

Healthy Animals, Healthy People

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



Maine Center for Disease Control and Prevention



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

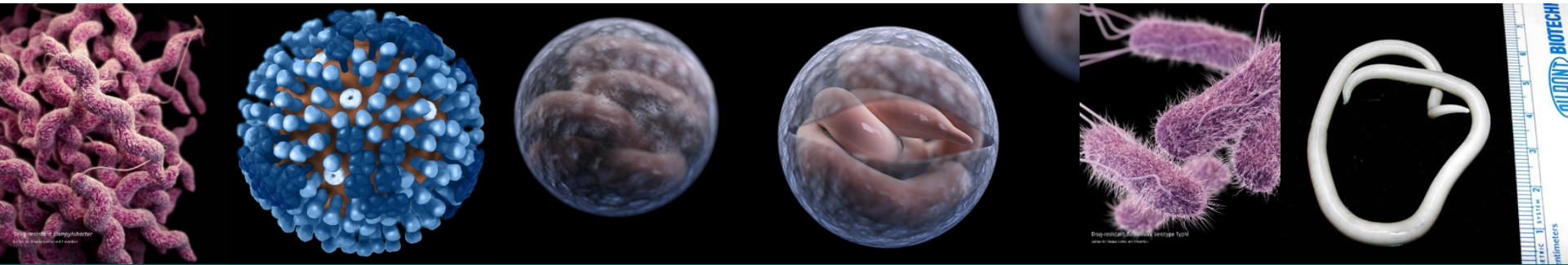
What IS a zoonotic disease?

- 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



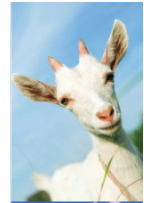
MEET...THE PATHOGENS

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

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

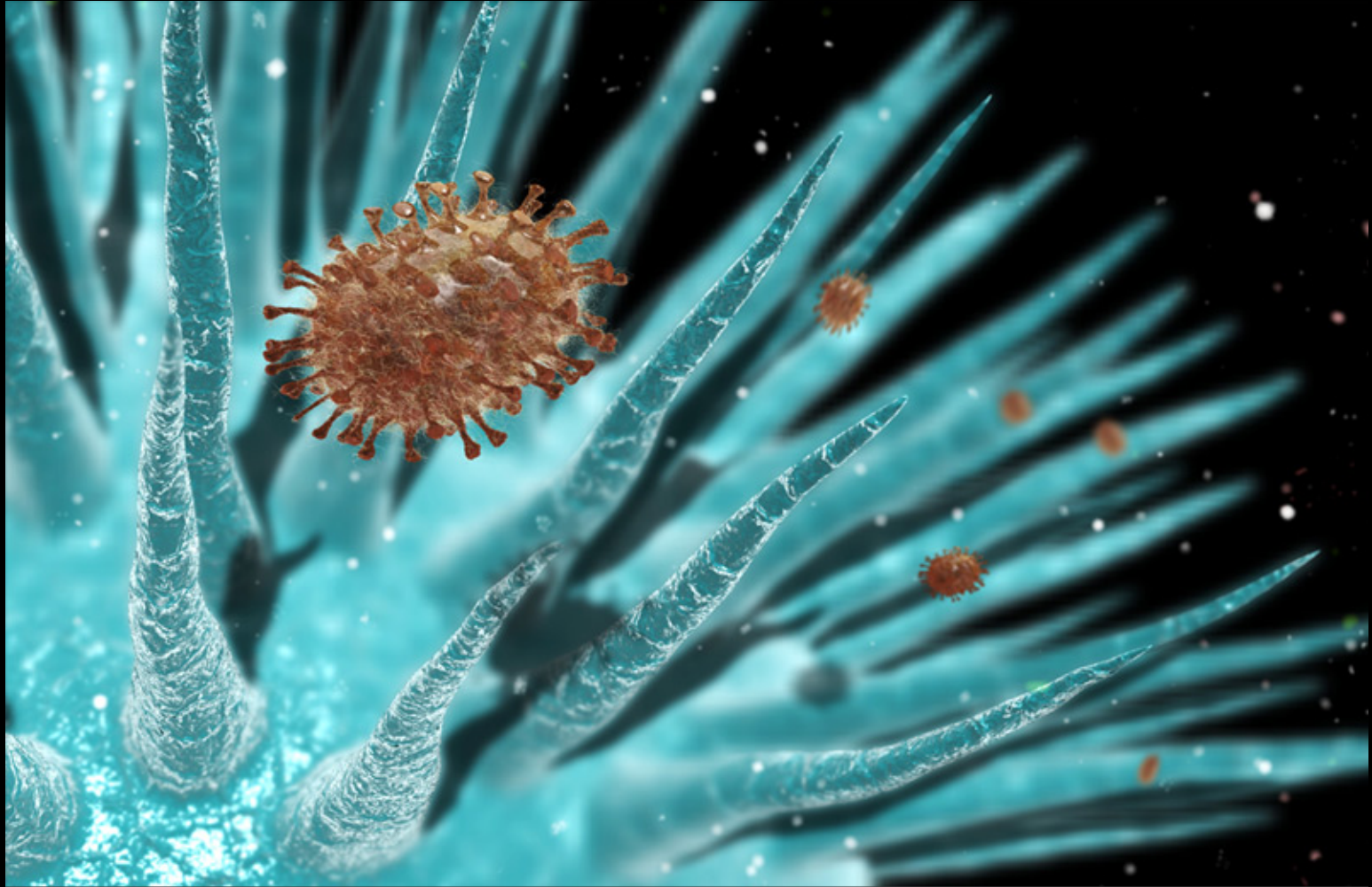
Keep us healthy.
**If you're sick, please
stay out of the barn.**

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



www.maine.gov/dep/
www.maine.gov/dacf/ahw/animal_health/index.shtml

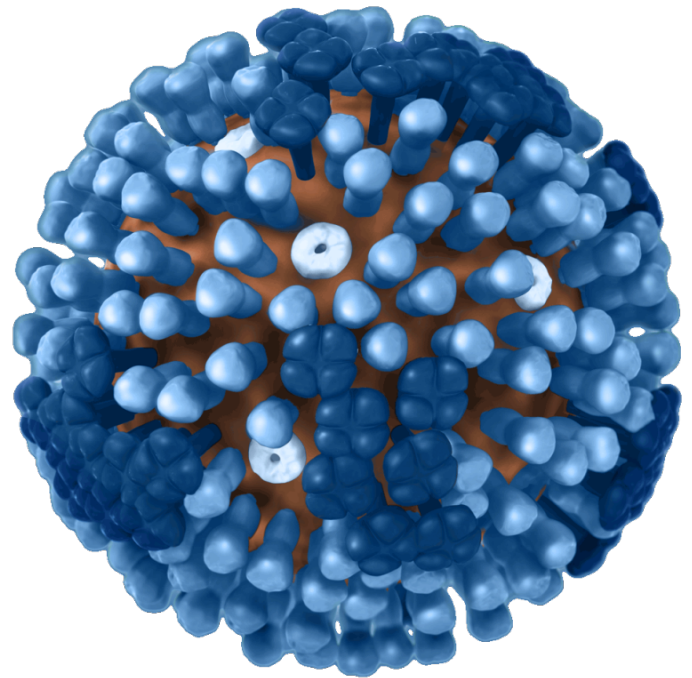
Respiratory Illnesses



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

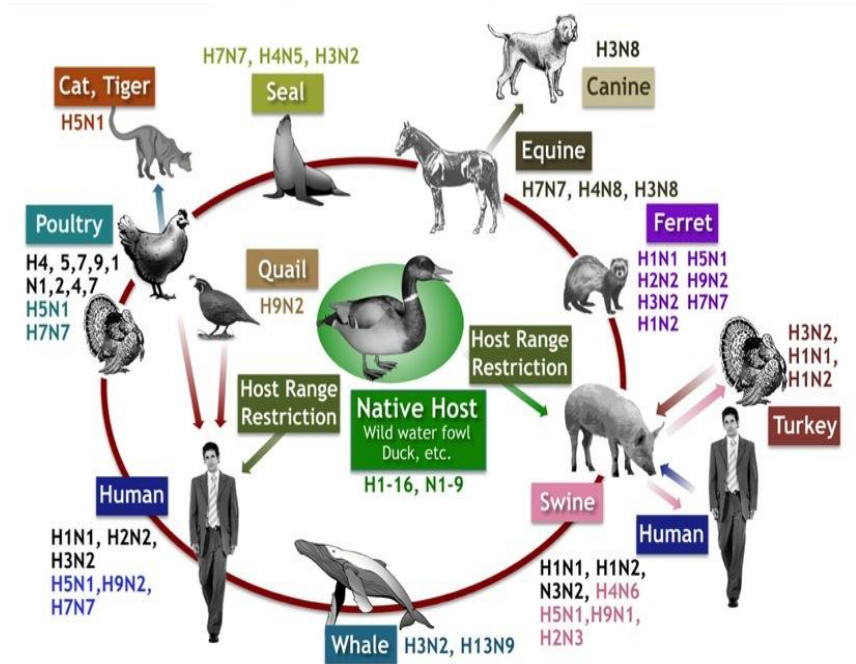
Influenza – what is it?

- 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?

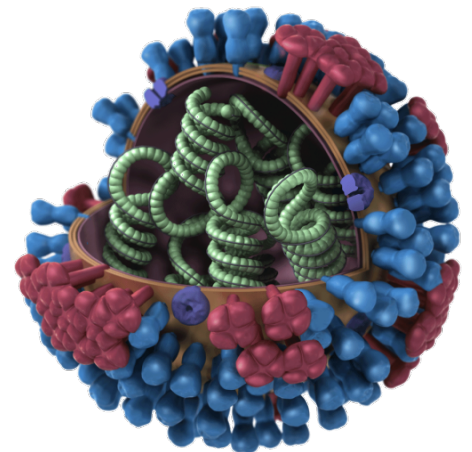
- The short answer – everyone!
- Pigs, birds, humans are most common
 - Population size
- Ferrets and other household pets may be at risk
 - A strain of bird influenza infected almost 400 cats at a shelter in New York in 2016
- Cases documented in whales, dolphins, wild animals



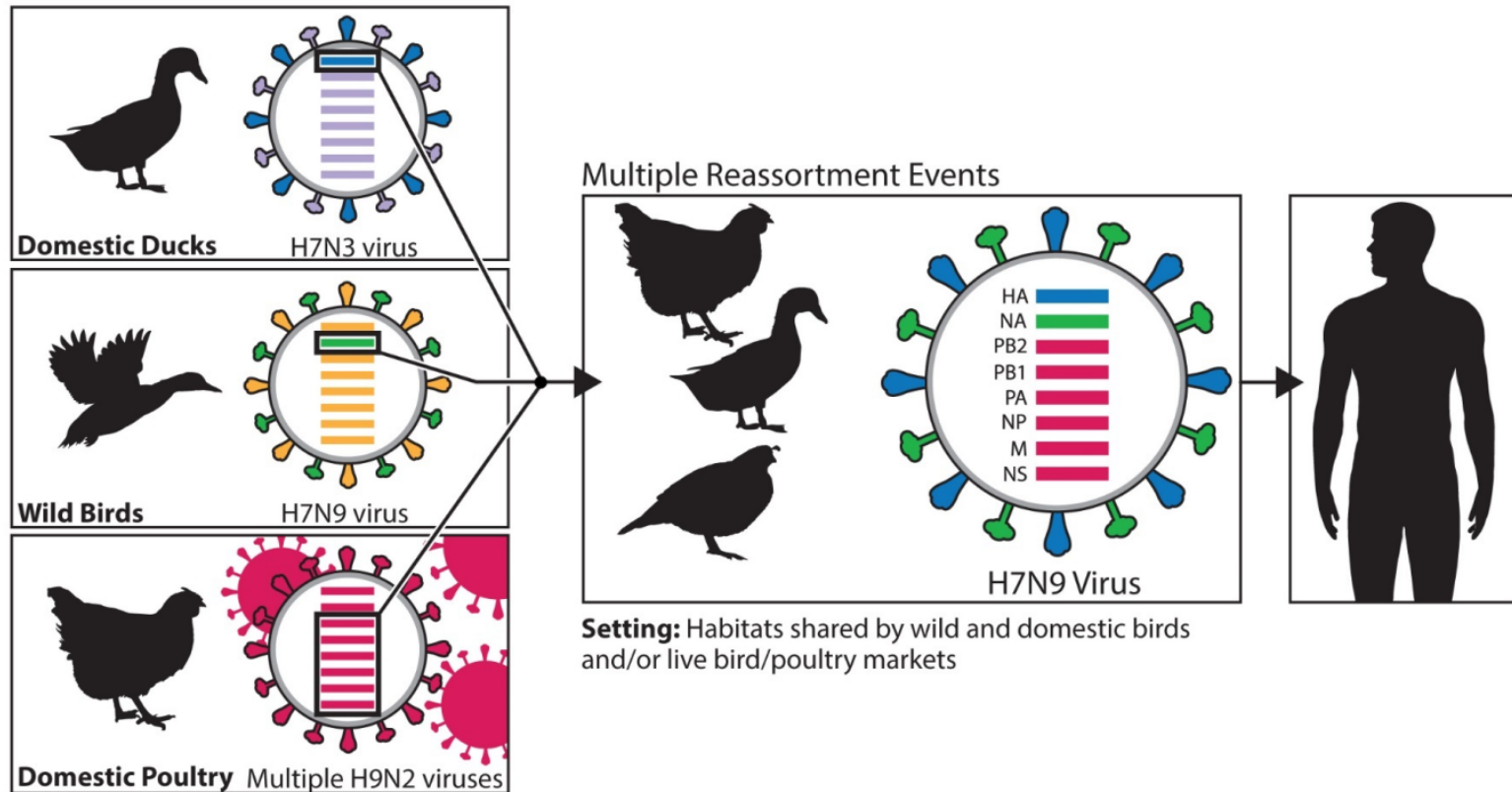
Adapted from : <http://www.medicalecology.org/diseases/influenza/influenza.htm#sec3>

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

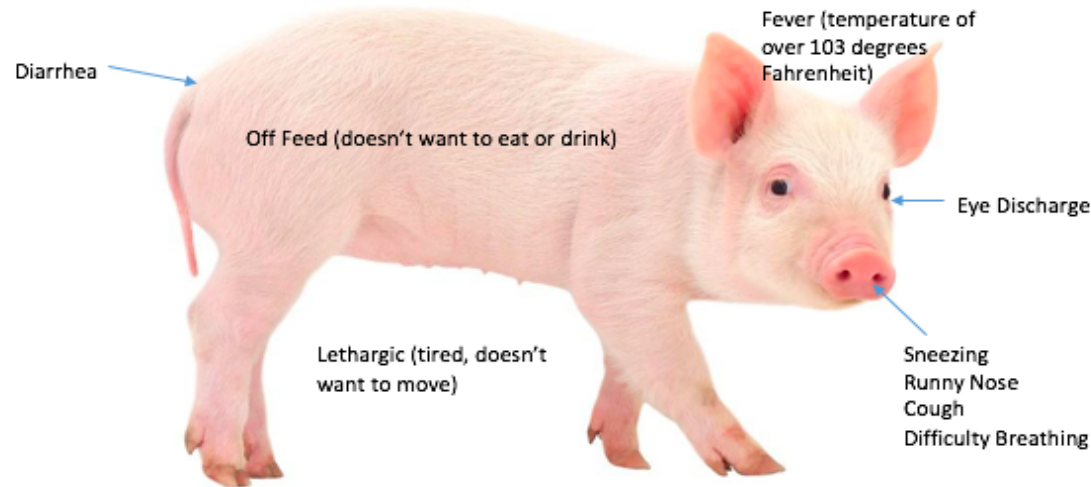
- Fever
- Coughing
- Runny eyes
- Runny nose
- Trouble breathing
- Overall lethargy
- Diarrhea – rare
- Vomiting – rare

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

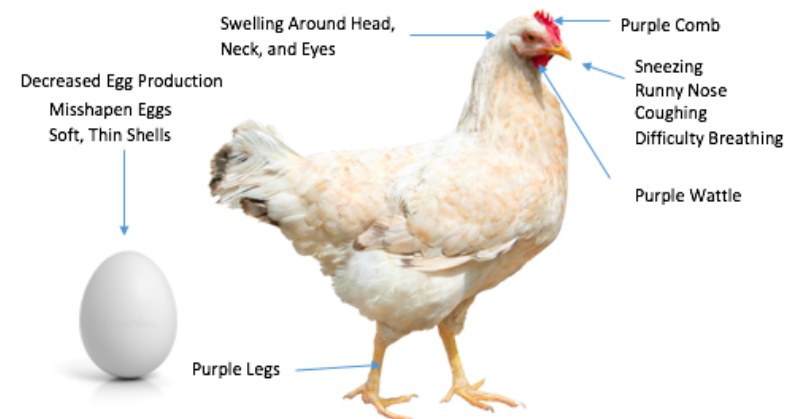


Influenza Signs and Symptoms in Birds

- 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

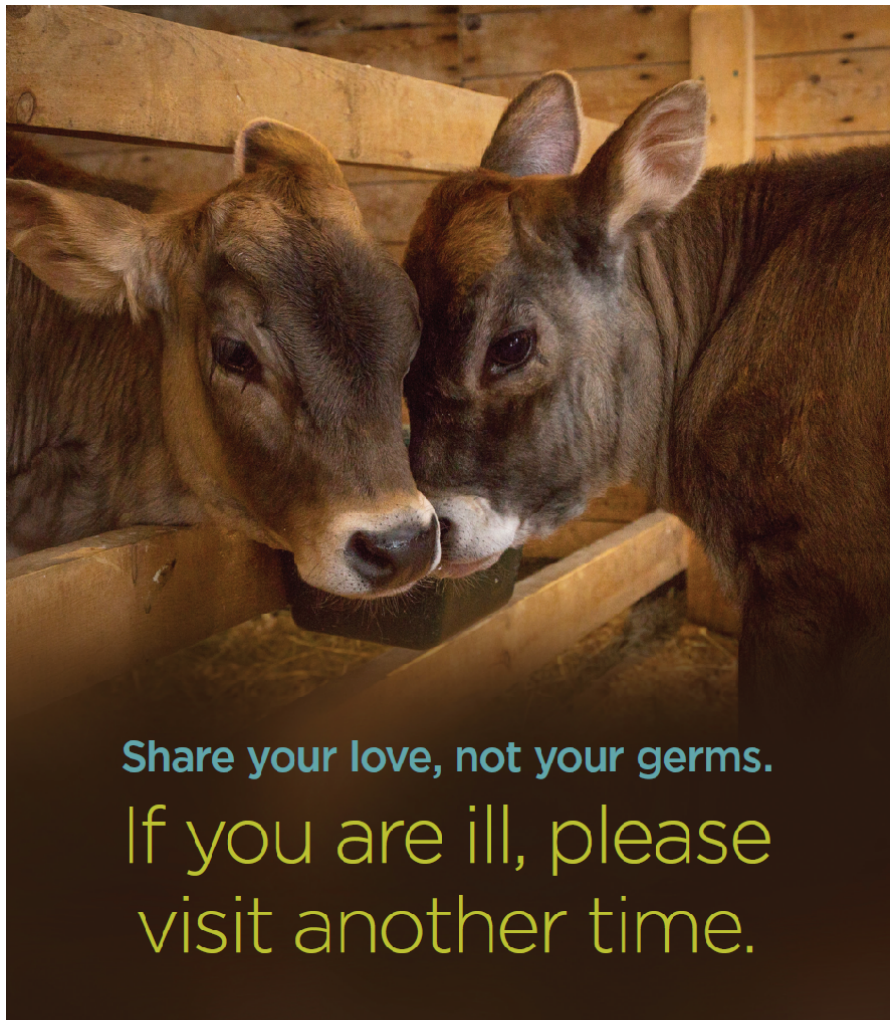
... and safe interaction between humans and animals

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



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

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.askdrmannny.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



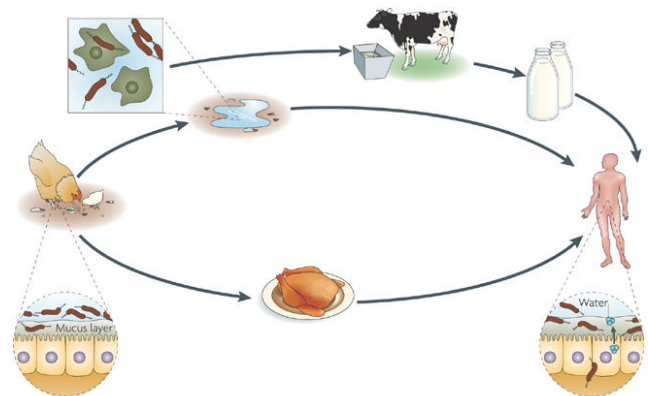
Campylobacter

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

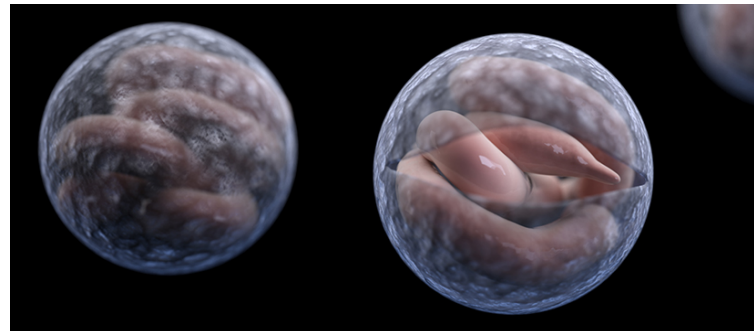
Cryptosporidium

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



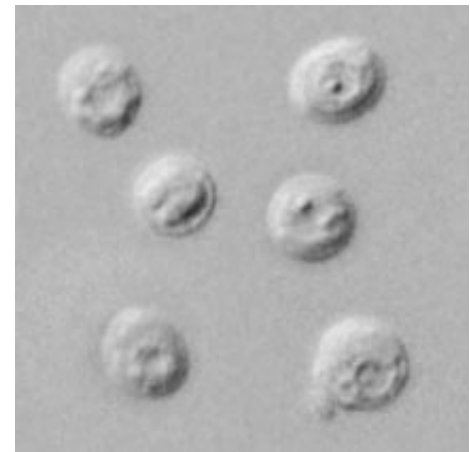
Cryptosporidiosis

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



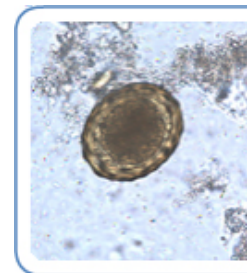
Ascaris

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



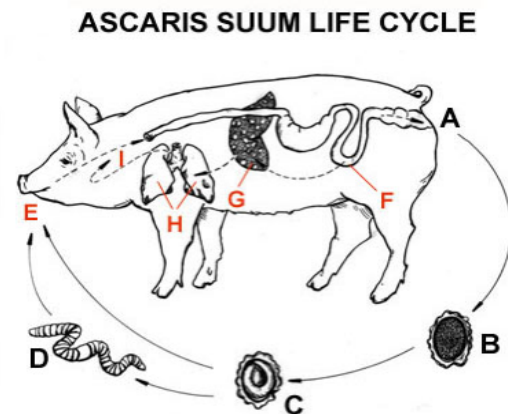
Ascaris

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 يَدَكَ

Arabic

Lávese las manos

Spanish

လက်တွေဆေးပါ။

Burmese

Nawa Mikono

Swahili

Hugasan ang iyong mga kamay

Tagalog

Bitte Hände waschen

German

ត្រូវលាងដៃរបស់អ្នក ។

Khmer

Wash

Помойте Ваши Руки

Russian

ລ້າງມືຂອງເຈົ້າ

Laotian

Your

अपने हाथ धोएं।

Hindi

Harka kee dhiqadhu

Oromo

손을 씻으십시오

Korean

Maydh gacmahaaga

Somali

Hands

हात धुनुहोस्

Nepali

לרשע
ידים

Hebrew

Lavez-vous les mains

French

သုနုတဖဉ်တကွာ်

Karen

gi zii bii gi nin jiin

Ojibwe

xin rửa tay

Vietnamese

ล้างมือให้สะอาด

Thai

洗手

Chinese (Mandarin)



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



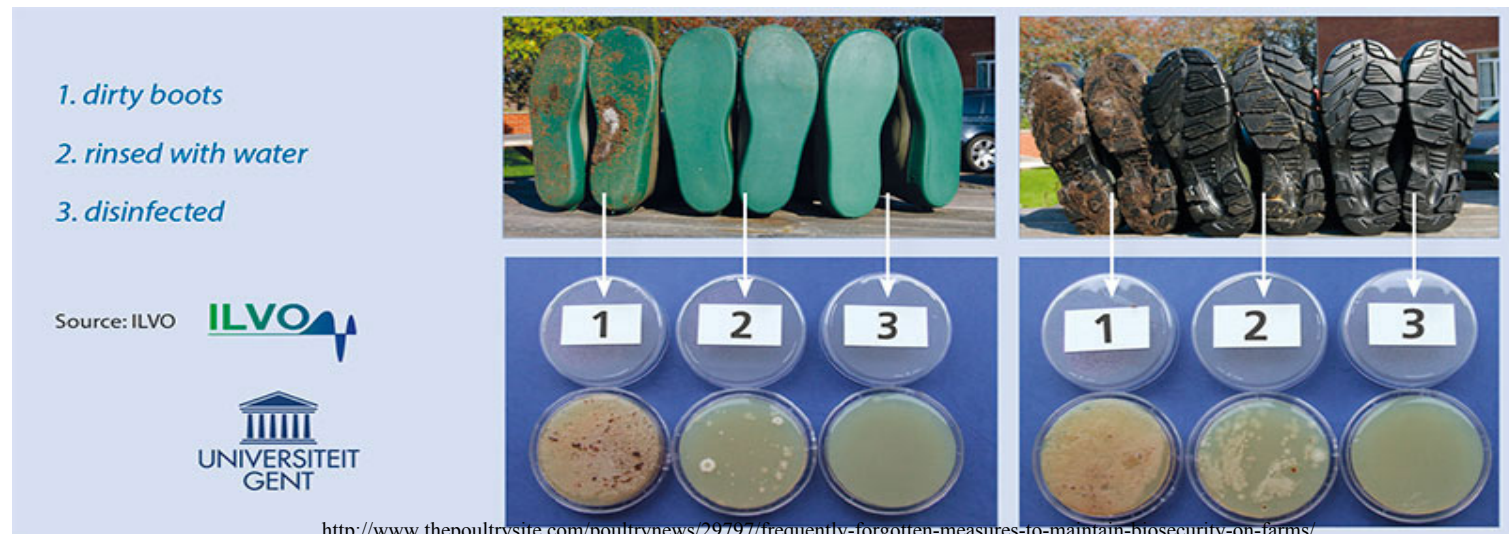
Well if all this is true.. Why haven't I gotten sick?

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

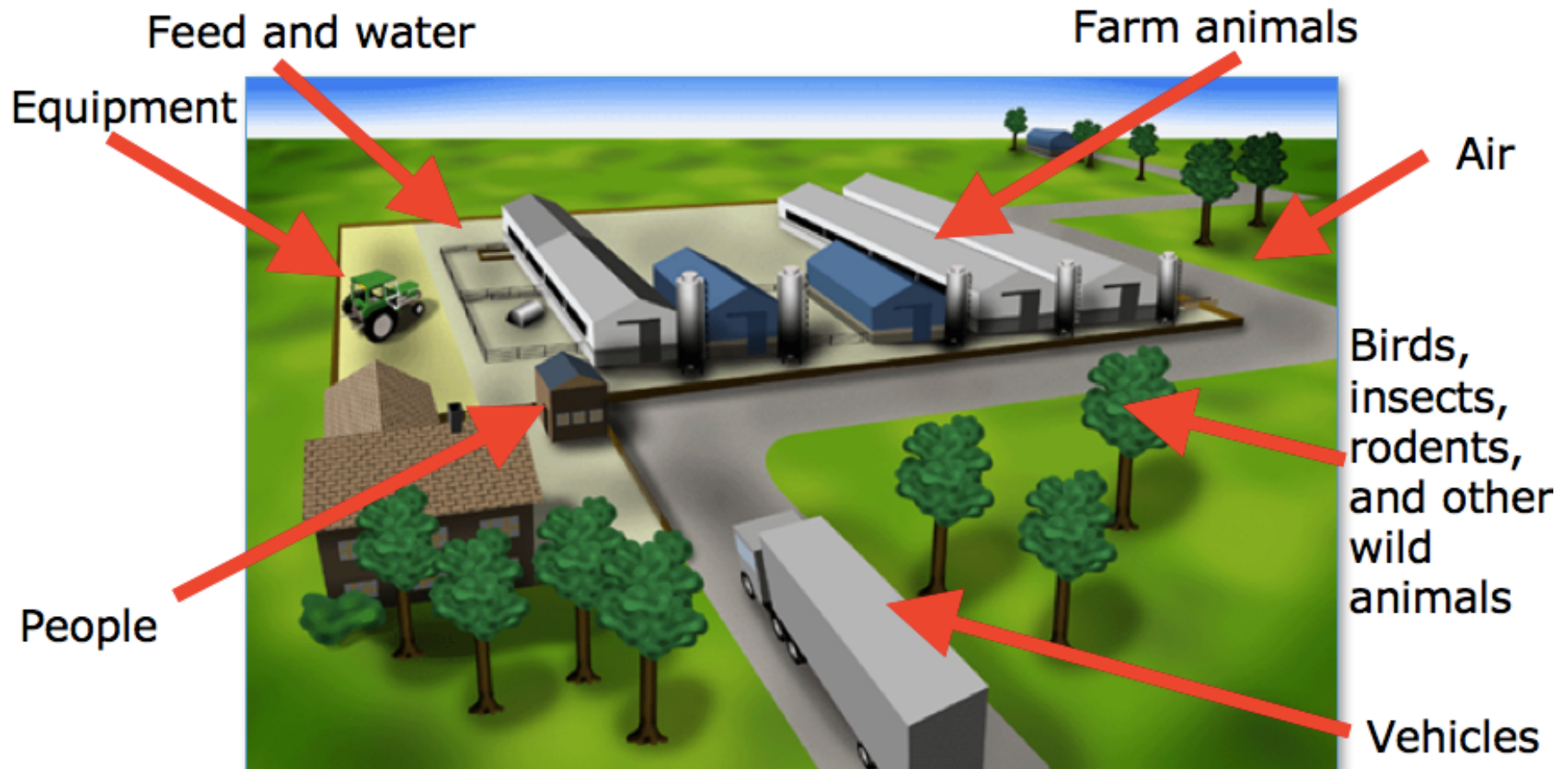
- Signs and symptoms are often overlooked in healthy people (less likely to experience severe symptoms)
- Only way to know for sure is by a fecal test
- Biggest risk is with people who have underdeveloped/challenged immune systems

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://nationalsafety signs.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

