


 UNIVERSITY of Prince Edward ISLAND

 THE OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE

One Health – The Risks and Rewards of Loving Animals

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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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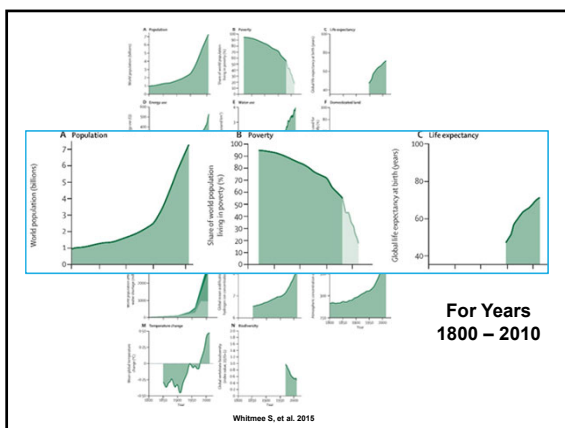
PAST ~ 70 YEARS

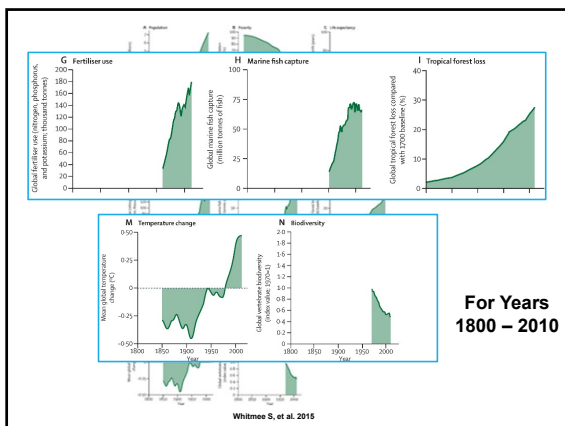
Improvements in human health
Global life expectancy ↑ 25 yrs
Global infant mortality ↓ to 30 per thousand

Environmental changes

Animal population changes

The Lancet Commissions
THE ROCKEFELLER FOUNDATION THE LANCET
The Rockefeller Foundation-Lancet Commission on planetary health
Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on planetary health
Whitmee S, et al. 2015






ONE HEALTH

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

Address areas at interface results in benefits of all



Thompson 2013

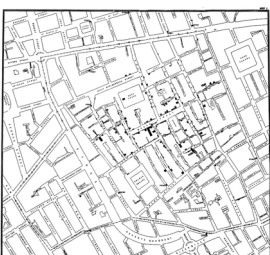
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SOMETHING OLD, SOMETHING NEW...

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







Think Globally, Act Locally

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



Source: Pixabay

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

HUMAN-ANIMAL BOND

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

- ↓ stress, anxiety, loneliness, depression¹
- ↓ risk cardiovascular disease²
- Children: better social skills, self-esteem, empathy³
- Catalyst for harm reduction (e.g., tobacco, drug use)⁴



Source: Pixabay

¹ Friedmann 2009 ² Patronek 1993 ³ Melson 1997 ⁴ Lem 2013 14

IMMUNOCOMPROMISED

Mental & physical isolation


HIV-infected¹

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

Cancer patients²

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

Immunocompromised children³

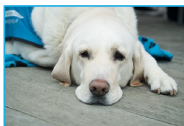


Source: Pixabay

¹ Siegel 1999 ² Larson 2010 ³ Stull 2014 15

PETS INCORPORATED INTO HUMAN HEALTHCARE¹

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



Source: Pixabay

¹ Hodgson et al., 2015

ZOOZOSES

- Naturally transmitted from animals to people
- Of 1,415 species pathogenic to people¹
 - 61% zoonotic
 - 75% emerging pathogens zoonotic



¹ Taylor 2001

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 facilities¹
 - *C. difficile* (OR=2.4)
 - MRSA (OR=4.7)



Source: Pixabay

¹ Lefebvre 2009

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 HOMES¹

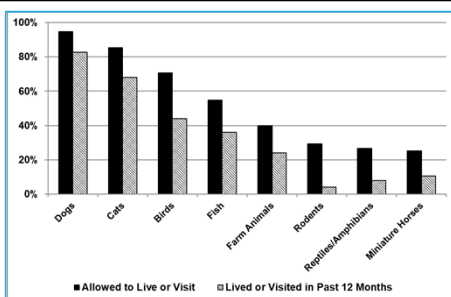
95 respondents (different OH facilities)

97% allowed animals to visit

- Family pet
- Socialization-directed
- Physical therapy

¹Stull et al, 2018

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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

¹Stull et al, 2018

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,¹ Gonzalo Bearman, MD, MPH,² Sherrill Brown, MD,³ Kristina Bryant, MD,⁴ Raymond Chinn, MD,⁵ Angela Hewlett, MD, MS,⁶ R. Glenn George, ID,⁷ Ellie J.C. Goldstein, MD,⁸ Galit Holzman-Peargal, MD,⁹ Mark E. Rupp, MD,¹⁰ Timothy Wianken, PhD, CIC, MPH,¹ J. Scott Wesse, DVM, DWS, DACVIM,¹¹ David J. Weber, MD, MPH¹²

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 Health (OBH). Please refer to the supporting document for an overview 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.

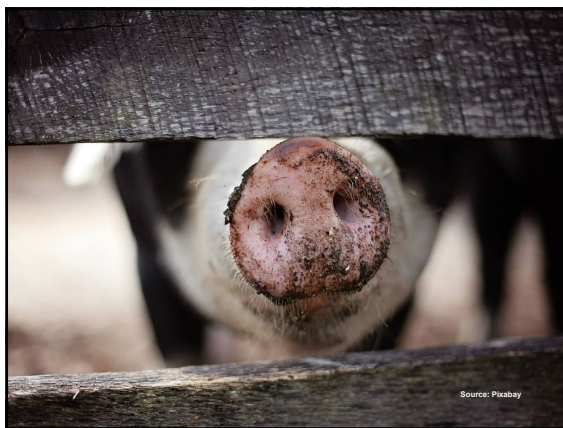
- a. The animal must be pre-approved by _____ **(staff position and/or letter, committee number)** before the first visit. Pre-approval includes ensuring the animal meets all requirements of this protocol including but not limited to species, age, health and temperament.
 - i. Approved animals will be entered into a log _____ **(staff position and/or internal committee number)** 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.

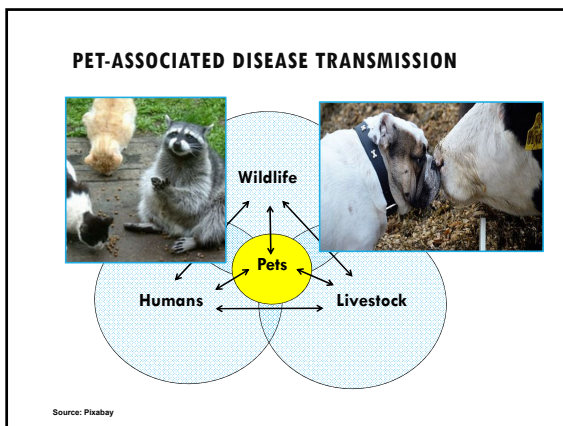
Animals in Ohio long-term care facilities
Keep residents safe while enjoying pets
A guide for administrators, activity coordinators and families



O
THE OHIO STATE UNIVERSITY

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





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-to-Human Spread

KEY MESSAGE: A Salmonella enteritidis epidemic in a hospital nursery was linked to infected calves on a dairy farm where the mother of the most affected child. 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 important because of the nature of antibiotic resistance and the need for infection control in hospitals.

OBJECTIVE: To identify the source of infection in a hospital nursery.

SETTING: A tertiary care hospital in Ontario, Canada.

DESIGN: A case-control study.

PATIENTS: All children in the nursery who became ill with Salmonella enteritidis between August 1 and August 15, 1998.

MEASUREMENTS AND MAIN RESULTS: The source of infection for all cases was identified as a dairy farm where the mother of the most affected child worked. 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 important because of the nature of antibiotic resistance and the need for infection control in hospitals.

CONCLUSIONS: The source of infection for all cases was identified as a dairy farm where the mother of the most affected child worked. 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 important because of the nature of antibiotic resistance and the need for infection control in hospitals.

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

KEY MESSAGE: A nosocomial outbreak of Salmonella typhimurium in a hospital nursery was caused by a strain of antibiotic-resistant Salmonella typhimurium acquired from dairy cattle. The source of infection was identified as a dairy farm where the mother of the most affected child worked. 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 important because of the nature of antibiotic resistance and the need for infection control in hospitals.

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Salmonella enteritidis epidemic in a hospital nursery

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DOG-OWNING LIVESTOCK FARMERS (OH, USA)¹

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

¹ 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%

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

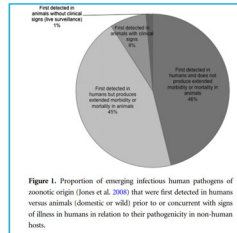


Figure 1. Proportion of emerging infectious human pathogens of zoonotic origin (Jones et al. 2008) that were first detected in humans versus animals (domestic or wild) prior to or concurrent with signs of illness in humans in relation to their pathogenicity in non-human hosts.

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

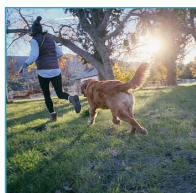


CANINE SENTINELS FOR HUMAN LYME RISK

Canine *B. burgdorferi* seroprevalence > 5% associated with increased human risk of Lyme disease¹

Ease and regular occurrence of testing dogs

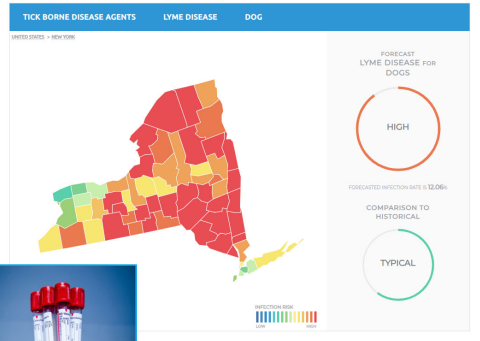
- Data readily available
- Typical canine lifestyle with tick/pathogen exposure



Source: Pixabay

¹ Mead et al., 2011

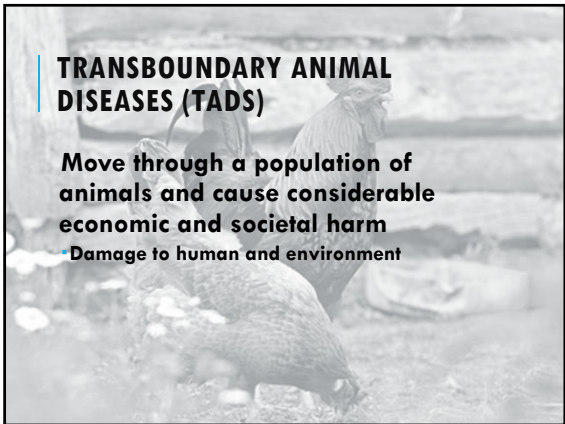
30 Day Parasite Forecast Map



TRANSBOUNDARY ANIMAL DISEASES (TADS)

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

- Damage to human and environment






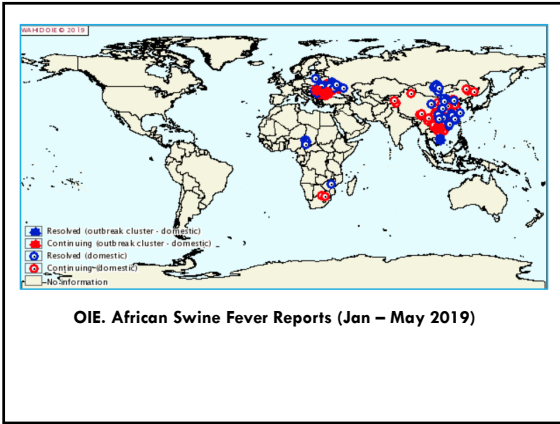
CURRENT EXAMPLES OF TADS

Newcastle disease
African Swine Fever

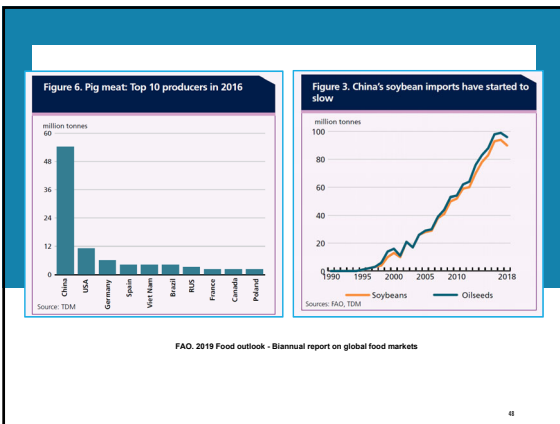
Key prevention tool is infection control (no treatment, no vaccine or of limited use)



Source: Pixabay







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.

Canada

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



GLOBALIZATION AND MIGRATION



Canine Influenza virus

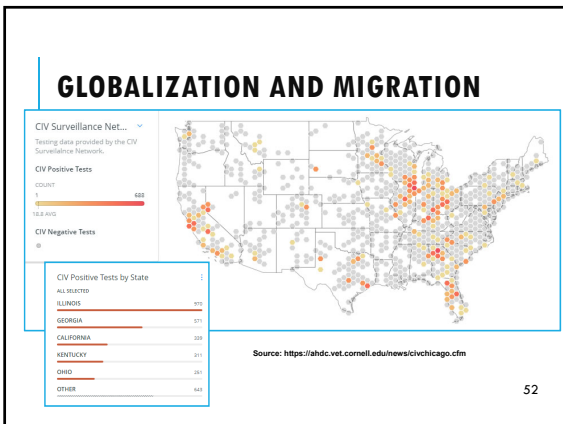


Longhorn tick

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

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Source: Pixabay



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 asked¹

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

¹ 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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