

**Veterinary Services Information Management
Procedures for Swine Enteric Coronavirus
Disease (SECD)**

United States Department of Agriculture (USDA)
Animal and Plant Health Inspection Service (APHIS)
June 11, 2014



**United States
Department of
Agriculture**

Contents

1.1	Introduction.....	3
1.1.1	Herd Monitoring and Management Plan for Novel SECD	3
1.2	Purpose & Coordination	4
1.2.1	Purpose.....	4
1.2.2	Coordination	4
1.3	Objectives & Guidelines	4
1.3.1	Objectives	4
1.3.2	Guidelines.....	5
1.4	Procedures.....	5
1.4.1	Materials, Supplies, and Equipment	5
1.4.2	Collecting Information.....	5
1.4.2.1	Baseline Positive Premises (First Priority)	5
1.4.2.2	Herd Plans (Second Priority)	6
1.4.2.3	Additional Testing after Initial Detection (Third Priority).....	6
1.4.3	Reporting (Once Data Flow Starts).....	6
1.5	Personnel.....	6
1.5.1	Laboratory Liaison.....	7
1.5.2	Disease Reporting Officer (DRO)	7
1.6	VS IT Systems.....	7
1.6.1	Emergency Management Response System 2.0 (EMRS2)	8
1.6.1.1	Business Objectives	8
1.6.1.2	Functionality	9
1.6.1.3	Access and Use	9
1.6.2	Laboratory Messaging Services (LMS)	10
1.6.2.1	Functionality	10
1.6.3	Surveillance Collaboration Services (SCS).....	11
1.7	Data Sharing/Exchange Initiatives	11
1.7.1	AgConnect.....	11
1.7.2	Data Sharing	12
	Attachment 1.A SECD Reporting Workflow	13
	Attachment 1.B Information on Laboratory Data.....	15
	Attachment 1.C Abbreviations	16

1.1 Introduction

Since its appearance in the United States in April 2013, porcine epidemic diarrhea virus (PEDV) has spread within the swine industry to 30 States. In recent months, an additional related virus, porcine delta coronavirus (PDCoV), has appeared in this country. Infections with these swine enteric coronaviruses can cause significant morbidity and mortality, particularly in young piglets. Actions to date, led by producers, swine veterinarians, and industry organizations, have focused primarily on biosecurity but have not been fully effective in limiting the spread of the virus. Therefore, the Federal government, States, herd veterinarians, and industry need to collaborate in a concerted effort to manage these infections in the United States.¹ This collaboration will support Veterinary Services' (VS) use of the Emergency Management and Response System 2.0 (EMRS2) for swine enteric coronavirus disease (SECD) reporting.

This document specifically covers information management procedures for VS. The goals of these information management (IM) procedures are to do the following:

1. Collect information to characterize and understand the scope of SECD, and inform future control options.
2. Provide reimbursement to producers when a herd management plan is in place and recorded within EMRS2.

VS provides SECD information on its website, [here](#). EMRS2 is the System of Record for managing information from SECD Monitored Herds.

1.1.1 Herd Monitoring and Management Plan for Novel SECD

The goals of the [Herd Monitoring and Management Plan for Novel Swine Enteric Coronavirus Diseases](#) are to:

1. Collect information to characterize and understand the scope of SECD, and inform future control options.
2. Decrease shedding and spread of PEDV and PDCoV or other novel enteric coronaviruses from affected herds.

These goals are intended to address the current outbreak of SECD in a manner that supports business continuity for commercial pork producers, maintains a plentiful supply of pork for consumers, and is credible to State and Federal animal health officials.

APHIS intends to accomplish these goals through collaboration with State Officials, veterinarians, laboratories, and producers by application of the following:

¹ The Federal Order, effective June 5, 2014, is available here: http://www.aphis.usda.gov/newsroom/2014/06/pdf/secd_federal_order.pdf.

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1. No federal regulatory response will be applied to herds that comply with the requirements of the Federal Order.
 2. Reporting of affected herds as described below will be required of laboratories, producers, and veterinarians.
 3. Affected herds will be required to have and follow a herd management plan.
 4. Regulatory action may be taken on entities that do not comply with the Federal Order requirements of reporting, having a herd management plan, and following that plan.
 5. Federal funding will be available for various costs that are described within the herd management plan.

The goal of herd monitoring efforts is to characterize and understand the scope of SECD and to decrease the shedding and spread of PEDV and PDCoV. Herd testing criteria, biosecurity practices, and disease control measures that will be most effective in addressing SECD will require input from herd veterinarians, laboratory diagnosticians, and regulatory officials as the details of this plan are developed.²

These *SECD Information Management Procedures* support the goals of the *Herd Monitoring and Management Plan for Novel SECD*.

1.2 Purpose & Coordination

1.2.1 Purpose

These procedures give users information about APHIS information technology (IT) systems that will be used in the reporting of SECD information. These procedures specifically explain IM procedures for VS personnel. These systems work together to provide accurate and timely information to responders, decision-makers, and stakeholders.

1.2.2 Coordination

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

1.3 Objectives & Guidelines

1.3.1 Objectives

- Ensure that local, State, Tribal, and Federal IM systems are compatible for sharing data and information.
- Collect SECD information in order to communicate goals and objectives, status reports, premises status information, diagnostic results, and epidemiology reports.
- Perform EMRS2 data entry processes or information downloads in 24-hour intervals, or as requested by the Incident Coordination Group.

² Available at:

http://www.aphis.usda.gov/animal_health/animal_dis_spec/swine/downloads/secd_monitoring_management_plan.pdf.

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- Effectively communicate goals and objectives, status reports, premises status information, diagnostic results, epidemiology reports, and herd plans to facilitate assistance to small and large producers in a timely manner.

1.3.2 Guidelines

Critical response activities such as diagnostics and premises designations will be entered daily into EMRS2. Several VS IT systems will be used for data collection and reporting of SECD information, including the following:

- Emergency Management Response System (EMRS2)
- Laboratory Messaging Services (LMS)
- Surveillance Collaboration Services (SCS)

EMRS2 is the System of Record for IM of SECD Monitored Herds, while SCS may be implemented in some States for use in later stages of managing the diseases. Implementing the Monitoring and Management Program will include APHIS developing necessary connections to fully integrate the LMS with the pertinent data management systems (e.g., EMRS2, SCS). In addition to direct entry and electronic messaging between LMS and EMRS (or SCS), data may be entered onto a spreadsheet, delivered to a designated location, and then directly uploaded to either EMRS2 or SCS.

Additionally, other systems such as AgConnect may be used to receive publicly cleared summary information for further data visualization and distribution.

1.4 Procedures

1.4.1 Materials, Supplies, and Equipment

Responders in the field must have the technology resources to collect, retrieve, assess, and transfer disease-specific information quickly. If possible, VS personnel should have a government-issued laptop with appropriate software including Microsoft Office and Microsoft Outlook. WE credentials are required to log-in to EMRS2; State users can use their own computers.

1.4.2 Collecting Information

1.4.2.1 Baseline Positive Premises (First Priority)

In order to establish and maintain an accurate list of what premises are infected, and which are cleared, (by meeting standard case definitions)³ the information listed below should exist in one IM system (EMRS2). This will allow for a gold standard source of Positive Premises.

1. Reports of positive lab testing will flow from the National Animal Health Laboratory Network (NAHLN) lab, to the LMS, then to EMRS2 for new positives. Data will include, at a minimum, premises identification number (PIN) or an alternative premises identifier from location tested, date of sample collection, type of unit being sampled (e.g., sow, nursery, finisher), test methods, and test results. Data will be recorded as associated

³ The case definition for SECD is available at:
http://www.aphis.usda.gov/animal_health/animal_dis_spec/swine/downloads/secd_case_definition.pdf.

to a premises record, initially created based on the premises associated with a positive result.

2. Locally Positive Premises will be confirmed by field personnel working with the submitting veterinarian to ensure the accuracy of the data. Then, investigations and statuses will be created by a designated Disease Reporting Officer (DRO). A “Confirmed SECD Positive” premises status will be applied by a DRO in EMRS2 at the State or District level. This will follow the case definitions for a Confirmed SECD Positive.
3. The premises primary producer, manager, company representative contact (including email) would all be beneficial information that can be added locally. This information will facilitate electronic communication and delivery of assistance.
4. Reports from producers or veterinarians outside the lab result reporting chain can be recorded as an Initial Contact Report in EMRS2.

Please see [Attachment B](#) for more information on reporting information required/requested from NAHLN laboratories.

1.4.2.2 Herd Plans (Second Priority)

In order to evaluate the effectiveness of biosecurity, the following should be entered in EMRS2:

1. Statuses entered of herd management plans attached to status document.

This information can be entered locally; assistance can be provided centrally if needed.

1.4.2.3 Additional Testing after Initial Detection (Third Priority)

This information is needed to evaluate if premises meets the case definition in order to close the premises infected status. Information entered into EMRS2 should include the following:

1. All testing during the time the premises is considered infected.

This information will flow from the NAHLN lab to LMS to EMRS2.

1.4.3 Reporting (Once Data Flow Starts)

Reporting of data on the above actions can be created, scheduled, run centrally, and distributed to need-to-know stakeholders at an agreed upon timetable, and with the appropriate amount of detail depending on the stakeholder.

[Attachment A](#) provides the SECD Reporting Workflow, with associated information about the steps in the workflow.

1.5 Personnel

In each District, specific personnel will be required to assist with data management, data entry, and data collection. Districts with more SECD may require additional personnel.

1.5.1 Laboratory Liaison

A Lab Liaison would be used to ensure that NAHLN laboratories are not overwhelmed by requests for information. A Lab Liaison from each District will be able to contact the NAHLN laboratories and request additional information if needed for each of the States within the District. The Lab Liaison will be the single point of contact for field personnel who require additional information from the laboratories.

1.5.2 Disease Reporting Officer (DRO)

In each District, a DRO will have access to all the data on premises in States within the District. In some cases, more than one DRO may be necessary. The DRO would be the critical control point for determining premises status and herd plan status.

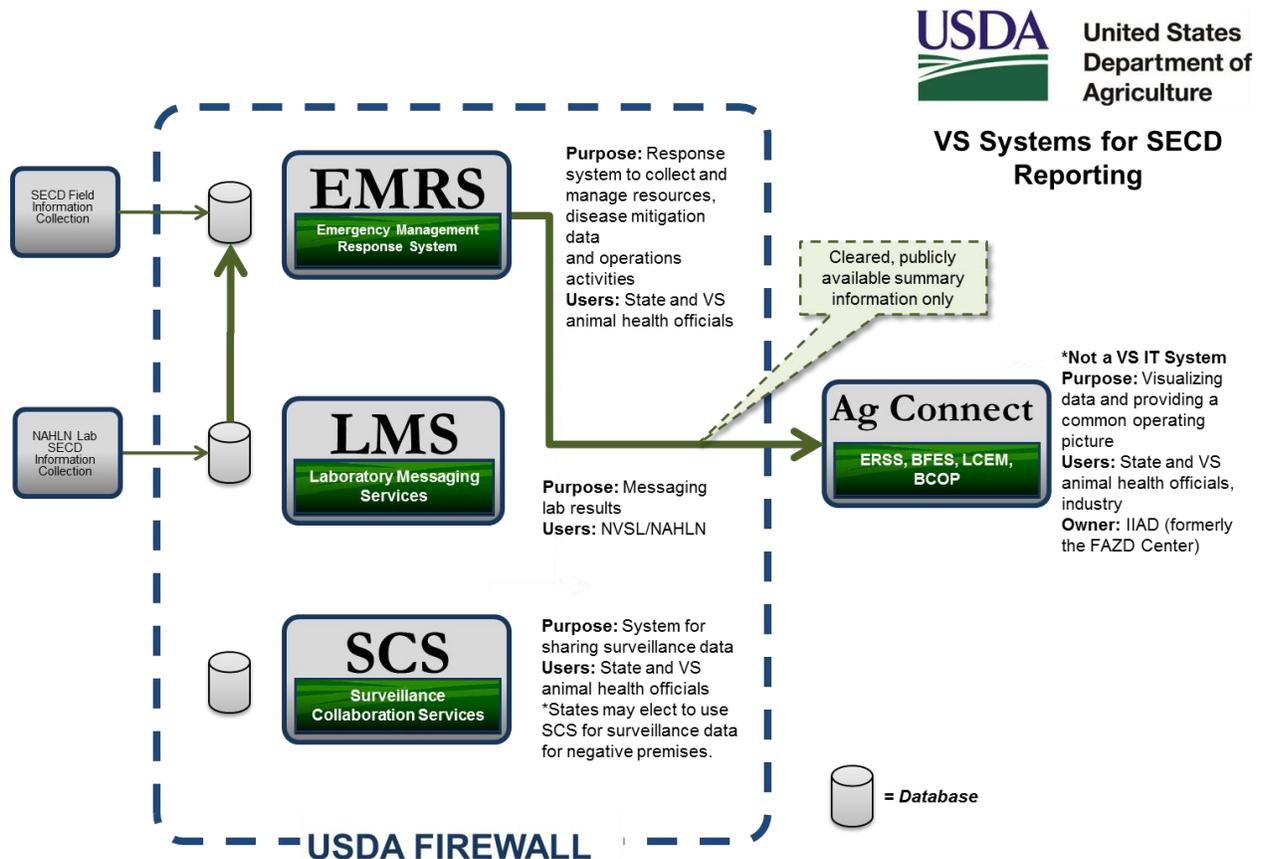
1.6 VS IT Systems

The VS Office of the Chief Information Officer (CIO) is responsible for developing, deploying, and supporting IM systems to support the data management requirements for these procedures. VS will use the following IM systems for SECD reporting:

1. EMRS2
2. LMS
3. SCS

Figure 1-1 provides an overview of these systems for SECD reporting. The following sections provide further information on the three IM systems listed above; this information broadly discusses the use and functionality of each of the systems.

Figure 1-1. SECD Data Flow for Reporting



1.6.1 Emergency Management Response System 2.0 (EMRS2)

EMRS2 is a web-based application used by Federal, State, Tribal, and local animal health officials in reporting routine investigations of suspected foreign animal diseases (FADs); surveillance and disease control programs; State specific disease outbreaks; and national animal health emergency responses. This IM system provides the capability to record information and manage various events, including SECD.

It automates the collection, management, and analysis of data. This system uses an n-tier architecture for increased scalability and reliability, consisting of separate load-balanced, high availability workgroups. It complies with USDA’s stringent security controls and protocols. The technical architecture can be upgraded to allow for increased business processing requirements on an ongoing basis. All system components are compliant with the Federal Information Security Management Act (FISMA) assessment and authorization security process.

1.6.1.1 Business Objectives

There are four overarching objectives for EMRS2, which indicate the scope and scalability of the system. They include the following:

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- *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, procedures, outreach and communication materials, and Incident Command System forms.
 - *Enterprise Reporting.* National, State, and local reports through multiple methods, including geographic information system (GIS) reporting and EMRS2 data.

1.6.1.2 Functionality

The EMRS2 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. EMRS2 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 EMRS2 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/Emerging Disease Incidents (EDI) and all-hazard animal incidents.

Data entered into EMRS2 can be exported for use with other applications, reporting, and data analysis.

1.6.1.3 Access and Use

Access to EMRS2 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 EMRS2 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.

EMRS2 is the official system of record for SECD reporting. For questions, please contact a local EMRS2 Network Associate. Further EMRS information is also available on the [USDA EMRS](#) website.

1.6.2 Laboratory Messaging Services (LMS)

LMS, a system used by NAHLN laboratories to quickly and accurately report laboratory results for animal diseases, 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 reuse in systems such as EMRS2.
- Integrates with existing networks, which allows the 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 findings for each submission, which allows for 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.

1.6.2.1 Functionality

LMS has three key components:

- *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 Laboratory Information Management Systems. 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.

1.6.3 Surveillance Collaboration Services (SCS)

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

States may elect to enter surveillance data about negative premises in SCS.

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.

The main functions that the SCS (CoreOne) 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, 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.

1.7 Data Sharing/Exchange Initiatives

1.7.1 AgConnect

AgConnect resides outside of the APHIS firewall. AgConnect, from the Institute for Infectious Animal Diseases (IIAD) at Texas A&M University, is a suite of customizable data integration and analysis products designed to provide improved situational awareness. AgConnect was developed through initial funding through VS Cooperative Agreements; it has since been supported by the Department of Homeland Security (DHS).

AgConnect can integrate data from other sources, bringing together complex streams of information, and is intended to provide decision-makers with coordinated information and a common operating picture. AgConnect also supports continuity of business planning, laboratory capacity estimation, as well as real-time collection of epidemiology information. For SECD, AgConnect may be leveraged to visualize publicly available summary data, provided through EMRS2.

For more information on AgConnect, please see: <http://fazd.tamu.edu/tools/agconnect-a-suite-of-customizable-data-sharing-tools/>.

1.7.2 Data Sharing

As States and VS adopt, implement, and use new IT systems, it is critical to actively work on data sharing and exchange initiatives to ensure data is not compartmentalized and that sharing of information is possible in the event of an animal health incident. Taking into account important data issues such as data integrity, data sharing, and exchange is an important priority of VS.

VS internal working groups are also developing policies, procedures, and agreements to facilitate appropriate data sharing.

Attachment 1.A SECD Reporting Workflow

Attachment 1.A contains Figure A-1, which outlines the SECD reporting workflow. Associated with Figure A-1 is Table A-1, which highlights and further defines the steps in the figure.

Figure A-1. SECD Reporting Workflow

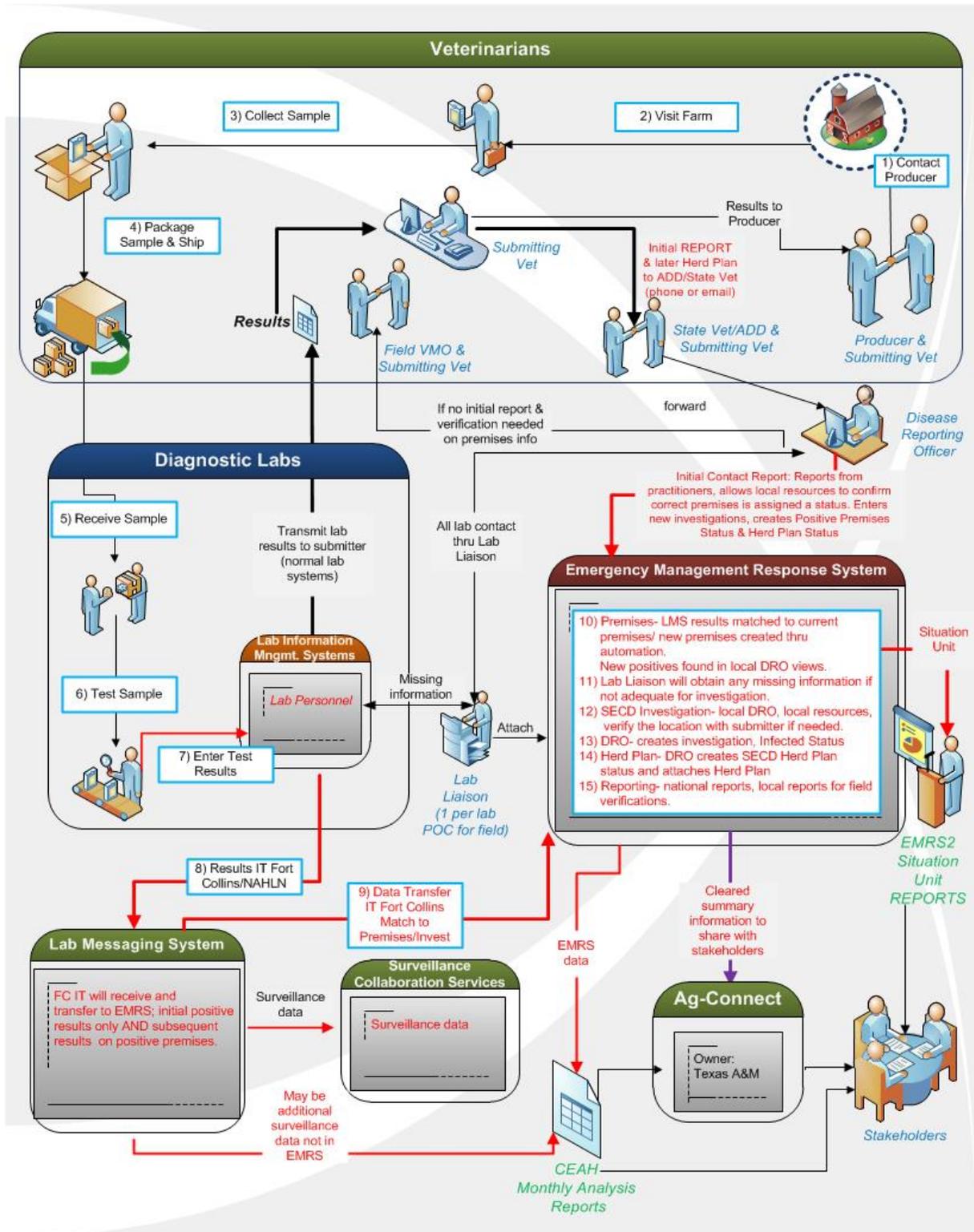


Table A-1. Detail of SECD Reporting Tasks

**Italics indicate steps occurring prior to the Federal Order thru normal business channels.*

Step	Description
1	<i>Swine veterinarian is contacted by a producer about clinical signs in his hogs.</i>
2	<i>The veterinarian visits one or more of the producer's premises.</i>
3	<i>The veterinarian collects one or more sets of specimens.</i>
4	<i>The veterinarian or his staff packages and ships specimens to his lab.</i>
5	<i>The lab staff receives the specimens and enters the accession into their Lab Information Management System.</i>
6	<i>The lab staff test the specimens submitted using the appropriate methods.</i>
7	<i>The lab staff enters tests conducted and results in their Lab Information Management System and when completed, transmits results thru their normal channels to the submitting veterinarian.</i>
8	Results are transferred thru HL7 messaging or spreadsheet (direct upload) by the NAHLN coordination staff. These transfers currently occur weekly, but are being updated to occur daily to the VS LMS.
9	Managed by VS IT, an automated process runs hourly that will take any positive lab result or any subsequent result from a current SECD Positive Premises and create a LMS result in EMRS.
10	An automated process by VS IT matches a positive result to existing premises in EMRS based on the premises on the test result or creates a new premises and matches the result. These results are readily available for view to each DRO in the Districts. DROs can review any new positive results daily, and determine if they have an initial report already submitted by the submitting veterinarian that will concur that the premises listed is the actual premises where the positive specimen originated.
11	If there is no Initial Report (in EMRS) for this premises or if this premises has not been designated as infected previously, the DRO would then determine if there is adequate information for themselves (or a field VMO) to contact the submitting veterinarian to validate the result. If there is not adequate information available to determine the submitter, they would contact the designated Lab Liaison to obtain that information from the lab submission. [Note: Since contacting the lab directly will result in delays and disruptions in lab services, a list of Lab Liaisons will be made available as soon as they are designated.]
12	DRO or Field VMO makes contact with the submitting veterinarian if needed to verify accuracy of lab results in EMRS. This is in order to make sure there were no errors in data entry or if multiple premises were submitted on a single submission, and to sort out the correct premises.
13	DRO creates an SECD investigation in EMRS on the verified premises and redirects LMS results if needed to the appropriate premises. The DRO verifies the testing meets the current case definition for a Positive Herd and opens a Positive or Presumptive Positive Status in EMRS. [Note: There is a critical control point here to make sure the premises is the correct premises sampled and the results meet the case definition for a Positive Premises. This will ensure accuracy of the Positive Premises list.]
14	When a DRO receives a forwarded SECD Herd Plan from a State Veterinarian or Assistant Area Director, they create a SECD Herd Plan status in EMRS for that premises. [Note: This is important because this will allow the reporting of Positive Premises and those covered by a current Herd Plan to facilitate efficient payment of reimbursements.]
15	National Situation Reports for Stakeholders will be produced by the Situation Unit weekly.

Attachment 1.B Information on Laboratory Data

Data fields required / requested for SECD test results submitted from NAHLN laboratories are as follows in Table B-1.

Table B-1. Data Fields Required/Requested from NAHLN Laboratories

Data Field
Premises ID*
Date Collected*
Lab Name**
Accession Number**
Specimen ID or Barcode Number**
Animal ID
Sample Collection Site City
Sample Collection Site State*
Sample Collection Site Zip
Age Class or DOB***
Specimen type
Date Tested
Test type*
Test result*
Submitter last name**
Submitter first name**
Submitter phone number**
Comments

* Required per Federal Order

** Required for incident information management SOP or for reimbursement

*** Age class or date of birth (DOB) is used to indicate production unit type as required per the Federal Order

Attachment 1.C Abbreviations

APHIS	Animal and Plant Health Inspection Service
CIO	Chief Information Officer
COTS	commercial off-the-shelf
DHS	Department of Homeland Security
DRO	Disease Reporting Officer
EDI	emerging disease incident
EMRS2	Emergency Management Response System 2.0
FAD	foreign animal disease
FISMA	Federal Information Security Management Act
GIS	Geographic Information System
HL7	Health Level Seven
IIAD	Institute for Infectious Animal Diseases
IM	information management
IT	information technology
LMS	Laboratory Messaging Services
LOINC	Logical Observation Identifiers Names and Codes
NAHLN	National Animal Health Laboratory Network
PDCoV	porcine delta coronavirus
PEDV	porcine epidemic diarrhea
PIN	premises identification number
SECD	swine enteric coronavirus disease
SCS	Surveillance Collaboration Services
SNOMED	Systematized Nomenclature of Medicine
USDA	U.S. Department of Agriculture
VS	Veterinary Services