

Lead Institution — Texas A&M University

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

As a Department of Homeland Security National Center of Excellence, the FAZD Center is the integrated, full spectrum center protecting the U.S. from engineered and exotic animal diseases that threaten public health and economic stability.

FAZD Center’s contribution to the mission of U.S. homeland security

The FAZD Center creates products that protect Americans from the intentional use of animal-borne disease to infect humans or to disrupt the national economy. These products have the additional benefit of defending against natural outbreaks. To this end, the Center develops integrated working teams across disciplines and institutions to create methodological platforms that provide excellence in methods with flexibility to address needs.

FAZD Center’s structure and scope

The FAZD Center’s product stream is organized along three themes:

- **Biological Systems** products are aligned to satisfy DHS goals of detection, diagnosis, prevention and recovery.
- **Informatics, Modeling, Analysis** products are

designed to better inform decision making at multiple levels of scale.

- **Education and Outreach** products provide the next generation of science power for homeland security and a more informed industry-government relationship for animal agriculture.

In addition, FAZD Center products come with a dual benefit. Each provides a defense against both naturally occurring and intentionally introduced foreign animal and zoonotic disease, and contributes explicitly to preparation for the national goal of an all-emergencies response.

FAZD Center’s strategy for investing its resources

The Center is currently funded with an \$18 million, three year award with presumed likelihood of renewal based on demonstrated performance. Core funds are leveraged by a factor of 1.3 with other funding to address the Center’s mission. The FAZD Center provides an enduring institutional capacity to address each DHS priority area, as illustrated in the chart below, and meet the future needs of the department. It applies these methods to current DHS priority areas to provide a stream of ongoing meaningful products to address priority needs.

Thematic Categories	DHS Priorities				
	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>Informatics, Modeling, and Analysis</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

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

- **FAZD Center's Avian Influenza School trained early responders to recognize potential outbreaks of H5N1** — Sessions have been held in Texas, California and Minnesota, and in Africa. Course modules prepared extension agents, veterinarians, researchers and farmers for prevention, intervention, and recovery from outbreaks of highly pathogenic avian influenza. Participants learned from scenarios including small poultry operations, live bird markets, commercial facilities and wildlife refuges.

- **Mass Animal Mortality Workshops examined the science, policy and environmental impact of proper disposal following natural, accidental, or man-made disasters affecting the livestock industry** — Sessions in California and Texas brought together federal/state regulatory and environmental authorities, county/state emergency management professionals, university and private scientific communities, livestock and poultry producers, feeding industry representatives, and commodity organizations. Stakeholders evaluated and recommended public policy and emergency response.

- **FAZD Center studies defined the potential for transmission of avian influenza virus in live bird markets in the United States** — Preventive measures have been approved and adopted. In addition, the FAZD Center conducted surveillance of wild migratory birds in the Gulf Coast region of the Central Flyway.

- **New tests allow rapid regional and chute side detection of foot-and-mouth disease** — The FAZD Center's real time PCR diagnostic tests for FMD can be used in regional labs to produce results in 45 minutes rather than three days as now required when samples are sent off shore. A hand held field test allows quick detection on site. This is crucial since, according to a FAZD Center model, any delay in detection will cost the U.S. economy \$2.3 million per hour.

- **Curriculum trained first responders and industry workers on identification and control of emerging animal diseases** — The FAZD Center published a handbook, CD and web-based curriculum for group and auto-tutorial training. It provided training to 350 Country Extension Agents and 28 Extension Livestock and Communications Specialists. The Center also recruited and identified key participants to serve as trainers at regional outreach centers.

- **FAZD Center investigators tested an innovative biological response to foot and mouth disease** — FMD vaccines require 7 to 10 days to take effect. Investigators intend to fill that gap with a biological product that is effective in three days after administration. The product makes use of "natural killer cells" that attack the FMD virus. The team tested the approach on a surrogate virus at Plum Island Animal Disease Center.

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 FY 07	<ul style="list-style-type: none"> • Laboratory validation of diagnostic tests for foot and mouth diseases, Rift Valley fever and avian influenza 	<ul style="list-style-type: none"> • Immunogenicity tests of Rift Valley fever and avian influenza vaccines • Live-agent challenge tests at Plum Island of antiviral agents for foot and mouth disease 	<ul style="list-style-type: none"> • Prototype integrated Decision Support System • National market and transportation model integrated in MESA • Scenario and consequence models for 2nd Bio-Threat Risk Assessment 	<ul style="list-style-type: none"> • National and international information/training modules for avian influenza fielded
FY 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
FY 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
FY 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