Center Focused Research

DHS University Network Summit on Research and Education

FAZD CENTER

National Center for Foreign Animal and Zoonotic Disease Defense

Overview of National Center for Foreign Animal and Zoonotic Disease Defense

March 16, 2007

2b. National Center for Foreign Animal and Zoonotic Disease Defense

Award Date: New 3-year term

FY2007 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

Major Partners

Texas A&M University
Univ. of California at Davis
Univ. of Southern California
Univ. of Texas Medical Branch
Univ. of Maryland

PIADC and National Laboratories

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

Customers

DHS Chief Veterinary Officer
DHS Preparedness Directorate
DHS NBACC
USDA and CDC
State Emergency Response Agencies
Agricultural Industry

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Core Partners

UC DAVIS University of California, Davis

Texas A&M University

USC University of Southern California

UTMB The University of Texas Medical Branch

Associate Partners

University of Minnesota

University of Maryland

The University of Wisconsin Madison

National Partners

Los Alamos National Laboratory Est. 1943

Lawrence Livermore National Laboratory
Science in the National Interest

Sandia National Laboratories

Pacific Northwest National Laboratory
...delivering breakthrough science and technology

Plum Island Animal Disease Center

State Partners

Texas Animal Health Commission — Serving Texas Animal Agriculture — Since 1893

cdfa California Department of Food & Agriculture

Centers of Excellence

CREATE Homeland Security Center

National Center for Food Protection and Defense
A Homeland Security Center of Excellence

FAZD CENTER
National Center for Foreign Animal and Zoonotic Disease Defense

Three Themes

Biological Systems ***BioSys***

- Detection & Diagnostics
- Host-Pathogen Interactions
- Disease Surveillance
- Functional Genomics
- Pathogenesis

Information Analysis Systems ***IMA***

- Threat Assessment
- Transportation Modeling
- Risk Analysis
- Spatial Science
- Economics Modeling
- Epidemiology
- Integrated Models

Education and Outreach

- Undergraduate
- Advanced degree
- Post graduate professional
- Commodity-specific
- Private Sector
- HLS Operators – Gov't
- Lender, insurer, consultant

FAZD Center Goals and Outcomes

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	Laboratory validation of diagnostic tests for FMD, RVF, and AI	Immunogenecity tests of RVF and AI vaccines using lab animals Live-agent challenge tests at PIADC of antiviral agents for FMD	Prototype integrated Decision Support System National market and transportation model integrated into MESA Scenario and consequence models for 2d Bio-Threat Risk Assessment	National and international information/training modules for AI fielded
FY 08	Prototype chute-side test for FMD and pen-side test for AI	Live agent challenge tests of prototype DIVA vaccines for RFV, AI and brucellosis.	Risk reduction tool for enterprise/sub-sectors, and dynamic planning/ training simulator for regional/national planning-intervention Refine market/transportation and bio-threat risk assessment	Dynamic planning and training simulators for FAZD available to decision makers
FY 09	Prototype detection systems for new priority agents Host-pathogen markers for earlier detection of infection	RVF, AI vaccines validated and available for production	Second generation scenario & consequence models for developed and used for 3rd Bio-Threat Risk Assessment.	Web based training and education modules deployed into national network
FY 10	Rapid multi-agent field tests for exotic animal disease Prototype host-pathogens markers for field testing	Enhanced resistance to classes of exotic disease – host-pathogen-environmental relationships –molecular genetics approach	Expand decision systems to other livestock species and human-animal interface scenarios	Second generation information and training modules for priority human-animal diseases

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NATIONAL CENTER FOR FOREIGN ANIMAL AND ZOONOTIC DISEASE DEFENSE

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Customers and Products

Customer	Product
Food and Agriculture Industries	Protection, planning, education, response
Policy/Decision Makers	Quantitative decision tools at multiple levels
DHS – ODP	Threat and vulnerability assessments NIPP
DHS – NBACC	Threat assessment
DHS Ports and Borders	Surveillance and detection for FAZD
APHIS	Databases, models, decision support system support and consequence management
CDC	Zoonoses- vulnerability assessment and consequence management
Intelligence Community	Assessments, requirements, analysis
Economic Research Service	Databases and GIS based animal transportation models
NBACC – LLNL	Agricultural component of the Biodefense Knowledge Center
Department of Defense	Biological products and impact assessment for zoonoses affecting war fighter
State Emergency Planning	Engagement at state levels in California and Texas – models for other states

FROM SCIENCE...SECURITY

FAZD CENTER

National Center for Foreign Animal and Zoonotic Disease Defense

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

Focused currently on threats posed by 3 diseases exotic to the United States

Each could be engineered for intentional use against the public health or the national economy

Foot and Mouth Disease
- Most contagious viral disease
- Highly susceptible for multiple species of livestock and wildlife
- Multi-billion dollar impact on U.S. economy
- 2001 UK outbreak: $11.75 billion

Avian Influenza
- Highly pathogenic H5N1
- Importation and possible mutation to human pandemic
- Transmission among species
- Economic and public health consequences

Rift Valley Fever
- Contagious viral disease transmitted between animal and man
- Mortality and abortion in animals
- Acute flu like symptoms in man
- Insect hosts are already present in the U.S.

To combat these threats, FAZD Center generates a stream of products that explicitly address DHS priorities

Biological Systems
Satisfy DHS goals of detection, diagnosis, prevention and recovery

Vaccines and Antiviral Agents
- State of the art vaccine candidates to protect livestock, poultry, and humans
- Immune system modulators to reduce time between immunization and onset of protective immunity

Detection/Diagnostic Technologies
- Rapid 'pen side' or 'chute side' tests
- High throughput, 'surge' capacity robotic assays
- Real-time PCR assays for improved sensitivity and agent subtyping

Universal Platforms for Advanced Agent and Disease Profiling
- Molecular signature archives of disease states to derive improved diagnostic and therapeutic capabilities

Informatics Analysis Systems
Better informed decision making at multiple levels of scale

Epidemiologic Modeling
- Analyses of impact of FMD incursion in California and Texas High Plains
- Marketing/transportation model addresses impact of livestock movement on spread of disease

Analysis and Information
- Computer program developed to enable national model integration
- Collaborative grid computing system has been established between universities

Economic Modeling and Risk Analysis
- Economic consequences of disease outbreaks and prevention, intervention, and recovery strategies
- Modeled the links between compensation for losses and disease management, price, consumer demand, and international trade adjustments

Education and Outreach
Provide the next generation of science power for homeland security

Avian Influenza School
- For extension agents, veterinarians, researchers and farmers in California, Texas, Minnesota and Africa
- Scenarios: Small poultry operations, live bird markets, commerical facilities and wildlife refuges

Mass Mortality Workshops
- For producers, government agencies, scientists and commodity associations in California and Texas
- Examined impact of proper disposal following disasters affecting livestock industry

Training in Emerging Diseases
- Trained first responders, industry workers, 350 County Extension Agents

Masters in Veterinary Health
- Extended graduate programs at University of California, Davis and Texas A&M University

FAZD Center products defend against both intentionally introduced and naturally occuring diseases and contribute explicitly to the national goal of an all-emergencies response

Lead institution Texas A&M University | **Core members** The University of California, Davis | The University of Southern California | The University of Texas Medical Branch