

# Healthy Animals, Healthy People

## How to Prevent the Spread of Zoonotic Diseases at Farms & Fairs



Maine Center for Disease Control and Prevention



Maine Center for  
Disease Control and Prevention

An Office of the  
Department of Health and Human Services

# Overview/Agenda

1. Overview
  - Project
  - Zoonotic Disease & Vocab
2. Influenza
  - Pathogens
  - Symptoms
  - Prevention
3. Enteric Diseases
  - Pathogens & Symptoms
  - Prevention
4. Handwashing
5. Biosecurity
  - At the Farm
  - At the Fair
  - Quarantine
6. Careers in Public Health
7. Closing

# Project Goals & Purpose

- Reduce disease in animals and humans
- Increase disease prevention awareness



**We want YOU to be the teacher!**

# One Health Triad

- Animal health, human health, and environmental health are all connected
- All aspects must be healthy to truly lower risk of disease



# Glossary

- **Enteric disease** – stomach illnesses caused by germs that enter the body through the mouth
- **Feces/fecal** – bodily waste or poop
- **Fomite**: a nonliving object that can carry and spread germs
- **Host** – a living animal or plant that provides food or shelter for another
- **Immunity** – the natural ability of a human or animal to prevent or avoid illness
- **Immunocompromised/Immunosuppressed** – a person or animal with a weak immune system, making them more likely to get sick
- **Incubation period** – the time between when a human or animal is exposed to a germ and when they get sick
- **Lethargy** – a lack of energy
- **Mutation** – a change to the DNA or RNA
- **Organism** – a living plant, animal, or cell
- **Parasite** – a germ that lives on or in a host and can cause harm
- **Pathogen** – germs that can cause illness
- **Zoonotic diseases** – illnesses that can be spread between humans and animals

# What IS a zoonotic disease?

- Zoonotic diseases are diseases which can be spread between animals and humans
  - $\frac{3}{4}$  of all human infectious diseases originated from animals
  - $\frac{1}{2}$  of all diseases are zoonotic
- *Prevention is key*
- Younger kids, older adults, immunocompromised individuals are most at risk



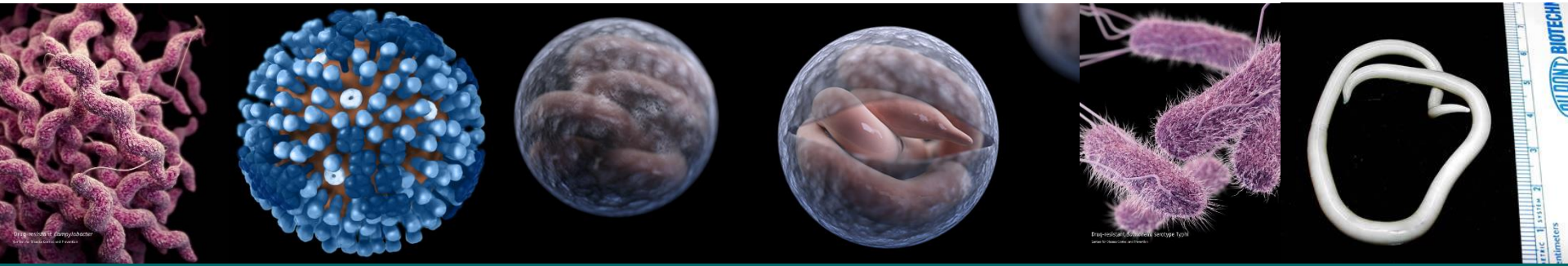
<http://dhhr.wv.gov/oeps/disease/Zoonosis/Pages/default.aspx>

Campylobacter | Influenza |

Cryptosporidiosis

| Salmonella |

Ascaris



# MEET...THE PATHOGENS



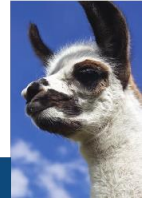
# What diseases are the highest risk at a fair/farm?

- Influenza
- Cryptosporidiosis
- Campylobacteriosis
- Salmonellosis
- E. coli infection
- Ascaris infection

**Keep us healthy.**

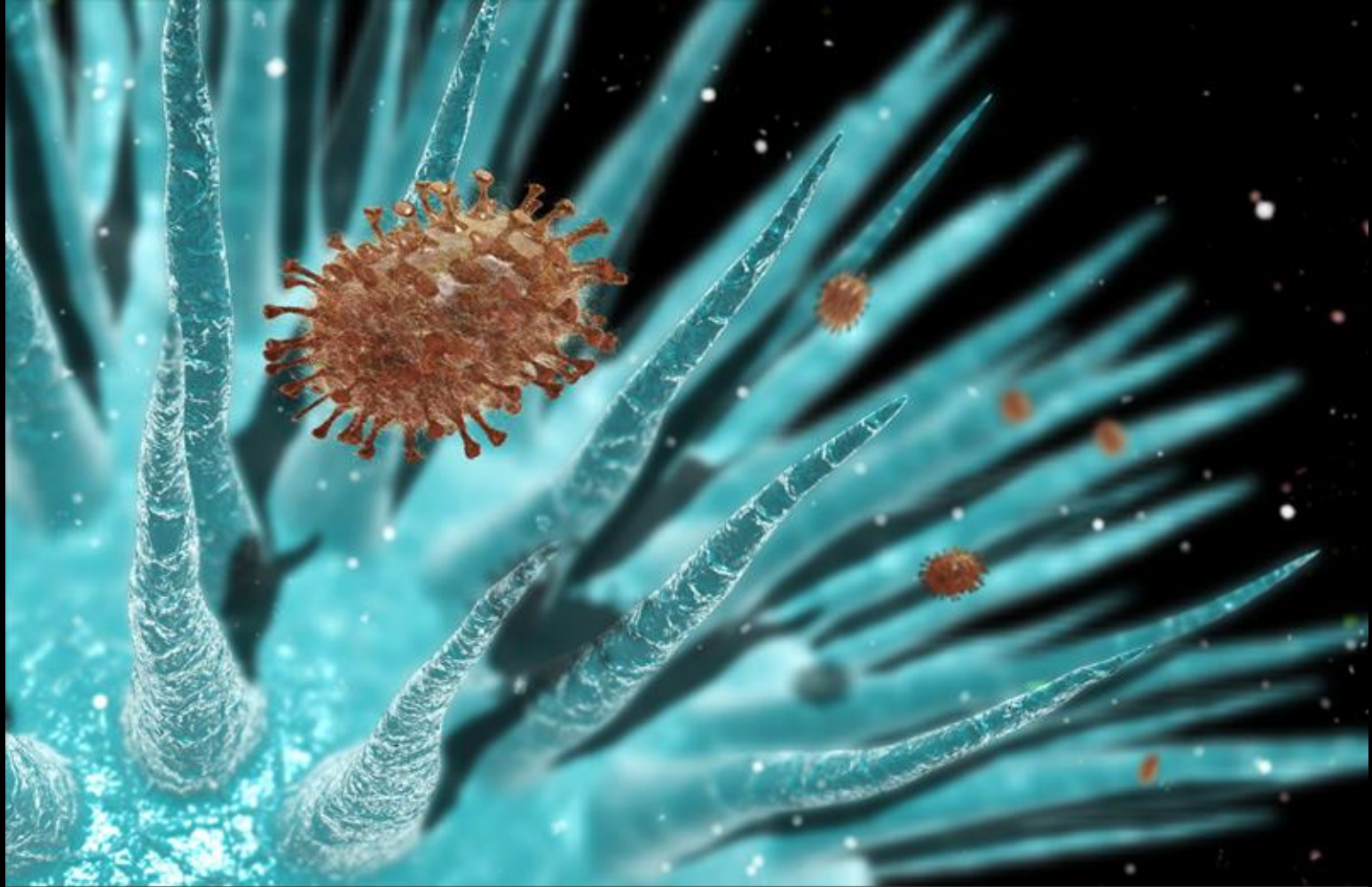
**If you're sick, please  
stay out of the barn.**

- People and animals can share germs
- Wash your hands before and after touching animals
- Wash your hands before eating





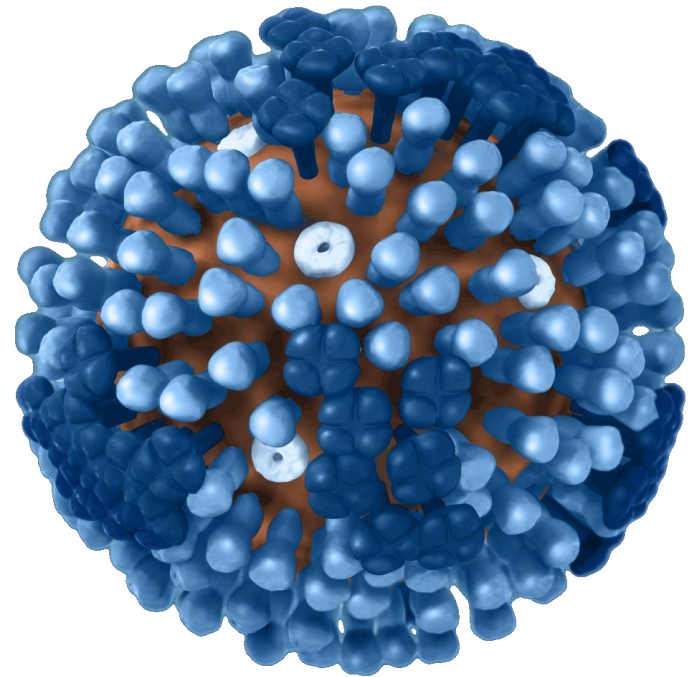
# Respiratory Illnesses



Conceptual image of flu virus particles (brown) invading cilia (blue)  
Image by Karsten Schneider/Science Photo Library

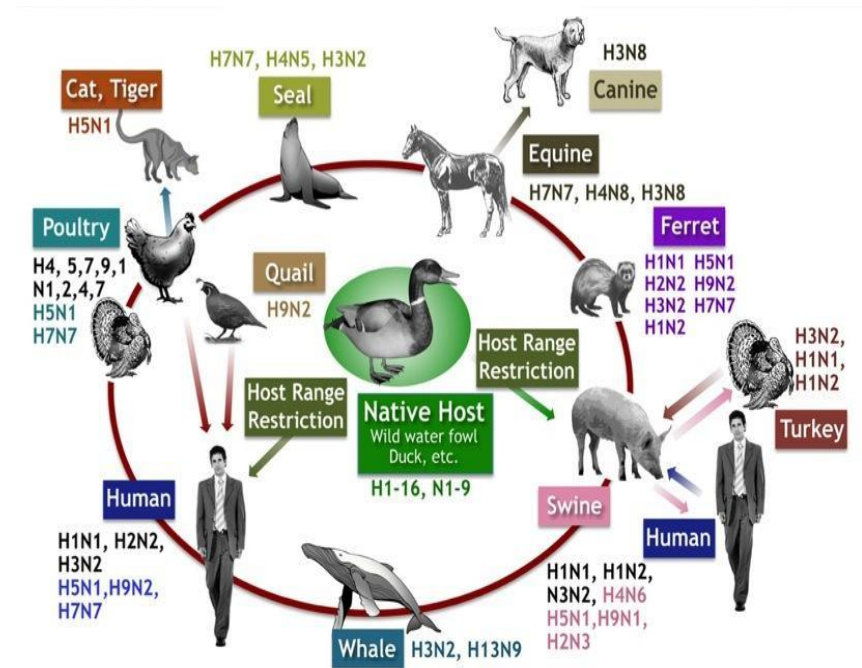
# Influenza – what is it?

- Commonly known as the flu
- Can infect humans and animals
- Contagious as early as one day before symptoms develop
- Spread by bodily fluids
- Signs and symptoms in all species include runny nose, fever, cough, overall lethargy



# Who gets the flu?

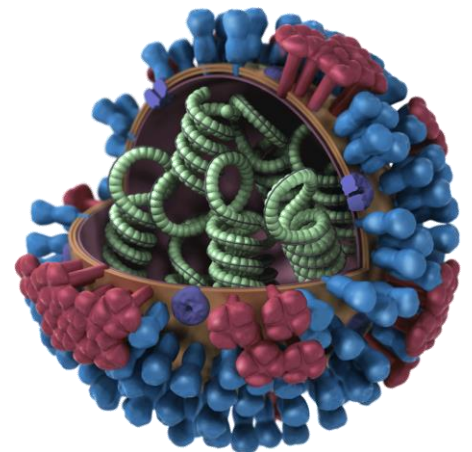
- The short answer – everyone!
- Pigs, birds, humans are most common
  - Population size
- Ferrets and other household pets may be at risk
  - A strain of bird influenza infected almost 400 cats at a shelter in New York in 2016
- Cases documented in whales, dolphins, wild animals



Adapted from : <http://www.medicalecology.org/diseases/influenza/influenza.htm#sec3>

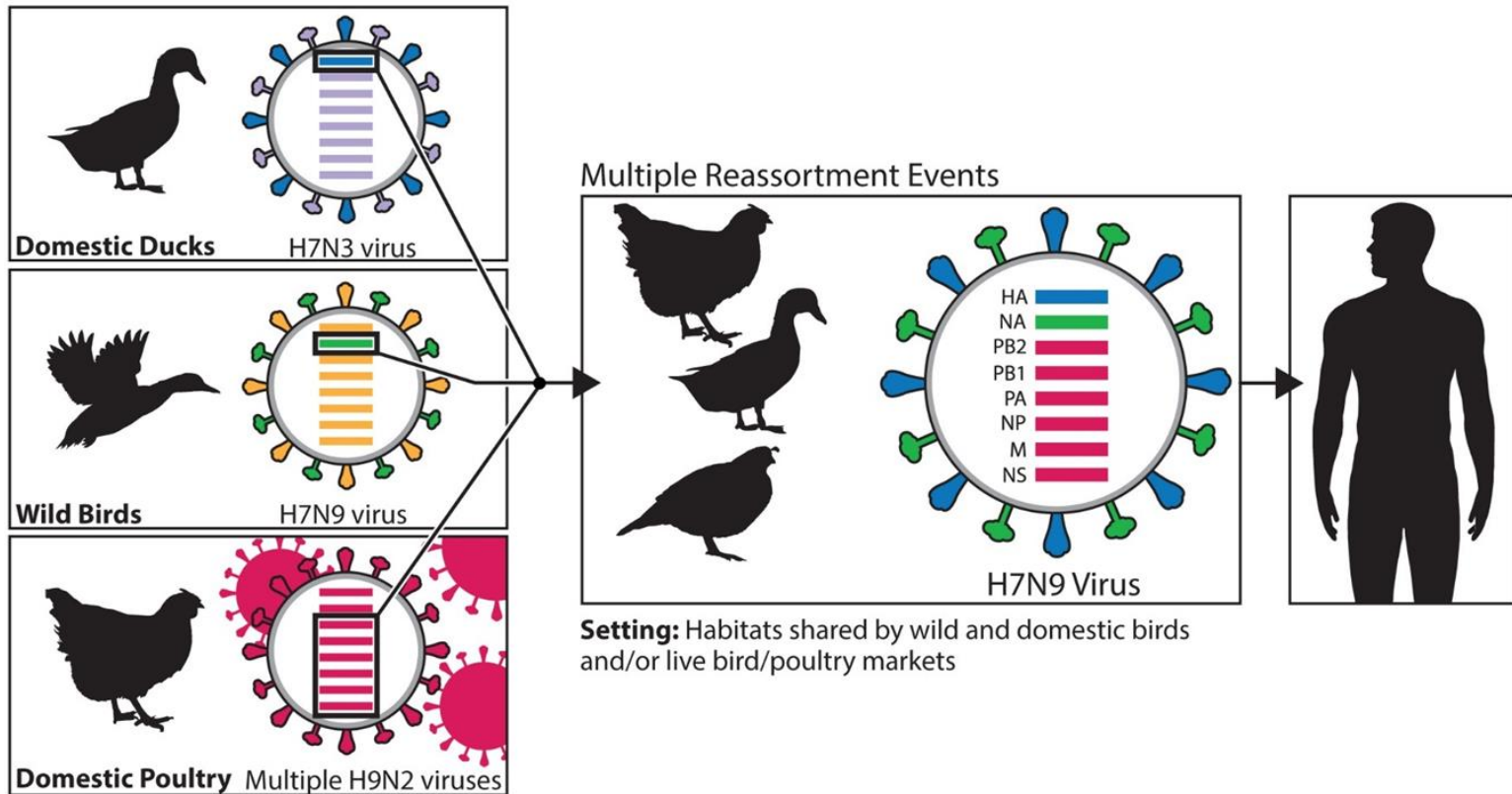
# Why is the flu so dangerous?

- Influenza can be deadly, in humans and animals
- The influenza virus changes often (mutates) making it difficult to control with vaccination or immunity after infection
- Diseases once limited to one species can mutate to infect others





# Genetic Evolution of H7N9 Virus in China, 2013



The eight genes of the H7N9 virus are closely related to avian influenza viruses found in domestic ducks, wild birds and domestic poultry in Asia. The virus likely emerged from "reassortment," a process in which two or more influenza viruses co-infect a single host and exchange genes. This can result in the creation of a new influenza virus. Experts think multiple reassortment events led to the creation of the H7N9 virus. These events may have occurred in habitats shared by wild and domestic birds and/or in live bird/poultry markets, where different species of birds are bought and sold for food. As the above diagram shows, the H7N9 virus likely obtained its HA (hemagglutinin) gene from domestic ducks, its NA (neuraminidase) gene from wild birds, and its six remaining genes from multiple related H9N2 influenza viruses in domestic poultry.



**Centers for Disease  
Control and Prevention**  
National Center for Immunization  
and Respiratory Diseases

# Influenza Signs and Symptoms

## **In Animals**

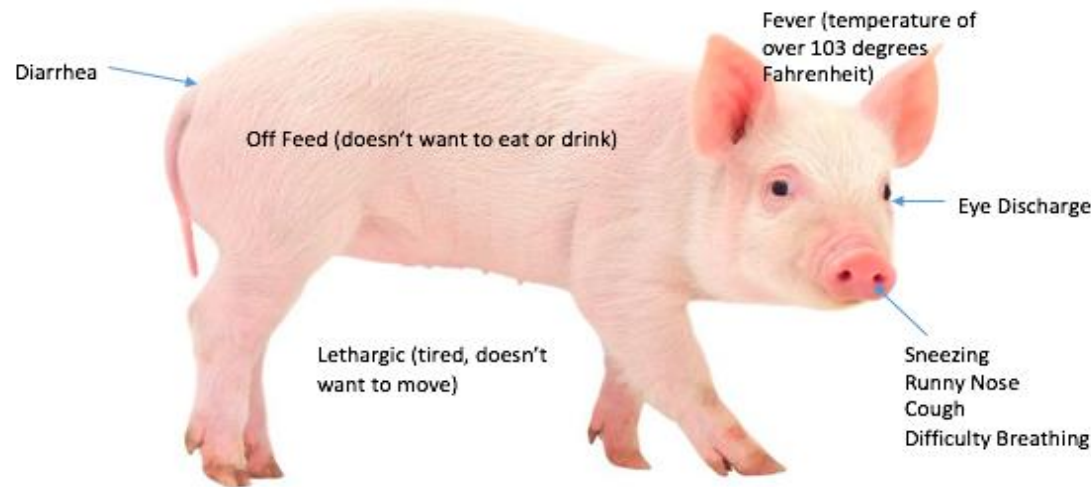
- Fever
- Coughing
- Runny eyes
- Runny nose
- Trouble breathing
- Overall lethargy
- Diarrhea – rare
- Vomiting – rare

## **In Humans**

- Fever
- Cough
- Sore throat
- Runny/stuffy nose
- Muscle or body aches
- Headaches
- Lethargy/Tired
- Diarrhea – rare
- Vomiting – rare

# Influenza Signs and Symptoms in Pigs

- Signs and symptoms: off feed, runny nose, coughing, tired
  - By the time these signs and symptoms hit, they are already shedding this virus, potentially exposing you or other pigs



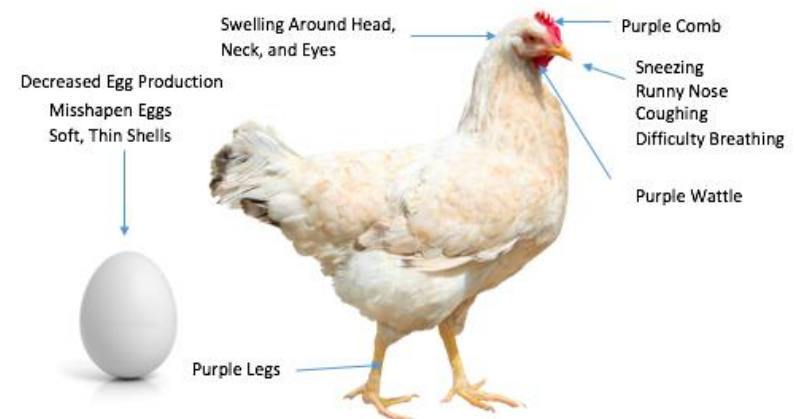


# Influenza Signs and Symptoms in Birds

- Sudden increase in flock deaths
- Sneezing, runny nose, coughing, difficulty breathing
- Decreased egg production
- Swelling around the head, neck, eyes
- Purple wattles, combs, legs
- Misshapen eggs or soft, thin shells



<http://www.thepoultrysite.com/articles/275/avian-influenza-in-poultry/>



<http://kindersay.com/signs/chicken>

<https://www.dreamstime.com/stock-photo-chicken-egg-white-single-isolated-background-image54462011>

# Concerns with Avian Influenza

- Wild bird populations can carry avian influenza without symptoms
  - Migratory populations
- Contaminate water (For example: farm ponds) via “fecal bombs”
- Potential for large outbreaks if viral material comes in contact with domestic birds



# Everyday Prevention of Influenza

## Humans

- Wash hands frequently
- Vaccinate
  - Annual seasonal vaccine for humans
- Watch for signs of illness in animals and yourself
  - If you are sick, minimize contact with animals
  - If your animal is sick, minimize contact with other animals and humans

## Animals

- Keep area clean
- Biosecurity & Quarantine
  - Especially in events where new people/animals are introduced (like at fairs)
- Vaccinate if available
- Keep away from other sick animals or sick people
- Consult a veterinarian

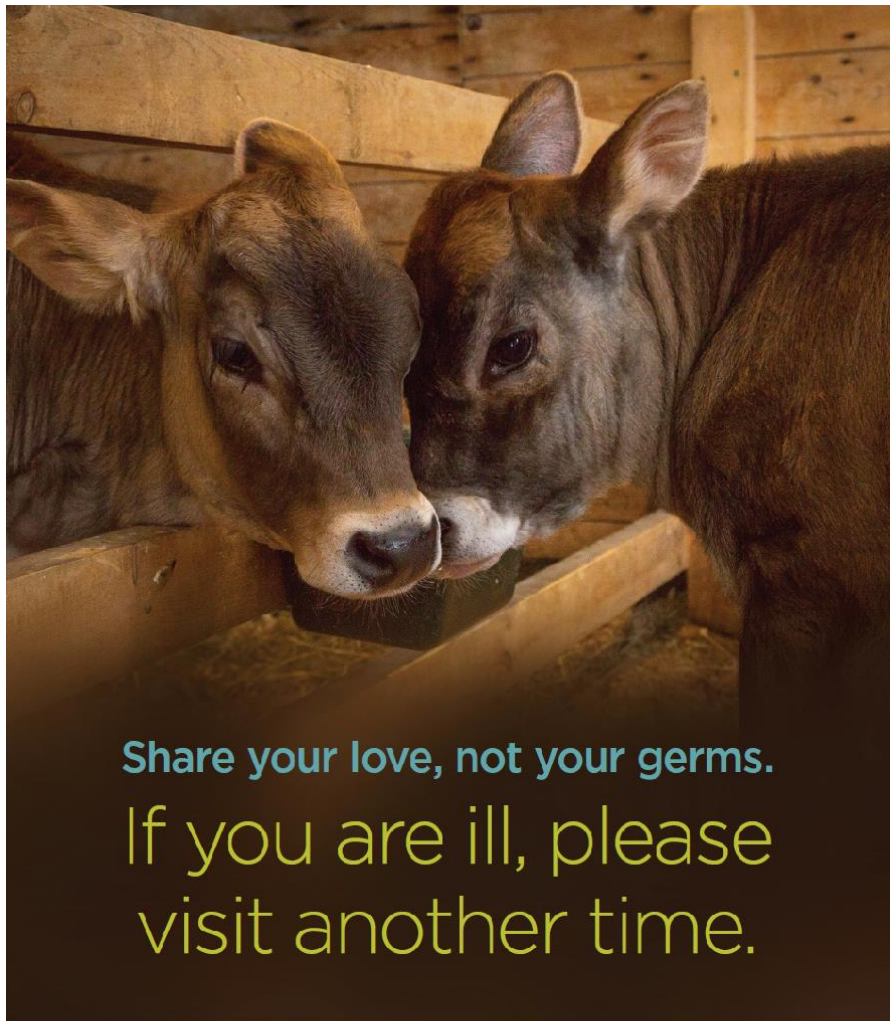
... and safe interaction between humans and animals

# Prevention of influenza in birds

- NO indirect or direct contact between wild birds and domestic birds
  - Keep domestic birds away from water where wild birds are able to bathe/live/feed
  - Do not allow domestic birds in areas where there may be wild bird droppings.
  - Keep food and water indoors
- Keep their environment clean and well ventilated.
- Do not share equipment from different flocks

# Prevention of influenza in swine

- Keep environment clean and well-ventilated
- Do not share equipment with other herds
- Vaccinate if one is available
- If any of your pigs are sick, minimize contact with other animals and humans
  - Separate sick pig from others if necessary
  - Contact your veterinarian ASAP if your pig has symptoms of influenza
- **AND DON'T BRING THEM TO THE FAIR!!**



Share your love, not your germs.  
If you are ill, please  
visit another time.



[www.maine.gov/dacf/ahw/animal\\_health](http://www.maine.gov/dacf/ahw/animal_health)



HOW TO PREVENT THE FLU

**1.** wash your hands



**2.** cover your cough

**3.** stay home when  
you're sick



**4.** get vaccinated



[www.mainepublichealth.gov](http://www.mainepublichealth.gov)

# I think I or my animal is sick. What do I do?

## Animals

- If your animals show signs and symptoms of influenza – please call your veterinarian
- Keep sick animal away from other animals and people

## Humans

- If you're experiencing a fever greater than 100 degrees Fahrenheit, a cough, and a sore throat, please call your healthcare provider.
- **SPECIAL NOTE:** If you have influenza and have contact with pigs and chickens, please mention this to your health care provider so they can send your test to the state lab. Only the state lab can tell if influenza came from a pig or other species.



Questions?



# ENTERIC ILLNESSES

# What is an enteric illness/disease?

- Group of diseases that cause enteric (or intestinal) issues
  - Foodborne illnesses
- Spread through ingestion of contaminated food/water, contact with infected bodily fluids, direct and indirect contact with infected animals or people
- Often have severe and prolonged signs and symptoms
- Often have longer incubation periods

# Signs and Symptoms of Enteric Illnesses in Humans

- Diarrhea
- Nausea
- Stomach pain
- Vomiting
- Fever
- Worms in feces (Ascaris)



<http://www.askdrmann.com/ulcerative-colitis/>

# Campylobacter

## What is it?

- Bacteria
- Also known as “Campy”
- Common hosts: healthy cattle, pigs, poultry, livestock, pets
- Potential hosts: humans, virtually any animal
- Incubation period: 2-5 days
- Length of Signs and Symptoms: 1 week
- Lives in intestines of healthy animals and is spread by feces

## Signs and Symptoms

- In humans: diarrhea (often bloody), fever, abdominal cramps, nausea, vomiting
- In animals: none



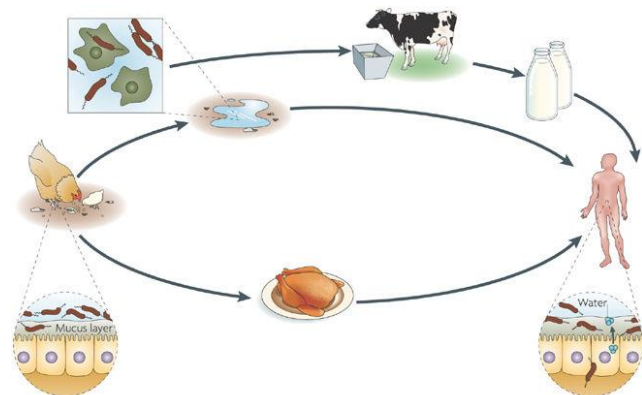
# Campylobacter

## Why is it high risk?

- Animals can carry it without showing any signs and symptoms
  - Even healthy animals can shed this bacteria
- Bacteria can be spread weeks after signs and symptoms stop
- 1 in every 1,000 people infected with Campy will develop Guillain-Barré syndrome (GBS)

## How common is it?

- Approximately 1.3 million human cases in the United States each year
- 232 human cases in Maine in 2017



Nature Reviews | Microbiology

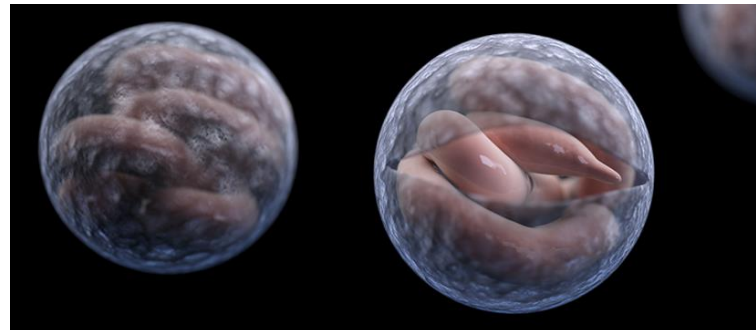
# Cryptosporidium

## What is it?

- Parasite
- Also known as “Crypto”
- Common Host(s): Cattle
- Potential Hosts: Virtually any animal
- Incubation Period: 2-10 days (average of 7 days)
- Length of Signs and Symptoms: 1-2 weeks
- Lives in intestines of host and is shed through feces

## Signs and Symptoms

- In humans: stomach pain, dehydration, nausea, vomiting, weight loss, fever
- In animals: typically diarrhea in young animals, however adult animals are often asymptomatic





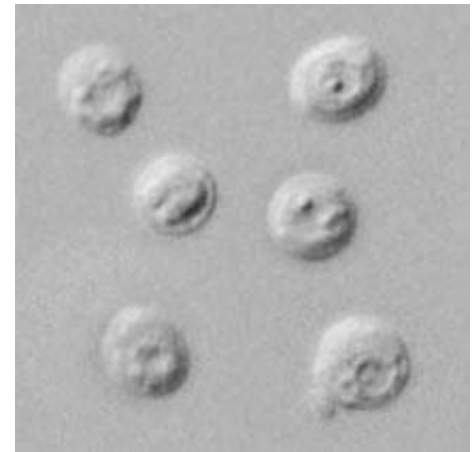
# Cryptosporidiosis

## Why is it high risk?

- Very common in cattle and other livestock
- Able to live outside of host for extended periods of time
- Able to survive in water
- Parasites still spread weeks after signs and symptoms stop
- Millions of parasites can be released from a single bowel movement

## How common is it?

- Almost 750,000 human cases in the United States each year
- 44 human cases in Maine in 2017



# *E. coli (STEC)*

## What is it?

- Bacteria
  - Some beneficial, some harmful
  - STEC (Shiga toxin-producing *E. coli*)
- Common Hosts: Ruminants (cattle, goats, sheep)
- Potential Hosts: Humans, virtually any animal
- Incubation Period: 1-10 days (usually 3-4)
- Length of Signs and Symptoms: about a week, unless HUS (hemolytic uremic syndrome) occurs, which can last another few weeks and is sometimes deadly
- Lives in intestines of infected animals and is spread through feces

## Signs and Symptoms

- In humans (STEC): often varies but often includes severe stomach cramps, diarrhea (often bloody), vomiting, low fever
- In humans (HUS): decreased urination, lethargy, loss of pink coloration in cheeks and inside lower eyelids
- In animals: none



# Shiga Toxin-Producing *E. coli*

## Why is it high risk?

- This bacteria lives naturally in animals, especially ruminants (cattle, sheep, goats, buffalo, deer)
  - Animals often do not show symptoms but can spread it

## How common is it?

- Approximately 100,000 cases in the United States each year
- 35 human cases in Maine in 2017
- 2 human cases of HUS in Maine in 2017

# Salmonella

## What is it?

- Bacteria
- Common hosts: Chickens, reptiles, amphibians, livestock
- Potential Hosts: humans, virtually any animal
- Incubation Period: 12-72 hours
- Length of Signs and Symptoms: 4-7 days
- Lives in intestines of animals and is spread by feces. Raw meat, eggs, or milk from infected animals can also contain this bacteria

## Signs and Symptoms

- In humans: diarrhea, fever, abdominal cramps
- In animals: none



# Salmonella

## Why is it high risk?

- Virtually any animal including common household pets such as dogs and cats can spread salmonella without showing signs and symptoms

## How common is it?

- Approximately 1.2 million human cases each year in the United States
- 102 human cases in Maine in 2017



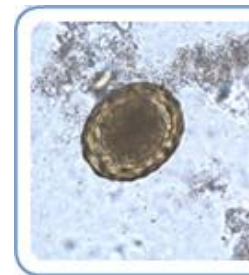
# Ascaris

## What is it?

- Parasite (roundworm)
- Common Hosts: pigs
- Potential Hosts: humans, virtually any animal
- Incubation Period: up to 8 weeks (time for ingested egg to develop into an adult)
- Length of Signs and Symptoms: indefinite, adults can live for years
- Lives in intestines, transmitted through feces

## Signs and Symptoms

- In humans: often none; sometimes light abdominal discomfort
  - Heavy infections can cause intestinal blockages, coughing, impaired growth
- In pigs (and other animals): usually none



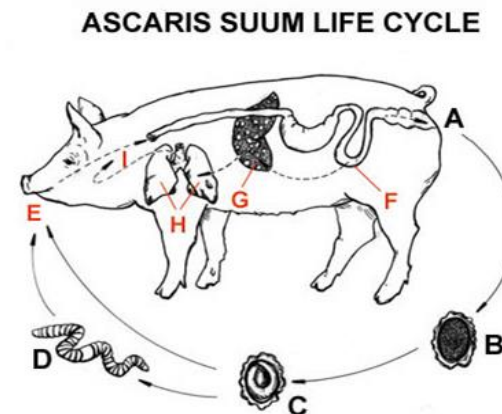
# Ascaris

## Why is it high risk?

- If manure of infected pig (or other animal) is used for fertilizer, it can contaminate the produce grown in the area the fertilizer was used
- Eggs can live in soil for years (up to 15)
- Animals often do not show signs and symptoms
- Potential to cause serious internal damage

## How common is it?

- Over 1,221 million people worldwide are thought to be suffering with ascariasis
- Now uncommon in the United States





# Ascaris from a 4 yr old in Maine!



# Prevention of Enteric Diseases

## **Humans**

- Always wash hands after handling animals, their manure, bedding, etc.
- Always wash hands and surfaces after handling raw meat.
- Always wash produce before serving

## **Animals**

- Regular deworming for parasites
- Keep environment clean
- Avoid sharing equipment/allowing contact with other herds

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Amharic

Ntxuav koj txhais tes

Hmong

اغسل يَدَيْكَ

Arabic

Lávese las manos

Spanish

လက်တွေဆေးပါ။

Burmese

Nawa Mikono

Swahili

Hugasan ang iyong mga kamay

Tagalog

Bitte Hände waschen

German

Wash

Помойте Ваши Руки

Russian

ត្រូវលាងដៃរបស់អ្នក ។

Khmer

अपने हाथ धोएं।

Hindi

ລ້າງມືຂອງເຈົ້າ

Laotian

손을 씻으십시오

Korean

Harka kee dhiqadhu

Oromo

हात धुनुहोस्

Nepali

Maydh gacmahaaga

Somail

Hands

သုနုတုတဖန်တကွာ်

KaRen

לָבֹשׁ לְיָדַי

Hebrew

Lavez-vous les mains

French

gi zii bii gi nin jiin

Ojibwe

xin rửa tay

Vietnamese

ล้างมือให้สะอาด

Thai

洗手

Chinese (Mandarin)



Used with permission from Minnesota Department of Health

Revised 1/2010 Wash Your Hands In 24 languages

# Questions?

# How to wash your hands

- **Wet** your hands with clean, running water and apply soap.
- **Lather** your hands by rubbing them together with the soap.
- **Scrub** your hands for at least 20 seconds.
- **Rinse** your hands well under clean, running water.
- **Dry** your hands using a clean towel or air dry them.





# Takeaway:

Even healthy, clean animals can pass on diseases that can hurt people...

So that's why **education** about the risks and the effective ways to reduce those risks is the key to healthy fairs!



# Zoonotic Disease & The Public

Farmers and people with animals willingly take this risk **BUT** the public is not always aware

- Healthy people may show minimal signs and symptoms, however these diseases can be deadly for young children and anyone with a suppressed immune system
- Our job is to make sure they are aware of these risks



# Well if all this is true.. Why haven't I gotten sick?

How many times have you had diarrhea and not known why?

- Signs and symptoms are often overlooked in healthy people (less likely to experience severe symptoms)
- Only way to know for sure is by a fecal test
- Biggest risk is with people who have underdeveloped/challenged immune systems

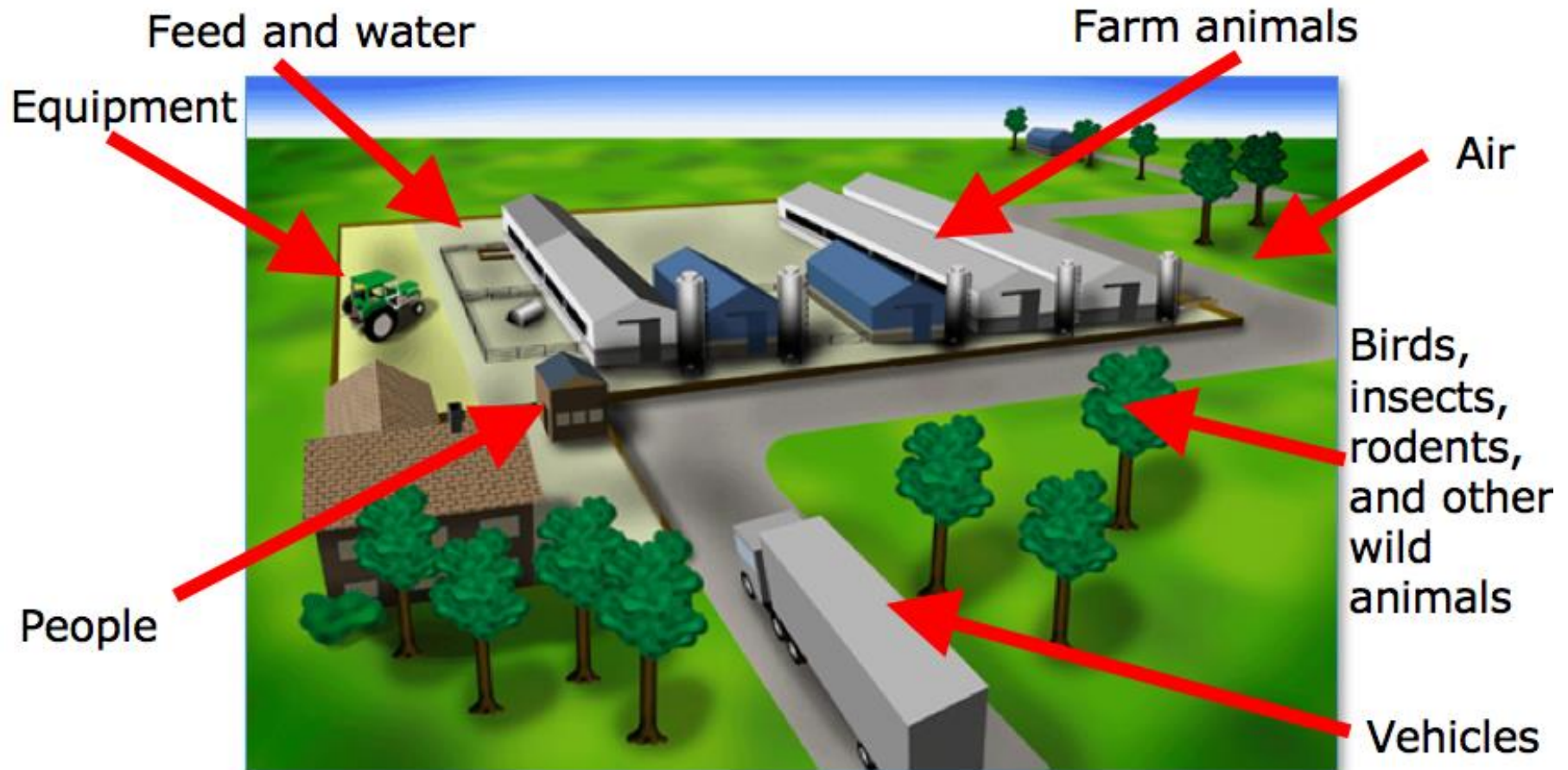


# Biosecurity: "What" and "Why"

- Biosecurity is a set of protocols to help prevent the introduction and spread of disease
  1. Keeping diseases from entering an area
  2. Preventing disease from spreading to other locations
    - Keeps your own herd safe from the introduction of new pathogens
    - Helps minimize the spread of existing pathogens
    - Helps prevent sickness from spreading TO or FROM humans and animals



# Ways Pathogens Can Enter a Farm



# Biosecurity at the Farm

- Visitors can carry pathogens inside of the farm on their clothes, boots, their own bodies, or even their vehicles.
  - Clean boots and clothes
  - Sick? Stay out of the barn!
  - Wash hands both before and after
  - Don't share equipment with your neighbor (fomites)

<https://nationalsafetysigns.com.au/safety-signs/farm-bio-hazard-sign-en32202/>



# Biosecurity at the Fair

- Fairs are educational and fun BUT can be high risk for both animals and people without proper biosecurity
  - People can get sick from your animals, or your animals can get sick from people
- Encourage healthy interactions between animals and people
  - Ask people to wash their hands before and after handling your animals (touching different animals back to back can spread disease from other farms to yours)
  - Discourage kissing animals, driving strollers through barns, using pacifiers that could be dropped, etc.
- Keep human eating areas away from manure storage and animal areas

**Use signage for those you cannot speak to directly**

# Biosecurity at the Fair cont.

- Do not share equipment with other farms
  - Even healthy animals can pass pathogens
- Keep your area clean and organized
- Separate any animals who appear to possibly be sick
- Never bring any animals that you suspect are ill





# Quarantine

## What is it?

- Quarantine is the process of isolating an animal(s) to prevent the spread of disease between them and the main population.

## How do you do it?

- Animal must be completely separated.
- No shared equipment
- Change clothes and boots, wash hands after handling
- 21 days is the recommended quarantine time to protect against the majority of diseases

## When is it necessary?

- When an animal seems sick
- When you bring home a new animal
- When you bring back animals from the fair!

<http://www.biosecuritynovascotia.com/disease-emergency/>



Questions?



# Careers in Public Health

- Public Health: Promotes health through prevention
  - Behavioral science/health education
  - Biostatistics
  - Environmental health
  - Epidemiology
  - Health services administration
  - Informatics
  - Veterinary Science

# Further Materials/Info

- This PowerPoint and others will be available to you after today
- Many of the posters you see here and at today's workshop are available for free at the ME CDC website:

<http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/order-form-wn.shtml>

- *See “Resources” handout for more information*



# THANK YOU!



**Contact Maine CDC or DACF for any questions or more information**

**Maine CDC: 1-800-821-5821**

**Maine DACF: 207-287-3200**



Maine Center for Disease Control and Prevention

