

USDA APHIS
VETERINARY
SERVICES

Planning and Preparing for
**Foot-and-Mouth
Disease**



Quick Briefing



United States
Department of
Agriculture

October 2020

OVERVIEW OF FOOT-AND-MOUTH DISEASE (FMD)

1. WHAT IS FMD?

- FMD is a highly contagious viral disease.
- There are 7 serotypes and more than 80 subtypes of the FMD virus.
 - FMD can affect domestic and wild cloven-hoofed animals.
- Domestic animals include cattle, swine, sheep, goats, and domestic cervids.
- Cloven-hoofed wild animals include deer, bison, pronghorn antelope, and feral swine.
 - Animals with FMD typically have a fever, vesicular (blister-like) lesions, and subsequent erosions (ulcers) on the inner surfaces of and around the mouth, tongue, nostrils, muzzle, feet, and teats.
 - Rates of illness can be high in all susceptible species, resulting in reduced productivity in meat and milk.
 - Death rates can be high in young animals.

2. IS FMD A THREAT TO PUBLIC HEALTH?

- FMD is not a threat to public health.
- FMD virus is not the same virus that causes hand-foot-and-mouth disease in humans.
- Meat and milk processed from FMD-infected animals is safe to eat/drink.
- In a widespread FMD outbreak, the supply of protein available for consumers could be affected.

3. DOES THE UNITED STATES HAVE FMD?

- The United States is free of the FMD virus
- The United States last experienced an FMD outbreak in 1929.
- Canada has not had an outbreak since 1952; Mexico has not had an outbreak since 1954.
- FMD is not presently found in North America, Central America, Western Europe, Australia, or New Zealand.

4. WHERE IS THE FMD VIRUS FOUND IN THE WORLD?

- FMD is found in parts of Africa, Asia, Eastern Europe, the Middle East, and parts of South America.
- FMD is present in approximately two-thirds of the countries in the world.

5. HAVE THERE BEEN RECENT FMD OUTBREAKS IN THE WORLD?

- FMD causes many outbreaks each year.
- Outbreaks occur sporadically in non-endemic areas.

RELEVANCE OF FMD

6. WHO IS CONCERNED ABOUT FMD?

- FMD is a high priority for the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), and the U.S. Department of Homeland Security (DHS).
- FMD is also a concern for State Animal Health Officials, livestock producers, and many other stakeholders in animal agriculture due to the potential large economic impact and consequences for consumers.

7. WHY IS FMD SO CONCERNING?

- FMD is one of the most contagious diseases of livestock.
- In 2017, the USDA National Agricultural Statistics Service estimated that there were approximately 166 million cattle and swine in the United States, along with another 8 million sheep and goats—all of these animals are susceptible to FMD.
- An outbreak of FMD in the United States would have a substantial and detrimental impact on the agricultural economy.
- FMD outbreaks in other countries have had a significant negative impact on their economies: FMD in the United Kingdom (2001) had estimated losses of \$12-18 billion (2017 U.S. dollars, adjusted for inflation), including the tourism impact.

- Research suggests an outbreak in the United States could result in losses of over \$6 billion, even if contained to one state, and scores of billions of dollars, depending on the duration of the outbreak, extent of trade embargoes, and reaction of consumers to the disease and response measures.

8. WHY IS FMD SO ECONOMICALLY DAMAGING?

- In an FMD outbreak of any size, there would be immediate disruptions to international exports of meat, meat products, and byproducts from cattle, swine, sheep, and goats.
 - In a large multistate FMD outbreak, international trade would be severely impacted, potentially for an extended period of time.
 - There would also be losses from disruptions to interstate commerce and production.
- Highly integrated animal agriculture relies on rapid and just-in-time movements.
 - Disruption (e.g., stop movement orders) of intrastate and interstate animal and product movement (such as milk) could interrupt food supply chains in both the short- and long-term.
- The direct costs of controlling an outbreak would be high—indemnity payments could be large, and activities such as depopulation and humane euthanasia activities for animal welfare, carcass disposal, disinfection, and vaccination are resource and personnel intensive.
 - In addition to direct costs, there are numerous other indirect costs and impacts, including unemployment and potential losses or disruptions in related industries (such as grain, other feed products, tourism, etc.).

USDA APHIS RESPONSE STRATEGY

9. WHAT DOES USDA APHIS PLAN TO DO IN AN FMD OUTBREAK?

- USDA APHIS will work to achieve its goals for an FMD response. These goals are to (1) detect, control, and contain FMD in animals as

quickly as possible; (2) eradicate FMD using strategies that seek to protect public health and the environment, and stabilize animal agriculture, the food supply, and the economy; and (3) provide science-and risk-based approaches and systems to facilitate continuity of business.

- Achieving these goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible.
- The objective is to allow the United States to regain FMD-free status and reestablish international trade without the response effort causing more disruption and damage than the outbreak itself.
- USDA will work with other Federal agencies, States, Tribes, and Territories to manage and control the outbreak in a unified approach alongside the owners, producers, industries, and communities affected.
- USDA—as part of a cohesive communications strategy—will assure consumers that USDA is responding quickly and decisively to eradicate the virus and that meat/meat products and dairy/dairy products are safe to consume.

10. CAN'T WE JUST STAMP-OUT FMD?

- Historically, FMD has been controlled by depopulating (also known as stamping-out) infected animals.
- Today, in the United States, complete stamping-out of anything beyond a small, focal FMD outbreak may not be a viable or sustainable response strategy.
- The cost of implementing a total stamping-out strategy could be inordinately high.
- The depopulation and disposal of large numbers of animals may not be publicly acceptable.
- There is not sufficient capacity to rapidly depopulate and appropriately dispose of large numbers of large animal carcasses.
- There may be severe and irreparable economic losses for producers from the loss of production animals and destruction of genetic stock.

- There are critical social and environmental consequences from large-scale animal depopulation; producers, owners, and communities can be devastated.
- There may be a lengthy interruption in the domestic food supply chain for key commodities destined for domestic consumption, including milk, meat, and cheese.

11. WILL APHIS VACCINATE OR STAMP-OUT?

- There are several response strategies that USDA APHIS will consider in response to an FMD outbreak in domestic livestock. These strategies are from the *FMD Response Plan: The Red Book* (a link is provided at the end of this document; please refer to this document for further information on the terms in this section).
- Stamping-out
 - *This strategy is the depopulation of clinically affected and in-contact susceptible animals.*
 - Stamping-out modified with emergency vaccination to kill
 - *This strategy is the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with subsequent depopulation and disposal of vaccinated animals. Depopulation and disposal of vaccinated animals may be delayed until logistically feasible, as determined by the Incident Command and the VS Deputy Administrator (U.S. Chief Veterinary Officer).*
 - Stamping-out modified with emergency vaccination to slaughter
 - *This strategy is the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with slaughter and processing of vaccinated animals, if animals are eligible for slaughter under USDA Food Safety and Inspection Service (FSIS) authority and rules and/or State and Tribal authority and rules.*
 - Stamping-out modified with emergency vaccination to live
 - *This strategy is the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, without subsequent depopulation of vaccinated animals. Vaccinated animals intended for breeding, slaughter, or other purposes live out their useful lives.*

- Emergency vaccination to live with no stamping-out.
- *This strategy is vaccination used without depopulation of infected animals or subsequent depopulation or slaughter of vaccinated animals.*
 - If it becomes apparent at any point in the FMD response that stamping-out will not achieve control, containment, and ultimately eradication of FMD, alternative strategies will be immediately considered, that of vaccination.
 - These strategies are not mutually exclusive. Different strategies may be implemented simultaneously in different animal populations or in different geographic regions.
 - Many factors will be considered when determining when to employ a particular response strategy; response strategies will be selected to best fit the outbreak situation.
 - No single factor will independently dictate a response strategy or a decision to employ emergency vaccination.
 - The primary goal of an emergency response will be to contain the outbreak as quickly as possible while causing the least impact on animal agriculture.

12. WHY DON'T WE VACCINATE FOR FMD NOW, BEFORE AN OUTBREAK?

- Effective FMD vaccines do exist, but they are strain specific (most strains require their own vaccine and do not cross-protect against infection from other strains, also known as subtypes).
- Because there are many different strains of FMD circulating, we cannot predict which might enter into the United States.
- Vaccinating for FMD has international trade repercussions, which would limit the ability of the United States to export.

13. WHAT ARE THE CHALLENGES WITH EMERGENCY VACCINATION STRATEGIES DURING A RESPONSE?

- FMD emergency vaccination campaigns can be challenging to implement.

- Having sufficient amounts of appropriate vaccine ready to use upon detection of FMD is expensive.
- The subtype that will be introduced will not be known in advance, and vaccines are usually not cross-protective.
- The United States has extremely large swine and cattle populations.
- When limited amounts of vaccine are available, it is challenging to prioritize the distribution of available vaccine.
- Vaccinating animals quickly enough and maintaining records on vaccinations are time and resource intensive activities.

FMD EXCLUSION

14. IS THE UNITED STATES DOING ANYTHING TO KEEP FMD OUT OF THE COUNTRY?

- The United States undertakes many preventative measures to keep FMD out of its susceptible animal populations.
 - USDA APHIS works closely with U.S. Customs and Border Protection to enforce import restrictions and requirements which help to ensure FMD is not brought into the country through the legal trade of animals and animal products.
 - USDA APHIS conducts pathways analyses to minimize opportunities for FMD introduction.
 - The United States helps other countries control and eradicate FMD outbreaks to reduce virus circulation.
 - USDA APHIS educates the stakeholders on the risk of FMD through exercises and agreements with academia and States.

15. IF WE ARE DOING SO MUCH TO ENSURE FMD DOESN'T ENTER THE COUNTRY, WHY DO WE NEED TO PREPARE FOR AN FMD OUTBREAK?

- There is always the risk of an FMD introduction into the United States.
 - FMD is highly contagious and high volumes of international travel and trade create a risk.

- Due to the volume of legal products entering the United States, it is impossible to search and inspect every shipment, piece of baggage, or person entering the country for illegal products.
- There is an unknown quantity of illegal animals and animal products entering the United States that may contain FMD.
- It is also possible that FMD may be introduced intentionally.
- To be able to successfully execute an FMD response, we must prepare and plan ahead of time; this also helps USDA be prepared to respond to other significant animal health incidents.

USDA APHIS FMD PREPAREDNESS

16. WHAT IS USDA APHIS DOING TO PREPARE FOR AN FMD OUTBREAK?

Investigations & Monitoring

- USDA APHIS trains veterinarians to be able to recognize FMD in domestic animals.
- USDA APHIS, in coordination with State Animal Health Officials, actively investigates suspected U.S. cases of vesicular disease (disease causing blister-like lesions).
- USDA APHIS coordinates with the National Animal Health Laboratory Network (NAHLN) so that NAHLN laboratories can run preliminary diagnostic testing during an investigation of vesicular disease.
- USDA APHIS also monitors disease outbreaks occurring around the world for situational awareness.

Capability Development

- The National Veterinary Services Laboratories (NVSL) develops and improves diagnostic tests to improve early detection and overall diagnostic capabilities; NVSL also coordinates with USDA's Agriculture Research Service to update science and information related to diagnostics.

- NVSL supports NAHLN laboratories—the NVSL Foreign Animal Disease Diagnostic Laboratory—serves as the U.S. reference laboratory to confirm FMD in the United States.
- There are over 40 State, university, and Federal laboratories in the NAHLN that can conduct FMD diagnostic testing for vesicular disease investigations.
- The United States is part of the North American FMD Vaccine Bank (NAFMDVB) in coordination with Canada and Mexico; the bank holds limited quantities of vaccine antigen concentrate that can be formulated into finished vaccine during an outbreak.
- The Agricultural Improvement Act of 2018 (The “Farm Bill”) included the establishment of the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB); Vaccine acquisition is currently underway to complete this new National Bank.
- The National Veterinary Stockpile (NVS) is working on modernizing processes and capabilities (including procurement, transportation, and delivery) to reflect the current practical and logistical realities related to effectively implementing emergency vaccination.
- The NVS has contracts in place to provide veterinary countermeasures, supplies, and equipment—to States, Tribes, or Territories in a disease outbreak.
- During a large-scale animal agriculture incident, USDA can leverage additional personnel to provide surge support to States.
- The USDA APHIS National Veterinary Accreditation Program provides USDA accredited veterinarians with supplemental training on foreign animal, vesicular, and exotic avian diseases, as well as on critical response activities and emergency management.

Response Planning

- USDA APHIS produces a public *FMD Response Plan: The Red Book* which provides a clear strategic framework for FMD response.
- USDA APHIS updates FMD response policy with regard to response strategies to include vaccinate to slaughter and vaccinate to live strategies.

- USDA APHIS provides multiple documents to help all responders prepare for an FMD outbreak, from investigating a potential case to executing a response effort.
- USDA APHIS engages in public-private-academic partnerships to develop and exercise the Secure Food Supply Plans, which help to facilitate continuity of business in an FMD outbreak: these plans use science- and risk-based approaches to mitigate disruptions for producers, haulers, and processors in the event of an outbreak.
- USDA APHIS develops, utilizes, and improves models and other analytical tools that can help to inform decision making prior to and during outbreak situations.

Engagement

- USDA APHIS creates public-private-academic partnerships to engage academic and industry experts and to help ensure FMD response planning reflects their objectives and requirements.
- USDA APHIS holds stakeholder meetings and exercises to discuss FMD preparedness planning, including vaccination.
- USDA APHIS coordinates with other government agencies to identify resources, develop processes and agreements, and foster partnerships to support coordinated response efforts across government.
- USDA APHIS also works with public and private researchers to discuss and improve current FMD diagnostic test and vaccine capabilities.
- USDA APHIS routinely engages with bilateral and multilateral trading partners on issues of international commerce.
- USDA APHIS engages with international partners, including the World Organization for Animal Health [OIE] to harmonize test capabilities, collaborate on issues of capacity building, and discuss standards for trade and FMD freedom—particularly reducing the time to freedom when vaccination strategies are implemented.

Exercises

- USDA APHIS Veterinary Services has a National Training and Exercise Program to build preparedness within VS.

- USDA APHIS conducts exercises to test Incident Command System procedures and processes for an FMD outbreak.
- The NVS completes numerous FMD exercises to verify the procedures for shipping, transporting, and receiving FMD vaccine.
- NAHLN conducts tabletop exercises to test laboratory response procedures and processes.

17. WHAT ARE USDA’S FUTURE OBJECTIVES, AS RELATED TO IMPROVING FMD PREPAREDNESS IN THE UNITED STATES?

- USDA APHIS will continue to work with stakeholders to define expectations and preparedness goals for an FMD outbreak. In doing so, USDA APHIS
 - understands that requirements and best practices may change by region and/or species affected;
 - is cognizant of the limitations of mass depopulation and disposal as a response strategy;
 - is aware of the current limitations of FMD vaccines and diagnostics, particularly in terms of available quantities and time to delivery; and
 - is mindful of the consequences of emergency vaccination on international trade.
- USDA APHIS will continue to engage stakeholders so that there is increasing interest and participation in FMD preparedness.
- USDA APHIS will continue to work to improve and expand communication to external and internal stakeholders regarding the capabilities required to effectively execute FMD response strategies.
- USDA APHIS will continue to participate in exercises and update response plans, procedures, and processes with lessons learned.
- USDA APHIS will continue to collaborate to improve diagnostic capabilities and veterinary countermeasures.

18. WHAT PLANS AND PROCEDURES ARE CURRENTLY AVAILABLE FROM USDA APHIS FOR FMD?

- *APHIS Foreign Animal Disease Framework (Manual 1-0): Roles and Coordination*
- *APHIS Foreign Animal Disease Framework (Manual 2-0): Response Strategies*
- *APHIS Foreign Animal Disease Incident Information and Reporting Manual (Manual 3-0)*
- *APHIS Foreign Animal Disease Investigation Manual (Manual 4-0)*
- *APHIS A Partial Listing of Foreign Animal Disease Stakeholders (Manual 5-0)*
- *APHIS Foreign Animal Disease Permitted Movement (Manual 6-0)*
- *FMD Response Plan: The Red Book*
- *National Animal Health Emergency Management System Guidelines: Vaccination for Contagious Diseases, Foot-and-Mouth Disease*
- *FAD PReP Standard Operating Procedures (including Etiology and Ecology and Surveillance, Epidemiology, and Tracing, among others)*
- *FMD Ready Reference Guides*
- *Foreign Animal Disease Strategy Document: FMD Phases and Types of an Outbreak.*

19. WHERE CAN I GO TO GET MORE INFORMATION?

- For more information on FMD and foreign animal disease (FAD) preparedness, and access to documents previously referenced, please go to
 - FAD PReP Materials: www.aphis.usda.gov/fadprep
 - APHIS Animal Health Emergency Management: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/ct_emergency_management_home.
- For more information on USDA APHIS Veterinary Services, please go to

- APHIS Veterinary Services Animal Health:
<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth>
- Approved NAHLN Laboratories:
https://www.aphis.usda.gov/animal_health/nahln/downloads/fmd_lab_list.pdf
 - For more information on the public-private-academic collaborations, please go to
- Secure Milk Supply: www.securemilksupply.org
- Secure Pork Supply: www.securepork.org
- Secure Sheep and Wool Supply: <https://securesheepwool.org/>
- Secure Beef Supply: www.securebeef.org.