


 UNIVERSITY of Prince Edward ISLAND

 THE OHIO STATE UNIVERSITY  
COLLEGE OF VETERINARY MEDICINE

# One Health – The Risks and Rewards of Loving Animals

Jason Stull, VMD, MPVM, PhD, DACVPM  
Assistant Professor

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## CONFLICT OF INTEREST STATEMENT

**The speaker declares he has no competing interests**

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## OBJECTIVES

-  Relationships between human, animal and environmental health and the public health challenges and opportunities these links present
-  Impact on health due to the human-animal bond
-  One Health impacts of globalization and migration of humans and animals

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**ONE HEALTH**

Recognize connections (human, animal, environmental health) for optimal benefits

Address areas at interface results in benefits of all

Thompson 2013

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**SOMETHING OLD, SOMETHING NEW...**

Concept of One Health not new

New technologies & approaches allow unique benefits

Lack of awareness across health disciplines – limited action

Map of cholera clusters (London epidemic, 1854)

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**ONE HEALTH**

Stephen C. Karesh WB, 2014

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**LEVERAGING ONE HEALTH CONCEPTS**

- Zoonotic Influenza
- Salmonellosis
- West Nile virus
- Plague
- Emerging coronaviruses (e.g., MERS-CoV)
- Rabies
- Brucellosis
- Lyme disease



**Prioritizing Zoonotic Diseases for Multisectoral, One Health Collaboration in the United States**

Workshop Summary



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**Think Globally, Act Locally**

*How does a One Health paradigm assist us in local Infection Prevention and Control?*



Source: Pixabay

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**ONE HEALTH AND ANIMALS: CASE EXAMPLES**

-  Animals in human healthcare facilities
-  Dogs on livestock farms
-  Pets as human disease sentinels
-  Transboundary animal diseases

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**PET OWNERSHIP IS COMMON**

Majority of homes have at least 1 pet  
Dog or cat (>50%)

- Fish
- Birds
- Rabbits, hamsters, guinea pigs, gerbils, ferrets, snakes, frogs, turtles, lizards

Source: Pixabay

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**HUMAN-ANIMAL BOND**

**Distress & social isolation: ↓ health**  
**Often strong bonds pets and owners**

- ↓ stress, anxiety, loneliness, depression<sup>1</sup>
- ↓ risk cardiovascular disease<sup>2</sup>
- Children: better social skills, self-esteem, empathy<sup>3</sup>
- Catalyst for harm reduction (e.g., tobacco, drug use)<sup>4</sup>



Source: Pixabay

<sup>1</sup> Friedmann 2009    <sup>2</sup> Patronelli 2003    <sup>3</sup> Melson 1997    <sup>4</sup> Lem 2013

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**IMMUNOCOMPROMISED**

**Mental & physical isolation**


**HIV-infected<sup>1</sup>**

- Pet as family member
- Source of support and affection
- Protect against loneliness
- Pet-owners with AIDS less depression than non-pet owners

**Cancer patients<sup>2</sup>**

- High level of attachment to pets
- Having a pet provided health benefits (67%)

**Immunocompromised children<sup>3</sup>**



Source: Pixabay

<sup>1</sup> Siegel 1999    <sup>2</sup> Larson 2010    <sup>3</sup> Stull 2014

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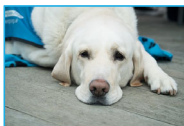
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## PETS INCORPORATED INTO HUMAN HEALTHCARE<sup>1</sup>

- Builders of social capital
- Harm reduction
- Motivators for healthy behavior change
- Participants in treatment plans



Source: Pixabay

<sup>1</sup> Hodgson et al., 2015

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## ZOOZOSES

- Naturally transmitted from animals to people
- Of 1,415 species pathogenic to people<sup>1</sup>
  - 61% zoonotic
  - 75% emerging pathogens zoonotic



<sup>1</sup> Taylor 2001

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## PET-ASSOCIATED DISEASE

- 70+ pathogens of pets transmissible to people
- Pets often subclinical shedding
- Emerging & reemerging diseases
- Animal and human reservoirs
- Dogs visiting human healthcare facilities<sup>1</sup>
  - *C. difficile* (OR=2.4)
  - MRSA (OR=4.7)



Source: Pixabay

<sup>1</sup> Lefebvre 2009

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### PET-ASSOCIATED DISEASE RISKS

**Disease risk greatest**

- Extremes of age (<5 yrs, ≥ 65 yrs)
- Pregnant
- Immunocompromised



Source: Pixabay

**Higher risk groups**

- Particular pathogens
- Longer duration
- More severe/unexpected complications

**Pet factors**

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**(SOME) ANIMAL-ASSOCIATED HUMAN OUTBREAKS, USA (2011-2019)**

- Pet store puppies (campylobacteriosis)
- Live poultry (salmonellosis)
- Poultry at slaughter plant (Psittacosis)
- Pet turtles (salmonellosis)
- Pet crested geckos (salmonellosis)
- Pet bearded dragons (salmonellosis)
- Pet frogs (salmonellosis)
- Pet hedgehogs (salmonellosis)
- Pet guinea pigs (salmonellosis)
- Pet rats (salmonellosis)

Source: Centers for Disease Control and Prevention (<https://www.cdc.gov/healthypets/outbreaks.html>)

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## RISKS AND BENEFITS OF PETS IN NURSING HOMES<sup>1</sup>

95 respondents (different OH facilities)

97% allowed animals to visit

- Family pet
- Socialization-directed
- Physical therapy

<sup>1</sup>Stull et al, 2018

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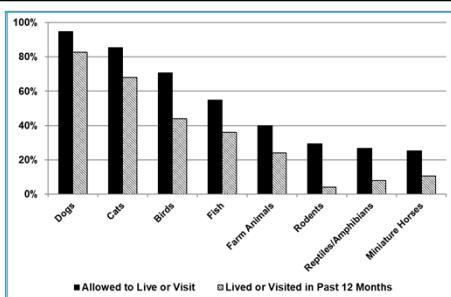
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Responding facilities (N = 75) that allowed pets to live in or visit the facility and reported presence of species within the facility in the past 12 months

<sup>1</sup>Stull et al, 2018

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## FACILITY POLICIES RELATED TO ANIMALS

Most (93%) had a policy concerning animals

Gaps in

- Hand hygiene (21 - 47%)
- Training of staff (18 - 33%)
- Within-facility location and species restrictions (23 - 55%)
- Animal age restrictions (2%)

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**BENEFITS AND RISKS**

**Perceived health benefits**

- Residents frequently ask to spend time with animals
  - 58% (birds) to 94% (dogs/cats)
- Useful in calming agitated residents
  - 61% (birds) to 94% (dogs)

**No reported pet-associated infections**

**Health and safety concerns low (25%)**

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**ONE HEALTH CHALLENGES**

**Accurately measuring health benefits and risks from animal contact**

**Needed to best weigh advantages and disadvantages**

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INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY  
SHEA EXPERT GUIDANCE

**Animals in Healthcare Facilities: Recommendations to Minimize Potential Risks**

Rekha Murthy, MD,<sup>1</sup> Gonzalo Bearman, MD, MPH,<sup>2</sup> Sherrill Brown, MD,<sup>3</sup> Kristina Bryant, MD,<sup>4</sup> Raymond Chinn, MD,<sup>5</sup> Angela Hewlett, MD, MS,<sup>6</sup> R. Glenn George, JD,<sup>7</sup> Ellie J.C. Goldstein, MD,<sup>8</sup> Galit Holzman-Peargal, MD,<sup>9</sup> Mark E. Rupp, MD,<sup>10</sup> Timothy Wianken, PhD, CIC, MPH,<sup>11</sup> J. Scott Wesse, DVM, DVM, DACVIM,<sup>12</sup> David J. Weber, MD, MPH<sup>12</sup>

**PURPOSE** guidance on the management of AHC in four categories: animal-assisted activities, service animals, research animals, and personal pet visitation. Institutions considering these programs should have policies that include well-organized communication and education directed at healthcare personnel (HCP), patients, and visitors. Appropriately designed studies are needed to better define the risks and benefits of allowing animals in the healthcare setting for specific purposes.

Animals may be present in healthcare facilities for multiple reasons. Although specific laws regarding the use of service animals in public facilities were established in the United States in 1990, the widespread presence of animals in hospitals, including service animals to assist in patient therapy and research, has resulted in the increased presence of animals in acute care hospitals and ambulatory medical settings. The role

**Murthy R, et al. Animals in healthcare facilities: recommendations to minimize potential risks. Infect Control Hosp Epidemiol. 2015**

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### Model Animal Protocols for Long-Term Care Facilities

This protocol is designed to target key topics related to animals in a long-term care facility (LTCF) likely to affect resident and animal health. Using this protocol as a guide, users are encouraged to adapt it to their facility while continuing to meet the requirements enforced by the Ohio Board of Civil Control. Please refer to the supporting document for an extension of the information and guidelines and state requirements to help inform your decision in developing an animal protocol.

Name of facility: \_\_\_\_\_  
Date last updated: \_\_\_\_\_

**Name of facility** proudly supports the utilization of animal-related activities (visiting animals and live-in animals) for the enrichment and entertainment of our residents. There is strong evidence that animals can provide many health benefits and can also create a home-like environment for our residents to enjoy. The following protocols ensure that our residents can benefit from visiting or live-in animals while preventing the risk of injuries and disease to these animals and our residents.

I. **Visiting Animals and Their Handlers.** Visiting animals are those brought into the facility to participate in an animal-related activity for all residents at the facility. This includes but is not limited to therapy animals, "petting zoo" animals, and animals used in educational programs.


- a. The animal must be pre-approved by \_\_\_\_\_ (staff position and/or intern/committee member) before the first visit. Pre-approval includes ensuring the animal meets all requirements of this protocol including but not limited to species, age, health and temperament.
  - i. Approved animals will be entered into a log. \_\_\_\_\_ (staff position and/or internal committee member) is responsible for creating and updating this log. This log will be reviewed yearly as animal temperament and health evaluations are completed.
- b. The handler is required to provide proof (e.g. health certificate or signed letter from a veterinarian) that within the last year the animal (as indicated for the species):
  - i. Has received a physical examination by a veterinarian including screening for internal and external parasites.
  - ii. Is up-to-date on vaccinations for common infectious agents including rabies.


<http://www.go.osu.edu/nhpets>

## Animals in Ohio long-term care facilities

Keep residents safe while enjoying pets

A guide for administrators, activity coordinators and families



  
THE OHIO STATE UNIVERSITY

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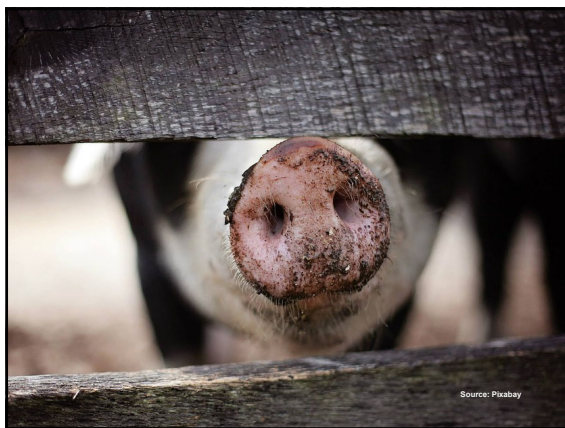
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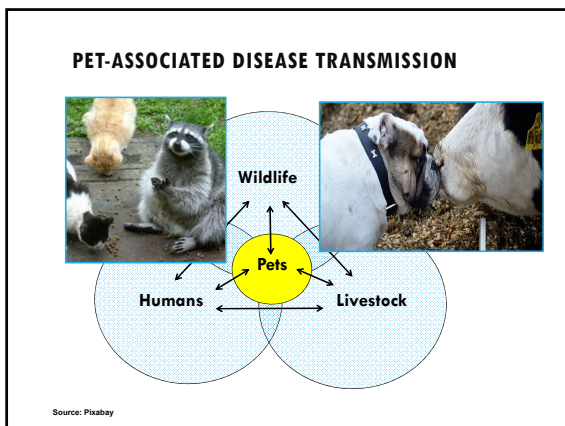
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## LIVESTOCK FARMS: UNIQUE ONE HEALTH OPPORTUNITIES

- People**
- Aging population (mean 58 yrs; 33% over 65)
  - On- and off-farm professions
- Livestock**
- Diverse species
  - Many zoonotic pathogens shared with people & dogs
  - Infection control principles key to health
- Dogs**
- Many with dual purposes (on-farm and household)

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### An Epidemic of Resistant Salmonella in a Nursery

Animal-Human Spread

From W. Lyons, M.D., Cornell; J. Tomasz, M.D., Iowa; & E. Archer, M.D., University of Illinois. (JAMA 1984; 251:1081-1084)

**A Salmonella enteritidis epidemic in a hospital nursery was traced to infected calves on a dairy farm where the mother of the most patient lived. The Salmonella source from all cases was resistant to chloramphenicol, ampicillin, and tetracycline. Identification of the source of infection from the farm animals by a hospital epidemiologist is relevant and raises questions about the nature of antibiotic-resistant enteropathogens and their role in infectious disease in humans.**

**INDEX WORDS:** Salmonella, enteritidis, hospital, nursery, infection, source, antibiotic resistance.

**THE SPREAD** of *Salmonella enteritidis* in a hospital nursery was traced to infected calves on a dairy farm where the mother of the most patient lived. The Salmonella source from all cases was resistant to chloramphenicol, ampicillin, and tetracycline. Identification of the source of infection from the farm animals by a hospital epidemiologist is relevant and raises questions about the nature of antibiotic-resistant enteropathogens and their role in infectious disease in humans.

**INDEX WORDS:** Salmonella, enteritidis, hospital, nursery, infection, source, antibiotic resistance.

patient was receiving chemotherapy. Long history of antibiotic use in the patient's home was noted. The patient's mother had been hospitalized for a long time before the patient's admission to the hospital. The patient's mother had been hospitalized for a long time before the patient's admission to the hospital. The patient's mother had been hospitalized for a long time before the patient's admission to the hospital.

**Nosocomial outbreak caused by antibiotic-resistant strain of Salmonella typhimurium acquired from dairy cattle**

**U.S. BACKGROUND:** Salmonella typhimurium is a common cause of bacterial meningitis in children. It is also a common cause of bacterial meningitis in adults. The outbreak in this hospital was caused by a strain of S. typhimurium that was resistant to chloramphenicol, ampicillin, and tetracycline. This strain was acquired from dairy cattle on a farm near the hospital.

## DOG-OWNING LIVESTOCK FARMERS (OH, USA)<sup>1</sup>

**67% (297/446) livestock farm owners had dog(s) on the farm**

### Household demographics

- < 5 yrs: 7%
- ≥ 65: 32%
- Immunocompromised: 32%
- High-risk households: 52%



Source: Pixabay

<sup>1</sup> Moran et al. 2018

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**DOG HUSBANDRY**

**Fed to the dogs**

- Home killed meat (6%)
- Raw meat/raw eggs (11%)
- Raw milk (5%)
- Raw animal treats (11%)

• Any high-risk: 24%

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**DOG-LIVESTOCK CONTACT**

**Dog access to livestock (70%)**

- Stalls/pens (71%)
- Sick/isolation pen (40%)
- Contact with new livestock (46%)
- Eat by-products, e.g., placenta (27%)

• One or more higher-risk practice (85%)

**Visit other farms (12%)**

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**DOG-PERSON CONTACT**

**High emotional attachment**

**Dog tends to sleep**

- Indoors
  - Free access to living areas (25%)
  - Family member bed (13%)

**Little/no concern for disease transmission**

- Livestock to dogs (90%)
- Dogs to livestock (87%)
- Dogs to people (94%)

**Need for education**

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## ONE HEALTH CHALLENGES

Surveillance programs (human, animal, environment) unconnected

Transmission not easily documented

Pet-associated disease

- Poorly understood
- Most not reportable
- Numerous exposure sources

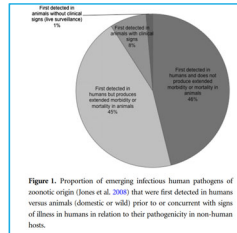


Figure 1. Proportion of emerging infectious human pathogens of zoonotic origin (Jones et al. 2008) that were first detected in humans versus animals (domestic or wild) prior to or concurrent with signs of illness in humans in relation to their pathogenicity in non-human hosts.

Bisson et al, 2015

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## EFFECTS OF CLIMATE CHANGE...

- Biodiversity
- Emergence of new zoonoses
- Negatively impact economies
- Reduce infectious disease control
- Increase densities of infectious agents
- Increased migration (people, pets, wildlife)

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## ANIMALS AS SENTINELS?

Vector-borne pathogens not directly transmissible from animal to person

Many cause similar disease in humans as they do in other species

Many vector-borne diseases of dog/cats and humans share the same tick vectors and likely risk factors for infection



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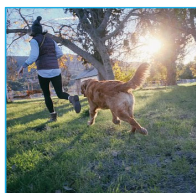
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## CANINE SENTINELS FOR HUMAN LYME RISK

Canine *B. burgdorferi* seroprevalence > 5% associated with increased human risk of Lyme disease<sup>1</sup>

Ease and regular occurrence of testing dogs

- Data readily available
- Typical canine lifestyle with tick/pathogen exposure



<sup>1</sup> Mead et al., 2011

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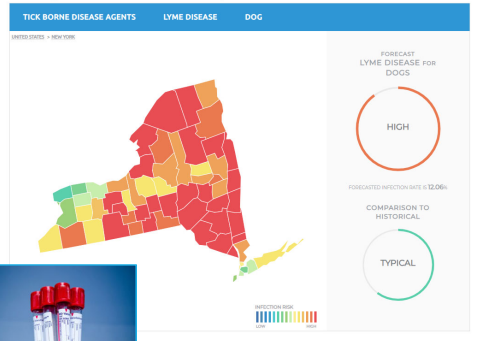
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### 30 Day Parasite Forecast Map



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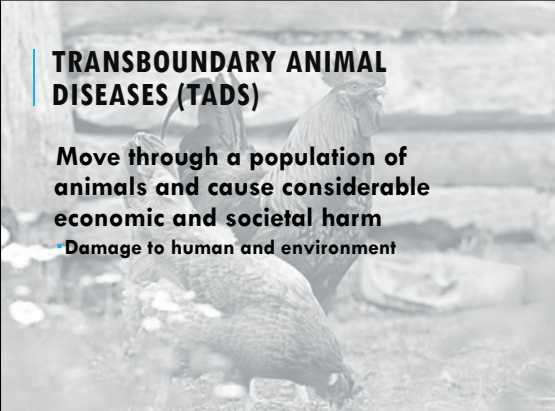
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**TRANSBOUNDARY ANIMAL DISEASES (TADS)**

Move through a population of animals and cause considerable economic and societal harm

- Damage to human and environment



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**CURRENT EXAMPLES OF TADS**

Newcastle disease  
African Swine Fever

Key prevention tool is infection control (no treatment, no vaccine or of limited use)



Source: Pichay

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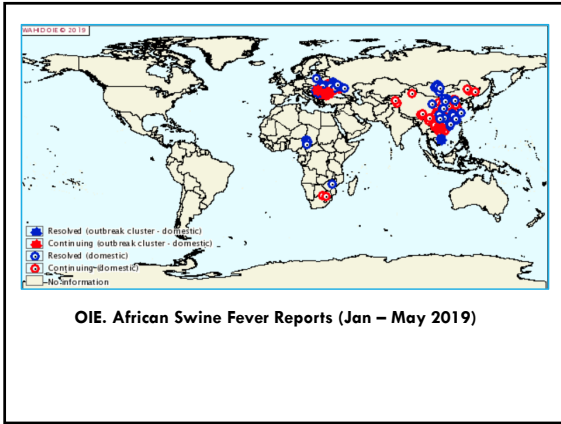
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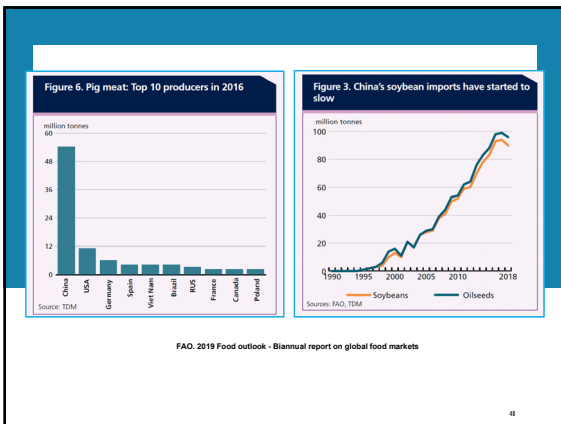
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Canadian Food Inspection Agency / Agence canadienne d'inspection des aliments


## DECLARE AT THE BORDER

PROTECT CANADA FROM FOREIGN ANIMAL DISEASES

As an international traveller, here is what you can do to reduce the risks spreading foreign animal diseases:

- ✓ DO declare ALL animal and food products at the border
- ➔ If you don't, you could be fined up to \$1300 at the border
- ✓ DO take precautions when visiting farms
- ✓ DO wash or dispose of all clothing and footwear worn while visiting a farm outside of Canada
- ✓ DO declare all farm visits at the border when you return to Canada

DO NOT visit any farms in Canada within 14 days of being in contact with farm or wild animals abroad.




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## GLOBALIZATION AND MIGRATION

1 million pounds of pork seized at US border amid deadly Chinese outbreak

By David Aaro

Published March 17, 2019

Fox News




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## GLOBALIZATION AND MIGRATION



Canine Influenza virus



Longhorn tick

Source Rainey, T (Hunterdon C. Dept Public Safety)

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Source: Pixabay

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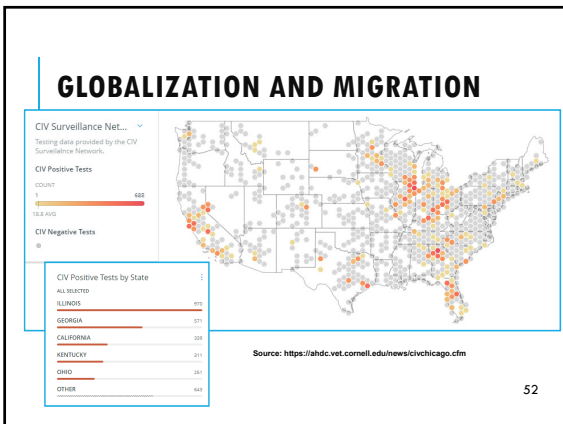
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### GLOBALIZATION AND MIGRATION

**Identified in NJ, USA 2017**  
**Broad host range: livestock, companion animals, humans**

**Vector**

- *Anaplasma phagocytophilum*, *Ehrlichia chaffeensis*, *Babesia spp?*
- Severe fever with thrombocytopenia syndrome virus (SFTS)?

Source Rainey, T (Hunterdon C. Dept Public Safety)

**Longhorn tick**

**Highly adaptive, cold tolerant**  
**How did it arrive?**

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### ACTING LOCALLY

**Minority of PHPs knew which patients had pets; 13% had asked<sup>1</sup>**

**Training: health benefits/risks & methods for asking patients about pets**

**Follow-up, ~1/3 routinely asking about pets**

**When talking about their animals, patients revealed**

- Social determinants of health
- Conversations about risk and benefits of pets more common

<sup>1</sup> Hodgson et al., 2017

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## ONE HEALTH MOVING FORWARD

Stay informed

Adoption/buy-in across the disciplines

Developing and fostering interdisciplinary partnerships

Prioritizing preventive medicine

Integrated leadership with action

Using a One Health point-of-view in problem solving and future planning

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