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Committee on Agriculture

ZOONOTIC DISEASES

Statement of the Issue

Zoonotic diseases are illnesses that can be transmitted between animals and humans. Potential threats include bacteria, viruses, fungi, and parasites that are found in feces, saliva, birthing fluids, in blood and on the fur of animals. Some have to be injected by a bite or a scratch, but others require only the most casual contact. Management and prevention of zoonotic diseases are crucial to improving public health. They influence a number of global security issues including human disease prevention, food for an increasing world population, access to international trade, species conservation and protection, and economic growth. Moreover, animal diseases raise concerns about the potential use of animal pathogens in bio-terrorism and economic espionage. The Florida Department of Agriculture and Consumer Services, the Florida Department of Health, the Centers for Disease Control and Prevention, and the United States Department of Agriculture, as well as non-government organizations have zoonotics programs. This issue brief will explore how these entities provide a logistical framework for education, outbreak reporting, and response.

Discussion

There are more than 150 diseases recognized under the umbrella of zoonosis. Some of the better known examples include: anthrax, brucellosis, hanta virus, bubonic plague, hemorrhagic fevers like ebola, rabies and even AIDS. The world's most significant zoonotic epidemic was believed to have originated in swine near Fort Riley, Kansas in 1917. This influenza outbreak accounted for more deaths to health responders and civil populations than bullets, bombs, and poison gas combined did in WWII.¹

Certain venues encourage or permit the public to be in contact with animals, resulting in millions of human-animal interactions each year. These settings include county or state fairs, petting zoos, animal swap meets, pet stores, zoologic institutions, circuses, educational farms, working farms, and slaughterhouses, among many others. In March of 2005, the Florida Department of Agriculture and Consumer Services (DACCS) and the Department of Health (DOH) received reports that several children had been hospitalized with hemolytic uremic syndrome. Health officials began investigating what they believed to be an E. coli outbreak and discovered that the hospitalized patients had visited one of three central Florida fairs in the days prior to falling ill. Investigators determined that exposure to E. coli occurred in an animal setting and that the fairs had only one vendor in common, an exhibitor of a farm animal petting zoo.

Bioterrorism is the deliberate release of viruses, bacteria, or other agents used to cause illness or death in people, animals, or plants. Biological weapons are relatively easy and inexpensive to produce and can be aerosolized and distributed over large geographic areas. Zoonoses have been used throughout military history. For example, the Japanese began one of history's most notorious bioweapons programs in 1932, and numerous human experiments were conducted on at least 3,000 prisoners of war. Of these prisoners of war, more than 1,000 were estimated to have died following experiments using such zoonoses as anthrax, botulism, brucellosis, and plague. These allegations were supported during a military tribunal held in the former Soviet Union in December 1949.²

¹ Jill Webster, Ph.D., Agricultural Health and Safety Fact Sheet AHS-08

² http://www.publichealthreports.org/userfiles/123_3/276-281.pdf

Arthropod-borne viruses are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States. EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from 3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito.³ In addition, family pets can transmit zoonotic diseases such as cat scratch disease, giardia, leptospirosis, rabies and ringworm. Through monitoring the health of companion animals and educating pet owners on zoonoses prevention, veterinarians can help reduce the likelihood of an immunosuppressed person acquiring certain zoonotic opportunistic infections. Human and veterinary medicine can clearly benefit from cross-collaboration to fight diseases that jump between animals and humans.

As a result of the terrorist attacks on September 11, 2001, the security of the entire nation has been questioned, including our food supply. The threat of terrorism on Florida's food supply is very real, and therefore, it is important that the food industry take measures to ensure, not only a safe, but also a secure food supply. Food terrorism could occur as a biological, chemical, physical, or radiological attack. DACS' Division of Food Safety has identified preventive measures that can be taken to minimize the risk to which food might be subject on each segment of the farm-to-table system within the operator's control. As a nation dependent upon a centralized food production system, any disruption could have dire consequences. The food supply is certainly vulnerable, but taking proactive measures can strengthen the security of both the food supply and delivery system.

Scientists have long assumed a relationship between air travel and the spread of viruses. Throughout March and April 2009, international air travelers departing from Mexico were unknowingly transporting a novel influenza A (H1N1) virus to cities around the world. Using an extensive database of global air traffic and passenger itineraries, a research team analyzed information on 2.35 million passengers traveling from Mexico to more than 1,018 cities in 164 nations in March and April of 2008. Data from this time period was used because passenger data from 2009 was not yet available, and air travel patterns in March and April change little from year to year. The findings were published online June 29, 2009, in a letter to the editor in the *New England Journal of Medicine*.

Researchers found that from Mexico, nearly 81 percent of air passengers flew to the United States or Canada, while 8.8 percent went to Central America, South America or the Caribbean Islands, 8.7 percent flew to Western Europe, 1 percent went to East Asia and 0.8 percent flew elsewhere. Of the top 20 destination countries, only one, Venezuela, had no confirmed cases of swine flu as of May 25, 2009, but all of the others had confirmed cases of swine flu related to travel from Mexico.

The database used in the study, called the Bio Diaspora Project, includes air-travel patterns that represent 99 percent of the world's commercial air traffic. Researchers plan to use the database to help determine where newly emerging infectious diseases are most likely to turn up. In doing so, governments and public health authorities could work together to strengthen the fabric of the world's public health security, preventing the spread of disease and taking steps to determine where to marshal limited public health resources.⁴

Florida's public health infrastructure must also have the capability to respond to bioterrorism and naturally occurring events such as the swine flu pandemic. To have an effective public health response, a coordinated effort involving groups with diverse responsibilities is required, as well as coordination at different levels of government and governments in multiple jurisdictions.

The Florida Department of Agriculture and Consumer Services, Division of Animal Industry (DAI), is the lead state agency in the coordination of animal disease surveillance, control and eradication. DAI works very closely

³ <http://www.cdc.gov/ncidod/dvbid/arbtor/arbdet.htm>

⁴ <http://content.nejm.org/cgi/content/full/NEJMc0904559>

with the Department of Health on nearly a daily basis with a host of zoonotic diseases that are endemic to Florida such as rabies, Eastern Equine Encephalitis, West Nile virus, brucellosis, and psittacosis. DAI also carries out extensive disease surveillance for diseases such as avian influenza and many foreign animal diseases or pests that are significant threats to animal and public health. As the lead agency for Emergency Support Function 17 for Animal and Agricultural Emergencies, DAI also carries out considerable effort in preparing for and responding to animal health emergencies that may be zoonotic in nature. Emergency Support Function 17 coordinates the response of state agencies in assisting local and volunteer organizations to provide all animals affected by the disaster with emergency medical care; evacuation; rescue; temporary confinement, shelter, food and water; and identification for return to the owner. The coordination may also involve diagnosis, prevention, and control of diseases of public health significance. Another major concern is the disposal of dead animals.

In addition to veterinary program managers and field staff that include veterinarians, supervisors, and inspectors located throughout the state, DAI also maintains two animal health laboratories that carry out extensive surveillance for animal diseases. The Kissimmee Animal Disease Diagnostic Laboratory is a nationally accredited laboratory and one of 12 core National Animal Health Laboratory Network laboratories in the nation. It includes BSL3 and BSL2 laboratories that provide biosecurity levels for working on zoonotic disease agents of high concern.

Staff of the Senate Agriculture Committee requested that the Division of Animal Industry provide information for the following questions.

What agencies would the Florida Department of Agriculture and Consumer Services be involved with in addressing a zoonotic disease public health emergency?

State and County - Departments of Health, Florida Fish and Wildlife Conservation Commission, Department of Environmental Protection, Division of Emergency Management, University of Florida/College of Veterinary Medicine, University of Florida/Institute of Food and Agricultural Sciences.

Federal - USDA/APHIS Veterinary Services, USDA/APHIS Animal Care, USDA/APHIS Wildlife Services, Health and Human Services/Centers for Disease Control, Health and Human Services/Public Health Services.

Private – Florida Veterinary Medical Association, Florida Association of Veterinary Practitioners, Food Animal Veterinary Medical Practitioners, impacted producer groups and associations.

Which agency would take the lead or who would be an incident commander?

This would depend upon the primary impact of the disease outbreak. In a highly pathogenic Avian Influenza outbreak that is primarily affecting birds, DACS would take the lead with direct support from the Department of Health (DOH). If the primary impact of a disease outbreak is on public health, DOH would be the lead agency with DACS providing direct support for animal issues. The Florida Division of Emergency Management would play a coordination role in ensuring support for the response.

If the incident was of high enough impact involving federal declarations of emergency, appropriate federal agencies (Health and Human Services and United States Department of Agriculture) would partner with state agencies and depending upon the extent of the emergency share command with state officials. A unified command structure would be established that might include DACS, DOH and associated federal agencies sharing the lead.

Is private industry, such as the poultry industry or veterinarians, involved?

Yes. Plans are in place to utilize private industry groups and veterinary practitioners. DACS leads the Florida State Agricultural Response Team or SART, which is the Emergency Support Function 17 multi-agency coordination group with over 20 agencies and organizations that coordinate and prepare for animal emergencies and that would offer support in response to emergencies.

A Florida Veterinary Corps has been established that includes nearly 50 private veterinarians who have agreed to serve as volunteers in the event of an emergency affecting animals in the state. They serve under University of Florida, College of Veterinary Medicine leadership and would work under DACS in an animal disease emergency response. Animal Health Technicians also volunteer under this program.

Has the state carried out preparedness exercises to examine response activities such as carrying out disease surveillance, investigation and implementation of control measures? Please provide any reports you may have on the outcome of past preparedness exercises.

Yes, recent preparedness exercises for zoonotic disease incidents that involve DACS, DOH, and multiple state and federal agencies include:

1. Department-level highly pathogenic Avian Influenza incident tactical exercise - 11/06.
2. County-level Florida Department of Health highly pathogenic Avian Influenza incident tabletop exercises - 6 exercises throughout 2008 involved more than 280 county participants.
3. Division laboratory National Animal Health Laboratory Network tabletop exercise for a highly pathogenic Avian Influenza incident - 8/08.
4. State-level Rift Valley fever incident tabletop exercise -11/08. More than 100 participants and multiple state and federal agencies participated in a three day exercise at the State Emergency Operations Center. This exercise is being adapted to an on-line training program by DOH for local inter-Agency training.
5. State Emergency Operations Center Thunderbolt Exercise for a highly pathogenic Avian Influenza incident -12/08. The State Emergency Response Team and representatives from the 18 Emergency Support Functions were involved.
6. Division laboratory tactical exercise for a Rift Valley fever incident - 3/09.

In addition, disease response presentations to veterinary, animal industry groups, and public health personnel are conducted by DACS on an ongoing basis.

Is there cross-organizational coordination in management of response operations?

Yes, there is multi-agency coordination through the State Emergency Operations Center as well as at the agency level. Agency coordination involves multiple federal and state partners that would be utilized in an animal health or zoonotic disease emergency response.

How is effective public information and risk communication provided without generating anxiety or panic that could impede responders from resolving the incident and minimizing damage?

Trained Public Information Officers through the use of a Joint Information Center would be utilized to jointly release information to the public. Although this could not guarantee that there would be no public anxiety or panic, coordinated, cross agency public information releases, prepared by trained public information officers, would minimize public panic and anxiety.

How are non-English-speaking populations reached during response efforts?

Public Information Officers through the Joint Information Center would prepare public information materials for non-English speaking citizens. Information tools that could be utilized are websites, press releases, informational handouts and public meetings. CDC has also prepared non-English informational materials that could be used in the event of an outbreak of zoonotic disease.

Is there a process for the state to quarantine or isolate someone who has been exposed to a zoonotic disease?

Human isolation and quarantine is led by the Florida Department of Health and County Health Departments which have statutory authority. Animal quarantine is carried out under DACS authorities.

Are sufficient drugs available to treat the public during an outbreak?

This is highly dependent upon the disease. Human drug release information would be provided by the Florida Department of Health or United States Department of Health and Human Services.

Funding

Over the past six years, the federal government has invested more than \$6.3 billion in state and local preparedness and provided an additional \$600 million for state and local pandemic preparedness. Federal funding, however, has been inconsistent and has declined over the past few years. A report from the Center for Studying Health System Change noted that “federal funding is fragmented...coming from several sources with varied requirements, making it difficult for communities to pursue a comprehensive strategy.”⁵

The Division of Animal Industry receives federal funding to enhance laboratory operations and support specific animal disease testing and surveillance programs as well as emergency response training and preparedness initiatives. To date, it has seen some reduction related to specific programs (Johne’s Disease testing and Herd Plan Management, Pseudorabies, Swine Brucellosis and National Animal Identification System). These reductions for next year will primarily impact surveillance and should not directly impact the state’s disease response capability.

The Division does have specific concerns relating to future reductions in federal funding. There has been a decrease in the willingness of USDA partners to commit additional resources in the event of foreign or emerging disease occurring in Florida. It will be important that they continue to provide resources in partnering with the Division to combat emergency or program diseases in the future. Bovine tuberculosis is an example of a disease spreading in other areas of the United States, and which threatens Florida at a time when federal resources nationally for the tuberculosis program are lessening.

A reduction in Department of Homeland Security funds would lower the Division’s emergency response readiness and limit the educational initiatives that have begun with regional and county emergency response units. A significant reduction of federal funds in high risk program areas (Avian Influenza testing and surveillance, foreign animal disease surveillance, laboratory operational funding, and general animal health surveillance and testing programs—brucellosis, equine encephalitis, rabies and other influenzas) would have a significant negative impact on the Division’s ability to fulfill its mission to prevent, control, and eradicate dangerous transmissible diseases. As approximately 65 percent of all diseases are zoonotic, the results of reduced funding could be catastrophic to both animal and human populations.

⁵ <http://healthyamericans.org/assets/files/bioterror-report-2008.pdf>