

Agroterrorism, Public Health and HL7

Integration and Future Directions



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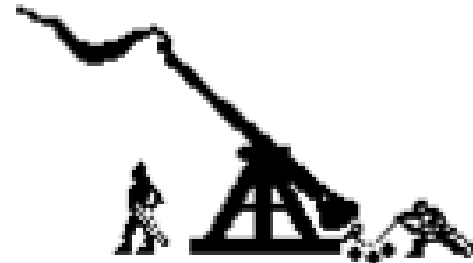
Forms of Terrorism

- “Classic” Terrorism - against persons & institutions
- Agroterrorism/Bioterrorism - directed against people, livestock, crops, food and plants
- Product tampering - directed against consumer/commercial products
- Cyber-terrorism - directed against computer or control systems



Biological Terrorism Incidents

- Public awareness “explodes” in 1990’s.
- Biological Incidents are actually old.
 - 1346 – Tartars hurling plague infected corpses into the walled city of Kaffa
 - Smallpox contaminated blankets given to American Indians during French and Indian War (1764)
- Potential for death, injury and economic ruin unprecedented.



Biological Terrorism

...Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.

--Federal Bureau of Investigation

Biological agents refer to living organisms or their biological products used to incapacitate or kill.



Agroterrorism

The use of biological (to include toxins), chemical, or radiological agents against some component of agriculture in such a way as to adversely impact the agriculture industry, or any segment thereof, the economy, or the consuming public.



History of Agroterrorism

- Not many documented cases
- WWI – Germans infected sheep for export into Western Europe with Anthrax (*Bacillus anthracis*) and Glanders (*Burkholderia mallei*)
- WWII – Japanese infected food items and water with Anthrax, Cholera, Plague and *Salmonella* organisms.



Veterinary Diseases of Interest

Office des Epizooties Internationale (OIE)

List A diseases

“Transmissible diseases that have the potential for very serious and rapid spread, irrespective of national borders, that are of serious socio-economic or public health consequence and that are of major importance in the international trade of animals and animal products.”



OIE List A Diseases

- Foot and mouth disease
- Swine vesicular disease
- Peste des petits ruminants
- Lumpy skin disease
- Bluetongue
- African horse sickness
- Classical swine fever
- Newcastle disease
- Vesicular stomatitis
- Rinderpest
- Contagious bovine pleuropneumonia
- Rift Valley fever
- Sheep pox and goat pox
- African swine fever
- Highly pathogenic avian influenza



Impact of Veterinary Diseases on Animal Populations

Disease	Location	Year	Animals Destroyed
Exotic Newcastle Dz	CA, USA	1972-74	11 million poultry
Avian Influenza	Eastern USA	1983-84	17 million poultry
Foot and Mouth Disease	Taiwan	1997	3.8 million swine
Classical Swine Fever	Netherlands	1997	> 8 million swine
Foot and Mouth Disease	UK	2001	> 4 million cattle, sheep
Exotic Newcastle Dz	CA, USA	2002-03	3.5 million poultry

Economic Impact of Foreign Animal Disease

- Generally measured in hundreds of millions to billions of dollars
- Loss of current animal population
- Loss of genetic stock
- Inability to repopulate premises for a time
- Quarantined animals or animal products may not move locally, interstate or internationally
- Environmental impacts
- Food supply impacts
- Costs of testing, monitoring and surveillance
- UC Davis study – FMD in CA
 - Direct loss up to \$13.5 billion



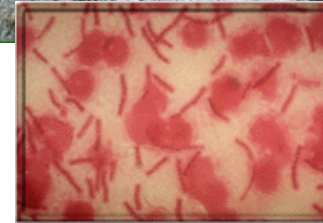
Animal Diseases make good terrorism agents

- Low tech, low-cost, high impact
- Cost to Produce 50% casualties/km² (1969 adjusted)
 - Conventional - \$7900
 - Nuclear - \$3200
 - Chemical - \$2400
 - Biological - \$4
- Rapid spread animal-to-animal
- Difficult to kill, persists in environment
- Difficult to trace
- Global source of raw material
 - Anthrax endemic in the US
 - FMD active in ~40 countries



Public Health augmentation by Veterinary Medicine

- Many “good” bioterrorism agents are zoonotic
 - *Bacillus anthracis* (Anthrax)
 - *Brucella* (Undulant Fever)
 - *Yersinia pestis* (Plague)
 - Viral Encephalidities (EEE, VEE, WEE)
 - *Coxiella burnetii* (Q Fever)
 - *Francisella tularensis* (Tularemia)
- Most likely seen first in animals
- These diseases are endemic in many places in the US animal population
- Veterinarians are trained to recognize these diseases
- Veterinary laboratories are well-equipped and trained to diagnose and identify these diseases



Other Zoonotic Agents of Interest

- West Nile Encephalitis Virus
- Rift Valley Fever
- Nipah Encephalitis Virus
 - Affected swine and humans in Malaysia
- Hendra Encephalitis Virus
 - Killed horses and humans in Australia
- Bovine Spongiform Encephalopathy
 - Associated with vCJD – 133 cases since 1990
- Avian Influenza
 - Linked to human deaths in Hong Kong, Netherlands
 - Last pandemic caused 25 million deaths

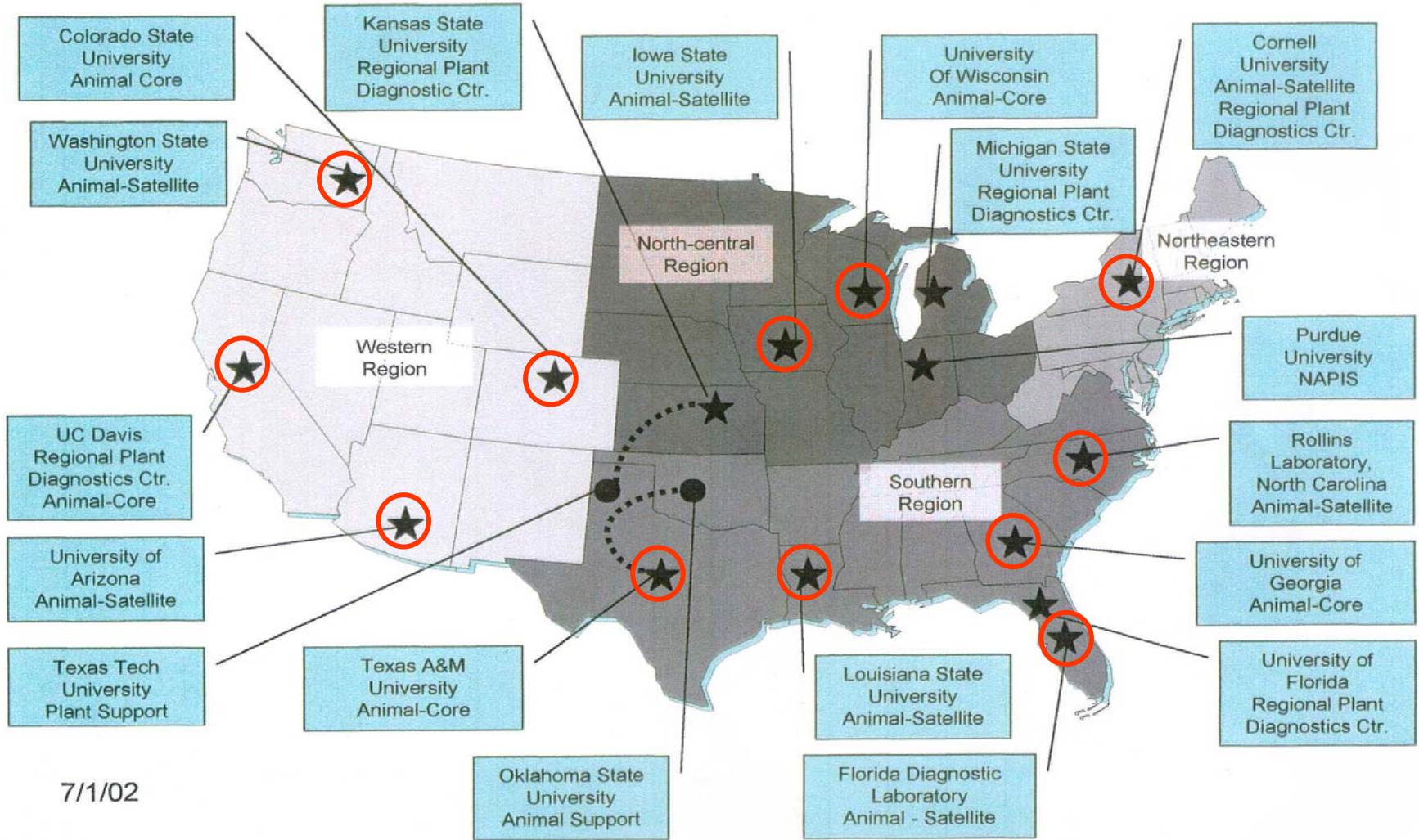


Veterinary Medicine and Public Health

- Increased participation by VDLs in PH programs:
 - LRN - Lab Response Network
 - eLEXNET – Food Safety Network
 - FERN – Food Emergency Response Network
 - CELDAR – California DHS and CAHFS
- Development of Animal Health Networks
 - NAHLN - National Animal Health Laboratory Network



Animal & Plant Disease and Pest Surveillance & Detection Network



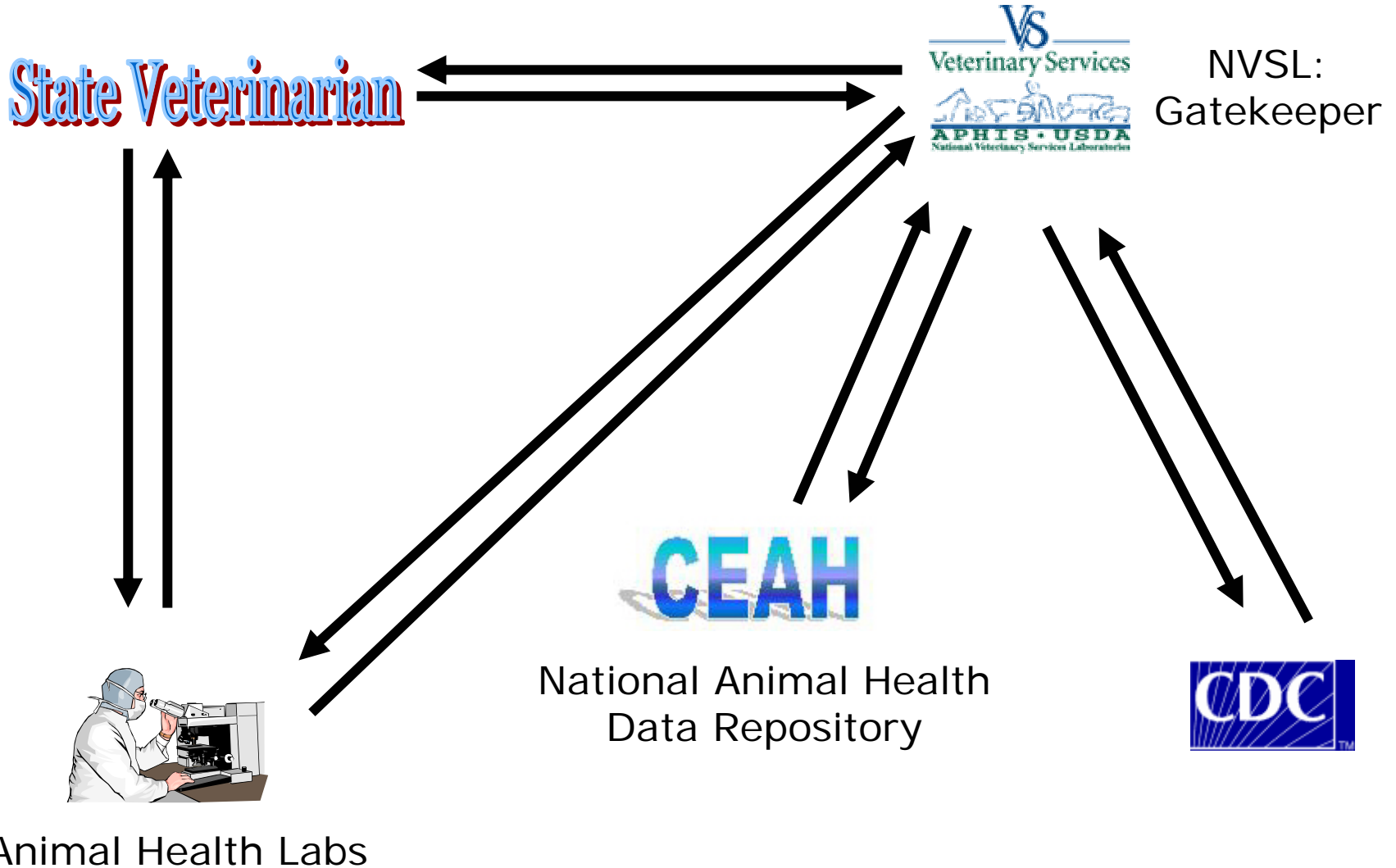
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Goals of the NAHLN

- Expand detection and response measures for pathogens that threaten animal agriculture
- Deploy standard diagnostic approaches for identification of select agents
- Bolster data sharing among animal health agencies
 - Creation of a secure, two-way communications network
 - Creation of a national repository for animal health data



NAHLN Structure



Increasing Role of HL7

- Recognition by public health agencies of the value of veterinary health information
- Increase amount and speed of communication among health agencies
- HL7 endorsed and adopted by both PH and vet medicine
 - CDC – Centers for Disease Control
 - FDA/CFSAN – Center for Food Safety and Nutrition
 - AVMA – American Veterinary Medical Association
 - AAVLD – American Association of Veterinary Laboratory Diagnosticians
 - AFDO - Association of Food and Drug Officials
- Cornerstone for development of a national health information infrastructure



Can HL7 support the needs of Veterinary Medicine?

- Veterinary medicine has some unique needs

Large number of different species



Non-conventional practice locations

Often population based (herds or flocks)



Animal health component of HL7

- V2.4 – supports species, breeds and classes of husbandry
- V2.5 – supports improved specimen attributes, populations and flexible observation messages
- V3.0 – RIM designed from the ground up to support broad based health applications
 - Entity groupings
 - Living_subjects
 - Specialized vocabulary



Current status of HL7 in Vet. Med.

- Awareness in the veterinary community increasing
- Early stages of message development to support the NAHLN
- Constrained by lack of funding, expertise, personnel resources
- Increased interaction with PH will encourage more participation

