

Healthy Animals, Healthy People



Healthy Animals, Healthy People

ABOUT THE PROGRAM

Zoonotic diseases are diseases that can be shared between animals and people. More than half of all infections that people get are zoonotic diseases.

Maine Center for Disease Control and Prevention's (Maine CDC) Infectious Disease Epidemiology Program in collaboration with Maine Department of Agriculture, Conservation and Forestry (Maine DACF) designed this curriculum to educate youth involved in agriculture.

This program provides education concerning One Health, zoonotic diseases, and biosecurity practices to keep ourselves and our animals healthy.

This text accompanies a PowerPoint presentation, "Healthy Animals, Healthy People." As you read the text, there will be a note about which PowerPoint slides relate to that section of text.

Each slide includes a list of definitions for new vocabulary.

Introduction and Overview:

1. Purpose of this program:

The purpose of this program is to learn how to keep ourselves and our animals healthy. These materials will be available for you to take and teach to the youth in your organization.

1. Sequence of the lesson:

We will start with a presentation on keeping ourselves and our animals healthy through the prevention of zoonotic diseases. Then we will break in to small groups and do activities for hands-on-learning of zoonotic diseases and how they spread.

2. Encourage questions and conversation:

We are going to learn about zoonotic diseases and how to keep ourselves and our animals healthy. Don't be afraid to ask questions!

What Is One Health?

The concept that animal health, human health, and environmental health are all connected.



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One Health

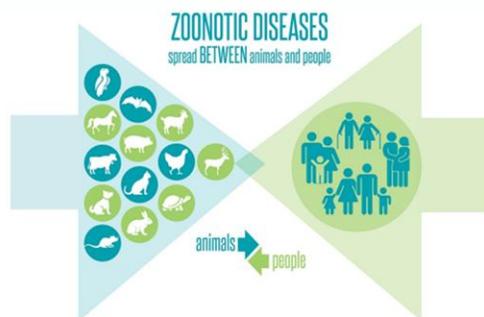
What is One Health? (slide 3)

The One Health concept recognizes that the health of people is connected to the health of animals and the **environment**. The goal of One Health is to achieve optimal health for all three. This is accomplished by working with physicians, veterinarians, ecologists, and many others to monitor and control public health threats and to learn about how **diseases** spread among people, animals, and the environment.

Vocabulary:

- **Disease**- An illness that affects a person, animal, or plant.
- **Environment**- The surroundings and conditions outside of the host that cause or allow diseases to be spread.

What Are Zoonotic Diseases?



Scientists estimate that more than **6 in every 10** known infectious diseases in people are spread from animals

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Zoonotic Diseases- Background

What are Zoonotic Diseases? (slide 4)

Zoonotic Diseases are illnesses that can be spread between humans and animals. These diseases are caused

by harmful germs, also known as **pathogens**, like **viruses**, **bacteria**, and **parasites**. These germs can cause many different types of illness in people and animals ranging from mild to serious illness and even death. Scientists estimate that more than 6 out of every 10 known infectious diseases in people are spread from animals. Each year, tens of thousands of Americans will get sick from zoonotic diseases.

Vocabulary:

- **Pathogen**- Germs that can cause illness.
- **Viruses**- A small germ that can cause illness and needs a living thing to spread. Some viruses can cause disease in humans, other animals, and plants.
- **Bacteria**- Single-celled germs that can be found everywhere. Some bacteria are harmless, some are useful, and others can cause infection.
- **Parasites**- Organisms that live in or on a different organism.

How Do Zoonotic Diseases Spread?



Direct Contact

Indirect Contact

Vectorborne

Foodborne

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How Do Zoonotic Diseases Spread? (slide 5)

The most common ways people can get infected with the germs are through **direct contact**, **indirect**

contact, vectors (vectorborne), and food (**foodborne**).

Vocabulary:

- **Direct contact** - Contact with an infected human or animal, its tissues, or its fluids by way of open wounds, mucous membranes (such as the lining of the digestive, respiratory, or urinary tracts), or scraped skin.
- **Indirect contact** - Contact with areas where animals live and roam, or objects or surfaces that have been contaminated with pathogens. Examples include petting zoos, pet habitats, chicken coops, plants, and soil, as well as pet food and water dishes.
- **Vector**- A living thing that can spread an illness to others such as a tick, a mosquito, or a flea.
- **Foodborne**- When an illness is caused by germs found in food and drinks such as unpasteurized milk, undercooked meat or eggs, or contaminated raw fruits and vegetables

Why Do Zoonotic Diseases Matter?

People can come into contact with animals in many places.

Anyone can become sick from a zoonotic disease, including healthy people and healthy animals.



Why Do Zoonotic Diseases Matter? (slide 6)

Many people interact with animals on a regular basis and anyone can become sick with a zoonotic disease.

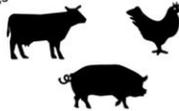
Enteric Zoonotic Diseases: Campylobacteriosis

- Caused by *Campylobacter* bacteria
- aka "Campy"



Photo courtesy of CDC

- **Common hosts:** cattle, poultry, pigs



- **What to avoid:** Undercooked food, contaminated water, raw milk, manure

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Understanding zoonotic diseases can help prevent you, your animals, and other people from getting sick.

Enteric Zoonotic Diseases

Enteric Zoonotic Diseases: Campylobacteriosis (slide 7)

Campylobacteriosis, also known as "campy," is an **enteric disease** caused by *Campylobacter* bacteria. It is commonly found in the gut of cattle, poultry, and pigs. **Infected** animals, or **hosts**, often appear healthy. People can get campy from eating undercooked food, contaminated water, raw milk, and contact with manure.

Vocabulary:

- **Enteric Disease-** Stomach illnesses caused by pathogens that enter the body through the mouth.
- **Infected-** When a person or animal has an agent such as bacteria or virus in the body.
- **Host-** A living animal or plant that provides food or shelter for another.

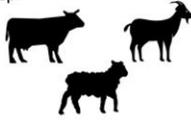
Enteric Zoonotic Diseases: *E. coli* infection

- Caused by *Escherichia coli* (*E. coli*) **bacteria**
- Some can be Shiga-toxin producing *E. coli* (STEC) and can cause severe disease



Photo courtesy of CDC

- **Common hosts:** cattle, goats, sheep



- **What to avoid:** Undercooked food, contaminated water, raw milk, manure

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Enteric Zoonotic Diseases: *E. coli* infection (slide 8)

Escherichia coli (*E. coli*) are bacteria that commonly cause infection. Some *E. coli* bacteria produce a toxin called Shiga-toxin. These are known as Shiga-toxin producing *E. coli* (STEC). Infection with STEC is often severe and can result in death. *E. coli* bacteria are commonly found in the intestines of infected ruminants such as cattle, goats, and sheep. Infected animals often appear healthy but can spread *E. coli* through their feces. People can get infected with *E. coli* from undercooked food, contaminated water, raw milk, and contact with manure.

Enteric Zoonotic Diseases: Salmonellosis

- Caused by *Salmonella* bacteria



Photo courtesy of CDC

- **Common hosts:** cattle, chickens, reptiles, amphibians



- **What to avoid:** Contaminated food, manure, touching reptiles

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Enteric Zoonotic Diseases: Salmonellosis (slide 9)

Salmonellosis is a disease caused by *Salmonella* bacteria. *Salmonella* is commonly found in the intestines of chickens and livestock and on reptiles and amphibians who appear healthy. The bacteria can live in raw meat, eggs, and milk from infected animals. People should avoid consuming contaminated food, contact with manure, and wash their hands after touching reptiles and amphibians.

Enteric Zoonotic Diseases: Ascariasis

- Caused by *Ascaris lumbricoides* (roundworm) parasite

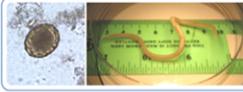


Photo courtesy of CDC

- Common hosts: pigs



- What to avoid: Contaminated vegetables/ fruit, manure

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Enteric Zoonotic Diseases: Ascariasis (slide 10)

Ascariasis is a disease caused by a roundworm parasite called *Ascaris lumbricoides*. This parasite lives in the intestines of pigs and spreads to humans and other animals through feces. Most infected pigs appear healthy. *Ascaris* can spread through manure and contaminated fruits and vegetables. Ascariasis is common world-wide but does not occur often in the United States.

Enteric Zoonotic Diseases: Cryptosporidiosis

- Caused by *Cryptosporidium* parasite
- aka "Crypto"

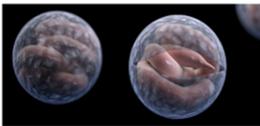


Photo courtesy of CDC

- Common hosts: Cattle



- What to avoid: Contaminated food, contaminated water, raw milk, manure (especially from sick calves)

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Enteric Zoonotic Diseases: Cryptosporidiosis (slide 11)

Cryptosporidiosis, also known as "crypto," is a disease caused by the *Cryptosporidium* parasite. Cattle are the common host. Adult animals often appear healthy; however, it typically causes diarrhea in young animals. People should avoid contaminated food, contaminated water, raw milk, and contact with manure.

Signs In Animals

- Animals often appear healthy
- Diarrhea (especially in young animals)



Photo courtesy of CDC

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Signs in Animals (slide 12)

Animals infected with enteric zoonotic diseases often have no **sign** of illness. Even **asymptomatic** animals can pass pathogens to people and animals. Infection with some

enteric diseases, particularly *Cryptosporidium*, can cause diarrhea in young animals.

Vocabulary:

- **Sign:** Any feeling of illness that can be measured, such as fever.
- **Asymptomatic:** When a living thing does not show signs of illness.

How Can I Prevent These Diseases.... In Animals? (slide 13)

Keeping the animal environment clean will prevent other animals from being infected through indirect contact. To prevent the spread of diseases from one herd of animals to another, avoid sharing equipment and limit contact between herds. Routine veterinary care, including deworming for parasites like *Ascaris*, is important for the overall health of animals.

Signs and Symptoms in Humans (slide 14)

Signs and **symptoms** of enteric disease in people can include diarrhea, nausea, stomach pain, vomiting, dehydration, and fever. These signs and symptoms can be

How Can I Prevent These Diseases?

... in Animals

- Keep environment clean
- Avoid sharing equipment/allowing contact with other herds
- Regular deworming for parasites
- Routine veterinary care for herd health



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Signs And Symptoms In Humans



- Diarrhea
- Vomiting
- Fever
- Nausea
- Dehydration
- Stomach pain

Image courtesy of CDC

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severe, especially in **immunocompromised** people.

Vocabulary:

- **Symptoms:** Any feeling of illness such as a sore throat that cannot be measured.
- **Immunocompromised:** A person or animal with a weak immune system, making them more likely to get sick.

How Can I Prevent These Diseases.... In Humans? (slide 15)

Handwashing is an important step in preventing diseases. Always wash hands after handling raw meat, manure, animals, things that have touched animals (such as bedding), and before eating. Produce can be contaminated with pathogens and should be washed before eating. Always cook food thoroughly and do not drink raw milk, as pathogens can live in undercooked food and milk.

How Can I Prevent These Diseases?

... in Humans

- Always wash hands
 - after handling animals, their manure, bedding, etc.
 - before eating
 - after handling raw meat.
- Always wash produce
- Cook food thoroughly
- Do not drink raw milk



Photo courtesy of Uppsvensk Kungälvcenter

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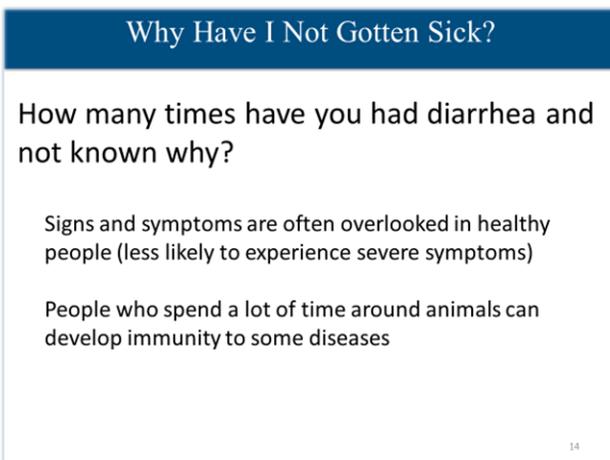


Handwashing

How Should I Wash My Hands? (slide 16)

Regular handwashing is one of the best ways to avoid getting sick. To reduce illness and the spread of germs, follow these hand washing steps:

1. Wet hands with clean running water, turn off the tap, and apply soap.
2. Lather hands by rubbing them together with the soap. Be sure to lather the backs of your hands, between your fingers, and under your nails.
3. Scrub hands for at least 20 seconds. (Tip: this is the same amount of time as the “Happy Birthday” song from beginning to end twice)
4. Rinse hands well under clean, running water.
5. Dry hands using a clean towel or air dry them.



Why Have I Not Gotten Sick? (slide 17)

In healthy people, symptoms of these diseases can be mild. People can get sick but do not always know why unless they go to the doctor for **diagnostic testing**. People who are

regularly exposed to these germs can build up **immunity** to them. People with immunity are less likely to show symptoms of these diseases.

Vocabulary:

- **Diagnostic tests:** Tests performed to aid in the detection of a disease.
- **Immunity:** The natural ability of a human or animal to prevent illness.

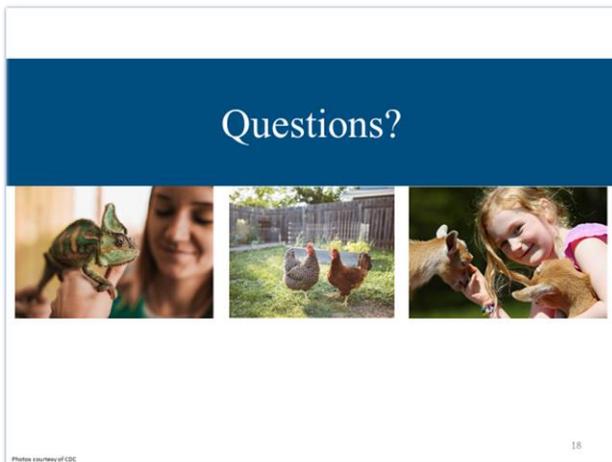
Questions? (slide 18)

Influenza

What Is Influenza? (slide 19)

Influenza, also known as “the flu,” is a respiratory disease caused by influenza viruses. Influenza viruses can infect many different animals, but the most common hosts are humans, pigs, and birds. Influenza viruses can be spread by bodily fluid so you should avoid direct and indirect contact with infected animals and people.

Vocabulary:



What Is Influenza?

- Caused by influenza **virus**
- aka “the flu”
- **Common hosts:** humans, pigs, birds
- **What to avoid:** Direct and indirect contact with infected animals and people

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Why Is Influenza Concerning?

- Influenza can be serious and even deadly in humans and animals
- The influenza virus changes often (mutates)
 - Hard to prevent
 - Can get more than once
- Influenza in one species can change and infect another species

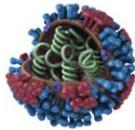


Image courtesy of CDC

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- **Influenza**- An illness of the lungs that can spread quickly to other humans or animals.

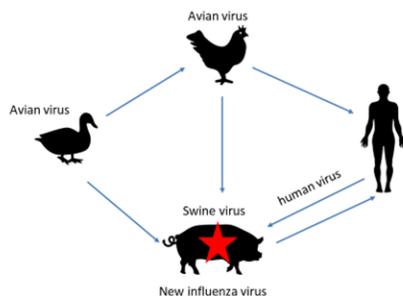
Why Is Influenza Concerning? (slide 20)

Influenza can be serious and even deadly in humans and animals. Influenza viruses regularly undergo **mutation**. The changes due to mutation make it hard to build immunity against the virus and allow the virus to infect different types of hosts.

Vocabulary:

- **Mutation**- A change to the DNA or RNA.

How Does Influenza Mutate?



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How Does Influenza Mutate? (slide 21)

Wild birds can be infected with influenza (avian influenza) then infect poultry and pigs. Avian influenza can then, rarely, infect humans. In pigs (swine influenza), this virus can undergo **reassortment** with avian and human viruses, resulting in a new, **emerging** influenza virus. Influenza **pandemics** are a result of a reassorted virus.

Vocabulary:

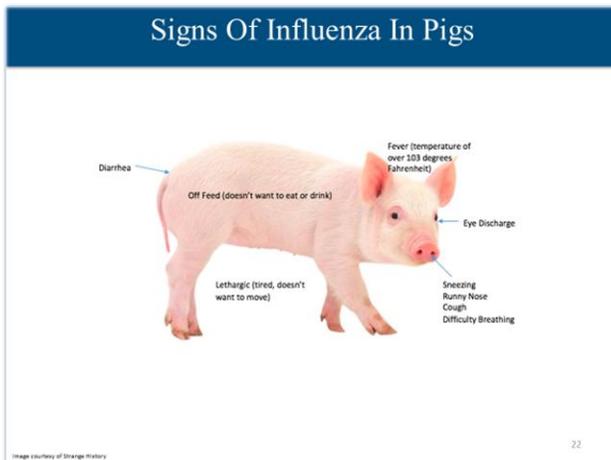
- **Reassortment**- Process in which two or more influenza viruses infect a single host and the viruses swap genetic materials to become new viruses.
- **Emerging**- A disease that appears in a population for the first time, or that previously existed but is rapidly increasing in incidence or geographic range.
- **Pandemic**- An illness that spreads across the world.

Signs Of Influenza In Pigs (slide 22)

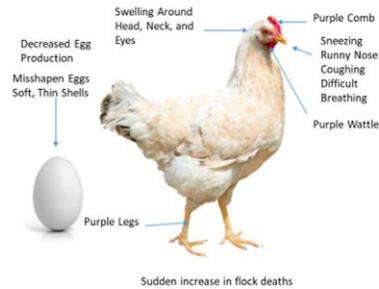
Signs of influenza in pigs can include fever, **lethargy**, coughing (barking), discharge from nose or eyes, sneezing, breathing difficulties, eye redness or inflammation, diarrhea, and going off feed. Some pigs infected with influenza may show no signs of illness at all.

Vocabulary:

- **Lethargy**- A lack of energy.



Signs Of Influenza In Poultry



Images courtesy of iStockphoto.com and
dreamstime.com

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Signs Of Influenza In Poultry (slide 23)

Some influenza viruses cause mild or no signs in poultry, while others cause severe illness and death. Signs of influenza in poultry include a sudden increase in flock deaths, decreased egg production, misshapen eggs with soft thin shells, swelling around the head neck and eyes, purple **comb**, **wattle**, and legs, sneezing, runny nose, coughing, and difficulty breathing.

Vocabulary:

- **Comb**- The fleshy growth on top of the head of chickens and turkeys.
- **Wattle**- The fold of skin hanging from the neck or throat of chickens and turkeys.

What Do I Do If My Animal Is Sick?

Quarantine (Isolation)-
Keep sick animal away
from other animals and
people



Call your veterinarian



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What Do I Do If My Animal Is Sick? (slide 24)

Animals that exhibit signs of illness should be kept in **isolation** or **quarantine** away from other animals. Call your veterinarian if you have a sick animal or animals.

Vocabulary:

How Can I Prevent Influenza?

... in Animals



- Keep area clean
- Avoid contact with sick animals or sick people
- Talk to a veterinarian

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- **Isolation**- Separation from others.
- **Quarantine**- Keeping sick animals away from healthy animals to avoid the spread of disease.

How Can I Prevent Influenza... In Animals? (slide 25)

The spread of influenza can be prevented by keeping the environment of the animals clean and well ventilated and by keeping healthy animals away from sick animals or sick people. Talk to a veterinarian about the best way to protect your herd or flock from influenza.

Signs And Symptoms Of Influenza In Humans



Images courtesy of Shutterstock

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Signs And Symptoms Of Influenza In Humans (slide 26)

Influenza signs and symptoms usually come on suddenly in people. People with influenza often experience fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches, and fatigue (tiredness).

What Do I Do If I Am Sick?

- Cover your cough and sneeze
- Stay at home
- Minimize contact with animals and other people
- Call your healthcare provider
 - **SPECIAL NOTE:** Tell your healthcare provider if you have recently been around pigs or chickens.



Photo courtesy of CDC

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How Can I Prevent Influenza?

...in Humans

- Wash hands frequently
- Cover your cough
- Stay at home when sick
- Vaccinate
 - Annual seasonal vaccine for humans
- Avoid contact with sick people and sick animals



Photo courtesy of CDC

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Who Else Is At Risk For Getting Sick?

Visitors and the public!

- These diseases can be severe or even deadly for young children and anyone with a weakened immune system
- The goal is to keep ourselves, our animals, and people visiting our animals safe



Photo courtesy of CDC

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What Do I Do If I Am Sick? (slide 27)

If you have influenza, you should stay at home, cover your cough and sneeze, and avoid contact with animals and people to limit the spread of influenza. Though many people ill with influenza do not require medical attention, you should contact your healthcare provider if you are very sick or worried about your illness.

How Can I Prevent Influenza... In Humans? (slide 28)

The best way to prevent influenza is by get an annual **vaccine**. Other ways to prevent illness and the spread of influenza include frequent handwashing, staying at home when sick, and avoiding contact with sick people and sick animals.

Vocabulary:

- **Vaccine**- A shot given to prevent a specific disease.

Who Else Is At Risk For Getting Sick? (slide 29)

People who visit animals, such as fair-goers and farm visitors, are at risk for zoonotic diseases. These diseases can

What Is Biosecurity?

Biosecurity= steps to help prevent the introduction and spread of disease

- Keeps your animals safe from the introduction of new germs
- Helps minimize the spread of existing germs
- Helps prevent sickness from spreading TO or FROM humans and animals



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Biosecurity: What Can You Do?

- Encourage healthy interactions between animals and people
 - Ask people to wash their hands before and after handling your animals
 - Discourage kissing animals, driving strollers through barns, using pacifiers that could be dropped, etc.
- Keep human eating areas away from animal areas

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be particularly severe or deadly in young children and those with weakened immune systems. We want to make sure everyone, including ourselves and our animals, are safe from disease.

Biosecurity

What Is Biosecurity? (slide 30)

Biosecurity is a set of steps to help prevent the introduction and spread of diseases. Biosecurity practices can differ depending on the needs of the farm or location, but all are done to keep animals safe from the introduction of new germs, help minimize the spread of existing germs, and help prevent germs from spreading to or from humans and animals.

Vocabulary:

- **Biosecurity**- Practices to prevent the spread of illness.

Biosecurity: What Can You Do? (slide 31)

Safe interactions between people and animals is the key to preventing the spread of disease. Encourage people on the farm and at the fair to wash

Biosecurity: What Can You Do?



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their hands before and after handling animals. Ask people to reduce contact such as kissing the animals and bringing things in to barns that are hard to wash, like strollers, or are put in the mouth like pacifiers and food. Keeping human eating areas away from animal areas reduces the risk of eating contaminated food.

Biosecurity: What Can You Do? (slide 32)

Posting signs around the farm or at the fair is a good way to remind yourself and others to practice biosecurity.

Biosecurity: What Can You Do?

Visitors can carry germs inside of the farm on their clothes, boots, their own bodies, or even their vehicles.

Visitors Should:

- Wear clean boots and clothes
- Stay out of the barn when sick
- Wash hands before and after



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Biosecurity: What Can You Do? (slide 33)

Visitors can carry germs to the farm or fair on anything they bring in with them, including clothes, boots, and vehicles. To protect yourself and your animals, remind visitors to wear clean cloth and boots, stay out of the barn if they are sick, and wash their hands before and after visiting.

Biosecurity: What Can You Do?

- Do not share equipment with other farms
 - Even healthy animals can pass germs
- Keep your area clean and organized
- Separate any animals who appear to possibly be sick
- Do not bring suspected ill animals to fairs

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Biosecurity: What Can You Do? (slide 34)

There are additional measures you can take to practice good biosecurity. Avoid sharing equipment and bringing sick animals to fairs to reduce the spread of disease to people and between herds. Keep a clean, organized area for animals and isolate animals who appear sick.

Careers in Public Health

Public Health: Promotes health through prevention

- Behavioral science/health education
- Biostatistics
- Environmental health
- Epidemiology
- Health services administration
- Informatics
- Veterinary Science



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Careers in Public Health (slide 34)

Interested in this kind of work? There are many aspects of public health. Public health careers including veterinary science, epidemiology, environmental health, and much more!

Additional Information and Resources:

New Hampshire:

24 hr disease reporting line: 603-271-5300
www.dhhs.nh.gov/dphs/cdcs/index.htm

Maine:

24 hr disease reporting line: 1-800-821-5821
Influenza email: Influenza.dhhs@maine.gov
www.Maineifu.gov
www.maine.gov/idepi



Icons courtesy of Flatiron

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Additional Information and Resources: (slide 36)