Texas Veterinary Medical Diagnostic Laboratory

DHS University Summit
Biological Systems for Foreign Animal and Zoonotic Diseases

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TVMDL: Who We Are

• State agency dedicated to providing veterinary diagnostic services to the citizens of Texas

• Service-based organization
  – Backbone of Texas animal and emerging/zoonotic disease surveillance program
  – 2008-1.4 million tests

• Facilities and staff at four locations throughout the state: Staff: 155

• National Animal Health Laboratory Network Lab
  - One of twelve core members of National Animal Health Laboratory Network Laboratories (NAHLN)
  - BSL-3 capacity
    ✓ Surveillance (BSE, bird flu, chronic wasting disease)
TVMDL Mission

• Promote animal health and protect agricultural, companion animal and public health interests in Texas and beyond, by providing excellence in veterinary diagnostic services:
  ➢ Provide veterinary medical diagnostic services to the citizens of Texas
  ➢ Reduce costs and suffering associated with animal diseases
  ➢ Contribute to an animal and zoonotic disease surveillance system
  ➢ Respond to potential high consequence and/or emerging/zoonotic disease events
  ➢ Contribute to the benefits of healthy human/animal interactions
Founding Principles and Features of NAHLN

- Standardized, rapid diagnostic techniques
- Trained personnel, modern equipment
- Quality standards, proficiency testing
- Secure communication, alert, reporting system
- Adequate facility biosafety/biosecurity levels
- Scenario testing
NAHLN

Mission

• Provide accessible, timely, accurate, and consistent animal disease laboratory services nationwide
• Provide laboratory data to meet epidemiological and disease reporting needs
• Maintain the capacity and capability to provide laboratory services in support of responses to foreign animal disease outbreaks or other adverse animal health events
• Focus on diseases of livestock (exotic, zoonotic, and emerging diseases)

Key Elements

• Capability and capacity to conduct nationwide surveillance, surge and recovery testing for an animal disease outbreak
• Secure communication, alert, and reporting systems
• National training, proficiency testing, and quality assurance
• Modern equipment and experienced personnel
Major Livestock Production Region
Laboratory Surge Capacity and Other Challenges

• **Challenges:**
  – Supporting surveillance zone testing, large demand for laboratory surge capacity
    • Early detection/directly linked to controlling the spread
  – Surveillance, response *and* recovery
    • High throughput analysis, reproducible assays
  – Testing for movement control/stop/permitting
    • “Point of care” diagnostics?
    • Permitting movement to slaughter/home?
  – Readily available reagents
  – DIVA vaccines and companion diagnostics
The Road Ahead: Challenges and Technological Needs

- **Technologies of the Future**
  - Lab-based technologies
    - Early detection and characterization of newly emerging diseases/strains
    - High-throughput (HTP) Capability
  - “Field” Based Detection Technologies
    - “Point of Care” Diagnostics
New Assay Formats/Technology Requirements

- **Performance**
  - Limit of Detection
  - Ability to identify strain/serotype

- **Speed**
- **Scalability**
- **Cost**
- **Reliability**
- **Quality**, readily available reagents

Assay Sensitivity
Assay Specificity
Diagnostic windows

What are we trying to do?

1. Rapid confirmation of clinical signs
2. Active surveillance for infected animals (including pre-clinical cases)
3. Sero-surveillance for FMDV exposed animals

Representative “in contact” cattle data from Alexandersen et al., 2003 and unpublished data from IAH
FAZD Center
Development/Technology Transfer

- **Tools for early detection, surge and recovery testing**
  - **NAHLN**
    - High-throughput surge-capacity robotic diagnostic tests
      - FMD replicons-mass scale ELISA for use in recovery
      - FMD and RVF
      - Readily available, reproducible reagents
    - Improved H5 ELISA and fluorescent microsphere based multiplex diagnostics
      - Efficient sub-typing of AI
      - 384 well format for surge response
      - Competitive ELISA
  - DIVA technologies
FAZD Center
Development/Technology Transfer
FAZD Center
Development/Technology Transfer

• “Point of Care” Diagnostics
  – Movement control
  – Preliminary premise diagnosis
FAZD Center/NAHLN Laboratory Collaboration

- **FAZD Center**
  - discovery/development of new technologies
  - Addressing all stages, technological requirements of disease response

- **NAHLN laboratory**
  - validation of assays
    - Aid in transfer of technology/CVB approval package
    - Negative cohort testing
      - Assay specificity
    - Validation of standard operating procedures
Summary

- FAZD Center work critical in developing and transfer of novel technologies that can be utilized in “field” and in the NAHLN laboratory
  - Technologies that address stages of disease surveillance, response and recovery
- NAHLN laboratories can play significant role in feasibility, validation and licensing studies
Ultimately it is all about “Business Continuity”-Getting our producers and the industry “back in the business” of feeding the nation and the world
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