FAZD CENTER

National Center for Foreign Animal and Zoonotic Disease Defense

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Center of Excellence for Emerging and Zoonotic Animal Diseases

Centers of Excellence for Foreign, Emerging, and Zoonotic Animal Diseases

Co-Led by the FAZD Center (National Center for Foreign Animal and Zoonotic Disease Defense) and CEEZAD (Center of Excellence for Emerging and Zoonotic Animal Diseases)

Six Year Strategic Plan (2010-2016)

I. MISSION, ORGANIZATION

a. Centers of Excellence Overview and Approach

The United States agricultural sector is vital to the nation's economic, social and political well-being[1]. At the same time, this sector is perhaps one of the most vulnerable to a natural and/or intentional introduction of a foreign animal, emerging and/or zoonotic disease event. Protection of this sector from potentially catastrophic disease events, whether naturally or intentionally introduced, requires proactive, aggressive and comprehensive approaches that include basic and translational research; countermeasure development, validation and deployment; robust, documented epidemiologic and economic models and an innovative, 21st century technology-driven education and outreach program. Each of the aforementioned components has been prioritized by numerous working groups and identified in multiple publications[2 3]. In addition, Homeland Security Presidential Directives (HSPD) 9 (Defense of United States Agriculture and Food) and 10 (Biodefense for the 21st Century) provide guidance on development of this comprehensive approach towards biodefense and protection of our nation's agricultural sector.

HSPD-9 clearly describes the vulnerability of the US agricultural sector to the natural or intentional introduction of an exotic disease. In this directive, agriculture is established as a critical infrastructure; and the Department of Homeland Security (DHS) is given the responsibility to "accelerate and expand development of current and new countermeasures against the intentional introduction or natural occurrence of catastrophic animal, plant, and zoonotic diseases". In addition, HSPD-9 called on the Secretaries of Homeland Security and Agriculture to establish university based Centers of Excellence in agriculture and food security. As a result, in 2004, the National Center for Excellence in Agriculture was competitively awarded to the Foreign Animal and Zoonotic Disease Defense (FAZD Center), with Texas A&M University as the lead institution.

In 2010, DHS awarded the Agricultural Center of Excellence to two universities; the FAZD Center (with Texas A&M University as the lead institution) and the Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD) (with Kansas State University as the lead institution). These two Centers were established as Co-Leads for the DHS Program on Zoonotic and Animal Disease Defense. The period of performance for both Centers extends for 6 years (2010-2016).

b. Alignment of FAZD Center/CEEZAD Programs

The FAZD Center and CEEZAD have strong inter/multi-disciplinary programs and research teams that focus on countermeasure development, basic research, information analysis systems, translation of research results into end user products, and last but certainly not least, education and outreach. The Centers' research and education and outreach programs align with and directly address the four pillars of biodefense outlined in HSPD-10: 1) threat awareness; 2) prevention and protection; 3) surveillance and detection; and 4) response and recovery. In addition, each center's portfolio is managed around the components of agricultural defense that are highlighted in HSPD-9: 1) awareness and warning; 2) vulnerability assessments; 3) mitigation strategies; 4) response planning and recovery; and 5) outreach and professional development. Other working group documents support the priorities being addressed within each center.[1,2,3]

The primary objectives of the Center (guided by the Quadrennial Homeland Security Review Report: A Strategic Framework for a Secure Homeland (Feb. 2010)) are to integrate and collaborate with other partners within the homeland security enterprise and enhance the resiliency of the agricultural community/sector.

The University Centers of Excellence (COEs) are truly unique due to their capacity to bring forth multi-disciplinary teams to solve the complex issues facing our agricultural industries. Throughout the next six years, the FAZD Center and CEEZAD will leverage our outstanding teams of scientists and educators and increase collaborations with the veterinary biologics industry while continuing to foster and expand our expertise. We will advance and support cutting-edge, inter-institutional, inter-disciplinary and translational research across several thematic areas to include: *(1) Countermeasure Development; (2) Basic Research; (3) Information Analysis Systems* (IAS)*; and (4) Education and Outreach*. The Centers' emphasis on cross-thematic linkages and multi-disciplinary, multi-institutional, translational research will form the foundation for solving the complex multi-factorial issues facing the agriculture and public health sectors.

The Centers are committed to five multi-disciplinary policies:

- Harnessing the intellectual and "brick-and-mortar" research capacities of partner institutions, on both an immediate and sustained basis, in order to fill critical knowledge gaps;
- Leveraging research activities through established relationships with complementary national and federal laboratories, as well as federal, state, local and non-profit agencies and programs;
- Aggressively extending and implementing our educational and outreach programs to augment and broaden national capabilities in global agricultural and public health
- Organizing efforts to contribute to the national and global *One Health-One Medicine-One World Initiative*; and
- Increasing participation and recognition at national and international symposiums, conferences, and workshops.

During the next six years, the Centers will:

- Continue to place major emphases on addressing the contemporary needs of its stakeholders;
- Employ cutting-edge 21st century technology in relevant sciences;

- Exploit opportunities to engage new research and translational partners and enlist new colleagues/ institutions in research, education and/or outreach projects;

- Advance new research and education and/or outreach projects;

- Offer a competitive grant process to encourage new ideas and develop new relationships; and

- Expand reach back capacity from the subject matter expert community to DHS and its partners.

c. Centers of Excellence Mission and Vision

Mission:

- *To protect the nation's agriculture and public health sectors against high consequence foreign, emerging and/or zoonotic animal disease threats*

    - *by conducting research, developing technology, training a specialized workforce and communicating the results of this research to a wider audience of animal, public and human health care providers and organizations, veterinary professionals and agricultural organizations and customers/stakeholders*

Vision:

- *To be a leading partner in providing cutting-edge, multi-disciplinary, basic and translational research and education for agricultural resiliency.*

d. Organizational Structure and Leadership

The FAZD Center and CEEZAD will function as Co-Leads for the DHS Program on Zoonotic and Animal Disease Defense. Each center will maintain control of its administrative functions and oversight of its scientific and education programs, but will work with DHS and its partner center to ensure programmatic alignment, efficient use of resources, and non-duplication of efforts. The Centers currently operate under a joint coordination strategy that outlines mechanisms for engagement, cooperation and collaboration. Both Co-leads will conduct projects in all of the thematic areas including: 1) vaccines; 2) detection; 3) diagnostics; 4) modeling and simulation; and 5) education and training.

Each center will utilize a consensus-based methodology for scientific leadership and administration. The Centers will apply this methodology to foster a multi-institutional, multi-disciplinary cadre of outstanding scientists whose parent institutions provide leveraging of DHS resources in implementing the mission of the individual centers.

e. Customers/Stakeholders and the Homeland Security Biodefense Complex

The Centers will integrate and collaborate with other members of the Homeland Security Enterprise. As a part of this network, members of the Centers will actively engage partners in DHS S&T, other DHS directorates (OHA and IP), the USDA APHIS Emergency Operations, National Veterinary Stockpile, National Animal Health Laboratory Network (NAHLN), the bioforensic community, the veterinary biologics industry and other customers/stakeholders.

The Centers will engage customers and stakeholders (Figure 1) throughout all phases of translational product development. We will establish and maintain effective liaisons with the customer/stakeholder community and conduct and/or participate in joint planning sessions with partners, customers and stakeholders. Strategic planning with stakeholders is enabled through liaison with the DHS S&T Chem-Bio Division.

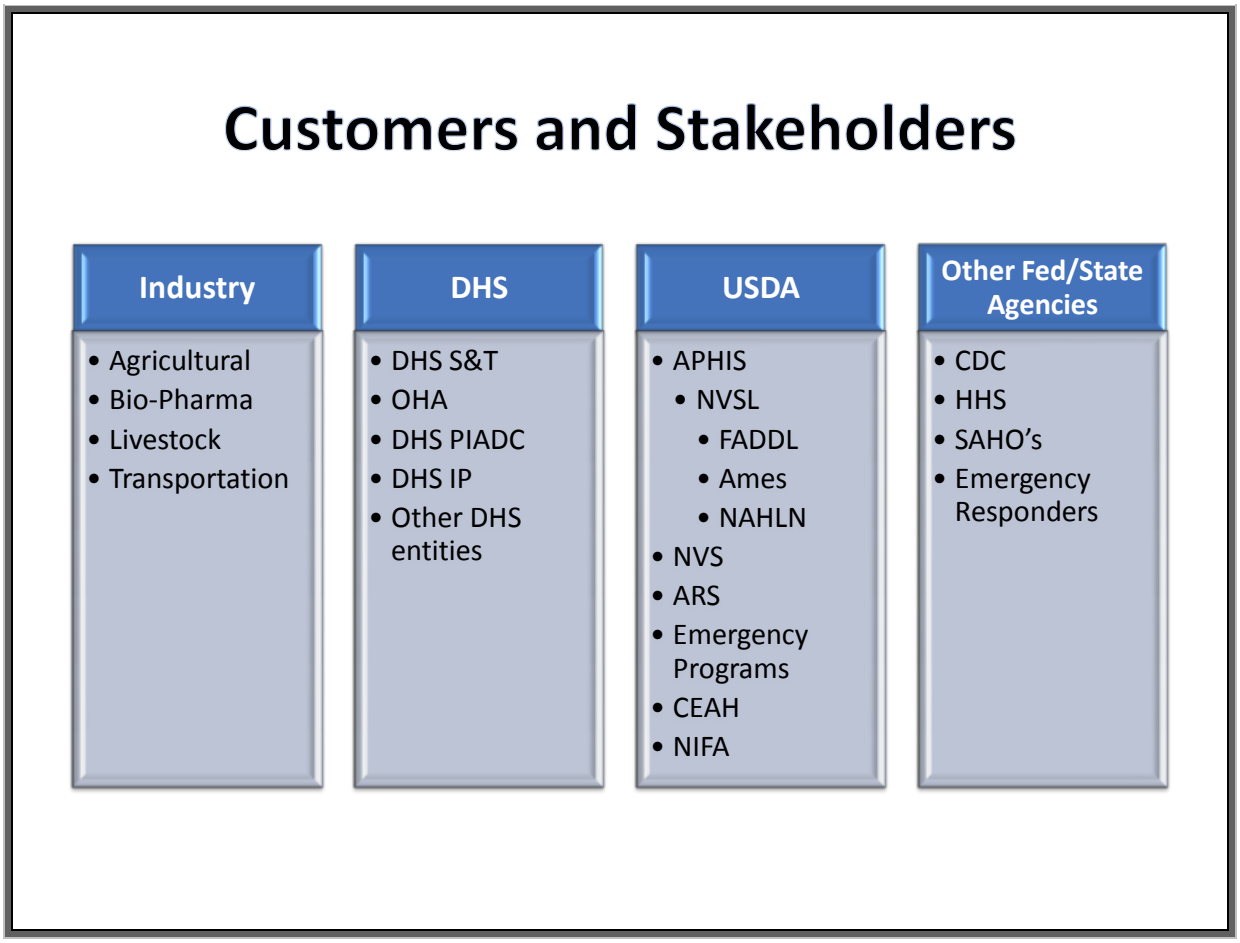

Figure 1: Center Customers and Stakeholders

II. STRATEGIC GOALS AND OBJECTIVES

The Strategic Goals and Objectives outlined in this plan are closely aligned and consistent with the priorities outlined in HSPD 9 and 10 as well as other working group documents that address high consequence animal disease threats.[1,2,3]

a. Centers of Excellence Goals

Goal 1: To be the leader in providing innovative, 21st century technology-based cutting-edge solutions, capacity, expertise and reach-back capabilities for high consequence disease threats facing the agricultural community.

Objective 1: Expand basic research to enhance scientific knowledge of foreign animal, emerging and/or zoonotic diseases

Objective 2: Develop, validate and transition to industry partners and/or other customer/stakeholders robust countermeasures for foreign animal and emerging animal diseases

Objective 3: Develop, document and verify epidemiologic and economic models for foreign animal emerging and/or zoonotic diseases of agricultural importance

Objective 4: Convene national/international symposiums and appropriate subject matter expertise to address topics critical for preparing, responding and recovering from a high consequence, emerging and/or zoonotic disease event

Goal 2: To be the national / international resource for information, knowledge, education, and policies on high consequence foreign animal, emerging and/or zoonotic diseases

Objective 1: Maintain a multi-disciplinary team of scientists and experts, as well as industry partners readily available for reach-back capacity

Objective 2: Establish and maintain linkages to national and international animal health organizations, world reference laboratories and national and international scientists and experts

Goal 3: To be the leader in providing education, knowledge exchange, networking and outreach to the next generation of homeland security professionals, paraprofessionals, private sector and industry.

Objective 1: Develop, implement and transition sustainable education and outreach programs targeted at all levels of education and/or outreach (K-12, formal education, private sector and commodity-specific) to enhance the resilience of US agricultural and public health sectors

Objective 2: Maintain a balanced education and outreach portfolio that reflects excellence in educational research, training and outreach

Objective 3: Facilitate diversity and career stability and choices in the homeland security workforce

Objective 4: Provide support for innovative, high-risk education-focused technological initiatives with the potential for achieving significant infrastructure protection

Goal 4: To leverage DHS funding for agrosecurity by obtaining grants, contracts and other financial sources to support the Center mission and activities.

Objective 1: Secure funding from external partners, agencies, and/or foundations through grants and contracts

Objective 2: Leverage funding from public health agencies to address foreign animal emerging and/or zoonotic disease threats of agricultural importance

b. Description of Goals and Objectives

***Goal 1:* To be the leader in providing innovative, 21st century technologically-based cutting-edge solutions, capacity, expertise and reach-back capabilities for high consequence animal disease threats facing the US agricultural community.**

The Centers will lead efforts to provide state-of-the art 21st century technologically based innovative, solutions for high consequence animal disease threats. Basic research efforts will expand and enhance the scientific knowledge of foreign animal, emerging and/or zoonotic disease ecology, detection, transmission, host-pathogen interactions, vector competencies, genetic resistance and the interactions that may occur between disease agents, wildlife and domesticated livestock. Through these efforts, scientist will be working to discover new targets and/or mechanisms that can be utilized to develop the next generation of countermeasures (vaccines, diagnostics and therapeutics) for early detection, identification, control and eradication of foreign animal, emerging and/or zoonotic diseases.

The Centers will be the leader in developing well documented, reliable epidemiologic and economic models for foreign animal and zoonotic diseases. These models will be utilized to study disease spread, the effects of policy decisions, sector resiliency factors, and last but not least, to educate and train responders and decision makers.

Objective 1: Expand basic research to enhance scientific knowledge of foreign animal, emerging and/or zoonotic diseases. Studies include pathogenicity, genetic resistance, vector transmission, disease transmissibility and host-pathogen interactions on high consequence foreign animal, emerging and/or zoonotic diseases

Objective 2: Develop, validate and transition to industry partners and/or stakeholders robust countermeasures to counteract zoonotic diseases

Objective 3: Develop, document and verify epidemiologic and economic models for foreign animal emerging and/or zoonotic diseases of agricultural importance

Objective 4: Convene national/international symposiums and appropriate subject matter expertise to address issues critical for preparing, responding and recovering from a high consequence, emerging and/or zoonotic disease event

Goal 1			
Objectives	**Near Term**	**Mid-Term**	**Long Term**
1. Expand Basic Research	• Initiate and continue studies on genetic resistance, vector competency, disease transmissibility, and the role of wildlife in disease ecology	• Transition knowledge gained in basic research studies to models and countermeasure development	• Parameterize models with knowledge gained in basic research studies
2. Develop Robust Countermeasures	• Develop countermeasures to address prevention, detection, control and eradication of high consequence animal disease threats • Identify and validate requirements and utilization policies for countermeasures (i.e. vaccines, diagnostics, and therapeutics)	• Collaborate with federal and industry partners to continue the development and validation of viable countermeasures • Work with industry partners and regulatory and licensing agencies to ensure acceptance and licensure of countermeasure candidates	• Support commercialization of validated countermeasure candidates
3. Develop Models and Information Analysis Tools	• Build well documented, parameterized, reliable models for FMD and RVFV • Integrate modeling efforts with RAPIID and NimBios groups	• Enhance parameterization of models for RVF and FMD with subject matter expertise/panels • Incorporate biological knowledge gained through basic research into RVF and FMD models	• Utilize reliable models for training and education, examining policy decisions and control measures, and resiliency • Develop models that enhance the Centers “reach-back” capacity

4. Convene National and International Symposiums	• Establish priorities for symposium topics • Establish list of subject matter experts and target audience • Establish dates and locations	• Engage stakeholders/ customers and subject matter experts in symposiums • Publish proceedings and recommendations from symposium	• Work with federal and industry partners to address recommendations from national symposiums

Goal 2: **To be the national / international resource for information, knowledge, education, and policies on high consequence foreign animal, emerging and/or zoonotic diseases**

Objective 1: Maintain a multi-disciplinary team of scientists and experts, as well as industry partners readily available for reach-back capacity

Objective 2: Establish and maintain linkages to national and international animal health organizations, world reference laboratories and national and international scientists and experts

Goal 2			
Objectives	**Near Term**	**Mid-Term**	**Long Term**
1. Maintain Reach-back Capacity	• Maintain and extend current team of scientists and experts in foreign animal, emerging and/or zoonotic diseases • Expand "Reach-back" capacity	• Enhance reach-back capacity through expansion of Centers' subject matter experts • Provide knowledge, data and decision tools upon request	
2. Establish and maintain national and international linkages/relationships	• Maintain current and establish new relationships and collaborations with national/ international animal health organizations, world reference laboratories and other subject matter experts	• Solidify national/international partnerships • Establish viable platforms to gain and share knowledge with national/international partners	

Goal 3: To be the leader in providing education, knowledge exchange, networking and outreach to the next generation of homeland security professionals, the private sector and industry.

Sustainable and effective education and outreach programs are vital for enhancing agricultural resilience, increasing diversity and providing a well-educated and trained 21st century Science, Technology, Engineering and Mathematics (STEM) workforce is critical for establishing the future Homeland Security (HS) workforce.

A wide variety of educational and/or outreach programs will be developed by the Centers. Minority serving institutions and underserved communities will be a focus of the Centers. Under-represented populations will be targeted for educational opportunities in homeland security.

Objective 1: Develop, implement and transition sustainable education and outreach programs targeted at all levels of education and/or outreach (K-12, formal education, private sector and commodity-specific) to enhance the resilience of the US agricultural and public health sectors

Objective 2: Maintain a balanced education and outreach portfolio that reflects excellence in educational research, training and outreach

Objective 3: Facilitate diversity and career stability and choices in the homeland security workforce

Objective 4: Provide support for innovative, high-risk education-focused technological initiatives with the potential for achieving significant infrastructure protection

Goal 3			
Objectives	**Near Term**	**Mid-Term**	**Long Term**
1. Establish sustainable Education and Outreach Programs	• Develop "One Health/One Medicine" programming content for K-12 students and their teachers • Target programs and organizations that already have the framework provided to incorporate HS-related curricula into the mission of their agency	• Expand the development and delivery of all programs initiated in the near term to additional groups/customers and individuals, with a special focus on the relevance of these programs to biological risk assessment and management • Provide national tracking capabilities of program metrics	
2. Develop a Balanced Education and Outreach portfolio	• Develop programs that increase enrollment in foreign animal and zoonotic disease courses and related disciplines • Deliver and assess outreach events	• Expand the program through external grant funding by DHS, NIH, NSF, USDA and other granting agencies and foundations	
3. Facilitate Diversity, and Career Stability and Choices the Homeland Security Workforce	• Increase minority students and MSIs in foreign animal emerging and zoonotic disease HS-STEM Career Development Programs • Link the homeland security workforce into newly developed web-based continuing education courses	• Develop a national program to escalate minority participation in One Health/One Medicine disciplines • Form and publicize a network of highest quality informational resources (K-12) • Refine educational materials and programs for MSIs	
4. Provide support for Innovative, High-risk Education -focused, Technological Initiatives	• Introduce Train-the-Trainer programs nationwide • Develop a Hispanic workforce curriculum • Write and distribute biosecurity publications for the backyard operators • Develop appropriate risk assessment and emergency response materials	• Form and support a sustainable national network of agricultural communicators for foreign, emerging and zoonotic diseases, and risk/crisis events • Create bilingual educational modules for industry workforce (dairy, pork, poultry) • Develop commodity-specific technology innovations • Train and educate minority workers on agricultural biosecurity practices	

Goal 3 continued: Partnerships with Minority Serving Institutions		
Near Term	**Mid-Term**	**Long Term**
• Extend and expand engagement with MSIs on research and education partnerships • Establish outreach programs for minority private sector operators • Continue scholarship and fellowship programs sponsored separately by OUP	• Deliver research, education and training products on foreign, emerging and zoonotic animal diseases through MSI – Center partnerships • Develop and deliver education and outreach modules for private sector minority operators • Encourage minority scientists to enter research and education careers in academia and industry with HLS interests and commitment	• Help MSI institutions to develop stand-alone programs on foreign animal and zoonotic defense and enduring partnerships across academia and government • Grow cadre of trained minority practitioners and scientists operating in academia, government and the private sector • Help minority operators become aware of foreign animal and emerging and zoonotic disease threats and become directly involved with planning, prevention and recovery strategies at state and national levels

Goal 4: **To leverage DHS funding for agro-security by obtaining grants, contracts and other financial sources to support the Center mission and activities.**

Objective 1: Secure funding from external partners and/or agencies through grants and contracts

Objective 2: Leverage funding from public health agencies to address emerging and zoonotic disease issues of agricultural importance.

Goal 4			
Objectives	**Near Term**	**Mid-Term**	**Long Term**
1. Secure funding from external partners/ agencies through grants and contracts	• Identify and submit to funding opportunities	• Expand proposal submittals and leverage funding through DHS and/or other external funds • Develop co-submission of proposals by FAZD Center and CEEZAD members	
2. Increase Public Health Funding	• Identify sources of funding for projects relating to “One Health/One Medicine” and/or zoonotic diseases of importance • Submit proposals for funding	• Expand proposal submissions and leverage previously awarded funding	

III. SUMMARY

In summary, the Center for Zoonotic and Animal Disease (Co-Led by the FAZD Center and CEEZAD) will be a national resource for foreign animal, emerging and zoonotic diseases, providing reach-back capability and performing cutting-edge research and countermeasure develop to enhance agricultural resiliency.

[1] A Comprehensive Strategy to Combat Agro-Terrorism, Report to Congress, US Department of Homeland Security Science & Technology Directorate, 2005

[2] Protecting against High Consequence animal Diseases: Research and Development Plan 2008-2012, Subcommittee on Foreign Animal Disease Threats, Committee on Homeland and National Security, National Science and Technology Council, 2007.

[3] The Office of Science and Technology Policy Blue Ribbon Panel on The Threat of Biological Terrorism Directed Against Livestock. Conference Proceedings. Washington, DC. December 8-9, 2003. CF-193-OSTP, March 2004.