Preventing Zoonotic Disease Transmission at Indiana Fairs and Festivals

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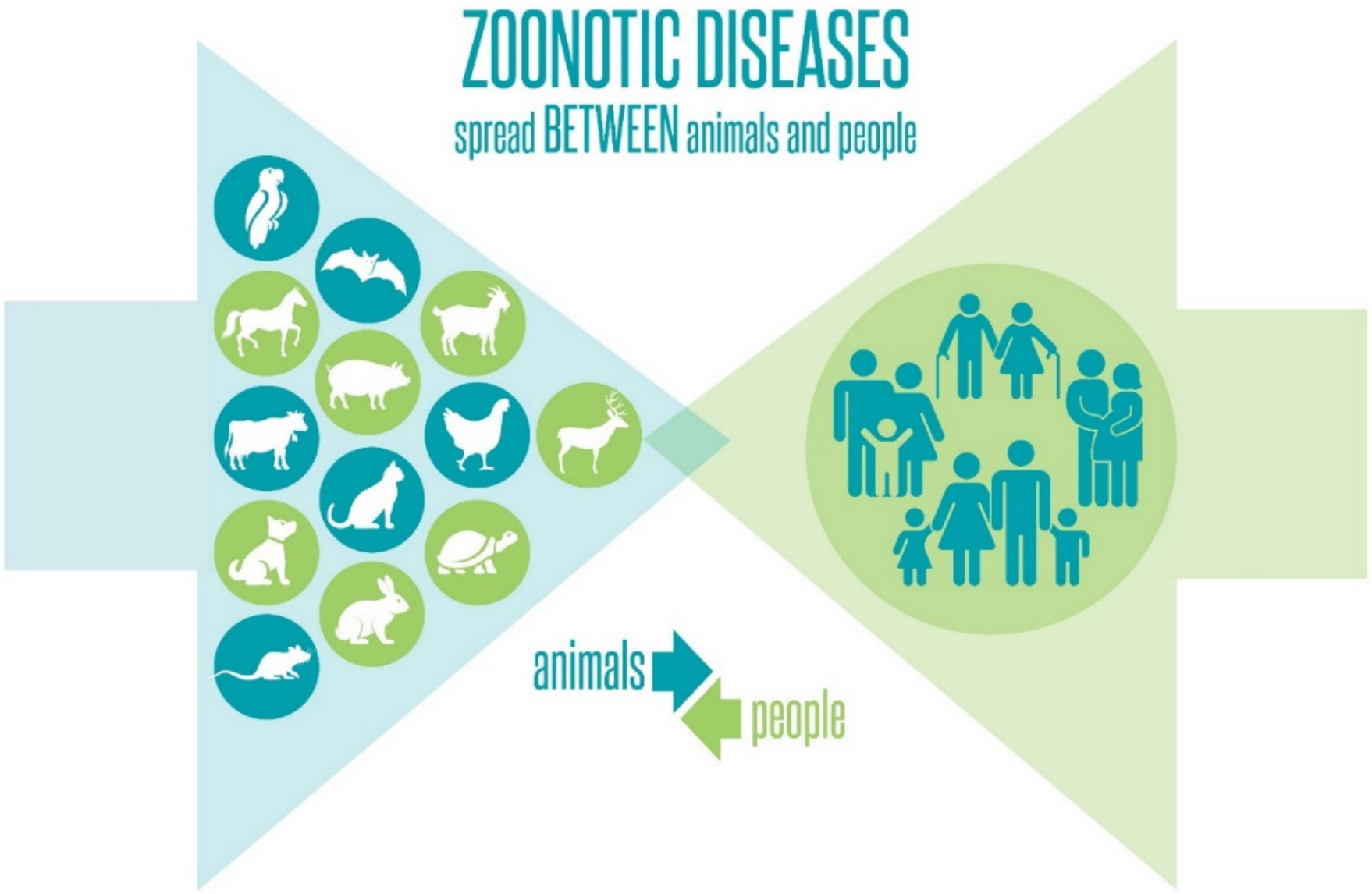
Indiana State Department of Health
Epidemiology Resource Center

Feb. 26, 2019

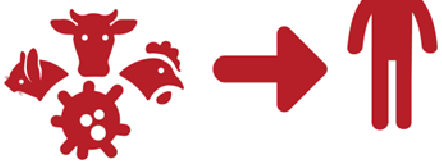


SOURCE: Centers for Disease Control and Prevention.

Prevention and control of zoonotic diseases is important for human health

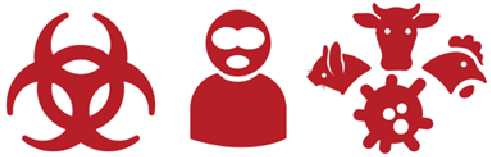
60% of existing human infectious diseases are zoonotic

At least 75% of emerging infectious diseases of humans (including Ebola, HIV, and influenza) have an animal origin



5 new human diseases appear every year. Three are of animal origin

80% of agents with potential bioterrorist use are zoonotic pathogens



SOURCE: Office International des Epizooties (World Organization for Animal Health).

Routes of transmission

- Direct contact
  - Contact with animals, urine feces or saliva
- Indirect contact
  - Contact with contaminated objects such as food, bedding, buckets, pen surfaces
- Aerosol
  - Droplets spread through air

BIRTHING EXHIBITS

Indiana State
Department of Health
Epidemiology Resource Center

Birthing exhibits increase risk of certain pathogens

- Leptospira
- *Listeria monocytogenes*
- *Chlamydophila* (Chlamydiosis)
- *Brucella* spp.
- *C. burnetii* (Q fever)

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

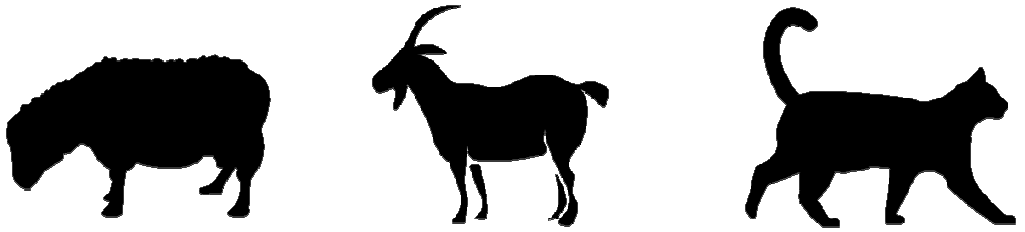
Birthing exhibits increase risk of certain pathogens

- Leptospira
- *Listeria monocytogenes*
- ***Chlamydophila*** **(Chlamydiosis)**
- ***Brucella*** **spp.**
- ***C. burnetii*** **(Q fever)**

Aerosolized pathogens are of particular importance!

Chlamydiosis

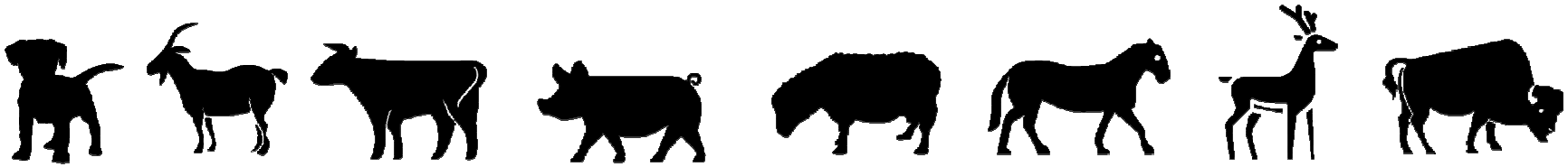
- Transmission: ingestion, direct contact or aerosol
- Species:



- Symptoms: flu-like symptoms, pneumonia
  - Abortion in pregnant women

Brucellosis

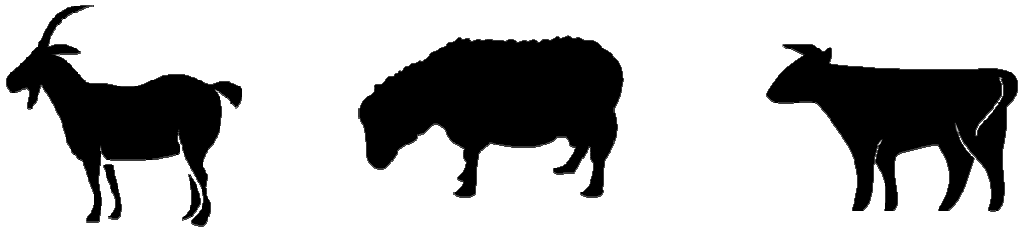
- Transmission: ingestion (esp. raw milk), droplet or aerosol, contact with mucous membranes
- Species:



- Symptoms: recurrent fevers, non-specific febrile illness, arthritis
  - Abortion in pregnant women

Q fever

- Transmission: aerosol, direct contact
- Species:



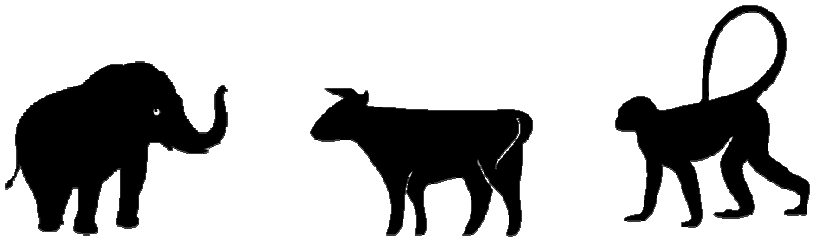
- Symptoms: influenza-like symptoms, pneumonia, endocarditis
  - Abortion in pregnant women

Recommendations for Birthing Exhibits

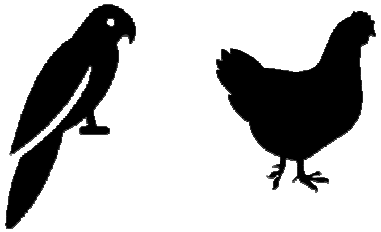
- Prevent visitor contact with newborn animals or birth products
- Provide signage that informs visitors of the risks
- Clean and disinfect the area after each birth
- Close the exhibit if there is a stillbirth or premature birth
- House the exhibits outdoors or in well-ventilated areas

Other exhibits

- Tuberculosis
  - Transmission: aerosol
  - Species:



- Psittacosis
  - Transmission: aerosol
  - Species:



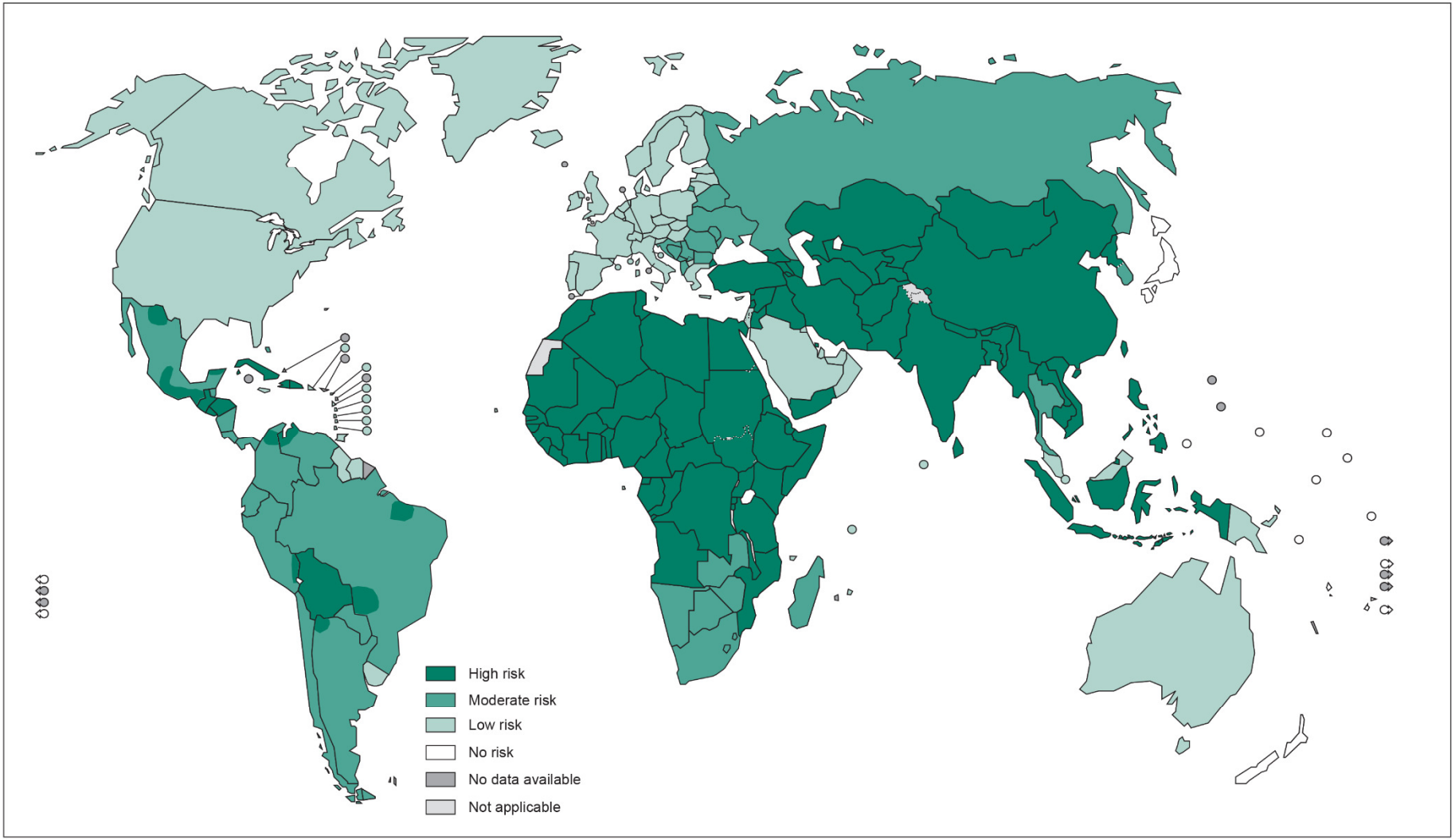
Prevention: Follow the NASPHV Animal Contact Compendium Guidelines!

ANIMAL BITES

Indiana State
Department of Health

Epidemiology Resource Center

Distribution of risk levels for humans contacting rabies, worldwide, 2013



Data Source: World Health Organization
Map Production: Control of Neglected Tropical Diseases (NTD)
World Health Organization

World Health Organization

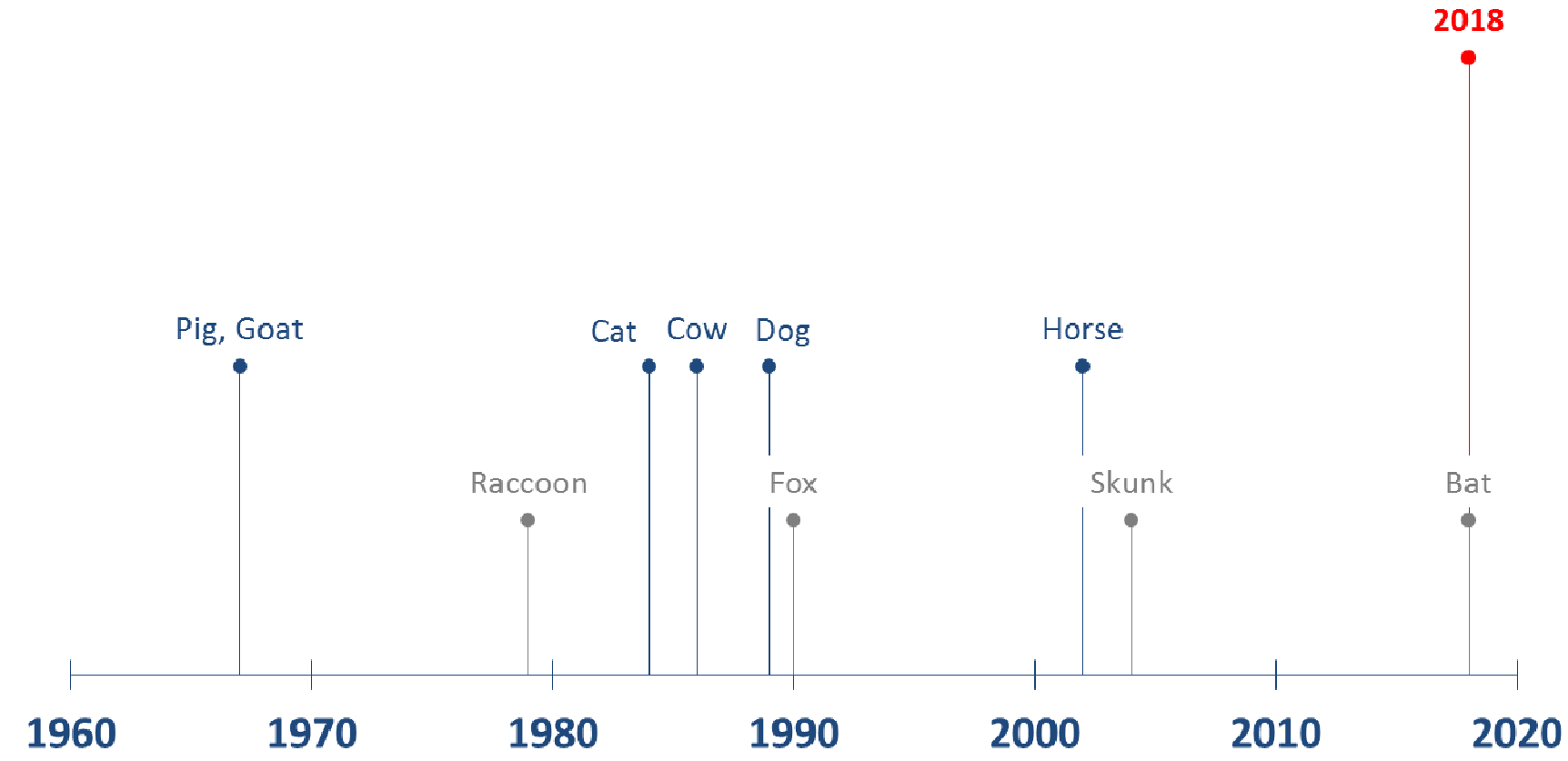
All Mammals Are Susceptible

Photo: Centers for Disease Control and Prevention

Photo: Dr. Kathryn Gaub

Last Rabies Case, By Species

Indiana, 1960–2018



Rabies Prevention

- The bite victim should receive medical care
- All animal bites should be reported to the local health department
  - Usually completed by a healthcare provider
- Follow the NASPHV Animal Contact Compendium to reduce risk of animal bites

ENTERIC DISEASES

Indiana State Department of Health

Epidemiology Resource Center

Enteric Disease

- **Enteric** = of or pertaining to the small intestines
- Broader term for disease of the upper or lower GI track.
- Enteric diseases are typically associated with foodborne disease
  - Foodborne disease = illness caused by ingestion of contaminated food

Symptoms of Enteric Agents

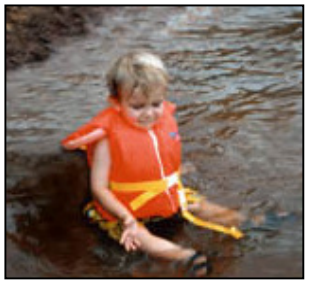
- Depends on the agent
- Symptom onset can be immediate or take months to manifest
  - **Nausea**
  - **Vomiting**
  - **Diarrhea***
  - Fever
  - Abdominal cramping

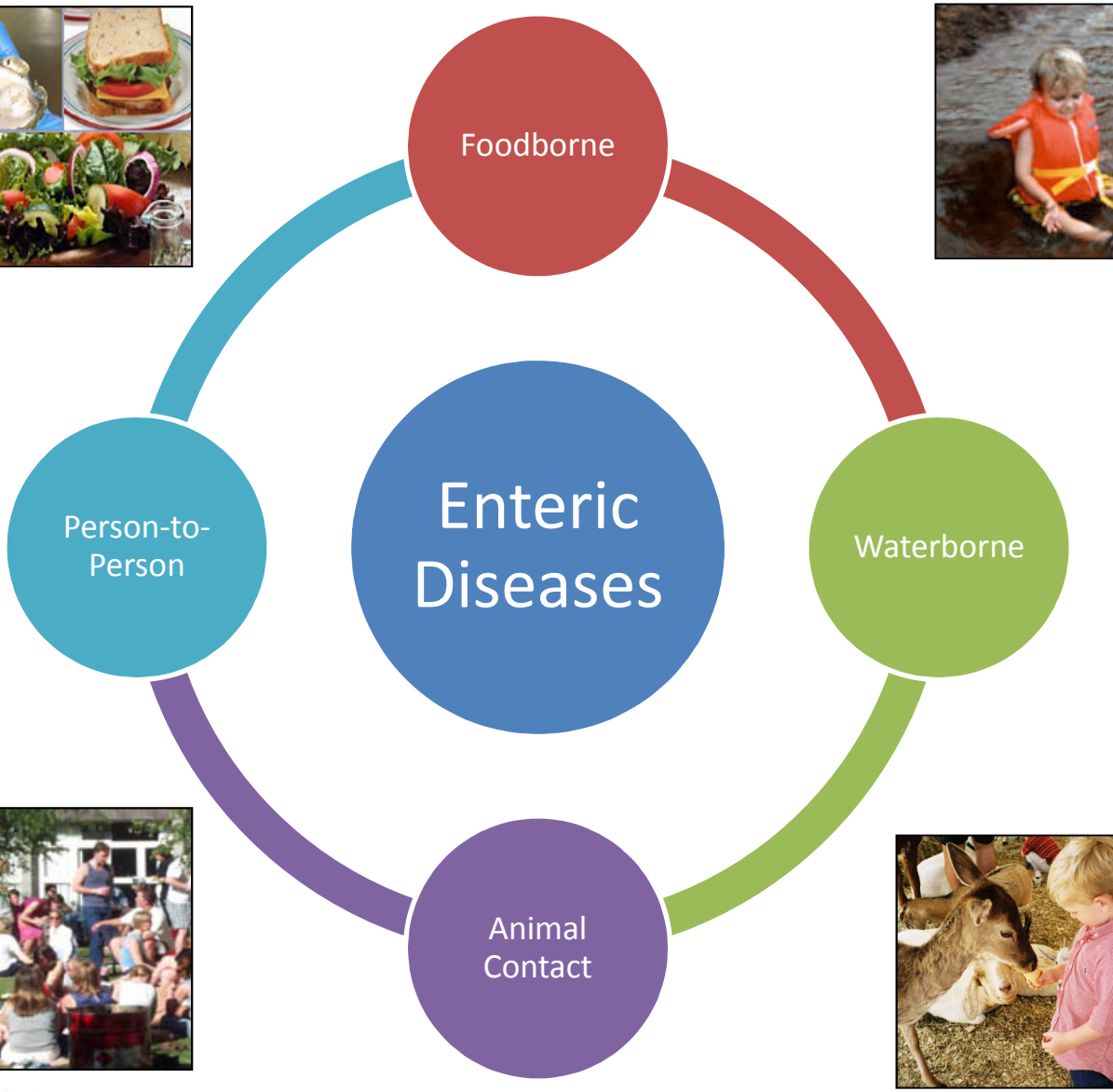
*Diarrhea = ≥3 loose stools in a 24-hour period

High Risk Populations

- Children younger than age 5
  - Higher rates of *Salmonella* infection than any other age group
- More likely to have severe infections:
  - Young children
  - Older adults
  - People with weakened immune systems

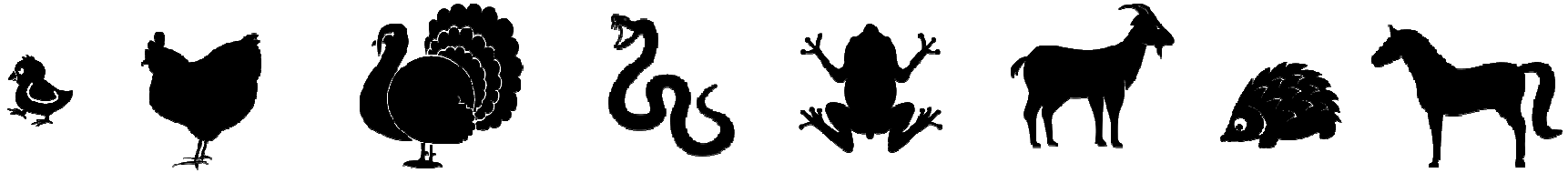
Modes of Transmission



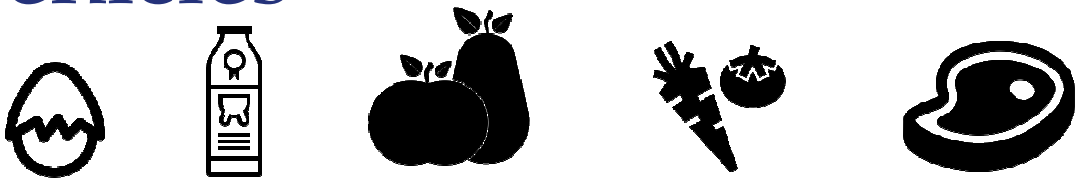


Salmonellosis

- Transmission: Fecal-Oral
- Species:



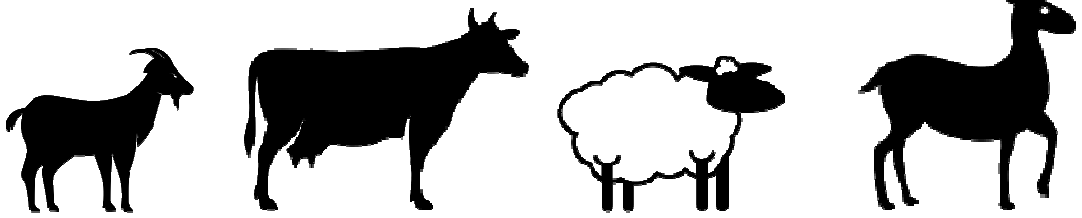
- Food Vehicles

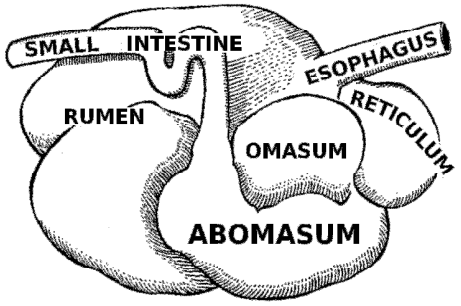


- Symptoms: Diarrhea, fever, abdominal cramping
  - Rare post-complication: Reactive arthritis

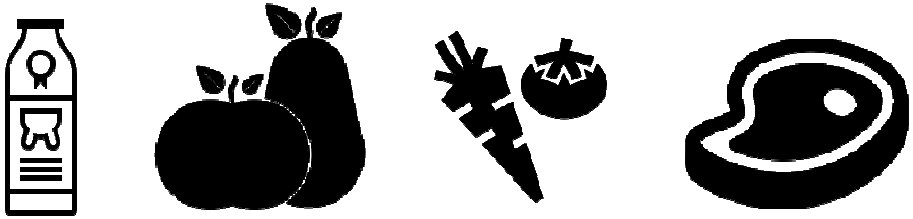
Shiga-toxin producing *E. coli* (STEC)

- Transmission: Fecal-Oral
- Ruminant Animals





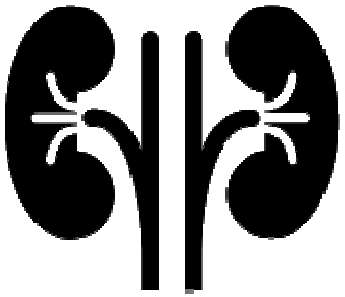
- Food Vehicles



- Symptoms: Severe abdominal pain, diarrhea (often bloody) and vomiting

Photo/Figure taken from CDC Image Library

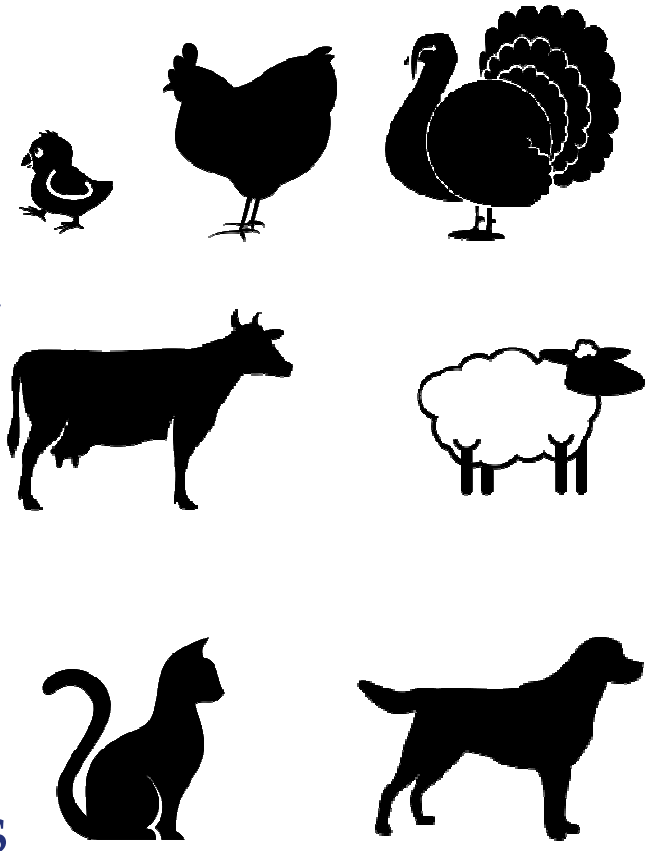
Hemolytic Uremic Syndrome (HUS)



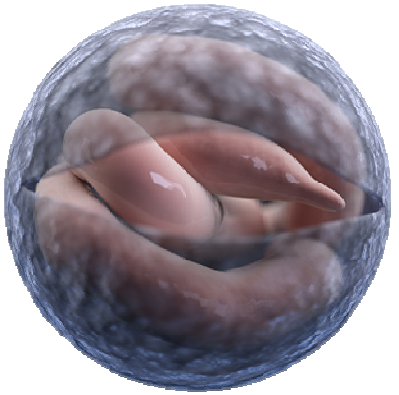
- Blood Clot Formation
- Red Blood Cell Destruction
- Platelet Deficiency (causes bleeding into the tissues, bruising, and slow blood clotting after injury.)
- Acute Renal Dysfunction: kidneys suddenly become unable to filter waste products from your blood.
- STEC is the primary case of **D+HUS** (HUS that follows a diarrheal illness)
- About 15% of young children and a much smaller proportion of adults with STEC:O157 diarrhea develop D+HUS.

Campylobacteriosis

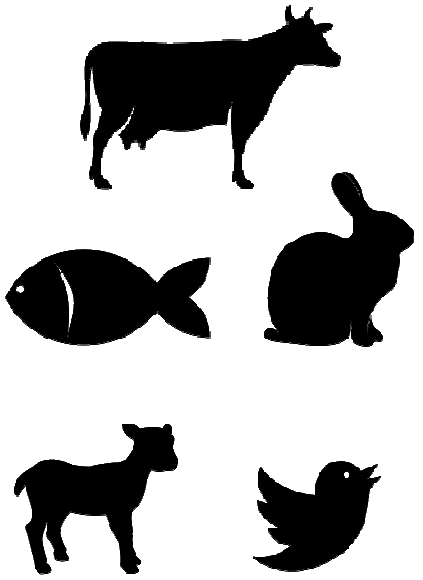
- Transmission: Fecal-Oral
- Risk Factors:
  - Eating raw or undercooked poultry
  - Eating food items that have touched raw or undercooked poultry
  - Contaminated water
  - Animal contact
  - Drinking raw (unpasteurized) milk
- Symptoms: diarrhea (often bloody), fever, abdominal cramps
  - Guillain-Barré syndrome (GBS)



Cryptosporidiosis

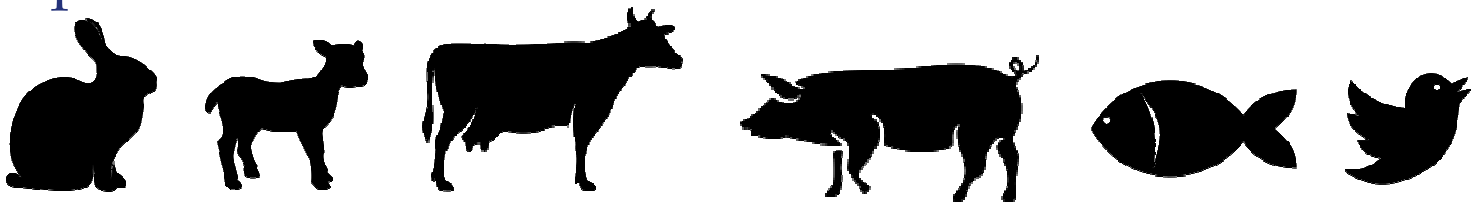


- Transmission: Fecal-Oral
- All mammals, especially young animals, can get cryptosporidiosis
  - Calves and lambs are most often affected
  - Birds, fish and rabbits can also be infected
- Symptoms: Watery diarrhea, stomach cramping, nausea, vomiting, weight loss, fever



Listeria monocytogenes

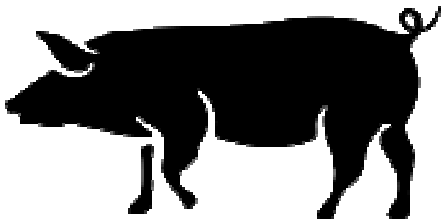
- Transmission: Fecal-Oral
- Species:



- Food Vehicles:
  - Ready-to-eat deli meats and hot dogs
  - Refrigerated pâtés or meat spreads
  - Unpasteurized milk and dairy products
  - Soft cheese made with unpasteurized milk, such as queso fresco, feta, brie, camembert
  - Refrigerated smoked seafood
  - Raw sprouts

Yersinia enterocolitica

- Transmission: Fecal-Oral
- Species:



- Food Vehicles: Pork
- Symptoms:
  - Young Children: Fever, abdominal pain, diarrhea (often bloody)
  - Older children and adults: Fever, pain on the right side of the abdomen

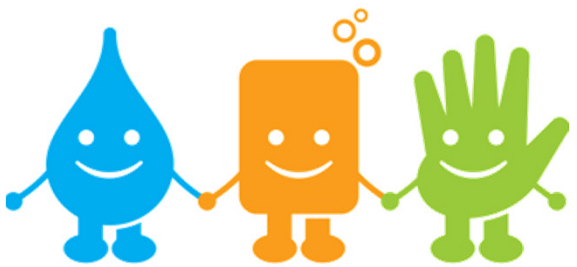
Prevention

1. Handwashing

- Availability of handwashing stations equipped with soap and paper towels upon exit of animal contact areas.
- Handwashing before, during and after food preparation
- After using the bathroom or assisting someone who is sick or needs help using the bathroom
- After changing diapers
- After handling raw meat or eggs

Prevention

2. Reducing Animal Stress
   (increases the probability of shedding)
3. Minimizing contact with surfaces
   around animal contact areas
4. Removing ill animals from exhibits



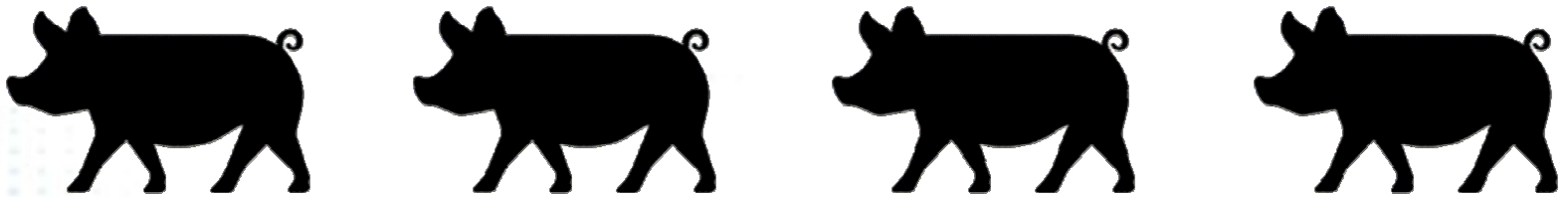
Swine influenza infections in humans

VARIANT INFLUENZA

Indiana State Department of Health
Epidemiology Resource Center

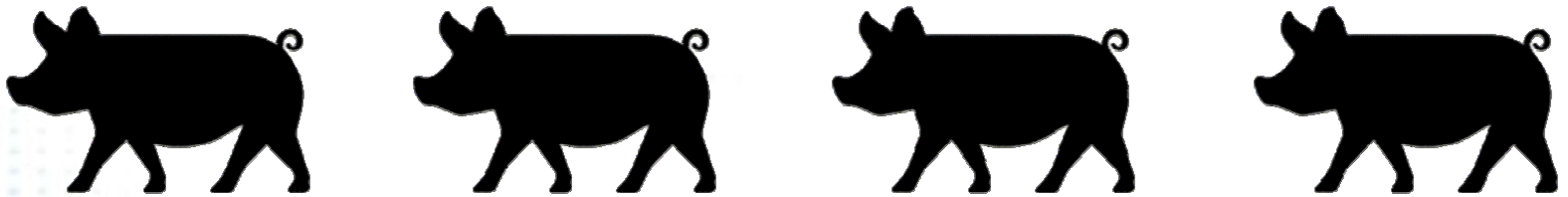
Variant Influenza Overview

- Pigs can be infected with their own influenza viruses (swine flu) that may be different from typical human flu viruses
- Influenza can spread from pigs to people and from people to pigs
- When an influenza virus that normally circulates in swine is found in humans, it is called a "variant" influenza virus and is labeled with a "v"
- An H3N2 virus in pigs that is spread to a person is called H3N2v



Variant Influenza Viruses

- Indiana reported the first confirmed variant influenza case of 2018
  - Influenza A (H3N2)v
  - Child with indirect swine exposure at an Indiana county fair
- There have been a total of 464 cases of variant influenza virus infection in the U.S. since 2010
  - Indiana is the state that has had the **most** cases
- Indiana has had 156 confirmed H3N2v cases to date



Clinical Presentation in Humans

- Symptoms are similar to regular human seasonal influenza
- Incubation period: 1-4 days (average of 2)
- Duration: 2-7 days
  - Contagious about 1 day before symptom onset up to 5-7 days after
- Recovery: Generally a complete recovery from symptoms without treatment; but severe complications, including death is possible
  - Influenza antivirals for seasonal flu may also be used for variant virus infections

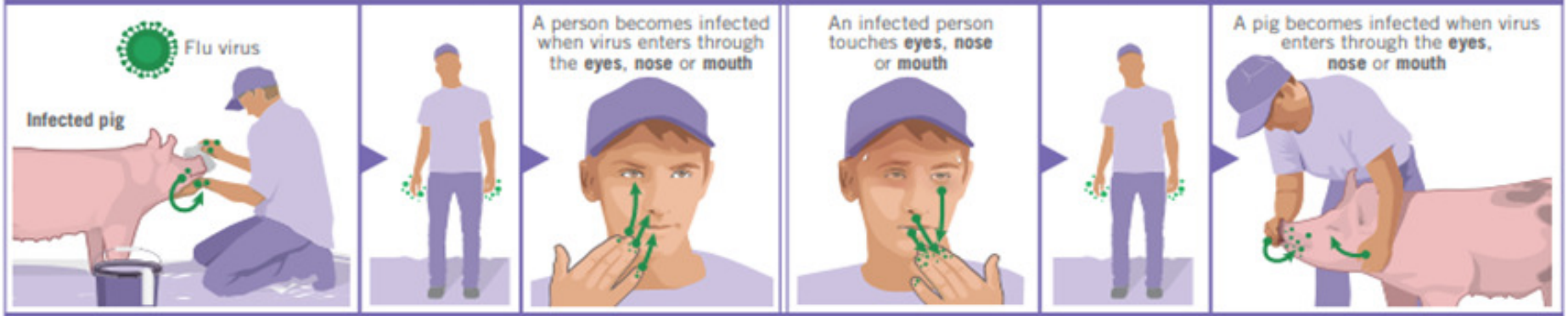
FLU CAN SPREAD BETWEEN PIGS AND PEOPLE

Information for people exposed to pigs, including people who enter the swine barns at agricultural fairs or people who raise pigs for show or farming

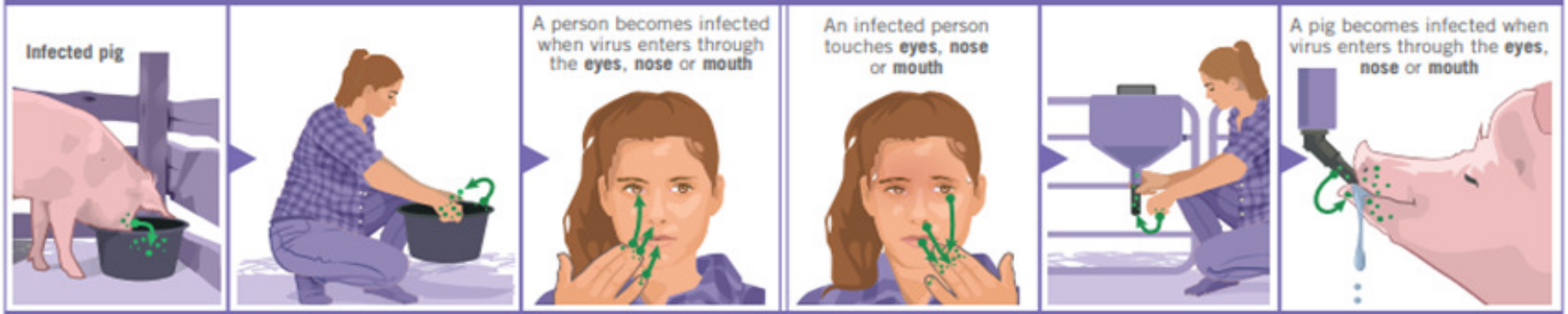
PIG TO PERSON

PERSON TO PIG

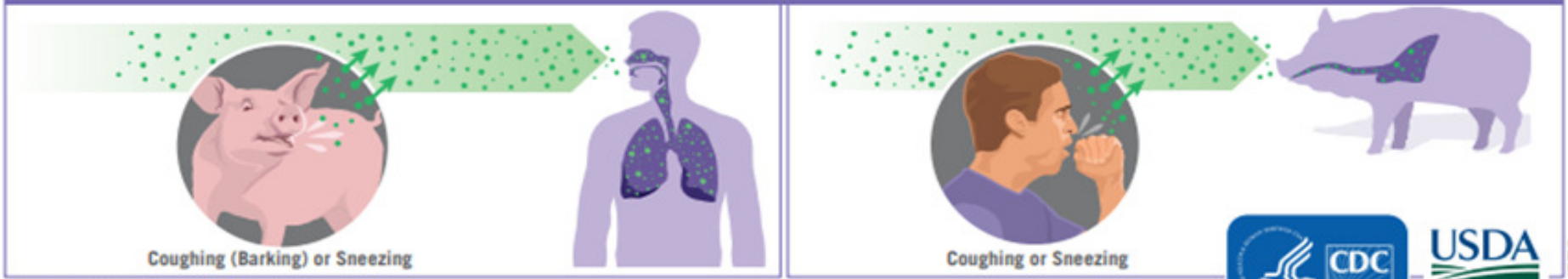
FLU CAN SPREAD THROUGH DIRECT CONTACT



FLU CAN SPREAD THROUGH SURFACE CONTACT



FLU CAN SPREAD THROUGH THE AIR (IN DROPLETS OR DUST)



www.cdc.gov/flu/swineflu/index.htm

CDC

USDA

Why are Human Infections with Variant Viruses of Concern?

- Regular seasonal flu vaccines are not thought to protect people from variant viruses
- If a pig were to be infected with influenza viruses from different species at the same time it is possible for the genes to mix to create a new virus
  - If easily transmitted person-to-person, an influenza pandemic could occur

https://pixabay.com/en/woman-blow-blowing-nose-hand-chief-698971/

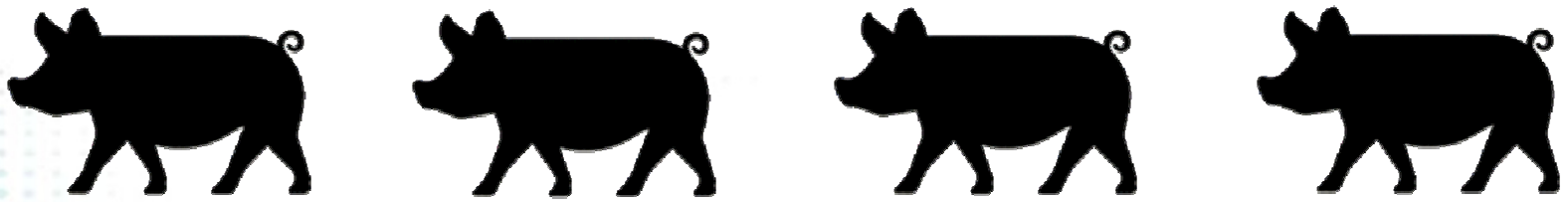
Swine Influenza

TAKE ACTION TO PREVENT THE SPREAD OF FLU VIRUSES BETWEEN PIGS AND PEOPLE

Indiana State Department of Health
Epidemiology Resource Center

Facility Recommendations

- Persons at high risk of serious flu complications should be instructed to avoid contact with pigs or pig areas
- Let visitors know they should never eat or drink in animal areas
- Notify visitors to wash their hands after leaving animal areas
- Instruct visitors not carry toys, pacifiers, spill-proof cups, baby bottles, strollers or similar items into areas with pigs



Facility Recommendations

- Instruct visitors to supervise children closely to discourage hand-to-mouth activities and contact with soiled bedding
  - Children should not be allowed to sit or play on the ground in animal areas
- Control visitor traffic to prevent overcrowding
- Hand out "Key Facts for People Exhibiting Pigs at Fairs" at registration
- Provide accessible hand-washing stations for all visitors

KEY FACTS for People Exhibiting Pigs at Fairs

Who is at high risk of serious illness from variant virus infections?

- People who are at high risk for serious complications (http://www.cdc.gov/flu/about/disease/high_risk.html) from flu, including variant flu viruses like H3N2v, include children younger than 5 years, people with certain long-term health conditions like asthma and other lung diseases, diabetes, heart disease, weakened immune systems, neurological or neurodevelopmental conditions, as well as pregnant women and people 65 years and older.
- Most of the people hospitalized because of variant virus infections have had one of these factors that put them at high risk.

Background

Pigs may be infected with swine influenza viruses that are different from human flu viruses. Swine flu viruses spread among pigs and – while rare – they can spread from pigs to people too. When that happens, these viruses are called variant viruses and are designated with the letter "v" after the virus subtype. Human infections with H1N1v, H3N2v and H1N2v viruses have been detected in the United States.

Spread of swine flu viruses from a pig to a person is thought to happen in the same way that human flu viruses spread; mainly through droplets when infected pigs cough or sneeze. This has happened in different settings, especially at fairs where pigs from many places come in close contact with each other and with people.

Exposure to pigs, especially close contact with pigs, is the main risk factor for infection with variant influenza viruses. While most illness with these viruses has been mild, serious illness, including illness resulting in hospitalization, has happened. To protect those most likely to get infected and develop serious illness, CDC and 4-H National Headquarters recommend exhibitors (and their friends or family) take the following actions to help prevent the spread of flu between pigs and people.

Recommendations for Fair Exhibitors with High Risk Factors:

- **Anyone at high risk of serious flu complications planning to attend a fair where pigs will be present should avoid pigs and swine barns at the fair.**
- This includes pig exhibitors and family members with high risk factors.
- This may mean that exhibitors with one or more high risk factors do not show their pig(s) this year.

National Center for Immunization and Respiratory Diseases
Influenza Division

CDC

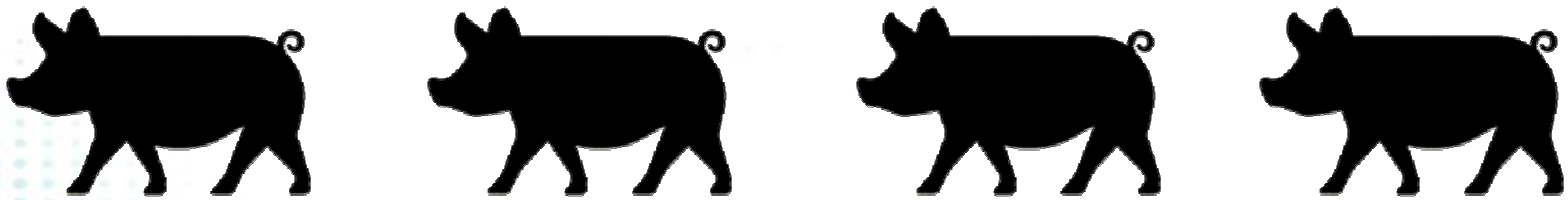
https://www.cdc.gov/flu/pdf/swineflu/fair_exhibitor_factsheet.pdf

Animal Area Recommendations

- Provide adequate ventilation both for animals and humans
- Store all feeders/equipment in designated areas that are restricted from public access
  - Avoid transporting soiled bedding through non-animal areas or transition areas
  - Take precautions to prevent spillage if this isn't avoidable
- Disinfect animal areas at least once daily when feasible

Animal Health Recommendations

- Monitor pigs daily for signs of illness
  - Discharge from nose and/or eyes
  - Sleepiness
  - No appetite
  - Fever
  - Cough/barking
- Ill pigs, animals suspected or known to be infected with influenza viruses and animals from herds with a recent history of respiratory disease should **not** be exhibited



COMPENDIUM OF DISEASE PREVENTION MEASURES

Indiana State Department of Health
Epidemiology Resource Center

Animal Contact in Public Settings: Benefits

- Helps the public understand:
  - Care and management of farm animals
  - Animal behavior
- Promotes the human-animal bond
- Provides entertainment

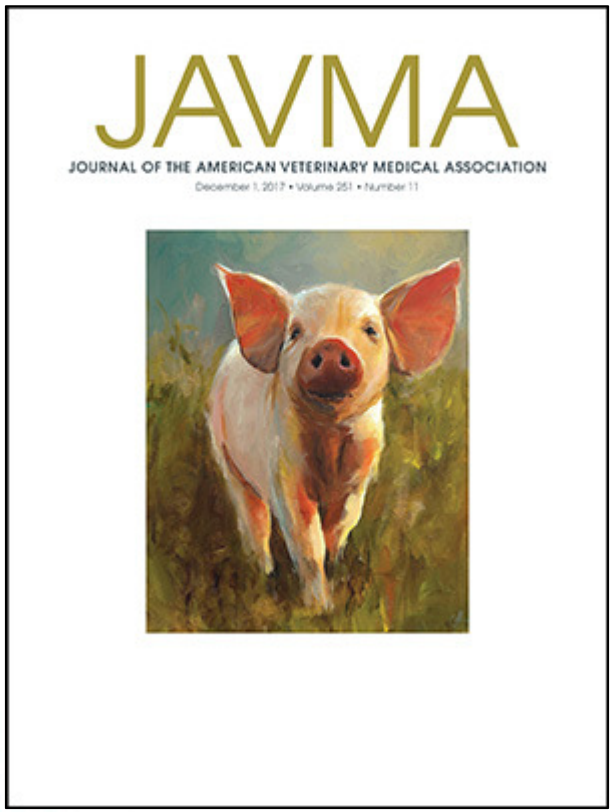
SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Animal Contact in Public Settings: Risks

- Animal contact is a risk factor for certain diseases
- About 445,000 enteric illnesses in the U.S. every year are due to animal contact
- About 100 disease outbreaks were associated with animal contact in public settings during 2010–2015

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2017



nasphv.org
national association of state public health veterinarians

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Objectives of the Compendium

- Provide recommendations for exhibitors, veterinarians and public health practitioners responsible for animal contact exhibits and venues
- Provide background information on diseases associated with animal contact in public settings

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Who should use the Compendium

- Fair boards and staff
- Petting zoo operators
- Agritourism venues with animal exhibits
- Private farms open to public visits
- School staff arranging field trips

Highlights of the Compendium

- Facility design
- Animal selection and care
- Hand hygiene

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Recommendations: Facility Design

- Keep animal exhibition areas separate from food preparation/consumption areas
- Post educational signage at entry/exit points
- Manage visitor flow and control animal contact by using barriers
- Keep facilities clean
- Ensure adequate handwashing facilities at exit points

Stay Healthy at the Fair!

- ❑ Do NOT eat, drink, or sleep in animal areas
- ❑ Do NOT bring pacifiers, baby bottles, toys, or eating utensils into animal areas
- ❑ If you are ill, stay OUT of the barn for at least 24-hours after a fever
- ❑ Wash your hands thoroughly after visiting

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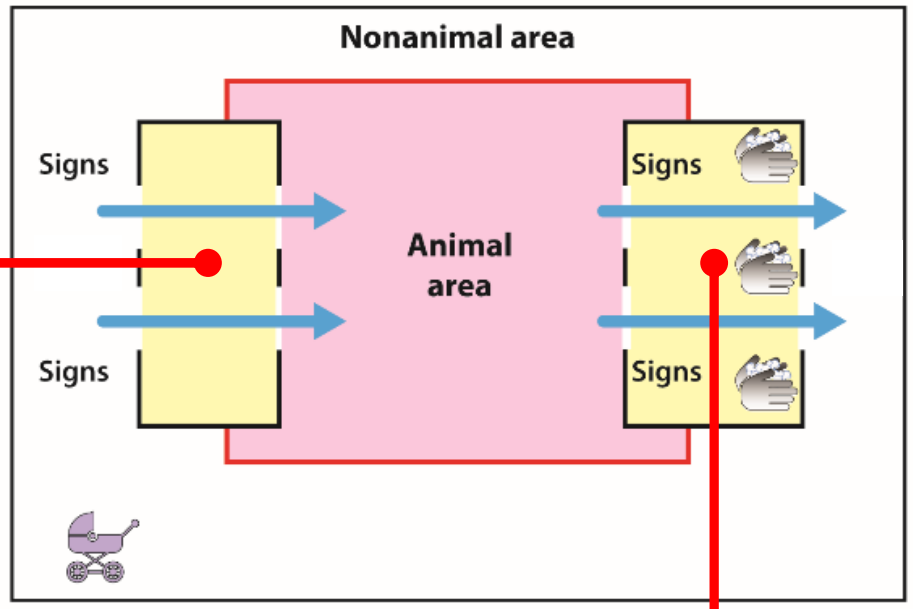
Facility Design: Separate Transition Areas

Entry Transition Area

- Signage
  - Risk communication
  - Prohibition of eating and drinking in animal areas
- Stroller parking
- Trash cans

Design 1

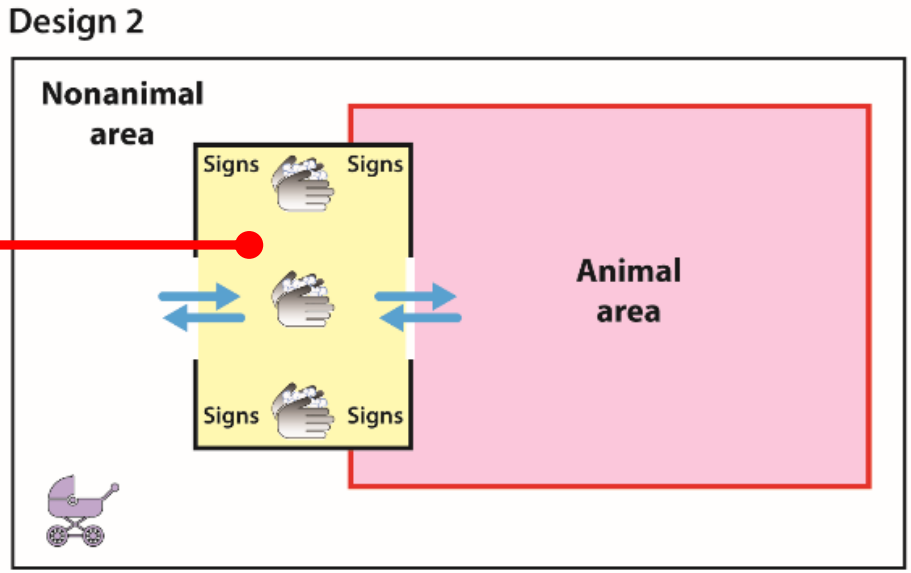


Exit Transition Area

- Signage
  - Handwashing
- Handwashing stations
- Event personnel

Facility Design: Single Transition Area

- Signage
  - Risk communication
  - Prohibition of eating and drinking in animal areas
  - Handwashing
- Stroller parking
- Handwashing stations
- Event personnel



Animals that are poor choices for public contact

- Sick animals, including those with diarrhea
- Dangerous animals (e.g., wild carnivores, venomous species, monkeys and apes)
- Special considerations
  - Calves <1 month old: *Cryptosporidium*
  - Goats: harmful *E. coli*
  - Baby chicks: *Salmonella*
  - Hogs: swine influenza

Recommendations: Animal Care

- Animals should be healthy during exhibition
- Animals should be appropriately vaccinated (e.g., rabies)
- Animals should acclimate to their surroundings before exhibition
- Animals should have adequate space to rest
- Disease screening is not generally recommended

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Recommendations: Handwashing Stations

- Desired amenities
  - Hot running water
  - Liquid soap
  - Paper towels
- Number of stations needs to be sufficient for visitor traffic
- Accessibility for children and disabled persons

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Recommendations: Hand Sanitizer Stations

- **Not** as effective as handwashing
- 60% alcohol or higher
- Accessibility for small children and disabled persons
- Signage: wash hands with soap and water at next opportunity

SOURCE: National Association of State Public Health Veterinarians. Used by permission.

Where to find the Compendium

Documents →

Compendia →

Compendium of Measures to Prevent Disease Associated with Animals in Public Settings

All Documents
Compendia
Correspondence

Animal Contact Compendium

- **Animals in Public Settings Compendium**
- **Animals in Public Settings Compendium — Cover Letter**

Animals in Public Settings Toolkit

These selected items are examples of educational resources that stakeholders can use to encourage implementation of the principles outlined in the Animal Contact in Public Settings Compendium.

- **Complete toolkit** (all individual files below)

- Aedin's Law - Animal Exhibition Regulations (North Carolina)
- Animal Care Recommendations for Exhibits (Arizona)
- Animal Exhibitor Packet Cover Letter (Arizona)
- Disease Prevention for Fairs and Festivals Toolkit (Kansas)
- Petting Zoo Best Practices Checklist (Minnesota)
- Reducing the Risk of Disease Transmission Fairs and Petting Zoos (South Dakota)
- State Statutes for Animal Exhibitions (North Carolina)
- Tips for Making Your Petting Zoo Safe for the Public (Arizona)

- Poster: Animal Exhibits Handwashing
- Poster: Animal Exhibits Handwashing (Spanish)
- Poster: Animals Can Carry Germs (Washington)
- Poster: Help Kids Wash Hands (Washington)
- Poster: KNOW How to Be Safe Around Animals (Arizona)
- Poster: ReduceYourRisk (North Carolina)
- Poster: Reduce Your Risk (North Carolina) (Spanish)
- Poster: Wash Hands Before Eating (Washington)
- Poster: Wash Hands After Visiting Animals (Washington)
- Poster: Welcome to the Fair - Wash Your Hands (Washington)
- Poster: Wash Hands with Arrow (Washington)

How to Stay Healthy at Animal Exhibits

Protect yourself from diseases like influenza (flu), *E. coli* and *Salmonella!*

Petting zoos and fairs give us exciting opportunities to interact with animals. These experiences are educational and fun, but it's important to remember that animals sometimes carry harmful germs that can make us sick. Here's what you can do to keep yourself and your family healthy and safe when visiting animal exhibits.

WASH YOUR HANDS OFTEN.

- Find out where handwashing stations are located.
- Always wash your hands right after petting animals or touching anything in animal areas (where they live, roam, or eat).
- Wash your hands when you leave animal areas, even if you did not touch the animals.
- Running water and soap are best. If running water and soap are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol. Wash your hands with soap and water as soon as a sink is available.

EAT AND DRINK SAFELY.

- Keep food and drinks out of animal areas.
- Don't prepare, serve, or eat food in animal areas (with the exception of service animals, or animals that assist people with disabilities).
- Don't share your food with animals, to keep yourself and the animals healthy. Animals should eat the food made for them.
- Remember: Wash your hands before preparing food or drinks and before eating and drinking.

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KEEP CHILDREN SAFE AROUND ANIMALS.

- **Young children are more likely to get sick from harmful germs that animals can carry. For this reason, it is recommended that children 5 years of age and younger not have contact with reptiles, amphibians, and live poultry, including baby chicks and ducklings, because these animals are commonly associated with outbreaks of disease.**
- Children **always** need adult supervision around animals.
- Never allow children to put their thumbs, fingers, or objects (like pacifiers) in their mouths when they're around animals or in an animal area.
- Encourage and supervise handwashing.
- Do not take or use strollers, bottles, pacifiers, spill-proof cups, or toys into animal areas.

Did you know?

Pigs can carry influenza (flu). People at high risk of serious flu complications should avoid contact with pigs and should not enter swine barns.

These groups include:

- **Children younger than 5 years**
- **People older than 65 years**
- **Pregnant women**
- **People with certain long-term health conditions (like asthma and other lung disease, diabetes, heart disease, weakened immune systems, and neurological or neurodevelopmental conditions)**

For more information on staying healthy around animals, check out these websites:

https://www.in.gov/isdh/25809.htm

https://www.cdc.gov/features/fairsandfood/index.html

http://www.health.state.mn.us/divs/idepc/dtopics/animal/animal.html

https://www.cdc.gov/flu/swineflu/h3n2v-basics.htm

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Questions?

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