



Food and Agriculture Defense Initiative: A Meeting of Networks

June 12-13 2012

USDA-NIFA Waterfront Centre Room 1410

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Presentation Outline

1. ARS Organization
2. U.S National Veterinary Stockpile
3. Gap Analyses
4. International Collaborations

ARS Mission

“Our mission is to conduct research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to . . .”



ARS Animal Health Research Locations

Pullman, WA

Clay Center, NE

East Lansing, MI

Manhattan, KS*

Ames, IA*

Orient Point, NY*

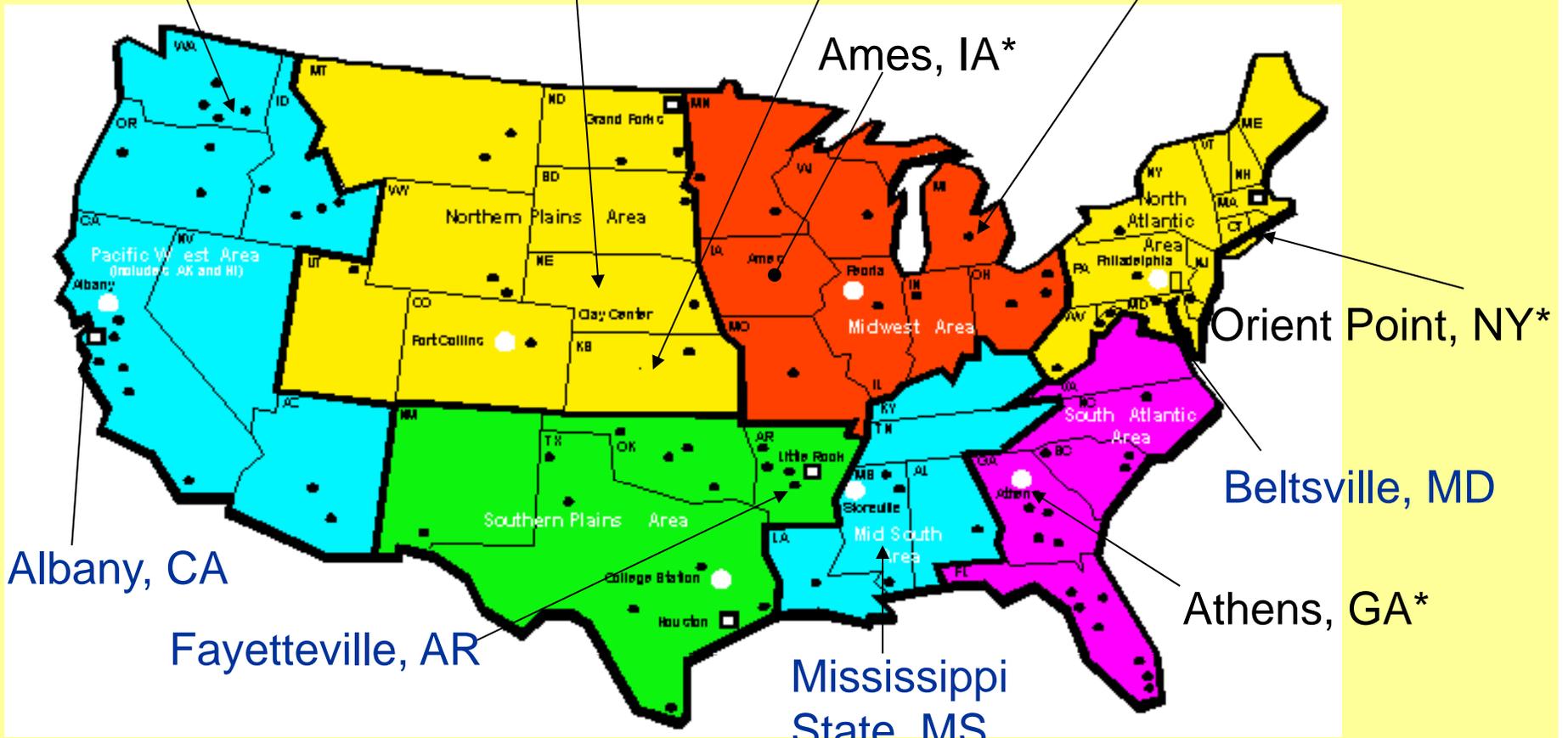
Beltsville, MD

Athens, GA*

Mississippi State, MS

Albany, CA

Fayetteville, AR



*Biodefense research

National Animal Health Program Number of ARS Scientists

- FY 2007 – 124
- FY 2008 – 118
- FY 2009 – 104
- FY 2010 – 100
- FY 2011 – 100

Animal Health Strategic Objectives

1. Establish animal disease research programs that integrate basic and applied research into flexible, fluid, and effective research networks that delivers solutions to problems of high national priority
2. **Access to specialized high containment facilities to study foreign, emerging, or zoonotic animal diseases**
3. Develop integrated animal and microbial genomics research program
4. Establish excellence in animal immunology research
5. Launch biotherapeutic discovery research programs providing alternatives to animal drugs
6. **Build technology-driven diagnostic and vaccine discovery research programs**
7. Develop core competencies in field epidemiology and predictive biology
8. Establish international research collaborations
9. Establish best in class training centers for veterinarians and scientists
10. **Develop model technology transfer programs to achieve the full impact of research discoveries**

2003 Rapid Diagnostics Initiative

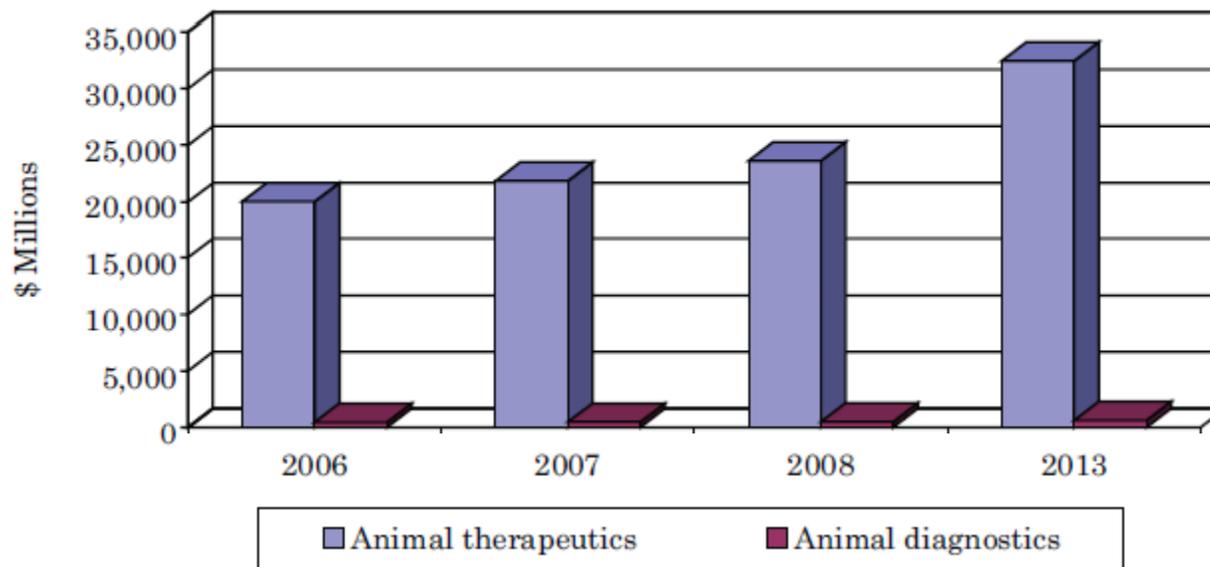
- \$18.3 M from U.S Secretary of Agriculture
- Detection of plant and animal diseases
- Formation of a bioinformatics database

U.S National Veterinary Stockpile

Homeland Security Presidential Directive Nine (HSPD-9) of January 30, 2004, Section 18(a) calls for the development of a “National Veterinary Stockpile (NVS) that shall contain sufficient amounts of animal vaccine, antiviral, or therapeutic products to appropriately respond to the most damaging animal diseases affecting human health and the economy and that will be capable of deployment within 24 hours of an outbreak.

Diagnostic Market

SUMMARY FIGURE
 TOTAL ANIMAL THERAPEUTIC AND DIAGNOSTIC MARKET BY MAJOR
 SEGMENT, 2006-2013
 (\$ MILLIONS)



Source: BCC Research

OIE Code: List of Diseases

- FOOT AND MOUTH DISEASE
- VESICULAR STOMATITIS
- SWINE VESICULAR DISEASE
- RINDERPEST
- PESTE DES PETITS RUMINANTS
- CONTAGIOUS BOVINE PLEUROPNEUMONIA
- LUMPY SKIN DISEASE
- RIFT VALLEY FEVER
- BLUETONGUE
- SHEEP POX AND GOAT POX
- AFRICAN HORSE SICKNESS
- AFRICAN SWINE FEVER
- CLASSICAL SWINE FEVER (HOG CHOLERA)
- HIGHLY PATHOGENIC AVIAN INFLUENZA (FOWL PLAGUE)
- NEWCASTLE DISEASE
- ANTHRAX
- AUJESZKY'S DISEASE
- ECHINOCOCCOSIS/HYDATIDOSIS
- LEPTOSPIROSIS
- RABIES
- PARATUBERCULOSIS (JOHNE'S DISEASE)
- HEARTWATER
- SCREWWORM
- CONTAGIOUS EQUINE METRITIS
- DOURINE
- EQUINE ENCEPHALOMYELITIS (EASTERN & WESTERN)
- EQUINE INFECTIOUS ANAEMIA
- EQUINE INFLUENZA
- EQUINE PIROPLASMOSIS
- EQUINE RHINOPNEUMONITIS
- GLANDERS
- EQUINE VIRAL ARTERITIS
- MANGE
- VENEZUELAN EQUINE ENCEPHALOMYELITIS
- EPIZOOTIC LYMPHANGITIS
- JAPANESE ENCEPHALITIS

- BOVINE BRUCELLOSIS
- BOVINE GENITAL CAMPYLOBACTERIOSIS
- BOVINE TUBERCULOSIS
- ENZOOTIC BOVINE LEUKOSIS
- INFECTIOUS BOVINE RHINOTRACHEITIS/INFECTIOUS PUSTULAR VULVOVAGINITIS
- TRICHOMONOSIS
- BOVINE ANAPLASMOSIS
- BOVINE BABESIOSIS
- CYSTICERCOSIS
- DERMATOPHILOSIS
- THEILERIOSIS
- HAEMORRHAGIC SEPTICAEMIA
- BOVINE SPONGIFORM ENCEPHALOPATHY
- OVINE EPIDIDYMITIS (BRUCELLA OVIS)
- CAPRINE AND OVINE BRUCELLOSIS (EXCLUDING BRUCELLA OVIS INFECTION)
- CONTAGIOUS AGALACTIA
- CAPRINE ARTHRITIS/ENCEPHALLITIS & MAEDI-VISNA
- CONTAGIOUS CAPRINE PLEUROPNEUMONIA
- ENZOOTIC ABORTION OF EWES (OVINE CHLAMYDIOSIS)
- ATROPHIC RHINITIS OF PIGS
- PORCINE BRUCELLOSIS
- TRICHINELLOSIS
- ENTEROVIRUS ENCEPHALOMYELITIS (PREVIOUSLY TESCHEN/TALFAN DISEASES)
- TRANSMISSIBLE GASTROENTERITIS
- INFECTIOUS BURSAL DISEASE (GUMBORO DISEASE)
- MAREK'S DISEASE
- AVIAN MYCOPLASMOSIS (MYCOPLASMA GALLISEPTICUM)
- AVIAN CHLAMYDIOSIS
- FOWL TYPHOID AND PULLORUM DISEASE
- AVIAN INFECTIOUS BRONCHITIS
- AVIAN INFECTIOUS LARYNGOTRACHEITIS
- AVIAN TUBERCULOSIS
- DUCK VIRUS HEPATITIS
- DUCK VIRUS ENTERITIS
- FOWL CHOLERA (AVIAN PASTEURELLOSIS)

Emerging Diseases

(and re-emerging diseases)

Human

- HIV/AIDS
- Ebola*
- Hantaan
- Legionaire's disease
- BSE*
- SARS*
- Dengue
- West Nile*
- Nipah virus*
- Rift Valley Fever*
- Chikungunya virus
- H5N1 AI*
- pandemic H1N1

Animal

- BSE*
- CWD
- West Nile*
- Foot-and-Mouth Disease
- Classical Swine Fever
- Blue Ear Pig Disease
- Rift Valley Fever*
- Avian Influenza*
- Nipah and Hendra*
- Bluetongue
- African Swine Fever
- African Horse Sickness
- pandemic H1N1**

* Zoonoses **Reverse Zoonosis

List of 17 Most Damaging Animal Disease Threats



Under
Review

1. Highly Pathogenic AI (F)
2. Foot-and-Mouth Disease
3. Rift Valley fever (F)
4. Exotic Newcastle Disease
5. Nipah and Hendra virus (F)
6. Classical swine fever
7. African swine fever
8. Bovine spongiform encephalopathy (F)
9. Rinderpest
10. Japanese encephalitis (F)
11. African horse sickness
12. Venezuelan equine (F) encephalitis
13. Contagious bovine pleuropneumonia
14. Ehrlichia ruminantium (Heartwater)
15. Eastern equine encephalitis (F)
16. Coxiella burnetii (F)
17. Akabane virus

F: Potentially fatal to humans

Gold text: FBI pathogens of Concern

U.S National Veterinary Stockpile Workshops

- Gap analysis of scientific information
 - Countermeasures assessment
 - Recommendations for research and stockpile
-
- Rift Valley Fever – Pasteur Institute, France
 - Avian Influenza – ARS, Washington D.C, United States
 - Foot-and-Mouth Disease – INTA, Argentina
 - Newcastle Disease – SEPRL, Athens, GA, United States
 - Nipah virus – AAHL, Australia
 - Classical Swine Fever – EU CSF, Germany
 - African Swine Fever – INIA, Spain

FMD Gap Analysis

International FMD Expert Panel

1. **Surveillance**
 - 1.1 Clinical diagnosis
 - 1.2 Tests to detect infected animals
2. **Response**
 - 2.1 Tests in the early stages of an outbreak
 - 2.2 Tests for vaccine matching
 - 2.3 Tests for early and sustained response
 - 2.4 Tests to detect infected animals
 - 2.5 Assays for detection of FMDV exposed animals
3. **Recovery**
 - 3.1 Tests to demonstrate absence of infection
 - 3.2 Tests to differentiate infected from vaccinated animals (DIVA tests)
 - 3.3 Tests to monitor herd immunity
 - 3.4 Tests to detect carrier animals
4. **Post-outbreak surveillance**
 - 4.1 Tests to enable confirmation of freedom from disease after a FMDV outbreak

FMD Diagnostic Gaps

- Diagnostic test kits that can be used during each phase of the outbreak
- Tests to rapidly detect cases in the field
- On-farm screening test for detection of FMDV in dairy holdings to allow movement of milk
- Pen-side tests that can be strategically distributed to trained veterinarians in the field and that includes a central reporting system
- Pen-side tests or mobile screening assays for rapid detection and surveillance in the surrounding quarantine zones

FMD Diagnostic Gaps

- Robust laboratory and field tests to determine infection in vaccinated animals (DIVA)
- Reagents for assays that are pre-determined to be “fit for purpose” and validated
- There is a need to increase the testing capability of the National Animal Health Laboratory Network (NAHLN) with high throughput semi-automated robotic systems that are readily deployable

Office of Science and Technology Policy

Subcommittee on Foreign Animal Disease Threats

Subcommittee on FADT

Subcommittee on Foreign Animal Disease Threats Leadership

Co-Chairs: Dr. Michelle Colby (DHS S&T), Dr. Steven Kappes (USDA ARS)

Membership:

- U.S. Department of Agriculture
- Department of Defense
- Department of Health and Human Services
- Department of Homeland Security
- Department of Interior
- Department of State
- Environmental Protection Agency
- National Science Foundation

Representation from the Executive Office of the President

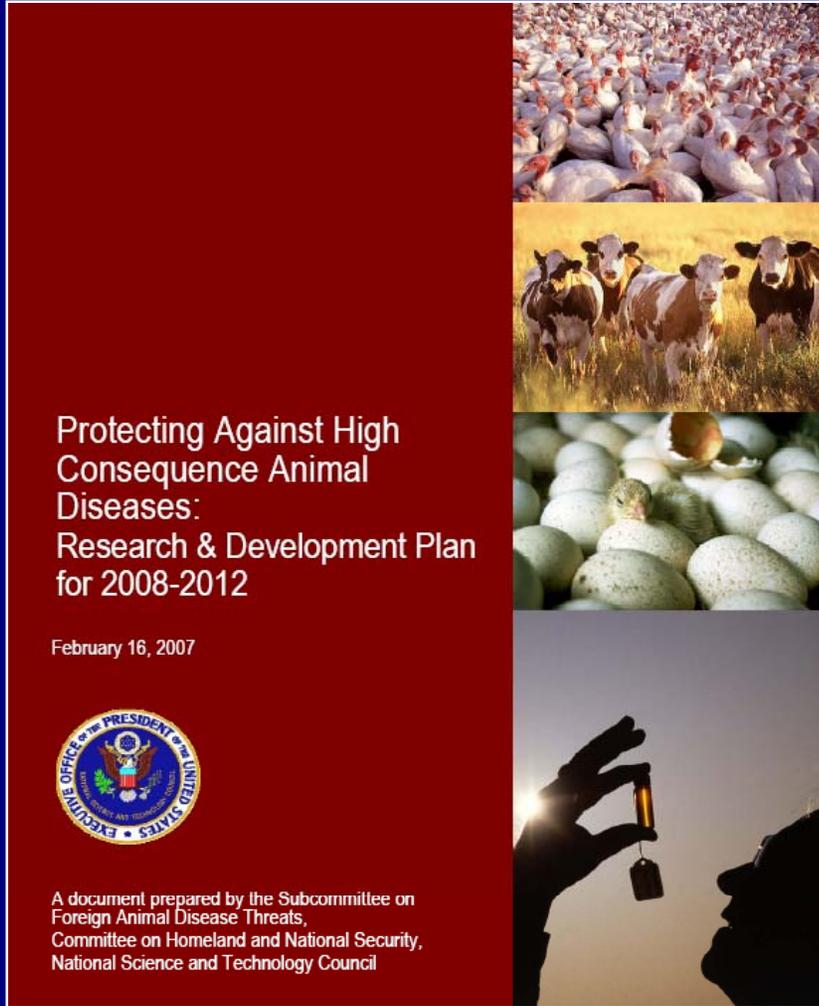
- Office of Science & Technology Policy
- Homeland Security Council
- Office of Management and Budget
- Office of the Vice President

Subcommittee on FADT

Accomplishments

Published 5 year R&D strategy

*“Protecting Against High
Consequence Animal Diseases:
Research & Development Plan for
2008 – 2012”*



The image shows the cover of the report titled "Protecting Against High Consequence Animal Diseases: Research & Development Plan for 2008-2012". The cover has a dark red background. On the right side, there is a vertical strip of four images: a large flock of white chickens, a group of brown and white cows in a field, a close-up of several white eggs, and a silhouette of a person's hand holding a small vial against a bright light. The text on the cover includes the title, the date "February 16, 2007", the seal of the Executive Office of the President of the United States, and the text "A document prepared by the Subcommittee on Foreign Animal Disease Threats, Committee on Homeland and National Security, National Science and Technology Council".

Protecting Against High
Consequence Animal
Diseases:
Research & Development Plan
for 2008-2012

February 16, 2007



A document prepared by the Subcommittee on
Foreign Animal Disease Threats,
Committee on Homeland and National Security,
National Science and Technology Council

Prioritization activities

5-year R&D plan

- Modeling
- Veterinary Countermeasures
 - Vaccines
 - Diagnostics
- Decontamination & Disposal
- Basic Research
 - Ecology
 - Immunology
 - Pathology
 - Genomics
 - Microbiology

Research Priorities Assessment

- NVS priority diseases
 - Foot-and-Mouth Disease
 - Avian Influenza
 - Classical Swine Fever
 - Nipah Virus
 - African Swine Fever
- Steps to be completed for these diseases
 - Gap analysis
 - Report to NVS Steering Committee
 - Research priorities assessment
- Research and Development Plan for 2012-2016

Global Foot-and-Mouth Disease Research Alliance



Global Foot-and-Mouth Disease (FMD)
Research Alliance



Home

General Information

Meetings & Events

Membership

- Members
- Associates
- Collaborators
- Membership Options

Research Projects

Publications

GFRA Presentations

FMD Resources

Contact

VISION OF GFRA

A coordinated global alliance of scientists producing evidence and innovation that enables the progressive control and eradication of FMD.

MISSION OF GFRA

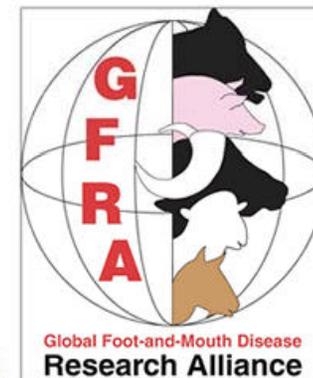
To establish and sustain global research partnerships to generate scientific knowledge and discover the tools to successfully prevent, control and eradicate FMD.

PROGRAMS OF GFRA

GFRA aims to expand FMD research collaborations worldwide and maximize the use of resources and expertise to achieve its five strategic goals (see below).

Several research programs are currently active in Europe, North America, South America and South-East Asia. GFRA programs will continue to expand the alliance in these areas and will actively reach out to new areas of the world that have a stake in the progressive control and eradication of FMD.

STRATEGIC GOALS OF GFRA



<http://www.ars.usda.gov/GFRA/>

DOS Biological Engagement Program

- Cooperative biological research projects
 - Research topics include FMD, ASF, CSF, Avian Influenza, Newcastle disease, Rift Valley Fever, Brucella,
 - Pakistan, India, South Africa, Philippines, Indonesia, Vietnam, Kenya, Egypt, Yemen, Russia, Georgia, Kazakhstan, Kyrgyzstan
- International workshops
- Training
 - Diagnostic techniques for Newcastle disease, Avian influenza
 - Participants from Middle East, Southeast Asia, Central Asia and Caucasus
 - Biological safety and security (Pakistan)

Conclusion

1. ARS Organization
2. U.S National Veterinary Stockpile
3. Gap Analyses
4. International Collaborations

Thank you!



Global Foot-and Mouth Disease Research Alliance (GFRA)

2008 Executive Committee Meeting

May 20th - 21st 2008