

# **Companion Animal Veterinarians and Public Health Initiatives: Tools for Integrated Zoonotic Surveillance**

**Diane M. Gubernot, M.P.H.**

**Rebecca Parkin, Ph.D., M.P.H.**

# Purpose

- Increase awareness of companion animal zoonotic diseases of public health significance
- Encourage collaboration and communication between veterinarians and public health officials
- Describe some of the greatest public health threats that affect pets
  - Reservoirs
  - Clinical sentinels
  - Sources of infections for humans

# Veterinary Awareness

- Evidence that animals can serve as effective sentinels of pathogens and chemical exposures (e.g., bioterrorist agents)
- Facilitate and expedite the early identification and control of emerging zoonoses in animals
- Improve communications and interventions with clients and public health officials

# Veterinary Awareness

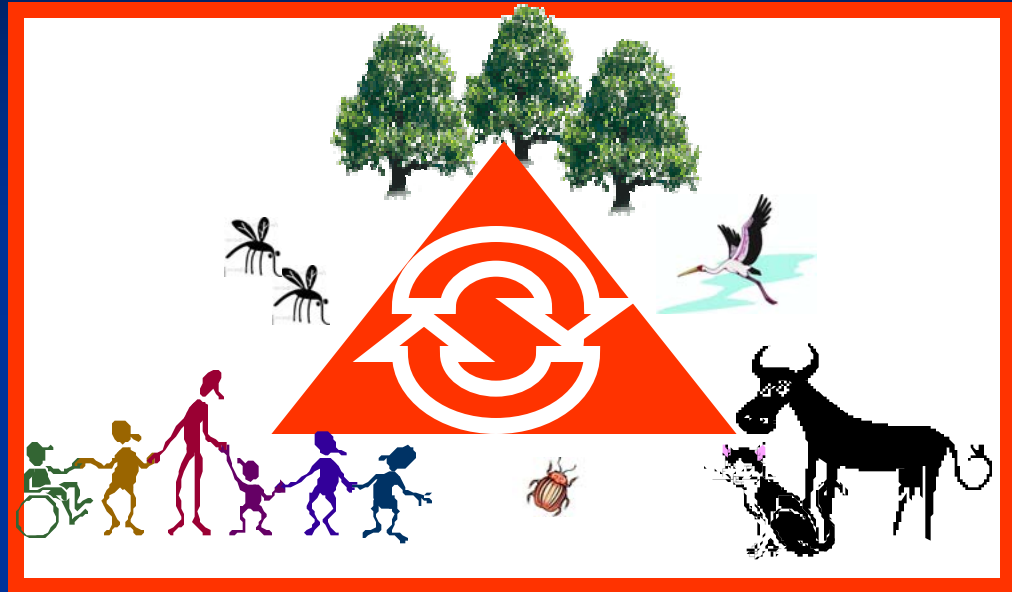
- Enhance detection of human zoonoses
- Sentinel events
- Facilitate a rapid response to an outbreak or bioterrorist incident
- Help monitor the scope of an epidemic

# Zoonotic Reporting

- **Animal illnesses reported to health department**
- **Dialogue**
- **Veterinary tools**
- **Integrates veterinary and human health surveillance**

# Background: Infectious Diseases

- Zoonoses
- One Health



- 1415 species of organisms; of these 868 (61%) are zoonotic
- 175 emerging species; 132 (75%) are zoonotic

*(Taylor, 2001)*

# Emerging Infectious Diseases

- Public awareness of zoonotic health risks
  - Monkeypox, SARS and Avian Influenza
- Common Risks/ Zoonotic exposure:
  - Immunocompromised
  - Occupational
  - Recreational
- Wildlife
- Farm animals

# Introduction of Disease Threats

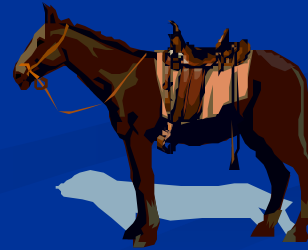
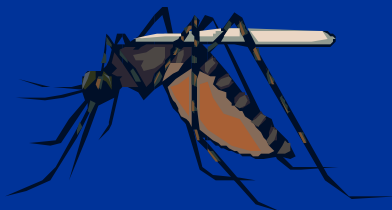
- Naturally
- Inadvertently (i.e. smuggled animals)
- Intentionally, via weaponized biological agents
  
- Pets
  - Environment
  - Wildlife
  - Farm animals





# The Canary in the Coal Mine

- **Sentinel:** “any non-human organism that can react to...an environmental contaminant before the contaminant impacts people” (*Stahl, 1997*)
- West Nile Virus surveillance



# The Value of Animal (Pet) Sentinels



**Breaking news** April 18, 2007 (10:00 am CDT) Pet food products recalled by Natural Balance Pet Foods on Monday have been shown to contain melamine, the company announced today. **The source of the melamine is believed to be a rice protein concentrate.**

# Common/Emerging Zoonotic Illnesses

- Campylobacteriosis
- *Clostridium difficile*
- *E. Coli* 0157:H7
- Highly Pathogenic Avian Influenza
- Leptospirosis
- Listeriosis
- Pasteurellosis
- Salmonellosis
- *Staphylococcus aureus* (MRSA)
- Yersinosis



# Zoonotic Bioterror Agents

- Anthrax
- Botulism
- Brucellosis
- *C psittaci*
- Epsilon toxin
- Glanders
- Hendra virus
- Melioidosis
- Nipah virus
- Plague
- Q-fever
- Ricin
- Rift Valley Fever
- *Staphylococcal* Enterotoxin B
- Tularemia



# Cooperation with Public Health Officials

- Each state/locality has different surveillance plans for zoonoses
- Many states: Rabies and *C psittaci* are the only reportable pet diseases
- Communication is lacking



**Lessons learned from the West Nile Virus 1999 investigation (GAO Report)**

# **Tools: Selected Agents and Clinical Severity in Sentinels**

| Agent or Disease          | Primary Reason(s) for Animal Surveillance | Dogs | Cats | Pet Birds | Horses | Ferrets | Hamsters | Rabbits | Reptiles | Guinea pigs |
|---------------------------|---|------|------|-----------|--------|---------|----------|---------|----------|-------------|
| Anthrax                   | B,P,S                                     | x    | x    | •         | X      | •       | •        | •       | •        | x           |
| Botulism                  | B,P,R,S                                   | x    | •    | x         | X      | •       | •        | •       | •        | •           |
| Brucellosis               | B,P,S                                     | x    | •    | •         | X      | •       | •        | •       | •        | •           |
| <i>Campylobacter</i> spp. | H   | x    | x    | •         | x      | x       | x        | •       | •        | x           |
| <i>C.psittaci</i>         | B,H,P,S                                   | •    | x    | X         | •      | •       | •        | •       | •        | x           |
| <i>C. difficile</i>       | H   | X    | X    | x         | x      | •       | •        | •       | •        | •           |
| <i>E. coli</i>            | B,H                                       | x    | x    | •         | •      | •       | •        | •       | •        | •           |
| Glanders                  | B,P,S                                     | x    | x    | •         | X      | •       | x        | •       | •        | x           |
| Hendra Virus              | B,P,S                                     | •    | x    | •         | X      | •       | •        | x       | •        | x           |
| HP Avian Influenza        | B,P,S                                     | •    | X    | x         | •      | X       | •        | x       | •        | •           |
| Leptospirosis             | H,R                                       | X    | x    | •         | x      | •       | x        | x       | x        | x           |
| <i>Listeria</i> spp.      | H,R                                       | x    | x    | x         | •      | •       | •        | x       | •        | x           |
| Melioidosis               | B,H,P,S                                   | •    | x    | x         | x      | x       | x        | x       | •        | x           |
| Nipah Virus               | B,P,S                                     | X    | x    | •         | x      | •       | •        | •       | •        | •           |

# Tools: Public Health Significance Chart



| Disease/Agent  | Companion Animals Affected                                   | Transmission Modes  | Public Health Threat  |
|--|--|---|---|
| <p><u>Campylobacteriosis</u><br/> <i>C. jejuni</i><br/> <i>C. coli</i></p> | <p>Dogs, cats, horses, ferrets, hamsters, rabbits, birds</p> | <ul style="list-style-type: none"> <li>● Primarily ingestion; also direct contact with infected animals and fluids</li> <li>● Occupational exposure</li> <li>● Human-to- human</li> </ul> | <p>As a <u>foodborne</u> pathogen, Campylobacter is the common cause of bacterial gastroenteritis in the US, causing an estimated 2.4 million human infections annually (42). Severe infections can lead to post-infectious sequelae such as <u>Guillain-Barre syndrome</u> and reactive arthritis.</p>   |
| <p><i>Clostridium difficile</i></p>  | <p>Dogs, cats, birds, horses</p>                             | <ul style="list-style-type: none"> <li>● Direct contact, ingestion</li> <li>● Human-to- human</li> <li>● Antibiotic-associated</li> <li>● <u>Nosocomial</u></li> </ul>                    | <p><i>C. difficile</i> is a significant human pathogen and an important cause of antimicrobial-associated diarrhea in humans (43). During 2000, a strain of <i>C. difficile</i> was identified that has increased virulence and/or antimicrobial resistance (44). Infection can result in the following diseases: <u>pseudomembranous colitis</u>, <u>toxic megacolon</u>, perforations of the colon, sepsis and death. <i>C. difficile</i>-associated disease (CDAD) is increasing in incidence and severity and may become more</p> |

# Discussion

- **Communication**
- **Collaboration**
- **Cooperation**
- **Education**
  
- **Task Force**
  - **Reporting Mechanisms/ Illnesses**
  - **Case Definitions**
  - **Contacts**

# Zoonoses Reporting – Potential Sources



# Summary

## Bridging human and veterinary medicine

→ Animal zoonoses reported to health department

- More data

- Early detection of an outbreak

- Rapid response

- Decreased morbidity and mortality in human and animal populations

# Acknowledgements

- **Benita Boyer, RN, MS, CIC**  
**District Epidemiologist, Loudoun  
County Health Department**
- **Marina Moses, Dr. P.H., M.S.**  
**Assistant Research Professor of  
Environmental and Occupational  
Health**

clickhere:gr

THANK YOU!



Gubernot@alumni.gwu.edu