refers to a group of cases of the same health issue that occur in a limited geographical area — like a school or neighborhood.

Outbreak refers to a greater number of cases than expected in an area within a certain time period. Usually, the cases are presumed to have a common cause or be related in some way.

An epidemic is similar to an outbreak but with a larger number of cases or occurring over a greater area.

A pandemic is like an epidemic but even more widespread over several countries or continents.

Most of the diseases posing the greatest risks to humans are contagious meaning that they are caused by an infectious agent and can be spread from person to person. Although many of these diseases are well known, novel diseases will continue to emerge and challenge us.