

One Health: The Intersection Between Human, Animal and Environmental Health

December 16, 2009



Lisa Conti, DVM, MPH, DACVPM
Director, Division of Environmental Health
Florida Department of Health

Definition of “Health”

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”

-World Health Organization



One Health

- Human
- Animal
- Environmental



One Health

The collaborative effort of multiple disciplines
working locally, nationally, and globally to
attain optimal health
for people, animals and our environment.

Public Health = Herd Health

“Anything you see in one animal might well suggest a wider problem encompassing humans, animals, and the habitat. If there’s something going on out there that might impact public health, quite often we’re the first people to see it; we could well be the first line of defense.” -- Tseng



~~“Veterinarians are valuable to public health because they understand herd health.”~~

Veterinarians are valuable to public health because they are highly trained medical professionals with a unique ability to respond to the unknown.

Environmental Health

- Ensuring safe drinking **water**
- Controlling **food** and waterborne illness
- Preventing **arthropod-borne** diseases
and **zoonoses**
- Protecting the public from **radiation**
- Controlling biomedical **waste**
- Preventing **chemical** exposure
- Consulting on the long-term health impacts
of environmental exposures

One Medicine



- “We see a lot of spontaneous disease in animals that reveals many things about the human condition.”



- human-animal bond/animal therapy
- food safety
- antimicrobial resistance
- bioterrorism







Global increase in demand for protein and food of animal origin

- 21 billion food animals in 2008
- Demand estimated to increase by 50% by 2020
- Increase in emerging zoonoses likely as the concentration of people and animals increase.



Concentrated Animal Feeding Operations



- Antibiotics/
Hormones
- Pathogens
- Nutrients
- Solid waste
- Trace elements

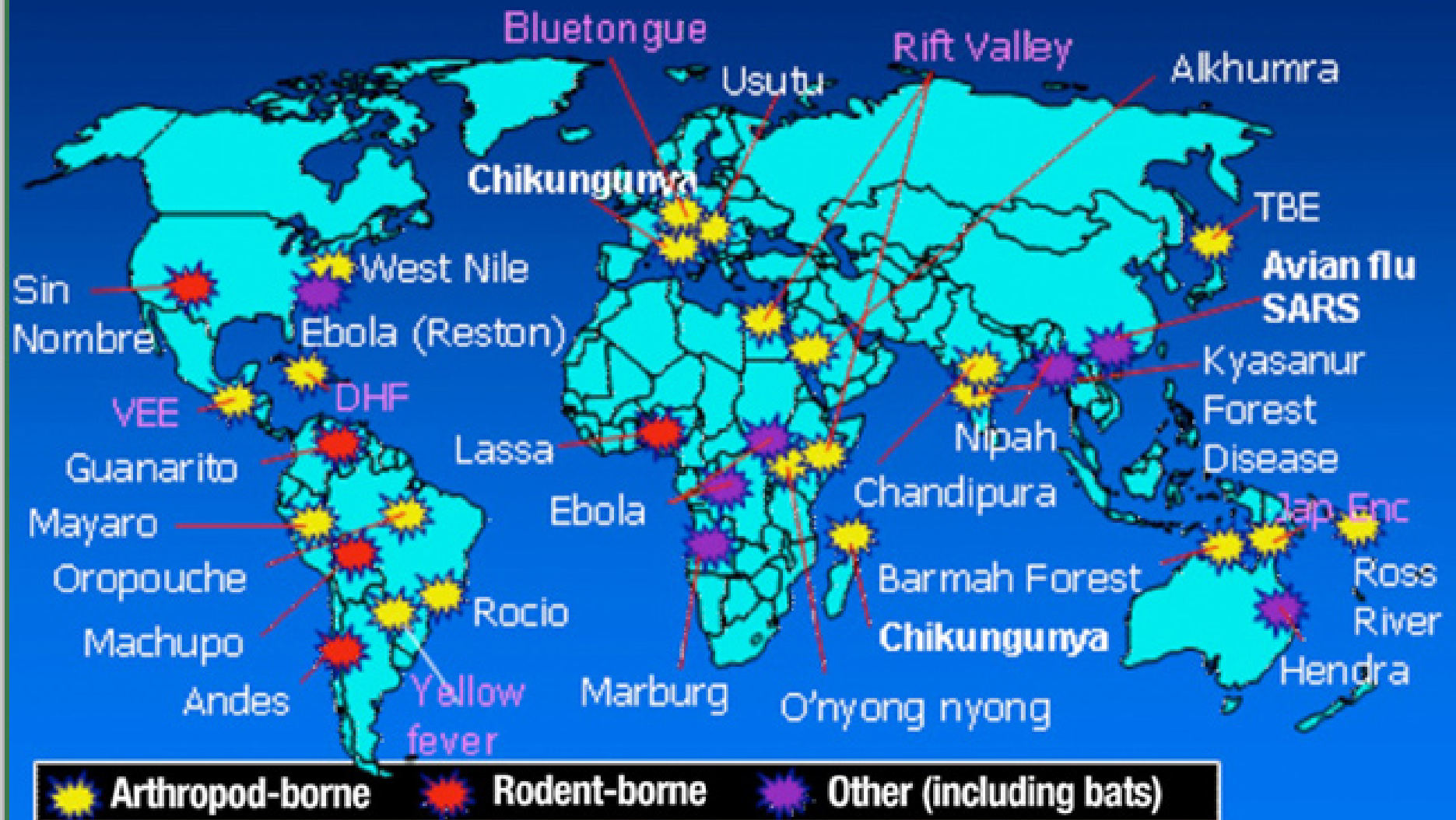


Zoonoses

- Disease may be seen in animals before humans
- Animals are sentinels
 - Pets, livestock, wildlife



Emerging and Reemerging infections - 70% vector-borne or zoonotic



West Nile Outbreak Lessons Learned

- Need to always remain open-minded to the possibility of the unexpected
- Importance of strong relationships between the medical community and public health.
- Need to engage nontraditional public health partners (e.g., veterinarians, wildlife experts)
 - Unusual events in animals/birds may be an early warning for human disease outbreaks



Goals of Enhanced Zoonotic Disease Surveillance

- Detect disease before it occurs in people
- Identify animal sources of human illness rapidly
- Implement control
- Educate the public and the health community about zoonotic diseases and how to prevent them



Factors That Promote Transmission of Zoonoses

- Frequent contact with domestic or wild animals
- Overlap with wildlife habitat
- Intensive livestock production
- Poor animal sanitation
- Poor personal hygiene
- Poor animal health



Disease Control: Client Education

- Disinfect/clean up areas contaminated with animal waste
 - Livestock, pets, wildlife, rodents
- Basic hygiene
 - Wash hands
 - Child supervision





Indirect contact transmission

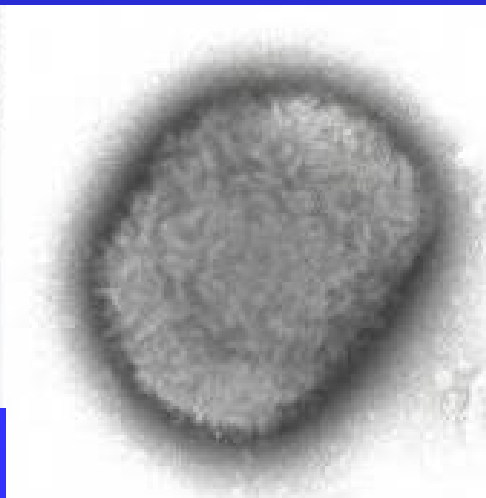


Annual Global Trade in Exotic Animals

- 4 million birds
- 640,000 reptiles
- 40,000 primates
- Illegal trade?



Human Monkeypox Cases



Pets with H1N1



IMPORTANT!

Reptile Handling Steps

Follow these safe reptile handling steps... and enjoy your pet!



1. Always wear gloves when handling reptiles to protect yourself from bites and scratches.

2. Support the reptile's body with one hand under the chest and the other under the hindquarters.

3. Avoid holding the reptile by its tail, as this can cause injury.

4. Do not squeeze the reptile, as this can cause internal damage.

5. Keep the reptile's head supported and avoid sudden movements.

6. Do not feed the reptile while you are handling it.

7. Wash your hands thoroughly after handling the reptile.

8. If you have a bite or scratch, clean the wound with soap and water and seek medical attention if necessary.



Category ABC Agent Overview



Category 'A' BT Agents

- Smallpox (*Variola major*)
- Anthrax (*Bacillus anthracis*)*
- Plague (*Yersinia pestis*)*
- Tularemia (*Francisella tularensis*)*
- Botulism (Botulinum toxin)*
- Viral Hemorrhagic Fevers (Filoviruses and Arenaviruses)*

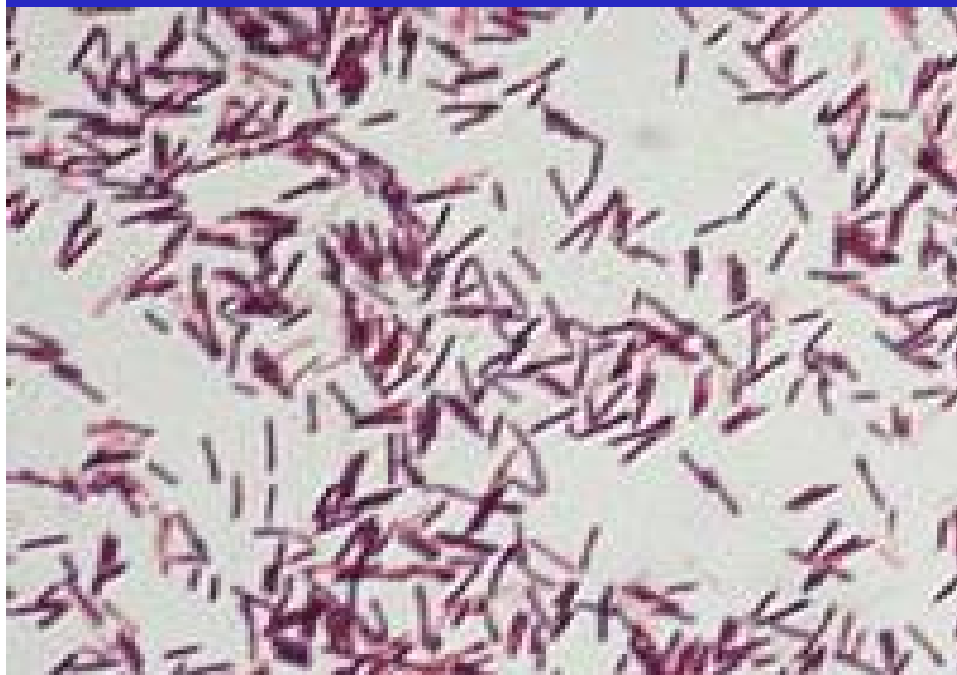
* Zoonotic agents





Bacillus anthracis

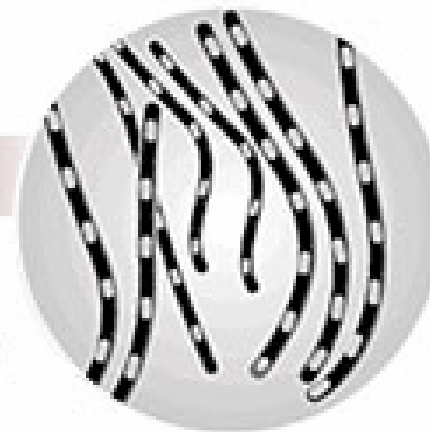
In 1877, Robert Koch grew the organism in pure culture, demonstrated its ability to form endospores, and produced experimental anthrax by injecting it into animals.



Bacillus cereus

ANTHRAX FACTS

*Anthrax is a naturally occurring disease in plant-eating animals which can infect all warmblooded animals. The disease is caused by the bacterium *Bacillus anthracis*.*



Rod-shaped spore found in soil

Humans are infected by:

Breathing spores formed by bacteria

Eating infected meat

Through cuts in skin resulting from contact with infected animals

Ideal biological weapon

- *Highly lethal*
- *Easy and cheap to produced in large quantities*
- *Easy to weaponize*

Symptoms begin one to six days after exposure*

- *Fever, fatigue, cough*
- *Breathing problems, sweating*
- *Bluish skin tone*

**Virtually always results in death*

Treatment

- *Vaccination prior to exposure*
- *Antibiotics immediately after exposure*



Anthrax or not?



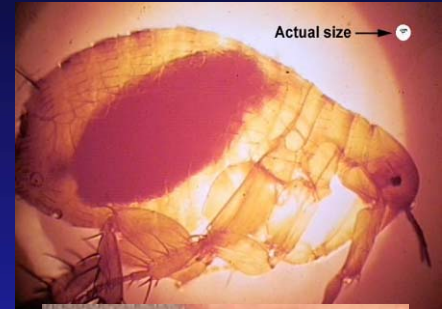
Rickettsia akari



Bacillus anthracis

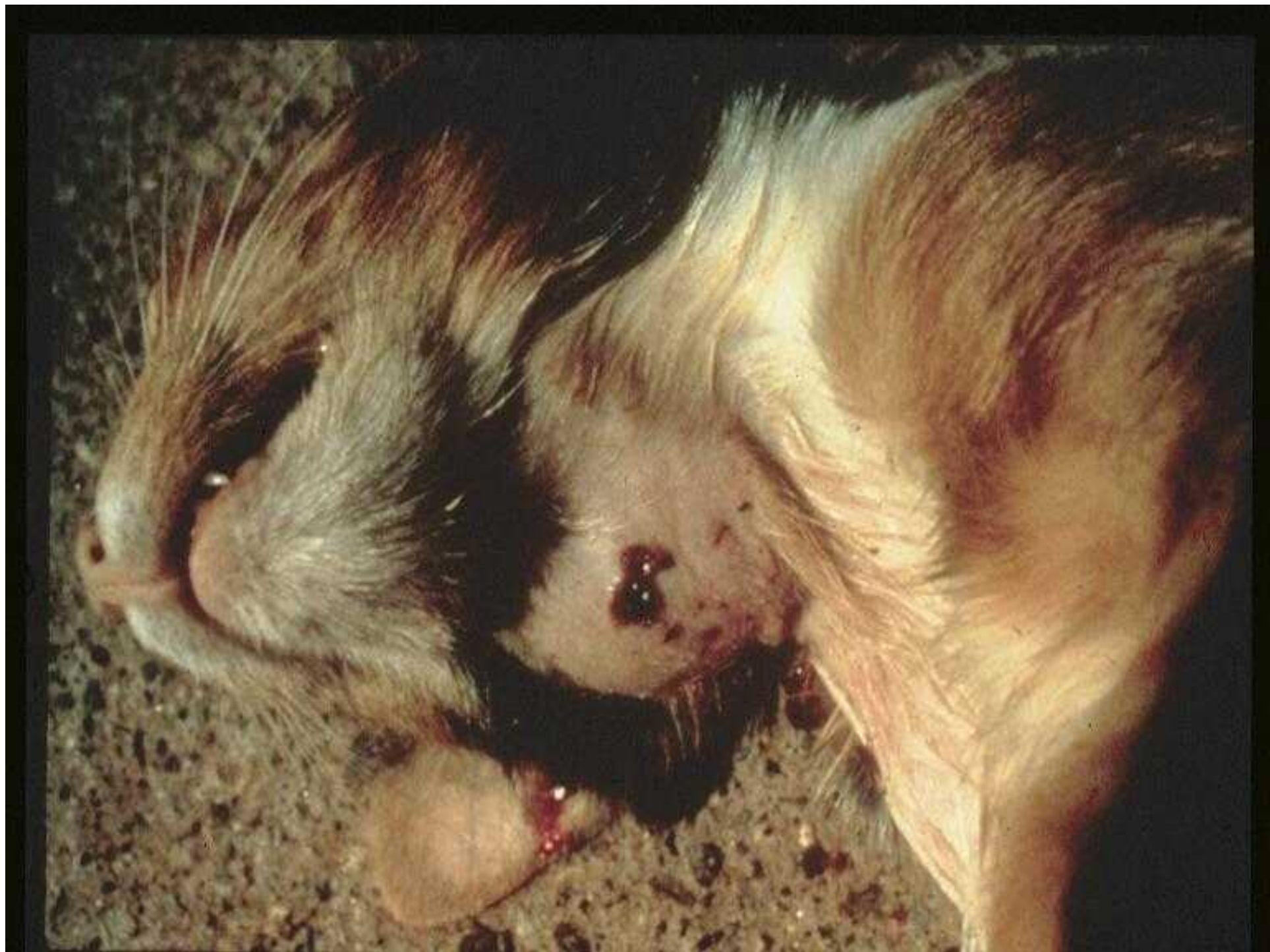
Plague: The Agent

- *Yersinia pestis*
 - Gram neg, transmitted by fleabites, aerosol, direct contact
- Symptoms: humans
 - Bubonic, septicemia, pneumonic
- Symptoms: animals
 - Cat: similar to human
 - Dogs, livestock: somewhat resistant





The actual cause of plague is the bacillus, *Yersinia pestis*, previously known at various times as *Pasteurella pestis* and *Bacterium pestis*.



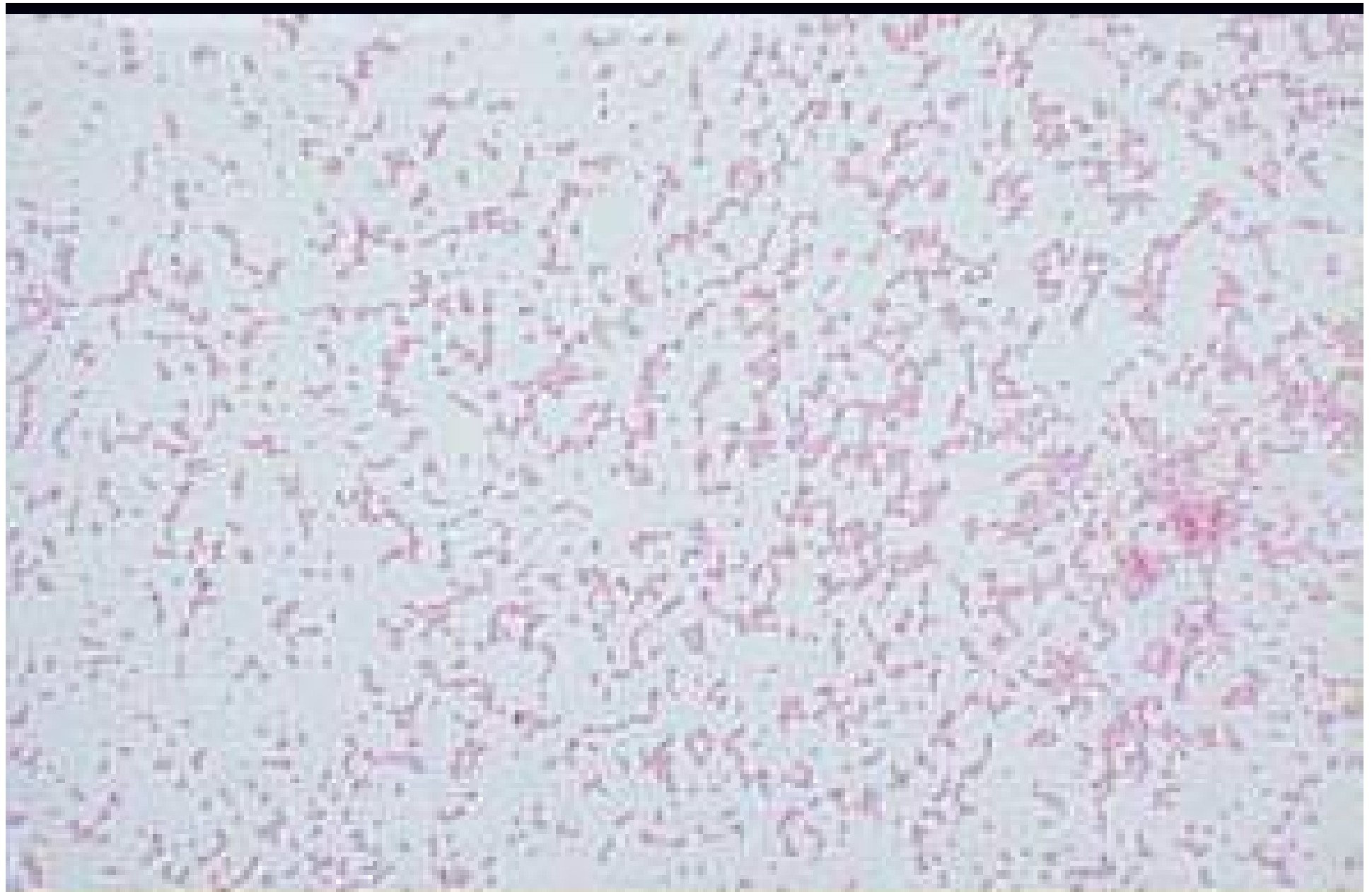
Category B and C Agents

- Bacterial
 - Brucellosis *
 - Q Fever *
 - Glanders *
 - Meliodosis *
 - Food/ Water Borne pathogens *
 - Psittacosis *
 - Typhus fever *
- Viral
 - Viral encephalitides (VEE, EEE, WEE) *
 - Nipah, Hanta * (Category 'C')
- Toxins
 - Staph Enterotoxin B
 - Ricin *
 - *C. perfringens* Epsilon toxin *

* Zoonotic agents

Brucellosis

- **Signs:** incubation period 1-2 months, fever, headache, profound weakness and fatigue, arthralgias, depression (fatalities are uncommon)
- **Diagnosis:** blood cultures, serology
- **Treatment:** doxycyclin and rifampin
- **Prophylaxis:** no approved human vaccine



Gram stain of *Brucella*

Brucellosis - animal

- Ingestion of bacteria, vectors
- Abortion, stillborn or weak offspring, retained placentas, reduced milk yield, infertility
- Dx with bacteriology or serology
- Exposure to direct sunlight kills the organism in a few hours



Smallpox

- Variola virus, *Orthopoxvirus*
- Eradicated from the world in 1977
- Narrow host range: humans only
- Transmission: person-to-person, fomites
- Clinical signs
 - Flu-like, progressive skin eruptions





Photo courtesy of the CDC



National Pharmaceutical Stockpile

- 12-hour Push Package
 - Complete package of medical materials
- Vendor Managed Inventory
 - Tailored to suspected agents



Surveillance for Animal Diseases

- State Agriculture Laws
 - Report infectious diseases in animals
- State Public Health Requirements
 - Clusters of diseases
- Barriers
 - In practice, only diseases of agricultural significance are reported, investigated, and targeted for control
- Principle issues regarding animal surveillance:
 - Who should get the report? (Ag or Health)
 - What is the baseline level of disease vs. emerging problem or intentional release (e.g. Q fever)?
 - What is the protocol for investigation and follow-up?

Disease Control: Veterinarians

- Restrict animal movement and contact in hospital
- Appropriate disinfection of hands, exam & waiting rooms, surgical suites
- Regularly disinfect animal holding areas & adequately ventilate
- Designated isolation area with posted protocols

Myths and Misinformation





- Dogs and cats DO NOT give people HIV infection

Occupational Issues

- Zoonoses (Biohazard)
- BITES! Human blood-borne pathogens
- Musculoskeletal injury (back injury)
- Allergies to animals



Toxicological Priorities

- Human-environment interaction is changing in complex ways



Disaster Mitigation

- Prior coalition development, public awareness
- Rabies alert/quarantine
- Animal vaccination, control, avoidance





Physical benefits of pet ownership

DUPLEX / By Glenn McCoy



"If your dog is fat, you aren't getting enough exercise."

—Anonymous

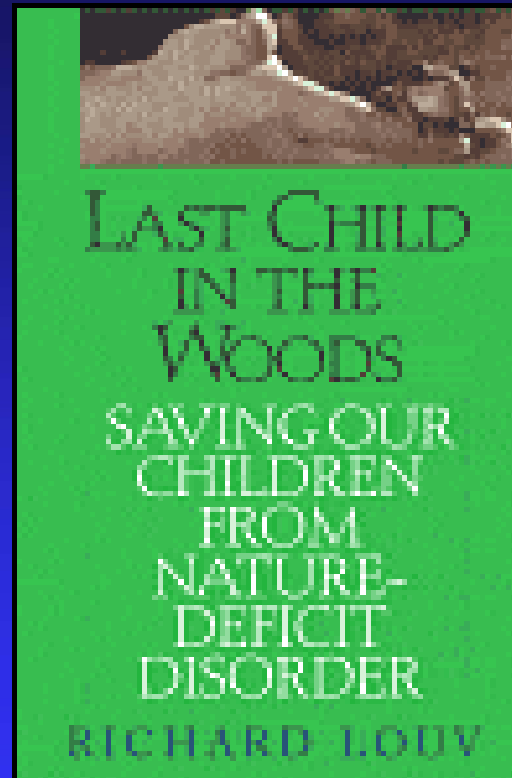
Want to take a walk?



Health and The Built Environment



“No Child Left Inside”



Health

- psychological, social, structural, environmental



Healthy by Design



The built and natural environment promote healthy living

Healthy By Design

- Preserve open space, farmland, natural beauty, and critical environmental areas
- Provide a variety of transportation choices
- Strengthen and direct development towards existing communities
- Encourage community and stakeholder collaboration



Attention Dog Guardians

Pick up after your
dogs. Thank you.

Attention Dogs

Grrrrr, bark, woof.
Good dog.

District of North Vancouver.
Bylaw 5981-11(i)



One Health Initiative Task Force : Final Report

July 15, 2008



http://www.avma.org/onehealth/onehealth_final.pdf

Bruce Kaplan DVM, Laura Kahn MD, Thomas Monath MD



<http://www.onehealthinitiative.com/>



Florida One Health Newsletter

Dr. Mary Echols, Editor

http://www.doh.state.fl.us/Environment/community/One_Health/OneHealth.html



Discussion

