CONFLICT OF INTEREST STATEMENT

The speaker declares he has no competing interests
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

PAST ~ 70 YEARS

- Improvements in human health
  - Global life expectancy ↑ 25 yrs
  - Global infant mortality ↓ to 30 per thousand
- Environmental changes
- Animal population changes
ONE HEALTH

Recognize connections (human, animal, environmental health) for optimal benefits
Address areas at interface results in benefits of all

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)
One Health – The Risks and Rewards of Loving Animals
Prof. Jason Stull, Ohio State University
Broadcast live from the 2019 IPAC Canada Conference

**ONE HEALTH**

Teleclass broadcast sponsored by GOJO Canada  www.gojo.ca
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Think Globally, Act Locally

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

Source: Pikabay

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, depression
- ↓ risk cardiovascular disease
- Children: better social skills, self-esteem, empathy
- Catalyst for harm reduction (e.g., tobacco, drug use)

Source: Pixabay

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IMMUNOCOMPROMISED

Mental & physical isolation

HIV-infected\(^1\)
- Pet as family member
- Source of support and affection
- Protect against loneliness
- Pet-owners with AIDS less depression than non-pet owners

Cancer patients\(^2\)
- High level of attachment to pets
- Having a pet provided health benefits (67%)

Immunocompromised children\(^3\)

\(^1\) Siegel 1999  \(^2\) Larson 2010  \(^3\) Stull 2014

PETS INCORPORATED INTO HUMAN HEALTHCARE\(^1\)

Builders of social capital

Harm reduction

Motivators for healthy behavior change

Participants in treatment plans

\(^1\) Hodgson et al., 2015
**Zoonoses**

Naturally transmitted from animals to people

Of 1,415 species pathogenic to people

- 61% zoonotic
- 75% emerging pathogens zoonotic

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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

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

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1 Taylor 2001

1 Lefebvre 2009
PET-ASSOCIATED DISEASE RISKS

Disease risk greatest
• Extremes of age (<5 yrs, ≥ 65 yrs)
• Pregnant
• Immunocompromised

Higher risk groups
• Particular pathogens
• Longer duration
• More severe/unexpected complications

Pet factors

(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/healthypetoutbreaks.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

¹ Stull et al, 2010

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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

Stull et al, 2018

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%)
BENEFITS AND RISKS

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ONE HEALTH CHALLENGES

Accurately measuring health benefits and risks from animal contact

Needed to best weigh advantages and disadvantages

http://www.go.osu.edu/nhpets
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PET-ASSOCIATED DISEASE TRANSMISSION

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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)

An Epidemic of Resistant Salmonella in a Nursery

Animal to Human Spread


A salmonellosa epidemic in a hospital nursery was traced to infected calves in a dairy farm where the mother of the index patient died. The salmonella strain was cultured in stool samples and passaged in human volunteers, confirming the pathogenicity of the infection. The salmonella strain was transmitted to the newborn from the farm workers in a manner consistent with animal-to-human transmission.

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**DOG-OWNING LIVESTOCK FARMERS (OH, USA)**

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%

[Image: Farm scene with dogs]

*Moran et al., 2010

**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%)

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
  * Subclinical carriage/shedding

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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)

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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CANINE SENTINELS FOR HUMAN LYME RISK

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

Ease and regular occurrence of testing dogs

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

1 Mead et al., 2011
TRANSBORDERANIMAL
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)

OIE. African Swine Fever Reports (Jan – May 2019)
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Source: AsiaNews.it. Jan 17, 2019

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

GLOBALIZATION AND MIGRATION

Canine Influenza virus

Longhorn tick

Source: Rainey, T (Huntsville C. Dept Public Safety)
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)?

Highly adaptive, cold tolerant

How did it arrive?

Source: Rainey, T (HUNTERDON C. DEPT PUBLIC SAFETY)
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

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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www.webbertraining.com/schedulep1.php

June 5, 2019
(South Pacific Teleclass)
THE ROLE OF ACTIVE SURVEILLANCE CULTURE IN RESOURCE-LIMITED SETTINGS
Speaker: Prof. Anucha Apisarnthanarak, Thammasart University Hospital, Pratumthani, Thailand

June 13, 2019
(FREE Teleclass)
SSI SURVEILLANCE STRATEGIES IN UNDER-RESOURCED SETTINGS
Speaker: Dr Joseph S Solomkin, University of Cincinnati College of Medicine, and World Surgical Infection Society
Sponsored by the World Surgical Infection Society

June 25, 2019
(European Teleclass)
GETTING TO GRIPS WITH HEALTHCARE-ASSOCIATED GRAM-NEGATIVE BLOODSTREAM INFECTION SOURCES
Speaker: Prof. Jon Otter, Imperial College London

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