

DRAFT

GUIDELINES FOR CLASSIFICATION OF PHASES AND TYPES OF A CLASSICAL SWINE FEVER OUTBREAK AND RESPONSE

March 22, 2015

Version 2.2

The following guidelines are being developed as an aid for rapid decision making to facilitate response planning and development of business continuity plans in the event of a classical swine fever (CSF) outbreak in domestic or feral swine in the United States. These guidelines are intended to supplement information and recommendations in the **FAD-PReP Classical Swine Fever Response Plan Red Book** (May 2013).

INTRODUCTION

Having pre-defined phases and potential types of a CSF outbreak will facilitate development of adaptable emergency response and business continuity plans for the U.S. swine industry. The phase is a temporal stage in a CSF outbreak response, the type is a categorical measure based on the potential magnitude of the outbreak. The phase and type of the CSF outbreak is expected to change over time and could be designated by the authorities responsible for managing the response. Different regions of the United States or segments of the swine industry may be designated as being involved in different phases or types of a CSF outbreak simultaneously.

Goals for Response to a CSF Outbreak

(Information taken from the FAD-PReP Classical Swine Fever Response Plan Red Book (May 2013))

The goals of a CSF response are to (1) detect, control, and contain CSF in domestic swine as quickly as possible; (2) eradicate CSF using strategies that seek to stabilize animal agriculture, the food supply, the economy, and protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected swine and non-contaminated pork products.

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

A further objective is to ensure that CSF does not become established in feral swine.

The internationally accepted standards for regaining CSF-free status are found in the World Organization for Animal Health (OIE) Terrestrial Animal Health Code (TAHC) (2014) (www.oie.int/international-standard-setting/terrestrial-code/access-online/) (Chapter 15.2).

The phase and type designations below are guidelines and may be modified by the responsible authorities to best fit the specific outbreak. The types of outbreak are aligned with different strategies for regaining CSF free status in the OIE TAHC. Descriptors defining different phases and types (for example, focal, moderate, regional) are intentionally left vague in recognition that responsible authorities will need to make decisions based on available information regarding specific outbreak characteristics.

Important Factors to Consider in Planning for the Response to a CSF Outbreak in the United States (Information taken from: OIE TAHC, FAD PReP CSF Response Plan: The Red Book and CFSPH CSF Fact Sheet)

CSF is highly contagious. The United States eradicated CSF in 1978, but it continues to be prevalent throughout most of the world. The pig is the only natural host for CSF virus (CSFV) (all species of domestic, feral and wild pigs, including European wild boar (*Sus scrofa scrofa*) and collared peccaries). Infected pigs are the only reservoir of the virus. **CSF is not a food safety or public health concern.**

The severity of this disease varies with the strain of the virus, the age of the pig, and the immune status of the herd. Acute infections, which are caused by highly virulent isolates and have a high mortality rate, are likely to be diagnosed rapidly. However, infections with less virulent isolates can be more difficult to recognize, particularly in older pigs. The wide range of clinical signs and similarity to other diseases can make CSF challenging to diagnose. For example, low virulent CSF strains present in the Caribbean are capable of infecting swine with little or no clinical signs. An infection might spread extensively before being diagnosed as part of an ongoing surveillance effort.

Sows can be infected at any stage of gestation and the virus may cross the placenta and infect the fetuses. The outcome of fetal infection depends on the strain virulence and the time of gestation when the infection occurs. Pigs born to sows infected with CSFV during gestation may be stillborn, aborted or mummified. Those pigs born alive may be persistently infected.

Virus shedding can begin before the onset of clinical signs, and occurs throughout the course of acute or subclinical disease. Chronically or persistently infected pigs can shed virus continuously or intermittently for months.

CSFV is easily transmitted due to its ability to survive in the environment and in pork products. Transmission between pigs occurs mainly by the oral or oronasal routes, via direct or indirect contact. Virus can be shed in saliva, lacrimal secretions, blood, urine, feces, and semen. Transmission may occur through feeding uncooked contaminated pork products including garbage and cured pork meat, or may be spread by genital transmission or artificial insemination. The virus can also be transmitted on fomites and by mechanical spread. Airborne transmission seems to be possible over short distances; however, the maximum distance the virus can spread is unclear. CSFV survival time in chilled pork is up to 3 months, up to 4 years in frozen pork and pork products, and 17-180 days in salted or smoked meat.

The incubation period for acute disease can range from 2 to 14 days, depending on the virulence of the strain, the route of infection and the dose.

The OIE TAHC (chapter 15.2) makes a distinction between domestic and captive wild pigs vs. wild and feral pigs. Under specific conditions, it is possible for a country with CSF infection in wild and feral pigs to be considered free of CSF in domestic and captive wild pigs for the purposes of international trade.

The United States recognizes some, but not all, states in Mexico to be free or low-risk of CSF. Central America and the Caribbean are not considered to be CSF-free. ([Click here for list](#)).

Vaccines for CSF

(Information taken from NAHEMS Guidelines: Vaccination for Contagious Diseases; Appendix B: Vaccination for Classical Swine Fever)

Inactivated whole virus vaccines are not effective or available for use. Live Attenuated Virus vaccines also known as Modified Live Virus (MLV) vaccines, made from attenuated CSFV strains, are the most widely used vaccines in countries with endemic CSF. In countries where CSF has become endemic in the feral swine population, oral vaccination of feral swine has been practiced using a MLV vaccine delivered in oral baits.

Countries free of CSF may not allow the use of MLV vaccines because it is impossible to differentiate animals vaccinated with MLV vaccines from animals infected with the field strain using serology or by PCR after the virus is cleared. Subunit or chimeric 'marker vaccines' induce antibodies that can be distinguished from those produced by animals infected with the field strain utilizing an accompanying serological test. The 'marker vaccines' which have been marketed previously use the CSFV major envelope glycoprotein E2 produced in a baculovirus recombinant system. These vaccines have the potential to allow the Detection of Infection in Vaccinated Animals (DIVA). These DIVA tests are not sufficiently sensitive to reliably detect individual animals that are infected. They are used on a herd basis.

Important Differences between FMD, CSF and ASF for Management of a Disease Outbreak

- CSF and ASF only affect swine. FMD affects all cloven hooved animals.
- The availability of effective vaccines for FMD and CSF (unlike ASF) enables the use of vaccination to suppress an extensive outbreak before entering the final phase of disease eradication. This was the approach used for the successful eradication of CSF from the United States. Some vaccines for FMD and CSF are marker vaccines that allow serologic detection of infection in vaccinated herds to facilitate eradication programs. There is only one antigenic type of CSF virus, therefore a single vaccine can be effective against all strains of CSF virus (Unlike FMD which requires multiple vaccines, each specific for one or a few topotypes).
- Since CSF and ASF are limited to swine, the resources for stamping out, carcass disposal and indemnity can be focused on swine and may allow more extensive stamping out than would be possible for FMD which also affects ruminants.
- Unlike FMD, CSF and ASF can become established and maintained in feral swine. FMD is not believed to be maintained in feral swine after it is eradicated from domestic animals.

- The OIE may recognize domestic and captive wild pigs in a country to be CSF free even if feral swine are infected (assuming adequate separation of domestic swine from feral swine). Countries with FMD in feral swine cannot be recognized as FMD-free until the disease is also eradicated from feral swine. It is unlikely that trading partners would consider any country with ASF in feral swine to be ASF-free for commerce.
- CSF is present in parts of Mexico and the Caribbean, ASF and FMD are not.
- The United States has a long established surveillance program in place for CSF through the NAHLN laboratories.

Controlled Movement Plans for Commercial Swine Production Systems

Commercial swine production systems depend on extensive movement of animals between premises at different stages of production and to slaughter. Stop movement may result in the need to euthanize animals for welfare reasons because there is not enough space to accommodate the animals. Commercial swine operations have extensive expertise and ability to manage disease within their systems. In the event of a CSF outbreak, they should be asked to rapidly develop and submit a controlled movement plan, consistent with the biosecurity and surveillance requirements of the Secure Pork Supply (SPS) Plan which minimizes both the risk of disease transmission and the need to euthanize animals. If the Incident Management officials approve the controlled movement plan for the production system, this plan can serve as the basis for issuing movement permits for the system premises in the Control Area. If a packing plant receives only swine from commercial swine systems which have implemented the biosecurity and surveillance requirements in the SPS Plan, and are issued movement permits based on evidence of CSF free status, pork products from the plant could be offered for export to countries which accept the very low risk of CSF virus in pork product from the SPS Participating Systems. **The impact of importing pork products that meet these criteria for countries which are already positive for CSF is negligible.**

PROPOSED PHASES AND TYPES OF CSF OUTBREAKS

Heightened alert phase: CSF outbreak in Canada, Mexico, or the Caribbean but not the United States

A heightened alert phase is invoked if CSF in either Canada, Mexico or the Caribbean could threaten to spread to the United States. The United States could be considered to be currently on heightened alert for CSF since parts of Mexico and countries in the Caribbean are not recognized as either CSF free or low risk.

Therefore CSF surveillance is proactively conducted in the United States through the Classical Swine Fever Surveillance Program (from FAD PReP CSF Redbook). This program conducts surveillance in five swine populations through tissue and serology samples:

- Sick pigs submitted to diagnostic laboratories,
- Pigs condemned at slaughter by USDA Food Safety and Inspection Service (FSIS),
- High-risk swine populations, including waste-feeding operations and high risk swine herds,
- Feral swine, and
- Swine FAD investigations submitted to FADDL as suspicious for CSF.

In the event of a CSF outbreak, additional, targeted surveillance would occur with the objective of not only detecting CSF-infected swine, but to determine the extent of the outbreak and to monitor progress toward eradication.

An active outbreak of CSF in Canada, Mexico, or the Caribbean could produce a heightened threat of spread to the United States if Control Areas are near or cross over the United States border or epidemiologically-linked premises export swine or uncooked swine products to the United States. If this were to occur, the following additional steps could be taken:

- Discontinue all imports of susceptible animals and animal products from the affected country into the United States.
- Work collaboratively with the affected country (as appropriate to that country's response plan) to assist them to:
 - Establish Control Areas around Infected Premises and Contact Premises
 - Implement controlled stop movement of susceptible animals in the Control Area and restrict other movements (vehicles, animal products, etc.) as appropriate to that country's response plan
 - Initiate stamping-out of infected and contact herds
 - Enforce biosecurity protocols within the Control Area
 - Conduct enhanced surveillance for CSF
- Advise State and Tribal authorities to ensure that their swine premises ID data is up to date and to be prepared for animal tracing.
- Activate Incident Management Teams, an Incident Coordination Group or logistics and communication support as needed.
- Implement an enhanced national CSF surveillance plan.
- Enhance surveillance for CSF at U.S. slaughter plants, buying stations and ports of entry.
- Conduct tracing and surveillance of swine imported from the CSF affected region or country within the last 28 days prior to the date of first infection of the index case.
- Initiate stop movement, quarantine and perhaps stamping-out of herds in the United States with epidemiological evidence of direct or indirect contact with infected herds.
- Advise all swine operations (including markets, fairs, exhibitions, etc.) in the United States to implement CSF-specific biosecurity plans.

Steps to take upon the first case of CSF in the United States and to continue for the duration of the outbreak

- Advise all swine operations (including markets, fairs, exhibitions, etc.) in the United States to implement CSF-specific biosecurity plans and continue until freedom from CSF is re-established.
- Emphasize, and enhance enforcement of, requirements for garbage feeding of swine in the United States.
- Allow movement of non-susceptible animals and their products (including eggs and milk) from the Control Area (from premises with no swine) into commerce with adequate truck and driver biosecurity for the duration of the outbreak.

PHASE 1

The period of time from the confirmation of the first CSF case in the United States until there is reasonable evidence to estimate the extent of the outbreak. The transition to Phase 2 should be accomplished as soon as possible, with a goal of less than 4 days.

- Establish Control Areas around Infected Premises and Contact Premises.
 - Require premises ID for all swine facilities in the Control Area
- Stand-up a Unified Incident Command.
 - Logistics support may be required.
 - Activate a Joint Information Center; coordinate communication, including public hotlines and other resources.
- Stand-up Incident Coordination Group and Multiagency Coordination Group(s), if not previously established.
- Implement controlled stop movement of susceptible animals in the Control Area and restrict other movements in the Control Area (vehicles, etc.) as appropriate (as permitted by SPS plans, see SPS Plan Appendix D: Factors to Consider in Implementing Controlled Movement of Swine).
- Initiate quarantine and stamping-out of infected and contact herds
- Implement an enhanced national CSF surveillance plan for the Control Area(s) and Free Area.
- Enforce biosecurity protocols within the Control Area(s).
- Work with USDA APHIS Wildlife Services and other appropriate Federal, State, and Tribal authorities to initiate the containment, testing, and then eradication of feral swine in the Control Area (if possible).
- States may activate livestock emergency response teams or notify them to be on “standby”.

PHASE 2

Surveillance and epidemiology provides timely evidence of the extent of the outbreak (characterized as one of four types) to support planning and decision making by Incident/Area Command.

Type 1 - Focal CSF Outbreak

Focal area of infection limited to one State or small region with low to moderate swine numbers on small to moderate sized premises. Epidemiologic investigation and surveillance indicates that it has not spread beyond the initial few premises. The Infected Premises have not had extensive animal movement and are not too large to depopulate quickly. **Rapid stamping-out in domestic swine is feasible.**

- Continue strict quarantines/movement controls for live animals, vehicles, etc. within the Control Area (movement as permitted by specific Secure Food Supply business continuity plans).
- Continue stamping-out with rapid depopulation, disposal, cleaning, and disinfection of Infected and Contact Premises.
- Only allow movement of pigs from the Control Area after an epidemiologic evaluation indicates no evidence of direct or indirect contact with any swine or fomites from any Infected or Contact Premises and the pigs test negative for CSF virus.

- Verified level 2 biosecurity from the SPS plan must be in place on a premises for at least 28 days before swine from that premises can move from the Control Area.
- Trace back and trace forward animal movements from Infected Premises for the previous two incubation periods (28 days, incubation period is 14 days).
- Work with Wildlife Services, and appropriate Federal, State, and Tribal authorities to contain, test and then eradicate feral swine in the Control Area(s) (if possible). Dispose of all feral swine carcasses in a biosecure manner.
- If there is evidence of infected feral swine, depopulate all swine premises in the Control Area that do not have sufficient biosecurity to ensure that feral swine do not infect domestic swine.
- Design and implement surveillance to obtain data, and then apply to the OIE for recovery of CSF-free status without vaccination. **CSF-free status without vaccination may be regained 3 months after the last case if stamping-out without vaccination is practiced (OIE TAHC Article 15.2.6).**

Type 2 – Moderate Regional CSF Outbreak

A few focal areas of infection limited to a region with low to moderate swine numbers on small to medium size premises. Depending on animal density, sufficient vaccine and resources can be made available to vaccinate designated swine herds to reduce virus transmission. Epidemiologic investigation and surveillance indicate CSFV has not spread beyond the region. The Infected Premises have not had extensive animal movement out of the Control Area and are not too large to depopulate quickly. **Rapid stamping out augmented with emergency vaccination-to-kill or vaccination-to-slaughter (with conventional MLV CSF vaccine) or vaccination-to-live with a DIVA compatible vaccine is a feasible strategy. All vaccination is discontinued as the outbreak comes under control.**

- Establish Area Command to coordinate multiple Incident Management Teams in the affected region.
- Continue strict quarantines/movement controls for live animals, vehicles, etc. within the Control Area. Consider allowing movement of non-infected animals (including vaccinates) according to the SPS Plan. Animals must meet vaccination withdrawal period (if it applies) and be able to pass FSIS ante-mortem inspection to be slaughtered.
- Continue rapid stamping-out of Infected and Contact Premises.
- Consider establishing a Containment Vaccination Zone and/or Protection Vaccination Zone with eventual depopulation and disposal, or slaughter and processing, of animals vaccinated with a conventional MLV vaccine. Animals vaccinated with a DIVA vaccine may be vaccinated-to-live.
 - Vaccinate-to-kill: killing means any procedure which causes the death of an animal that does not enter the human food chain (depopulation and disposal).
 - Vaccinate-to-slaughter: slaughter means any procedure which causes the death of an animal by bleeding where the animal may enter the human food chain (slaughter and processing).
 - Vaccinate-to-live: the animal is allowed to live out its useful life-span.
- Officially identify all vaccinated domestic swine for surveillance and monitoring purposes.
- Initiate vaccination of feral swine using oral baits if they are determined to be a significant contributor to disease spread.
- No new vaccinations will be administered more than 28 days after the last known new case of CSF is detected. Design and implement surveillance to obtain data, then apply to the OIE for recovery of CSF-free status. **CSF free status may be restored three months after the last case**

and the slaughter of all vaccinated animals, or three months after the last case without the slaughter of vaccinated animals where there are means, validated according to Chapter 2.8.3. of the Terrestrial Manual, of distinguishing between vaccinated and infected pigs (OIE TAHC Article 15.2.6.

Type 3 – Large Regional or National CSF Outbreak

Multiple areas of infection are detected in a region, or the type, number and/or size of infected and contact herds are too great to depopulate quickly enough to suppress disease spread. Depending on the epidemiological situation, there may not be sufficient vaccine and resources available to vaccinate designated swine herds to reduce virus transmission. **The number of affected animals and premises is too great to continue stamping out. Vaccinate-to-slaughter (with conventional MLV CSF vaccine), and/or vaccinate-to-live with a DIVA compatible vaccine is a feasible strategy. Vaccination with non-DIVA compatible vaccines is discontinued as the outbreak comes under control.**

- Consider transitioning from an emergency response program to long-term eradication and control program.
- Continue strict quarantines/movement control for live animals and vehicles, etc. within the Control Area. Consider allowing movement of non-infected animals (including vaccinates) according to the Secure Food Supply Plans. Animals must meet vaccination withdrawal period (if it applies) and be able to pass FSIS ante-mortem inspection to be slaughtered.
- Stamping-out of Infected and Contact Premises will be discontinued. Some Infected and Contact Premises (or severely affected individual animals) may be depopulated based on epidemiologic, economic, or humane considerations.
- A vaccinate-to-live policy may be considered to reduce the shedding and spread of the virus. DIVA vaccine should be used if available. If not available, conventional MLV vaccine could be used to suppress disease spread. Discontinue use of conventional vaccine when sufficient DIVA vaccine becomes available, or when the outbreak is coming under control and can be managed by biosecurity.
- Initiate vaccination of feral swine using oral baits if they are determined to be a significant contributor to disease spread.
- Officially identify all vaccinated domestic swine for surveillance and monitoring purposes. Some Infected and Contact Premises may be depopulated by movement of healthy animals to slaughter; healthy animals that pass FSIS ante-mortem and post-mortem inspection can be slaughtered and enter the food chain.
- Swine production systems infected with CSF virus should develop a plan acceptable to the Unified Incident Command for controlled depopulation and repopulation of premises.
- No new vaccinations with non-DIVA compatible vaccines will be administered more than 28 days after the last known new case of CSF is detected. Design and implement surveillance to obtain data, then apply to the OIE for recovery of CSF-free status. **Since stamping out was discontinued, Article 15.2.3 of the OIE TAHC applies (see Appendix A). Regaining CSF-free status will require at least a year after the last case.**

Type 4 - North American CSF Outbreak

Widespread areas of infection are detected involving a large portion of the United States, Canada, and/or Mexico. Sufficient vaccine and resources are not available to quickly vaccinate all designated susceptible animals in the affected regions/countries. The number of vaccinated animals is too great to consider a vaccinate-to-kill policy. It becomes apparent that CSF is widespread, and will not be eradicated within a year.

- Implement the same steps as a Type 3 outbreak. In addition:
- Work with officials in Canada and Mexico to implement a North American plan for animal and animal product movement.
- Work with officials in Canada and Mexico to implement a comprehensive North American CSF control program, including vaccination once sufficient vaccine becomes available.

PHASE 3

Recovery: Surveillance and epidemiologic evidence indicates that the outbreak is under control and a plan is implemented to regain CSF-free status (perhaps in domestic and captive wild pigs only).

PHASE 4

The United States is declared free of CSF (perhaps in domestic and captive wild pigs only). The USDA continues to work to convince trading partners to accept U.S. exports of animals and animal products.

Please send comments and suggestions to:

James A. Roth, DVM, PhD
Director, Center for Food Security and Public Health
Executive Director, Institute for International Cooperation in Animal Biologics
College of Veterinary Medicine
Iowa State University
Ames, Iowa 50011
Phone: 515-294-8459
Email: jaroath@iastate.edu

Appendix A

OIE Terrestrial Animal Health Code 2014 Chapter 15.2. Classical swine fever (Selected Articles)

Article 15.2.6

Recovery of free status

Should a CSF *outbreak* occur in a free country or *zone*, the free status may be restored where *surveillance* in accordance with Articles 15.2.26. to 15.2.32. has been carried out with negative results either:

- 1) three months after the last *case* where a *stamping-out policy* without *vaccination* is practised;
- OR

where a *stamping-out policy* with emergency *vaccination* is practised:

- a) three months after the last *case* and the *slaughter* of all vaccinated *animals*, or
- b) three months after the last *case* without the *slaughter* of vaccinated *animals* where there are means, validated according to Chapter 2.8.3. of the *Terrestrial Manual*, of distinguishing between vaccinated and infected pigs;

OR

- 3) where a *stamping-out policy* is not practised, the provisions of Article 15.2.3. should be followed.

The country or *zone* will regain CSF free status only after the submitted evidence, based on the provisions of Article 1.6.10., has been accepted by the OIE.

Article 15.2.3

CSF free country or zone

A country or *zone* may be considered free from CSF when Article 15.2.2. is complied with, and when:

1. *surveillance* in accordance with Articles 15.2.26. to 15.2.32. has been in place for at least 12 months;
2. there has been no *outbreak* of CSF in domestic and *captive wild* pigs during the past 12 months;
3. no evidence of *infection* with CSFV has been found in domestic and *captive wild* pigs during the past 12 months;
4. no *vaccination* against CSF has been carried out in domestic and *captive wild* pigs during the past 12 months unless there are means, validated according to Chapter 2.8.3. of the *Terrestrial Manual*, of distinguishing between vaccinated and infected pigs;
5. imported pigs and pig *commodities* comply with the requirements in Articles 15.2.7. to 15.2.14.

The country or the proposed free *zone* will be included in the list of CSF free countries or *zones* only after the submitted evidence, based on the provisions of Article 1.6.10., has been accepted by the OIE. Retention on the list requires that the information in points 1 to 5 above be re-submitted annually and changes in the epidemiological situation or other significant events should be reported to the OIE according to the requirements in Chapter 1.1.

Article 15.2.7

Recommendations for importation from countries, zones or compartments free from CSF

For domestic and captive wild pigs

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the *animals*:

- 1) showed no clinical sign of CSF on the day of shipment;
- 2) were kept in a country, *zone* or *compartment* free from CSF since birth or for at least the past three months;

- 3) have not been vaccinated against CSF, nor are they the progeny of vaccinated sows, unless there are means, validated according to Chapter 2.8.3. of the *Terrestrial Manual*, of distinguishing between vaccinated and infected pigs.

Article 15.2.8

Recommendations for importation from countries or zones considered infected with CSFV

For domestic and captive wild pigs

Veterinary Authorities should require the presentation of an *international veterinary certificate* attesting that the *animals*:

- 1) showed no clinical sign of CSF on the day of shipment;
- 2) were kept since birth or for the past three months in a CSF free compartment;
- 3) have not been vaccinated against CSF nor are they the progeny of vaccinated sows, unless there are means, validated according to Chapter 2.8.3. of the *Terrestrial Manual*, of distinguishing between vaccinated and infected pigs.