

FAZD CENTER

NATIONAL CENTER FOR FOREIGN ANIMAL AND ZOO NOTIC DISEASE DEFENSE

A DHS Center of Excellence

Lead Institution — Texas A&M University

Core Members — The University of California, Davis; The University of Southern California; The University of Texas Medical Branch

Award Date

October 1, 2004
 Extended term, FY08
 (FY09 is indicative, pending availability of funds)

Mission

To protect against the introduction of high-consequence foreign animal and zoonotic diseases into the United States, with an emphasis on prevention, surveillance, intervention and recovery

Impact and Relevance

- New methods for rapid and accurate detection of foot and mouth disease, rift valley fever, avian influenza, and brucellosis
- Vaccines and antiviral agents against introduced diseases
- Decision tools for assessment of consequences of options to prevent/curtail disease spread
- Education and Outreach

Major Partners

Texas A&M University, Univ. of California at Davis, Univ. of Southern California, Univ. of Texas Medical Branch, Georgetown Univ., Plum Island Animal Disease Center and National Laboratories, plus nine Minority Serving Institutions

Funding

- Core budget of \$5 million in FY08, with additional \$5 million approved in FY09
- Other competitive funds from DHS

Project Themes

Biological Systems

- Develop rapid and accurate methods for detecting and diagnosing biological agents
- Develop vaccines, antiviral agents, and means to increase resistance against threat diseases

Information and Analysis Systems

- Develop effective decision support systems to assess consequences of options to prevent or curtail disease

Education and Outreach Systems

- Develop and deliver educational and training programs at state and national levels

Customers

- Office of Health Affairs
- Office of National Protection & Programs
- National Biodefense Analysis and Countermeasures Center
- USDA and CDC
- State Emergency Response Agencies
- Agricultural Industry

DHS Priorities

Thematic Categories	Prevention	Detection	Response	Recovery	Risk Communications/ Education
<i>Biological Systems</i>	<ul style="list-style-type: none"> • Vaccines and immunomodulators • Natural resistance • Management practices • Border security 	<ul style="list-style-type: none"> • ELISA test • PCR test • Novel detection systems -- host response and organism 	<ul style="list-style-type: none"> • Modern methods and alternatives to slaughter and burn 	<ul style="list-style-type: none"> • Tests to distinguish vaccinated from infected animals and application of immunogens 	<ul style="list-style-type: none"> • Undergraduate and graduate education programs through sponsored thesis research • Masters and Ph.D. programs
<i>Information and Analysis Systems</i>	<ul style="list-style-type: none"> • Planning • Table top exercises • Training • Gap analysis • Integrated assessment 	<ul style="list-style-type: none"> • Evaluation of options for detection • Surveillance • Border/port monitoring 	<ul style="list-style-type: none"> • Operational tools for incident command function • Options for managing outbreaks 	<ul style="list-style-type: none"> • Impact of mitigation options • Methods for risk assessment for resumption of trade after clean up 	<ul style="list-style-type: none"> • Quantitative risk analysis, aversion and mitigation • Use of table top exercises • Create knowledgeable next generation
<i>Education and Outreach</i>	<ul style="list-style-type: none"> • Train surveillance and first responders • Develop ongoing communications systems 	<ul style="list-style-type: none"> • Undergraduate and graduate students trained to use modern detection and diagnostic systems 	<ul style="list-style-type: none"> • New cadre of first responders trained to use modern decision tools in an incident command setting 	<ul style="list-style-type: none"> • Training international trading partners in modern risk assessment using new tools 	<ul style="list-style-type: none"> • Graduate and undergraduate • Scholarships and short courses • Add material to curriculum in food and agriculture

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Products to defend America's health and economy from exotic animal diseases

- Vaccines for Selected Zoonotic Diseases:** In addition to safety, efficacy, and the ability to manufacture sufficient quantities of vaccine, FAZD Center investigators are using modern recombinant technologies to incorporate genetic "markers" into Rift Valley Fever and Avian Influenza vaccines to distinguish vaccinated from infected livestock. In controlling an outbreak, this will prevent unnecessary slaughter of animals and related damage to the economy through trade restrictions. Candidate vaccines are ready for initial field testing. The University of Texas Medical Branch – a partner in the FAZD Center – is working on the development of a commercial vaccine for Rift Valley fever using the MP-12 antigen. The FAZD Center has supported the development of an animal vaccine at UTMB for three years.
- Rapid Detection Tests:** After an outbreak of Foot and Mouth Disease (FMD) has been confirmed, the emergency response program to eradicate the disease involves sometimes massive culling of infected or exposed herds. The FAZD Center is developing a rapid, accurate, inexpensive field test that will distinguish infected and uninfected animals at chute site within minutes. This will eliminate unnecessary loss of uninfected animals, saving hundreds of thousands of animals in large outbreaks. These tests are moving from successful laboratory development to evaluation at the Plum Island Animal Disease Center
- Epidemiologic and Economic Impact of Rift Valley Fever Introduction:** FAZD Center scientists assessed the national epidemiologic and economic impact of the introduction of Rift Valley fever in the U.S. for the biennial White House Biothreat

Risk Assessment conducted by the DHS National Biological Threat Characterization Center. A vector borne human and animal disease, Rift Valley fever is an emerging threat and is one of the select agents for bioterrorism. An outbreak in the U.S. would have its largest impact in areas where mosquitoes reside with livestock and wildlife.

- Model of Interstate Transportation of Cattle and Swine:** Most epidemiologic models assume disease is spread by direct or indirect contact at local levels. They fail to take into account the long distance movement of animals across the country that occurs in commerce. The DHS has provided special funding to the National Center for Food Protection and Defense (NCFPD) and the FAZD Center to acquire the data and to build a national transportation model that will be input to multiple epidemiologic modeling efforts. The initial effort will focus on beef, dairy, and swine. This will provide for the first time a quantitative estimate of what is probably one of the most important factors in the spread of foreign animal or zoonotic disease through the interstate movement of large numbers of animals over long distances.

- Lessons Learned from the Outbreak of FMD in the United Kingdom:** At the request of the Office of Health Affairs at DHS, the FAZD Center provided ongoing chronologic reviews of the events associated with the recent outbreak and containment of foot and mouth disease in the U.K. from August through October 2007. A follow on study is planned to develop lessons learned from the outbreak and its management with respect to applications relevant to the United States.

The FAZD Center generates a stream of products that are useful and usable by recognized stakeholders. This product stream is illustrated in the chart below:

Goals	Rapid and accurate detection and diagnosis of threat agents	Vaccines, antiviral agents, resistance against threat diseases	Decision systems to assess consequences of options to prevent/curtail disease	Education: Planning and training tools for private sector stakeholders
Outcomes Fiscal year '08	<ul style="list-style-type: none"> Prototype chute-side test for foot and mouth disease, and pen-side test for avian influenza 	<ul style="list-style-type: none"> Live-agent challenge tests of prototype DIVA vaccine for Rift Valley fever, avian influenza and brucellosis 	<ul style="list-style-type: none"> Risk reduction tool for enterprise/subsectors, and dynamic planning/training simulator for regional/national planning-intervention 	<ul style="list-style-type: none"> Dynamic planning and training simulators for FAZD available to decision makers
Fiscal Year '09	<ul style="list-style-type: none"> Prototype detection systems for new priority agents Host-pathogen markers for earlier detection of infection 	<ul style="list-style-type: none"> Rift Valley fever, avian influenza vaccines validated and available for production 	<ul style="list-style-type: none"> Second generation scenario and consequence models developed and used for 3rd Bio-Threat Risk Assessment 	<ul style="list-style-type: none"> Web-based training and education models deployed into national network
Fiscal year '10	<ul style="list-style-type: none"> Rapid multi-agent field tests for exotic animal disease Prototype host-pathogens markers for field testing 	<ul style="list-style-type: none"> Enhanced resistance to classes of exotic disease — host-pathogen environmental relationships — molecular genetics approach 	<ul style="list-style-type: none"> Expand decision systems to other livestock species and human-animal interface scenarios 	<ul style="list-style-type: none"> Second generation information and training modules for priority human-animal diseases