NAHEMS GUIDELINES:
INFORMATION MANAGEMENT

FAD PReP
Foreign Animal Disease Preparedness & Response Plan

USDA

United States Department of Agriculture

United States Department of Agriculture • Animal and Plant Health Inspection Service • Veterinary Services

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The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines provide a framework for use in dealing with an animal health emergency in the United States.

This FAD PReP/NAHEMS Guidelines are under ongoing review. This draft document was last updated **May 2014**. Please send questions or comments to:

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PREFACE

The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines provide the foundation for a coordinated national, regional, State, and local response in an emergency, complementing non-Federal preparedness activities. These guidelines may be integrated into preparedness plans of other Federal agencies, State and local agencies, Tribal Nations, and additional groups involved in animal health emergency management.

ADDITIONAL APHIS DOCUMENTS

Several key Animal and Plant Health Inspection Service (APHIS) documents complement the *NAHEMS Guidelines: Information Management* and provide further details. These documents include the following:

- U.S. Department of Agriculture (USDA) APHIS Veterinary Services (VS) Information Technology Roadmap
- USDA APHIS NS National Veterinary Services Laboratories (NVSL) Strategic Plan
- *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0)
- *APHIS Foreign Animal Disease Framework: Response Strategies* (FAD PReP Manual 2-0)
- Foreign Animal Disease Response Ready Reference Guide
  - Introduction to the Emergency Management Response System (EMRS) 2
  - Understanding the EMRS 2 Interface
- FAD PReP Standard Operating Procedures
  - 7. Communications

These documents are available on the Inside APHIS site for APHIS employees, at http://inside.aphis.usda.gov/vs/em/fadprep.shtml, and at http://www.aphis.usda.gov/fadprep.

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National Animal Health Emergency Management System

USDA

Guidelines: Information Management

1. INTRODUCTION

Foreign animal diseases (FADs) are considered a threat to animal health, food security, the economy, and potentially, public health and the environment. Because animal disease incidents vary widely in size and scope, Veterinary Services (VS) requires information management (IM) or information technology (IT) systems that are flexible and scalable to different data requirements. IM systems used by VS, Animal and Plant Health Inspection Service (APHIS), facilitate the collection, management, reporting, analysis, and dissemination of critical emergency response information and give emergency responders access to accurate and timely data needed for decision making.

Critical response information such as tracing, diagnostics, and premises designations are likely to be entered daily into an IM system. All personnel, including those in the field, should have access to mobile devices necessary for collecting and monitoring information.

1.1 Purpose & Scope of Document

This document gives users information about APHIS IT systems that can be used in the event of an FAD/Emerging Disease Incident (EDI) outbreak. These systems work together to provide accurate and timely information to responders, decision-makers, and stakeholders.

This document does not provide guidance or instructions on how to use each information management system. This document provides an overview of the key IM systems that would be used in an animal health incident.

1.2 Goals of an FAD Outbreak Response

IM activities are a critical component of a response effort. The three goals of an FAD outbreak response are as follows:

To (1) detect, control, and contain the FAD in animals as quickly as possible; (2) eradicate the FAD using strategies that seek to stabilize animal agriculture, the food supply, and the economy, and to protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate COB for non-infected animals and non-contaminated animal products.

Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain FAD-free status without the response effort causing more disruption and damage than the disease outbreak itself.

Please see Appendix B for more information on the imperative for FAD preparedness and planning.

1.3 Goals for Information Management Activities

1.3.1 Preparedness Goals

The preparedness goals for IM are to

- ensure that local, State, Tribal, and Federal IM systems are compatible for sharing data and information;
- identify gaps or weaknesses in current IM systems during a large-scale FAD outbreak for communicating incident goals and objectives, status reports, tracing information, premises status information, diagnostic results, epidemiology reports, permits for movement, and resource information; and
- improve capabilities for IM for a large-scale or complex outbreak.

1.3.2 Response Goals

The response goals are to

- perform Emergency Management Response System (EMRS) 2.0 data entry processes or information downloads in 24-hour intervals, or as requested by Incident Command.
- effectively communicate incident goals and objectives, status reports, tracing information, premises status information, diagnostic results, epidemiology reports, permits for movement, and resource information.

1.4 Responsibilities & Procedures

A good IM plan is necessary for ensuring robust IT systems are readily available to responders during FAD/EDI outbreaks. During an FAD/EDI, it is important that these systems are functioning and appropriately integrated.

1.4.1 Coordination

Continuous coordination must occur between the National Preparedness and Incident Coordination (NPIC) Center, Districts, Program Staff, States, VS Field Staff, APHIS, and external stakeholders, such as universities and industry groups.

1.4.2 Incident Command System (ICS)

The National Incident Management System (NIMS) provides a systematic, consistent approach for Federal, State, Tribal, and local governments and other responders to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. At the center of NIMS is the Incident Command System (ICS). ICS is designed to bring multiple responding agencies, including those from different jurisdictions, together under a single overall command structure for incident response.

During a response, the roles of IT personnel will vary depending on the incident and may also vary during an incident, based on the size, duration, and complexity of the incident. Large scale incidents may involve multiple premises and may cover large areas. The command structure and positions below are provided as guidance.

Under the ICS, IM duties and responsibilities extend across several layers of organizational responsibility. For disease data management efforts, the Situation Unit, Disease Management Branch, Disease Surveillance Branch, and Disease Support Branch maintain IM systems to ensure timely disease data entry, and accessibility to disease data. To support these systems, the IT Unit Leader, Logistics Section, is responsible for most IT and supplying technical support. IM systems are also used in external and internal communications. Please see Appendix C for an example of the ICS structure.

1.4.3 Confidentiality

USDA APHIS VS complies with all Federal requirements, rules, and regulations to keep information secure and confidential.

1.4.4 Materials, Supplies, and Equipment

Responders, both at headquarters and in the field, must have the technological resources to collect, retrieve, assess, and transfer disease-specific information quickly. However, during emergency situations, responders may not have access to the equipment needed to process, collect, or retrieve valuable information. If possible, responders should have with them a government-issued laptop with the VS image (includes a VPN connection, Microsoft Office, and Microsoft Outlook) that also allows the responder to log in with their Linc Pass. Additionally, electronic-authentication (E-Auth) can be used to access VS IT systems with a username and password, particularly for responders working without a VS laptop.

1.4.5 Continuity of Operations

VS is currently developing a continuity of operations (COOP) plan that focuses on those IM systems that need to be recovered within 12 hours. A priority of VS is to maintain and support these systems to ensure proper and efficient collection and transfer of information during an FAD/EDI. A COOP plan is a critical coordination piece and must be taken into account when working with any IM application, function, system, or hardware.

2. AUTHORITIES

The Code of Laws of the United States of America (U.S.C.) and the Code of Federal Regulations (CFR) are codified authorities representing different stages of the legislative process. The U.S.C. provides the general and permanent statutes of the United States, which are passed by Congress and signed by the President. Executive branch agencies then interpret the U.S.C., developing detailed regulations in the CFR. The CFR is developed through a public rulemaking process, where the public is allowed to comment. For more information, please see the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0).

In an FAD incident response, the U.S.C. and CFR provide policy, via statutes and regulations, for USDA; interim regulations can be implemented—in the event of an outbreak—to prevent the spread of disease.

2.1 USDA APHIS Authorities for Foreign Animal and Emerging Diseases

An FAD is a terrestrial animal disease or pest, or an aquatic animal disease or pest, not known to exist in the United States or its territories. An emerging animal disease is any terrestrial animal, aquatic animal, or zoonotic disease not yet known or characterized, or any known or characterized terrestrial animal or aquatic animal disease in the United States or its territories that changes or mutates in pathogenicity, communicability, or zoonotic potential to become a threat to terrestrial animals, aquatic animals, or humans. An FAD or emerging animal disease may involve livestock, poultry, other animals, and/or wildlife.

In the event of an FAD or emerging animal disease outbreak in domestic livestock that involves wildlife, USDA APHIS will work in close collaboration, communication, and coordination with State, Tribal and Federal wildlife agencies that have primary jurisdictional authority and subject matter expertise for wildlife.

For information on the procedures for an FAD investigation and specimen submission, including for Foreign Animal Disease Diagnosticians, please see VS Guidance Document 12001 (previously APHIS VS Memorandum 580.4) and the *Foreign Animal Disease Investigation Manual* (FAD PReP Manual 4-0).

2.1.1 Animal Health Protection Act

APHIS receives its permanent and general regulatory authority from the Animal Health Protection Act (AHPA), 7 U.S.C. 8301 *et seq*.

The AHPA enables the Secretary of Agriculture to prevent, detect, control, and eradicate diseases and pests of animals, including foreign animal and emerging diseases, in order to protect animal health, the health and welfare of people, economic interests of livestock and related industries, the environment, and interstate and foreign commerce in animals and other articles. The term "animal" means any member of the animal kingdom (except a human), 7 U.S.C. 8301-8302. The Secretary is specifically authorized to carry out operations and measures to detect, control, or eradicate any pest or disease of livestock, which includes poultry, 7 U.S.C. 8308, and to promulgate regulations and issue orders to carry out the AHPA (7 U.S.C. 8315). The Secretary may also prohibit or restrict the importation, entry, or interstate movement of any animal, article, or means of conveyance to prevent the introduction into or dissemination within the United States of any pest or disease of livestock (7 U.S.C. 8303-8305).

2.1.2 Code of Federal Regulations

Title 9 of the CFR provides detailed USDA APHIS administrative regulations for the control and eradication of animal diseases, including FADs and emerging animal diseases. Below are several key sections of the CFR to safeguard public health, animal health, animal products, interstate commerce, and international trade. Please refer to the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0) for more information:

- **9 CFR 71.2**
  - Secretary (of Agriculture) to Issue Rule Governing Quarantine and Interstate Movement of Diseased Animals, Including Poultry
- **9 CFR 71.3**
  - Interstate Movement of Diseased Animals and Poultry Generally Prohibited
- **9 CFR 53**
  - Foot-and-Mouth Disease, Pleuropneumonia, Rinderpest, and Certain Other Communicable Diseases of Livestock or Poultry
- **9 CFR 161**
  - Requirements and Standards for Accredited Veterinarians and Suspension or Revocation of Such Accreditation.

3. VS IT SYSTEMS

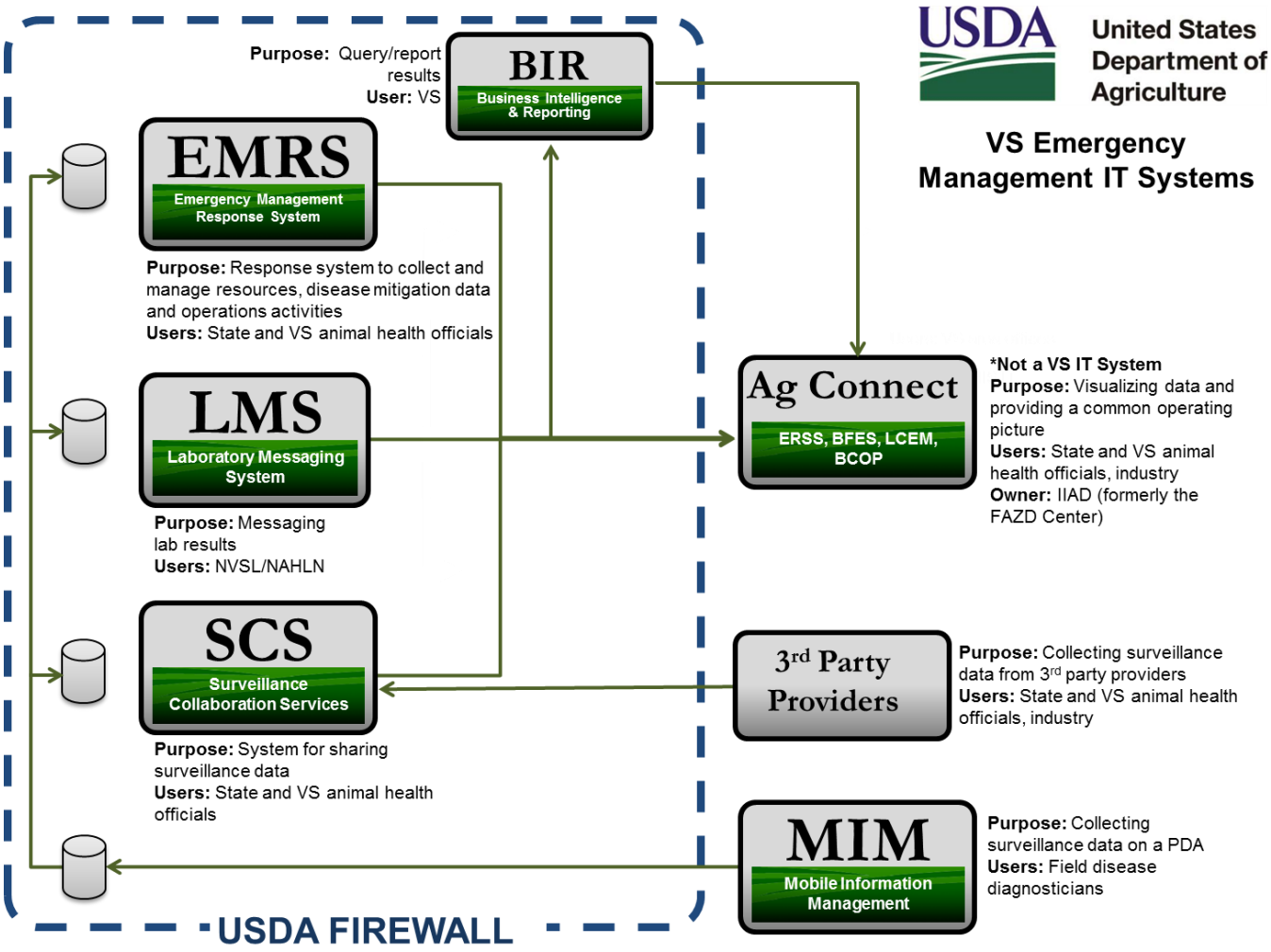
Within VS, there are a number of IT systems that would be available and used during an FAD outbreak (listed below). The VS Office of the Chief Information Officer (CIO) is responsible for developing, deploying, and supporting automated information systems that support the data management requirements of VS' national animal health program activities. VS maintains the following systems:

- EMRS 2.0
- Surveillance Collaboration Services (SCS)
- Laboratory Information Management System (LIMS)
- Laboratory Messaging System (LMS)
- Animal Disease Traceability Information System (ADTIS)
- Veterinary Services Process Streamlining (VSPS)
- National Veterinary Logistics System (NVLS)
- Business Intelligence & Reporting (BIR)
- Mobile Information Management (MIM)
- Licensing Serial Release and Testing Information System (LSRTIS)

Additionally, there are other IT systems which VS may access and use during an FAD incident that are not owned by VS. These are discussed later in the document.

Figure 1 illustrates on overview of key systems that are most frequently used for emergency response. The systems are then discussed in turn.

Figure 1. Conceptual Overview of VS Emergency Management IT Systems



3.1 Emergency Management Response System (EMRS) 2.0

EMRS was first developed in 2001, in conjunction with emergency management staff, VS laboratory officials, district and area officials, epidemiologists, and foreign animal disease diagnosticians. EMRS provides a manageable repository for storing disease surveillance data and FAD investigation data.

EMRS 2.0, which has recently been developed on the Microsoft Dynamics platform, is a secure, web-based application used by Federal, State, Tribal, and local animal health officials in reporting of routine investigations of suspected cases of an FAD; surveillance and disease control programs; State specific disease outbreaks; and national animal health emergency responses. EMRS is the foundation—and official system of record—for incident management in disease outbreaks or incidents.

The tracing capabilities of EMRS 2.0, and the ability to manage and report this information, are robust. For both intrastate and interstate movements, EMRS is used to trace animals with unique identification (ID), animals without ID, identifiable groups of animals, and items/objects that are involved with animal disease outbreaks. EMRS provides the structure and capabilities to trace animals, as well as to manage the disease mitigation activities (for example, testing, movement control, depopulation, etc.) associated with these animals. EMRS manages this information in a secure environment, which gives Incident Commanders and program managers the ability to evaluate tracing and associated activities, and assess the effectiveness of these activities on an incident, program, outbreak, or on a national basis. EMRS

the effectiveness of these activities on an incident, program, outbreak, or on a national basis. EMRS supports traceability through integration with other modules of the VS Animal Disease Traceability Information Systems.

There are four overarching business objectives for EMRS 2.0, which indicate the scope of this system, and the many ways it can be leveraged for IM. They are as follows:

- *Disease Management.* Premises management, animal management, investigations, tasking, specimen collection/submission, disease mitigation activity tracking, contact management, permits, movements, tracing, and disease data exchange.
- *Resource Management.* Inventory, order, track and manage all types of incident resources, including personnel, fleet, equipment, and supplies.
- *Knowledge Management.* Incident action plan and situation reports, standard operating procedures (SOPs), outreach and communication materials, and ICS forms.
- *Enterprise Reporting.* National, State, and local reports through multiple methods, including geographic information system (GIS) reporting, legacy data from EMRS 1.0, and current EMRS 2.0 data.

3.1.1 Functionality

The EMRS 2.0 is a web-based task management system. It employs a custom secure role protected interface built upon the Microsoft Dynamics platform. It uses a SQL server relational database to track investigations, general tasks, and manage resources. The investigation data are also available through a mapping interface, allowing the user to view real-time, high quality maps of outbreak areas, respond to patterns, and deliver the maps to decision makers, government institutions, and the public. EMRS performs the following:

- Automates many of the tasks associated with animal disease outbreaks and emergencies.
- Provides a secure accessible system for data collection, management, and analysis utilizing a web-based comprehensive investigation, task, and resource management suite and a universal information platform.
- Provides EMRS users (Federal, State, and Tribal Veterinary Medical Officers, Animal Health Officials, Animal Health Technicians, Animal Disease Specialists and Epidemiologists) a means to respond to animal disease outbreaks, routine surveillance of FAD/EDI and all-hazard animal incidents.

Data entered into EMRS can be exported for use with other applications, reporting, and data analysis. Please see Appendix A for an example of basic EMRS 2.0 workflow for an FAD investigation and an FAD outbreak.

3.1.2 Access and Use

Access to EMRS 2.0 is primarily for State and Federal animal health personnel who must complete an APHIS 513 form. The APHIS 513 form must be signed by the employee's supervisor or VS contact (for State employees). Please contact a local EMRS Network Associate or IT Specialist to complete and submit a 513. If you cannot locate this information, please email EMRS_Registration_Approvers@aphis.usda.gov.

In FAD/EDI outbreaks, the EMRS 2.0 is the official system of record used to track, summarize, and report all the activities of the outbreak at all of the affected premises. Please see the FAD PReP Epidemiology, Surveillance, and Tracing SOP for additional information on tracing. For other questions on EMRS, please contact a local EMRS Network Associate. EMRS information is also available on the USDA EMRS website. Basic and advanced EMRS 2.0 training is available.

3.2 Surveillance Collaboration Services (SCS)

VS has purchased a commercial-off-the-shelf (COTS) software module which has been branded as SCS (CoreOne). Each State, as of January 31, 2013, has successfully completed SCS implementation.

The SCS fulfills a management goal of providing comprehensive, coordinated, and integrated animal health surveillance and program management software that serves as the foundation for animal health, public health, food safety, and environmental health. SCS supports the function of managing data related to animal health surveillance and response to animal health events. Well managed surveillance data is the foundation for animal health activities that include domestic disease control and eradication programs, emergency preparedness and response, and trade.

3.2.1 Functionality

The main functions that the SCS software module performs are as follows:

- Records details of persons, including owners and herd managers
- Records animal identification tag allocations and use
- Records domains (premises and herds/flocks/tanks)
- Records individual animal details
- Records and manages restrictions on movement and slaughter
- Records movements of individual animals and/or groups of animals
- Provides full tracing of intrastate movements and animal contacts, including herd/flock reconstitution at any given date
- Records treatments and vaccinations for individual animals
- Records tests undertaken on individual animals
- Provides graphical representation on digital maps (GIS)
- Provides multi-species recording on the same database
- Records laboratory submissions
- Records laboratory results
- Records activity scheduling.

When fully completed at all levels, SCS will contain/receive data from MIM, spreadsheet uploads, and LMS, the Veterinary Services Laboratory Submission System, as well as from data entry directly into SCS. SCS then outputs data to spreadsheets, as well as BIR for reporting. SCS supports the administration of the location identifiers per the Animal Disease Traceability General Standards document.

3.3 Laboratory Information Management System (LIMS)

A LIMS is implemented in NVSL and in other laboratories; LIMS is an internal IM system for each laboratory. LIMS enables the NVSL to provide a wide variety of information and services centered on the diagnosis of domestic and FADs; support of disease control and eradication programs; supply of reagents for diagnostic testing; and maintenance of inventories of reagents and select agents.
There are important benefits of a LIMS in a laboratory:

1. Submitters can choose how reports are sent to them.
2. Each submitter is given a unique number for tracking submissions. Submitters can use this number on submissions for retrieving their information.
3. Submitters can use the NVSL Customer Contact Information Update Form on the APHIS website to update their information in LIMS: http://www.aphis.usda.gov/library/forms/pdf/VS_Form4_10.pdf.
4. Submitters can use bar-codes on submission forms for sample and animal ID.
5. E-mail groups can be established as required. These groups would receive e-mail notification of accessions as they are released.

6. To alert those receiving the report, the subject line in the e-mail message can be modified as needed.

3.4 Laboratory Messaging System (LMS)

LMS, a system used by the National Animal Health Laboratory Network (NAHLN), quickly and accurately reports laboratory results in the event of an animal disease outbreak, enhances surveillance programs, and recognizes emerging issues. LMS does the following:

- Provides automated alerts on defined animal health events to authorized personnel who support disease prevention and response.
- Allows the NAHLN labs to securely transmit and store data using nationally recognized health information standards, which improves data quality and data reuse in systems such as EMRS 2.0.
- Integrates with existing animal health and veterinary-diagnostic data networks, which allows for electronic transfer of information from the time diagnostic samples are collected in the field to when appropriate diagnostic test information is available from the NAHLN laboratories.
- Reports routinely on the relevant laboratory findings for each submission, which allows for the effective data routing and central aggregation in the NAHLN repository.

LMS uses standardized terminology (Systematized Nomenclature of Medicine [SNOMED] and Logical Identifiers Names and Codes [LOINC]) with the diagnostic electronic message standards (Health Level Seven [HL7]) used by human-health informatics systems. Data standardization helps to ensure that information can be accurately transferred from one system to another and facilitates comparison across data sets from different laboratories.

3.4.1 Functionality

LMS has three key components that provide different system functionalities.

- *Laboratory Registry.* Veterinary diagnostic laboratories are registered in the system. Information stored for each registered laboratory includes capacity and capability levels that support testing plans during both routine animal health surveillance activities and emergency outbreak responses.
- *Laboratory Reporting.* Laboratories registered in the system can submit laboratory reports with test results as electronic messages sent directly from their own LIMS. These messages are transmitted based on data exchange and terminology standards (HL7, LOINC, SNOMED). The LMS routes the laboratory results to the appropriate APHIS program unit and stores the results in an integrated national data repository. Only personnel with the appropriate user role-based security access rights can view the laboratory results on the internet.
- *Monitoring of Laboratory Findings.* Laboratory findings stored in the data repository will be monitored for quality, aberrant patterns, and unexpected trends. This can serve as an early warning for animal disease incidents, novel infections, or uncharacteristic testing performance. The monitoring process can also be configured to trigger automated notification alerts that are distributed to appropriate parties.

For more information, please email nahln@aphis.usda.gov, or call 515-337-7731.

3.5 Animal Disease Traceability Information System (ADTIS)

Animal Disease Traceability is a national program intended to identify specific animals in the United States and record their movement over their lifespan. The ADTIS is a cooperative State-Federal-industry partnership system designed for the purpose of standardizing and expanding animal ID programs and practices to all animals that would benefit from rapid trace backs in the event of an animal disease emergency. The goal of ADTIS is to enable trace back of the movement of any diseased or exposed

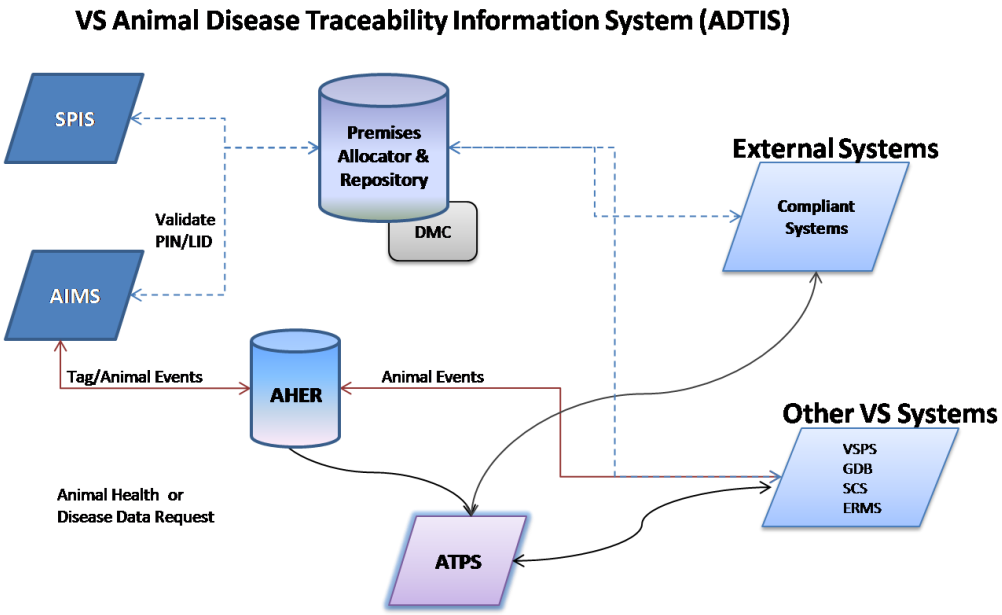
animal. This will help to ensure rapid disease containment and maximum protection of the Nation's food and recreational animals.

The ADTIS is used to manage data for uniquely identified premises and individual animal/group IDs. It provides an automated process and data repository for aggregating 'sighting' records (records that associate a unique animal/group ID with a unique premises at a specific time), which supply information for tracing activities.

The ADTIS system has four components. They are the Animal Identification Management System (AIMS), Standardized Premises Registration System (SPRS)[1], Data Management Center (DMC), and Animal Trace Processing System (ATPS). Subsections 3.5.1 through 3.5.4 further describe these components.

Figure 2 depicts the four components in ADTIS.

Figure 2. ADTIS Components



ATPS	Animal Trace Processing System	VSPS	Veterinary Services Process Streamlining
AIMS	Animal Identification Management System	GDB	Generic Database
AHER	Animal Health Event Repository	SCS	Surveillance Collaborative Services
DMC	Data Management Center		
SPIS	Standardized Premises Identification System		

The data entered in ADTIS or any of the external systems first gets sent to the allocator, which passes the data to the three postal databases (TeleAtlas, Google, and United States Postal Service) for address validation purposes. The data then moves back to the originating system for further analysis. Once this is complete, the data is again sent through the allocator and is stored in the National Repository as well as by the local system's database.

[1] This is also known as the Standard Premises Identification System, or SPIS, as in Figure 6-3.

The ADTIS is hosted at two locations through the National Information Technology Center to provide for backups and redundancy. USDA is responsible for the development, maintenance, and upgrades of the system.

3.5.1 Animal Identification Management System (AIMS)

The AIMS is a web-based program that supports the administration of official identification devices and other animal events. Initially the system was developed to administer Animal Identification Number (AIN) tags. In 2005, the system was enhanced to support the administration of scrapie tags. Over time, interest from users to have the AIMS support the administration of other official numbering systems justified the development of such options.

The primary principle of the AIMS is to maintain a record of official animal numbers with a location identifier using event codes along with the date of the event. This principle has been applicable to the recording of AIN tag distribution records and applies to the administration of other methods of official identification as well as animal event codes.

The AIMS allows for many participants in various roles and provides the means to record the distribution of official identification devices to premises. It is designed to create the unique individual record identifier, to facilitate order and delivery of physical animal tags to premise locations, and to collect and maintain history of animal location. It handles unique animal identification and the movement of AIN IDs between premises. The AIMS utilizes the Premises ID Allocation System to identify current and historical geographic location of individual animals to support State and Federal animal disease monitoring and surveillance programs.

3.5.2 Standardized Premises Identification System (SPIS)

The main purpose of the SPIS is to provide a system to adhere to the US Animal Identification Work Plan, which will ultimately provide a trace back system that can identify all animals and premises that were potentially exposed to an animal with an FAD within 48-hours after discovery. The SPIS provides a common, free-for-use system for individual States to register locations (premises) for animal processing and obtain a national premises ID. The data is segregated on a State-by-State basis. The system provides separation at the State level, providing the ability for each state to manage their data independently of other States. Within each State, users will register an account (providing business information), and user contact information. Once registered, users can then register one or more premises to their account. Through the premises registration process, the system will connect to the National Premises Allocator system to generate the National Premises ID. In addition, the system provides various features for querying premises and account information.

3.5.3 Data Management Center (DMC)

The DMC was originally built to support ADTIS helpdesk personnel in researching addresses that will not validate against commercial databases, to run various reports against the national repository, and to support other access and general management of the national repository. With recent security upgrades, selected State Animal Health Officials (SAHOs) can also have access to the DMC to perform these functions against the data for their state. The DMC interfaces with both the allocator and the national repository.

3.5.4 Animal Traceability Processing System (ATPS)

The ATPS is a web-based application that will—when developed and completed—provide State and Federal animal health officials a single portal-like system to obtain trace back data for disease investigations. When the full system is in production, it will allow external databases that store and maintain animal trace data, referred to as Animal Trace Database (ATDs), to provide this information to SAHOs on as needed basis. ATDs may include public or private system that stores animal movement,

sightings, or event data. Additionally, all databases maintained internally by APHIS VS for disease programs will be integrated with the ATPS and systematically respond to requests for information.

3.6 Veterinary Services Process Streamlining (VSPS)

APHIS VS is charged with regulating the importation of live animals and animal products into the United States, the transference of live animals across state boundaries, and the exportation of live animals and animal products out of the United States.

VSPS supports the monitoring of animals and animal products that are under the regulatory purview of APHIS. Fundamental goals of the VSPS are to provide

- customers with an electronic interface to conduct business with the Agency for purposes of collection and monitoring of domestic and imported animal commodities from point of manufacture to ultimate destination;
- agency staff with a streamlined method of processing customer requests, data, and sending responses to customers; and
- Federal risk analysts with an electronic source of data and information.

Another fundamental goal of the VSPS project is to provide APHIS trade, surveillance, risk, and regionalization analysts a readily available source of animal and animal product monitoring information. VSPS is designed with the intent of consolidating several disparate datasets, which are currently in different formats, including paper.

VSPS considers the following industry "best practices" to maximize interoperability between other APHIS investments.

- A web-based system to meet the demand for an open standard browser-based interface.
- Access to the platform using a proven security mechanism (eAuthentication).
- Streamlined access to quality data using a stable database platform (Oracle).
- A one-stop 24/7 service commitment to meet customer needs.

With these goals in mind, VSPS provides the framework needed to manage animal health related issues in an effective and efficient manner. In addition, VSPS aids APHIS in meeting the goal of providing improved quality "Service to Citizens" as mandated by the Presidential Management Agenda and expansion of the eCommerce initiatives within the government.

VSPS consists of four major modules: Veterinarian Accreditation, Interstate Animal Movement, Animal Export, and Animal Import. These provide the capability to monitor animal or product movement in and out of the United States. These modules are explained further in the Subsections 3.6.1 through 3.6.4.

3.6.1 Veterinary Accreditation Module

Accredited veterinarians are relied upon to attest to the health of animals being exported to foreign countries or being moved between States to prevent disease transmission. Veterinarians must be accredited in the State where they perform Federal work. This module automates submission of accreditation applications; streamlines the approval process via electronic distribution of information; and records actions taken against accredited veterinarians. This component does the following:

- facilitates the accreditation application process;
- prints accreditation certificates;
- validates contact information;
- checks veterinarian accreditation status;
- finds accredited veterinarians;
- updates core orientation status;
- processes accreditation applications (tracking, approving and adding to the database);

- changes accreditation status;
- takes action against veterinarians;
- reinstates a short-term suspension;
- reinstates revocations;
- updates Assistant District Director (ADD) offices;
- and generates detailed reports.

3.6.2 Interstate Animal Movement Module

All animals being moved between States are required to go through an interstate movement certification process. Each animal must be inspected by an accredited veterinarian and is subject to the target State's entry regulations. This module regulates the way accredited veterinarians gather animal health information, including laboratory test results, and the processing of final health certificates required for entry into the target State. It also provides a mechanism for online issuance of permits by the State for requests for interstate movement. This component facilitates viewing interstate movement requests; adding interstate movement requests; importing data from veterinary practice products; viewing state protocols; maintaining state protocols; processing interstate movement certificates; updating lab results; viewing interstate movement certificates; deleting inactive pending requests; generating National Animal Identification System activity movement files; generating animal detail reports; and generating interstate movement reports.

3.6.3 Export of Live Animals Module

All animals leaving the United States are required to go through an export process. Each animal must be inspected by an accredited veterinarian and is subject to the target country of entry's import regulations. This module automates the way accredited veterinarians gather animal health information including the lab test results and VS processing of final health certificates and final inspections. This component facilitates viewing export requests; requesting health certificates; selecting export protocols; viewing export requests; processing health certificates; performing final inspections; maintaining International Animal Product Export Regulations; and updating the export database.

3.6.4 Import of Live Animals Module

All animals entering the United States must go through an import process. There are numerous routes of entry depending on purpose (direct consumption, grazing, pet ownership, and temporary admission). This module will automate the collection of information and submission of permit requests online. It will also facilitate the tracking of importers for numerous permit forms. This component will facilitate viewing import requests; adding import requests; amending or editing import permits; viewing State and Federal imports; processing import permits; tracking the arrival and release of animals, generating import reports; and updating the import database.

3.7 National Veterinary Logistics System (NVLS)

The National Veterinary Stockpile (NVS) is the nation's repository of vaccines, personal protective equipment, and other critical veterinary items. Established by the Homeland Security Presidential Directive 9 (HSPD-9), the NVS deploys countermeasures within 24 hours against FADs, and ensures States are ready to request, process, and use the stockpile.
The NVS has three types of inventory:

1. Stockpile Managed Inventory, which is owned and managed by NVS in its warehouse.
2. Contractor (or Vendor) Managed Inventory, which contractors or vendors hold and manage for NVS.
3. Contingency Support Items, which contractors own, hold, and manage but provide during emergencies on a promissory basis.

The NVLS manages APHIS-VS and NVS inventory held in multiple locations, tracks requisitions from vendors, and tracks deployments. NVLS allows web-based user access, with a simple, user-friendly interface.

Other attributes of NVLS include the following:

- User configurable ad hoc and management dashboard reporting;
- Management of different types of inventory;
- Import or export of data from other logistics partners;
- Integration with APHIS' Resource Ordering and Status System;
- Reporting on the readiness of emergency response packages (Push Packs), during their construction;
- Stratification by location type (for example, controlled or refrigerated);
- Condition code and quality control management.

As of May 2014, the NVS continues to use the current system (the National Oceanic and Atmospheric Administration's Consolidated Logistics System), while NVLS continues to be developed.

3.8 Business Intelligence and Reporting (BIR)

BIR is a tool used to report and analyze data produced by other IM systems. For example, BIR can be employed to answer commonly asked questions about programs (such as frequency and duration of specific activities), diagnostic testing (such as summary reports), as well as animal ID tag searches. This IM system can help VS manage and process large amounts of data, facilitating oversight and evaluation of various standards and goals. BIR allows VS to extract and integrate data from different systems in order to report it in a useful and functional way to inform operations.

3.9 Mobile Information Management (MIM)

The MIM software application suite uses mobile computing and peripheral devices, such as PDAs and radio frequency identification (RFID) readers, to collect and provide data management for a number of VS program field activities. Traditionally, much of the data collection and recordkeeping in the field was done manually; handwritten ID numbers and test results collected during the day are later entered into a computer at the office. With MIM, once data are collected, all of the relevant information about an animal is immediately retrievable onsite and in real-time. Relevant hard copy reports are generated in the field and data are electronically transmitted to the appropriate VS data repositories. This not only reduces the time required to process animals on the farm and build valuable databases, but support a high degree of efficiency in program delivery, increases data accuracy and integrity, and decrease the data entry and management workload. Additionally, MIM can produce a data file that can be exchanged with other databases or applications, including SCS and EMRS. MIM resides outside the VS firewall.

The MIM PDA application is designed for rapid data collection and entry in the field and reduces the time spent performing redundant post-activity manual data entry. When paired with an electronic RFID reader, a field veterinarian or animal health technician scans the animal's RFID tag, checks the animal, and then easily enters additional information – such as other identification numbers, age, sex, and breed. Once all data are entered, the PDA then transfers the data to a computer using MIM Manager and the veterinarian and or animal health technician can enter or edit other relevant information, such as premises, associated contact, and operation type, before uploading into approved Federal, State, or other databases (SCS, EMRS, and USAHerds).

APHIS VS CIO is moving forward with MIM in routine disease surveillance. It will increase collaboration with herd and flock management companies and improve data sharing capabilities. MIM will support animal population inventory management and reconciliation capabilities.

MIM provides the following capabilities:

- Manages and reports
  - tuberculosis test information;
  - brucellosis adult and calfhood vaccination information (VS 4-26);
  - brucellosis herd test information (VS 4-33);
  - avian influenza surveillance of wild birds;
  - herd inventory and reconciliation information; and
  - indemnity and restricted movement information.
- Captures
  - multiple forms of animal ID including RFID;
  - barcode information;
  - GPS coordinates; and
  - location of animal.
- Generates
  - barcode labels;
  - on-screen alerts to assist finding animals of local or national interest; and
  - reports from a spreadsheet (data output).
- To encrypt data files for transmission.

3.10 Licensing Serial Release and Testing Information System (LSRTIS)

This system allows the Center for Veterinary Biologics (CVB) to manage information related to licensing programs and processes. LSRTIS, owned by CVB (within the Science, Technology, and Analysis Services of VS), supports the following processes and associated data and services:

- Veterinary Biologics Establishments and Products: Licensing
- Veterinary Biologics Products Serial Release
- Veterinary Biologics Products Testing
- Veterinary Biologics Products Compliance
- Veterinary Biologics Establishments and Products: Inspection
- Veterinary Biologics Product Export Certification
- Maintaining Veterinary Biologics Correspondence between regulated industry and CVB program.

Under the 1913 Virus-Serum-Toxin Act, further amended by the 1985 Food Security Act, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is responsible for ensuring that all veterinary biologics produced in the United States are pure, safe, potent, and effective (9 CFR 101–123).

LSRTIS is used to ensure that distributed veterinary biologics are in compliance with the Virus-Serum-Toxin-Act. Data in the system will be used to track information regarding the biological establishment's location, master seed and cells produced, product label submissions, employee qualifications, and product licenses. This information will enable decisions relating to new product licensing, serial release, product and manufacturing site inspections, and compliance of veterinary biologics firms.

This system allows CVB to receive and process submissions from Veterinary Biologics Firms related to licensing and releasing serials of Veterinary Biologics Products. The system allows CVB to capture detailed information about firms, manufacturing sites, establishment licenses, product licenses, product serials, and product sample test results. This enables decisions relating to new product licensing, serial release, and inspection and regulatory compliance of veterinary biologics firms.

All information maintained in LSRTIS is proprietary to the licensed manufacturer, and may contain confidential business information. The licensed entity can request information for their respective licensed veterinary biologics from CVB. Information requested for other licensed manufacturers or products must be requested through a Freedom of Information Act (FOIA) request.

3.11 Other IT/IM Systems—APHIS Systems

The Emergency Management Safety and Security Division (EMSSD) provides APHIS with comprehensive emergency preparedness, response, and recovery services.

If a disaster affects APHIS, the EMSSD will have a lead role in implementing COOP and mission assurance plans. It also provides measures for physical protection and control of sensitive and classified information. The Branch has responsibility for the following systems:

- APHIS Emergency Qualifications Systems (EQS)
- Resource Ordering and Status System (ROSS).

3.11.1 Emergency Qualifications System (EQS)

EQS is a database of emergency response personnel and their credentials for all emergency response positions. It is used to store the skills and qualifications of emergency response personnel and other data that is imported from the National Finance Center and AgLearn. It feeds certification data to ROSS and is customizable to APHIS Program needs. The database can be searched according to pre-defined qualifications/certifications.

EQS also has the capability of housing training documents. For APHIS employees, training documents flow into EQS from AgLearn. For National Animal Health Emergency Response Corps volunteers who do not have access to AgLearn, training documentation can be manually entered or imported through an Excel spreadsheet.

3.11.2 Resource Ordering and Status System (ROSS)

ROSS allows APHIS to identify, track, and mobilize resources that are needed to support emergency response. It provides a database of qualified emergency response personnel. The database can be searched according to personnel training levels and subject of expertise, such as procurement, epidemiology, or public information. Being able to quickly identify and dispatch appropriate personnel and supplies is a key component of emergency response, and ROSS facilitates that process. ROSS initiatives include:

1. Developing the APHIS Agricultural Health Position Catalog.
2. Integrating ROSS into APHIS Emergency Management Practices.
3. Training and sustaining an APHIS Dispatch Community.

3.12 Other External Systems and Tools

3.12.1 AgConnect

AgConnect, from the Institute for Infectious Animal Diseases (IIAD) (formerly the National Center for Foreign Animal and Zoonotic Disease Defense) at Texas A&M University, is a suite of customizable data integration and analysis products designed to provide improved situational awareness. AgConnect, situated outside the VS firewall, can integrate data from multiple sources, bringing together complex streams of information. It is intended to provide decision-makers with coordinated information and enhanced situational awareness. AgConnect solutions also support continuity of business planning, laboratory capacity estimation, and biosurveillance.

For more information on the AgConnect suite from IIAD, please see: http://iiad.tamu.edu/software/.

3.12.2 Geographic Information Systems (GIS)

While not an information management "system", GIS capabilities—often integrated into existing systems, or leveraging their data—are critical to interpret animal health data. GIS enables the spatial component of animal health to be incorporated in reporting and analysis. GIS allows VS to view, understand, question, interpret, and visualize geographically referenced data in a way that may reveal relationships, patterns, and trends, which can be displayed in maps, reports, or charts.

For example, an analysis of the spatial distribution of an animal disease may show patterns that provide evidence supporting possible causes. Furthermore, knowledge of the geographical component can enhance existing functions of information management systems. There is a GIS unit in the Centers for Epidemiology and Animal Health (Science, Technology, and Analysis Services), which is responsible for GIS activities in VS.

Three important reasons to use GIS are as follows:

- *Data Inventory or Data Visualization:* GIS used with animal health data can be used to produce routine reports of animal disease incidence, visualize control program planning, facilitate priority setting, and fulfill international reporting requirements. Reports can convey a realistic picture of the current animal disease situation for decision makers, which is particularly important in outbreak response.
- *Analysis or Data Exploration:* Ongoing research is essential to the effective implementation of animal disease control programs. When the spatial component of animal disease distribution is incorporated through GIS, the examination of geographical location as a factor in animal disease occurrence is possible.

4. TRAINING

Many IM systems require supervisory approval for read and write access. While there are some formal training courses, users of IM systems will need to take initiative in reading system manuals and reaching out to colleagues for support.

The following are Professional Development Staff training courses for EMRS that can be taken through AgLearn:

- EMRS Training for VS.
  This course provides a brief overview of all aspects of EMRS and demonstrates the methods used in recent incidents to manage disease tracing and control activities as well as resource management. Participants receive instruction on basic EMRS functionality.
- EMRS Advanced Training.
  This course covers advanced training in using EMRS for workflow management techniques used during an emergency response, including using combinations of zone statuses and premises visit forms. Advanced data management, data extraction and manipulation, forecasting, report generation, and mapping are covered.
- EMRS for Incident Management Teams.
  The purpose of this class is to train Incident Management Teams to use EMRS during animal disease outbreaks and emergencies. The first day will be devoted to a complete overview of EMRS and practice exercises on data entry and reporting from EMRS. The second and third days will consist of a scenario based exercise using EMRS to manage a new outbreak while practicing ICS principles including the Planning cycle and Situation reporting using data from EMRS. Team building will be encouraged through the exercises.
- VS Information Systems Training Support Network for EMRS.
  This course was developed to maximize training resources and provide local support for end users of EMRS. This course provides technical and training delivery instruction for network associations.

PHOTO AND ILLUSTRATION CREDITS

Figure 2: USDA Animal Disease Traceability Technical Reference, Version 1.0, July 2011.

Acronyms

ADD
Assistant District Director

ADTIS
Animal Disease Traceability Information System

AIMS
Animal Identification Management System

AIN
Animal Identification Number

APHIS
Animal and Plant Health Inspection Service

ATPS
Animal Trace Processing System

BIR
Business Intelligence & Reporting

CIO
Chief Information Officer

COOP
continuity of operations

COTS
commercial off-the-shelf

CVB
Center for Veterinary Biologics

DMC
Data Management Center

E-Auth
electronic-authentication

EDI
emerging disease incident

EMRS
Emergency Management Response System

EMSSD
Emergency Management Safety & Security Division

EQS
Emergency Qualifications System

FAD
foreign animal disease

FAD PReP
Foreign Animal Disease Preparedness and Response Plan

GIS
geographical information system

HL7
Health Level 7

HSPD
Homeland Security Presidential Directive

ICS
Incident Command System

ID

identification

IIAD
Institute for Infectious Animal Diseases (formerly the National Center for Foreign Animal and Zoonotic Disease Defense [FAZD])

IM
information management

IT
information technology

LIMS
Laboratory Information Management System

LMS
Laboratory Messaging System

LOINC
Logical Observation Identifiers Names and Codes

LSRTIS
Licensing Serial Release and Testing Information System

MIM
Mobile Information Management

NAHEMS
National Animal Health Emergency Management System

NAHLN
National Animal Health Laboratory Network

NPIC
National Preparedness and Incident Coordination Center

NIMS
National Incident Management System

NVS
National Veterinary Stockpile

NVLS
National Veterinary Logistics Systems

NVSL
National Veterinary Services Laboratories

PDA
personal digital assistant

RFID
radio frequency identification

ROSS
Resource Ordering and Status System

SAHO
State Animal Health Official

SCS
Surveillance Collaboration Services

SNOMED
Systematized Nomenclature of Medicine

SPIS/SPRS
Standardized Premises Identification System/Standardized Premises Registration System

SOP
standard operating procedure

SQL
structure query language

TDD
telecommunications device for the deaf

USDA
U.S. Department of Agriculture

VPN
virtual personal network

VS
Veterinary Services

VSPS
Veterinary Services Process Streamlining

APPENDIX A: EXAMPLE OVERVIEW EMERGENCY MANAGEMENT RESPONSE SYSTEM (EMRS 2.0) WORKFLOWS

Figure A-1: EMRS Workflow for an FAD Investigation

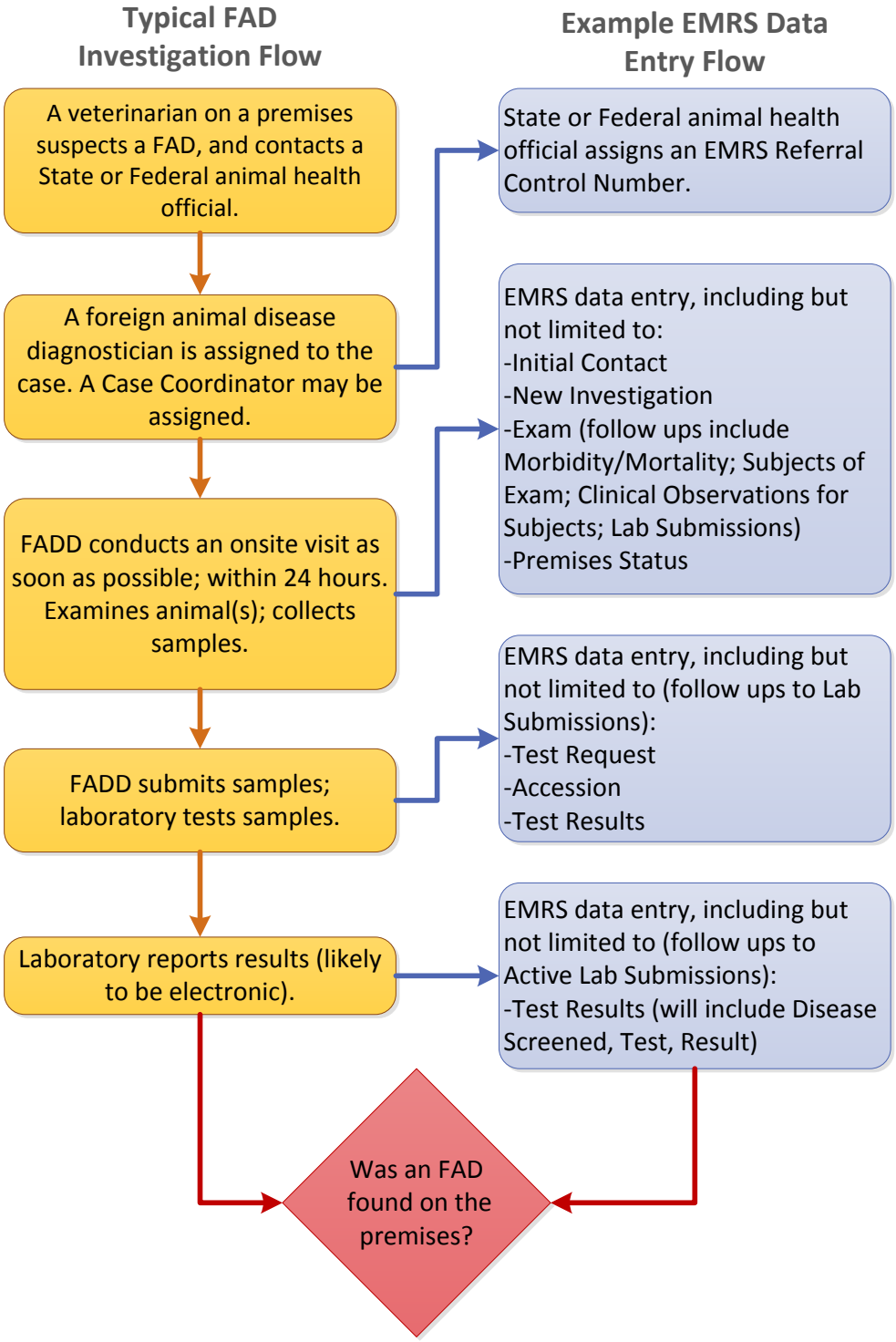
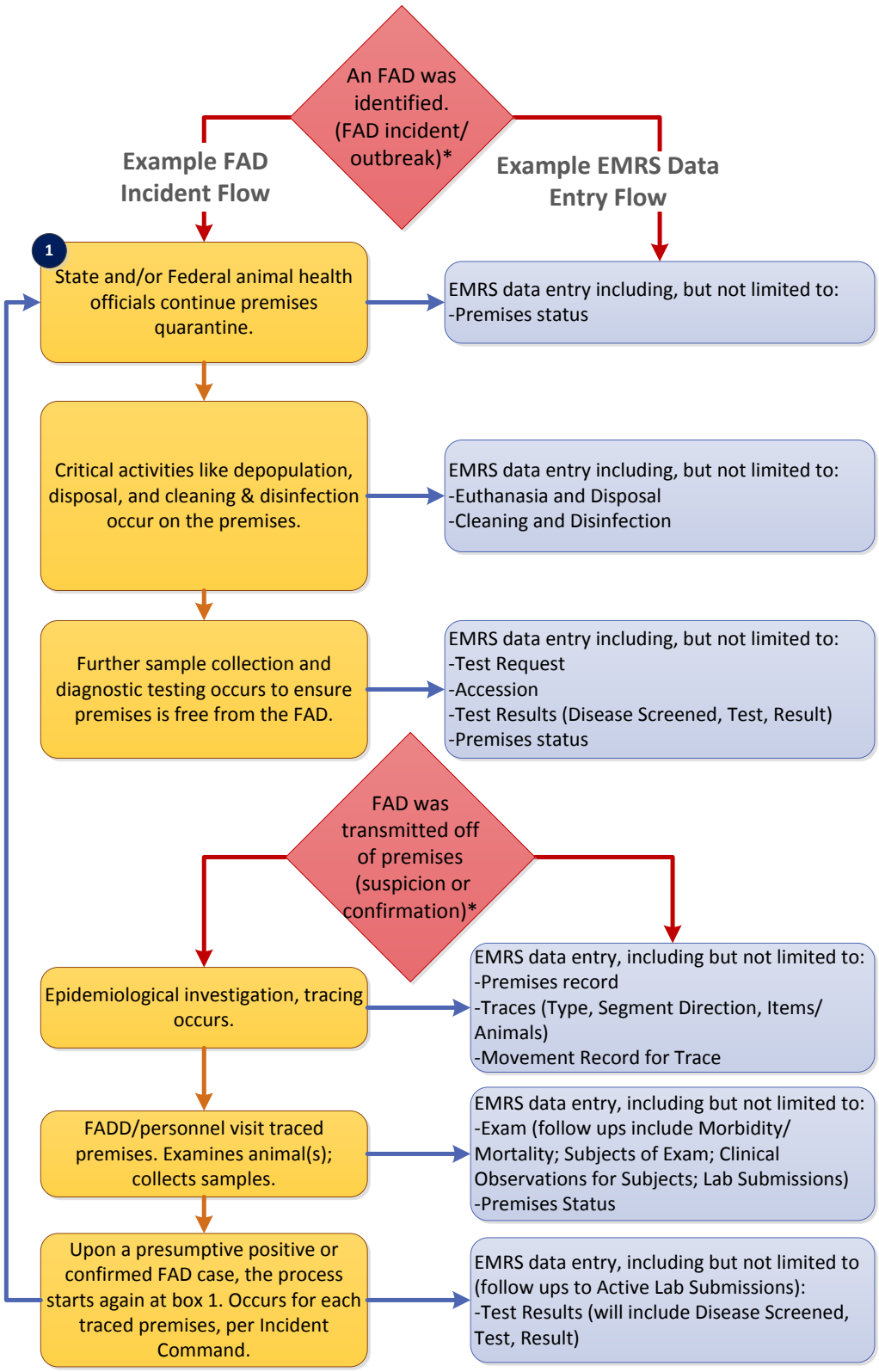


Figure A-2: EMRS Workflow for an FAD Incident or Outbreak

*Tracing may start with a presumptive or confirmed positive case. If there is concern the FAD has been transmitted off of the premises, tracing will occur simultaneously with other activities on the premises, like depopulation and disposal.



APPENDIX B: THE IMPERATIVE FOR FOREIGN ANIMAL DISEASE PREPAREDNESS AND RESPONSE

Why Foreign Animal Diseases Matter

Preparing for and responding to foreign animal diseases (FADs)—such as highly pathogenic avian influenza (HPAI) and foot-and-mouth disease (FMD)—are critical actions to safeguard the nation's animal health, food system, public health, environment, and economy. FAD PReP, or the *Foreign Animal Disease Preparedness and Response Plan*, prepares for such events.

Studies have estimated a likely national welfare loss between $2.3–69 billion[1] for an FMD outbreak in California, depending on delay in diagnosing the disease.[2] The economic impact would result from lost international trade and disrupted interstate trade, as well as from costs directly associated with the eradication effort, such as depopulation, indemnity, carcass disposal, and cleaning and disinfection. In addition, there would be direct and indirect costs related to foregone production, unemployment, and losses in related businesses. The social and psychological impact on owners and growers would be severe. Zoonotic diseases, such as HPAI and Nipah/Hendra may also pose a threat to public health.

Challenges of Responding to an FAD Event

Responding to an FAD event—large or small—may be complex and difficult, challenging all stakeholders involved. Response activities require significant prior preparation. There will be imminent and problematic disruptions to interstate commerce and international trade.

A response effort must have the capability to be rapidly scaled according to the incident. This may involve many resources, personnel, and countermeasures. Not all emergency responders will have specific skills required in areas such as biosecurity, quarantine and movement control, epidemiological investigation, diagnostic testing, depopulation, disposal, or emergency vaccination.

Establishing commonly accepted and understood response goals and guidelines, as accomplished by the FAD PReP materials, will help to broaden awareness of accepted objectives as well as potential problems.

Lessons Learned from Past FAD Outbreaks

The foundation of FAD PReP is lessons learned in managing past FAD incidents. FAD PReP is based on the following:

- Providing processes for emergency planning that respect local knowledge.

[1] Carpenter TE, O'Brien JM, Hagerman AD, & McCarl BA. 2011. "Epidemic and economic impacts of delayed detection of foot-and-mouth disease: a case study of a simulated outbreak in California." *J Vet Diagn Invest.* 23:26-33.

[2] Estimates based on models may vary: Ekboir (1999) estimated a loss of between $8.5 and $13.5 billion for an FMD outbreak in California. Ekboir JM. 1999. "Potential Impact of Foot-and-Mouth Disease in California: the Role and Contribution of Animal Health Surveillance and Monitoring Services." *Agricultural Issues Center.* University of California, Davis.

- Integrating State-Federal-Tribal-industry planning processes.
- Ensuring that there are clearly defined, obtainable, and unified goals for response.
- Having a Unified Command with a proper delegation of authority that is able to act with speed and certainty.
- Employing science- and risk-based management approaches to FAD response.
- Ensuring that all guidelines, strategies, and procedures are communicated effectively to responders and stakeholders.
- Identifying resources and trained personnel required for an effective incident response.
- Trying to resolve competing interests prior to an outbreak and addressing them quickly during an outbreak.
- Achieving rapid FAD detection and tracing.

FAD PReP Mission and Goals

The mission of FAD PReP is to raise awareness, expectations, and develop capabilities surrounding FAD preparedness and response. The goal of FAD PReP is to integrate, synchronize, and deconflict preparedness and response capabilities as much as possible before an outbreak by providing goals, guidelines, strategies, and procedures that are clear, comprehensive, easily readable, easily updated, and that comply with the National Incident Management System.

In the event of an FAD outbreak, the three key response goals are to: (*1) detect, control, and contain the FAD in animals as quickly as possible; (2) eradicate the FAD using strategies that seek to stabilize animal agriculture, the food supply, the economy, and to protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.* Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain FAD-free status without the response effort causing more disruption and damage than the disease outbreak itself.

FAD PReP Documents and Materials

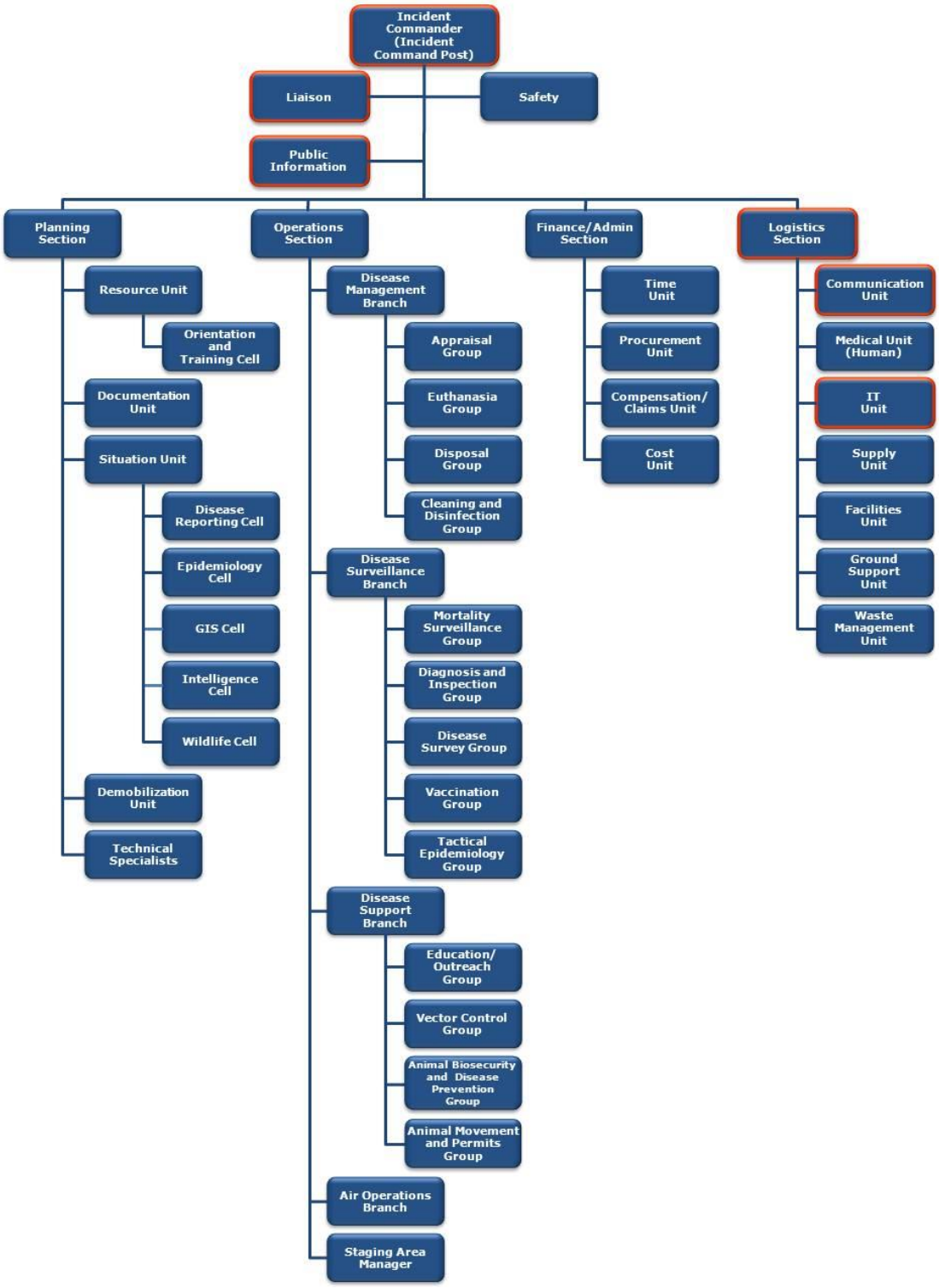
FAD PReP is not just one, standalone FAD plan. Instead, it is a comprehensive U.S. preparedness and response strategy for FAD threats, both zoonotic and non-zoonotic. The following section provides examples of the different types of FAD PReP documents available.

- Strategic Plans—Concept of Operations
  - *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0): This document provides an overall concept of operations for FAD preparedness and response for APHIS, explaining the framework of existing approaches, systems, and relationships.
  - *APHIS Foreign Animal Disease Framework: Response Strategies* (FAD PReP Manual 2-0): This document provides significant detail on response strategies that will be conducted in an FAD outbreak.
  - *FAD Investigation Manual* (FAD PReP Manual 4-0): This field-ready manual provides detailed information on completing an FAD investigation from start to finish.
  - *A Partial List of FAD Stakeholders* (FAD PReP Manual 5-0): This guide identifies key stakeholders with whom the National Preparedness and Incident Coordination Center collaborates.
  - *Incident Coordination Group Plan*: This document explains how APHIS headquarters will organize in the event of an animal health emergency.
- NAHEMS Guidelines
  - These documents describe many of the critical preparedness and response activities, and can be considered as a competent veterinary authority for responders, planners, and policy-makers.
- Industry Manuals

  - These manuals describe the complexity of industry to emergency planners and responders and provide industry a window into emergency response.
- Disease Response Plans
  - Response plans are intended to provide disease-specific information about response strategies. They offer guidance to all stakeholders on capabilities and critical activities that would be required to respond to an FAD outbreak.
- Standard Operating Procedures (SOPs) for Critical Activities
  - For planners and responders, these SOPs provide details for conducting critical activities such as disposal, depopulation, cleaning and disinfection, and biosecurity that are essential to effective preparedness and response to an FAD outbreak. These SOPs provide operational details that are not discussed in depth in strategy documents or disease-specific response plans.
- Continuity of Business Plans (commodity specific plans developed by public-private-academic partnerships)
  - Known as the Secure Food Supply Plans, these materials use science- and risk-based information to facilitate market continuity for specific products in an outbreak.
  - More information on these plans can be found at the following: www.secureeggsupply.com, www.securepork.org, www.securemilksupply.org, www.securebroilersupply.com.
- APHIS Emergency Management
  - APHIS Directives and Veterinary Services (VS) Memorandums provide important emergency management policy. These documents provide guidance on topics ranging from emergency mobilization, to FAD investigations, to protecting personnel from HPAI.

For those with access to the APHIS intranet, these documents are available on the internal APHIS FAD PReP website: http://inside.aphis.usda.gov/vs/em/fadprep.shtml. Most documents are available publicly, at http://www.aphis.usda.gov/fadprep.

APPENDIX C: EXAMPLE INCIDENT COMMAND SYSTEM STRUCTURE



GIS = geographical information systems, IT = information technology.