FMD Preparedness and Response: Overview of Capabilities And Critical Activities

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Jon Zack, DVM
USDA APHIS Veterinary Services
Emergency Management and Diagnostics
Preparing for and responding to foreign animal diseases (FADs) are critical activities to safeguard our nation's animal health, public health, and food supply.
FMD Detection - First Steps

Critical Activities in the First 72 Hours of an FMD Outbreak

0 – 24 HOURS
- Initiate quarantine, hold orders, movement restrictions and standstill notices (e.g., 24 – 72 hours) for relevant zones and regions
- Notify States, Tribes, industry, trading partners, media
- Initiate biosecurity measures
- Initiate tracing activities
- Initiate virus identification for vaccine
- Initiate Incident Command processes

24 – 48 HOURS
- Evaluate quarantine and movement controls
- Ongoing surveillance and tracing activities
- Initiate coordinated public awareness campaign
- Ongoing biosecurity measures
- Initiate continuity of business plans
- Continue virus identification for vaccine

48 – 72 HOURS
- Evaluate quarantine and movement controls
- Continue ramping up Incident Command and Operations Center
- Ongoing surveillance and tracing activities
- Ongoing biosecurity activities
- Ongoing public awareness campaign
- Continue virus identification for vaccine

FMD Virus Detected

Appropriate critical activities and tools will continue to be employed throughout the response.
FMD Response in the United States

Critical Activities and Tools for Containing, Controlling, and Eradicating FMD

- Rapid diagnosis and reporting
- Epidemiological investigation and tracing
- Increased surveillance and diagnostic capacity
- Swift imposition of effective quarantine and movement controls
- Continuity of business measures for non-infected premises and non-contaminated animal products
- Biosecurity measures
- Cleaning and disinfection measures
- Effective and appropriate disposal procedures
- Mass depopulation and euthanasia (as the response strategy indicates)
- Emergency vaccination (as the response strategy indicates).
  - Information Management
  - Communications & public awareness campaign

Source: ISU
Quarantines, Movement Controls, and Continuity of Business

Critical Activities Implemented as FMD Outbreak Response Progresses

- **FMD Detection**
- **Hold Orders and Standstill Notices for Relevant Regions and Zones**
- **Quarantine and Movement Controls**
- **Control Area Established**
- **Managed Movement through Continuity of Business Plans**
6 Types of FMD Outbreaks

- **Type 1:** Focal FMD Outbreak
  - Even a focal FMD outbreak would require significant operational capabilities and have significant economic implications for the United States, including from lost international trade and disruptions to interstate commerce.

- **Type 2:** Moderate Regional FMD Outbreak

- **Type 3:** Large Regional FMD Outbreak

- **Type 4:** Widespread or National FMD Outbreak

- **Type 5:** Catastrophic U.S. FMD Outbreak

- **Type 6:** Catastrophic North American FMD Outbreak

This proposed typology of an FMD outbreak was developed by Dr. Jim Roth, of the Center for Food Security and Public Health, Iowa State University. It is one approach to describing a response to an FMD outbreak in the United States.

Response Shifts from Emphasis on Stamping-Out to Emphasis on Alternate Strategies (duration of FMD response)
# Overview of Traditional FMD Response Strategy or Strategies

<table>
<thead>
<tr>
<th>Strategy or Strategies</th>
<th>Definition of Strategy</th>
<th>Likelihood of Use</th>
<th>Example of Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stamping-Out (no emergency vaccination)</strong></td>
<td>Depopulation of clinically affected and in-contact susceptible animals.</td>
<td>Likely (if outbreak is contained in jurisdictional areas in which FMD can be readily contained and further dissemination of the virus is unlikely).</td>
<td>Stamping-out Infected Premises.</td>
</tr>
<tr>
<td><strong>Stamping-Out Modified with Emergency Vaccination to Slaughter</strong></td>
<td>Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with subsequent slaughter of vaccinated animals.</td>
<td>Highly likely (depending on the type of the FMD outbreak).</td>
<td>Stamping-out Infected Premises; emergency vaccination to slaughter within the Control Area in Containment Vaccination Zones.</td>
</tr>
<tr>
<td><strong>Stamping-Out Modified with Emergency Vaccination to Live</strong></td>
<td>Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, without subsequent slaughter of vaccinated animals.</td>
<td>Highly likely (depending on the type of the FMD outbreak).</td>
<td>Stamping-out Infected Premises; emergency vaccination to live outside of the Control Area in Protection Vaccination Zones.</td>
</tr>
<tr>
<td><strong>Stamping-Out Modified with Emergency Vaccination to Slaughter and Emergency Vaccination to Live</strong></td>
<td>Combination of emergency vaccination to slaughter and emergency vaccination to live (previous two rows).</td>
<td>Highly likely (depending on the type of the FMD outbreak).</td>
<td>Stamping-out Infected Premises; emergency vaccination to slaughter within the Control Area in Containment Vaccination Zones and emergency vaccination to live outside of the Control Area in Protection Vaccination Zones.</td>
</tr>
<tr>
<td><strong>Vaccination to Live (without Stamping-Out)</strong></td>
<td>Vaccination used without depopulation of infected animals or subsequent slaughter of vaccinated animals.</td>
<td>Less likely (unlikely to be implemented at start of outbreak).</td>
<td>No stamping-out of Infected Premises; Vaccination to live outside of the Control Area in Protection Vaccination Zones.</td>
</tr>
<tr>
<td><strong>No Action</strong></td>
<td>FMD would take its course in the affected population; measures may be implemented to stop spread.</td>
<td>Highly unlikely.</td>
<td>Quarantine and movement control measures; biosecurity measures; cleaning and disinfection measures implemented. No stamping-out and no vaccination.</td>
</tr>
</tbody>
</table>
Resources Needed Based on Response Strategy and Outbreak Type

Type of FMD Outbreak

Type 6 (Catastrophic North American)
Type 5 (Catastrophic U.S.)
Type 4 (Widespread National)
Type 3 (Large Regional)
Type 2 (Moderate Regional)
Type 1 (Focal)

Predominant Response Strategy

Stamping-Out Only Strategy (No Vaccination)
Vaccination to Slaughter Strategy with Stamping-Out
Vaccination to Live Strategy with Stamping-Out (can also include Vaccination to Slaughter)
Vaccination to Live Only (No-Stamping Out)

More resources required for depopulation and disposal
More resources required for vaccination

It is unlikely this strategy would be considered in a catastrophic or widespread FMD outbreak.
It is unlikely this strategy would be considered in a focal outbreak.
Example Zones, Areas, and Premises

Zones and Areas

Premises

Note: Figures are not to scale. The Vaccination Zone can be either a Protection Vaccination Zone or Containment Vaccination Zone.

Legend

- Infected Zone
- Buffer Zone
- Vaccination Zone
- Surveillance Zone
Size of Regulatory Control Areas

*Size of Control Area:* Perimeter should be at least 10 km (~6.21 miles) beyond the perimeter of the closest Infected Premises. This area may be redefined as the outbreak continues.

Examples of the **Upsides** and **Downsides** to Large and Small Control Areas

<table>
<thead>
<tr>
<th>Small Control Area</th>
<th>Large Control Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty that all Infected Premises are contained in Control Area is lower.</td>
<td>Certainty that all Infected Premises are contained in Control Area is higher.</td>
</tr>
<tr>
<td>Likelihood of disease spread to outside the Control Area may be higher.</td>
<td>Likelihood of disease spread to outside the Control Area may be lower.</td>
</tr>
<tr>
<td>Quarantine and movement controls easier to manage; less resources required, less animals and premises to manage.</td>
<td>Quarantine and movement controls harder to manage; more resources required, more premises and animals to manage.</td>
</tr>
<tr>
<td>Potentially less impact to normal business.</td>
<td>Potentially more impact to normal business.</td>
</tr>
</tbody>
</table>
FMD Outbreak in Texas—Small Control Area

Number of Livestock Affected: ~5.7 million
Number of Operations Affected: ~9,300

Source: NASS, 2007
FMD Outbreak in Texas—Medium Control Area

Number of Livestock Affected: ~17.8 million
Number of Operations Affected: ~34,000

Source: NASS, 2007
FMD Outbreak in Texas—Large Control Area

Number of Livestock Affected: ~33.7 million
Number of Operations Affected: ~290,000

Source: NASS, 2007
## Iowa Outbreak: One Infected County

<table>
<thead>
<tr>
<th>Where</th>
<th>Bovine</th>
<th>Swine</th>
<th>Sheep/Goats</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infected Zone (pink)</td>
<td>14,933</td>
<td>66,515</td>
<td>3,893</td>
<td>404</td>
</tr>
<tr>
<td>Buffer Zone (blue)</td>
<td>143,866</td>
<td>1,860,968</td>
<td>20,107</td>
<td>2,525</td>
</tr>
<tr>
<td>Total</td>
<td>158,799</td>
<td>1,927,483</td>
<td>24,000</td>
<td>2,929</td>
</tr>
</tbody>
</table>

*Total livestock affected: 2,110,282*
## Iowa Outbreak: Three Infected Counties

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<tr>
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<th>Sheep/Goats</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infected Zone (pink)</td>
<td>63,548</td>
<td>240,484</td>
<td>8,067</td>
<td>1,025</td>
</tr>
<tr>
<td>Buffer Zone (blue)</td>
<td>463,637</td>
<td>3,534,164</td>
<td>32,844</td>
<td>6,245</td>
</tr>
<tr>
<td>Total</td>
<td>527,185</td>
<td>3,774,648</td>
<td>40,911</td>
<td>7,270</td>
</tr>
</tbody>
</table>

*Total livestock affected: 4,342,744*
## Iowa Outbreak: Nine Infected Counties

![Map showing infected and buffer zones in Iowa](image)

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<thead>
<tr>
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<th>Bovine</th>
<th>Swine</th>
<th>Sheep/Goats</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infected Zone (pink)</td>
<td>181,106</td>
<td>1,567,560</td>
<td>18,690</td>
<td>3,108</td>
</tr>
<tr>
<td>Buffer Zone (blue)</td>
<td>1,927,955</td>
<td>11,423,618</td>
<td>133,979</td>
<td>23,723</td>
</tr>
<tr>
<td>Total</td>
<td>2,109,061</td>
<td>12,991,178</td>
<td>152,669</td>
<td>26,831</td>
</tr>
</tbody>
</table>

*Total livestock affected: 15,252,908*
### Iowa Outbreak: Nine Infected Counties and Vaccination Zone

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<thead>
<tr>
<th>Where</th>
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<th>Swine</th>
<th>Sheep/Goats</th>
<th>Operations</th>
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<td>Infected Zone (pink)</td>
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<tr>
<td>Buffer Zone (blue)</td>
<td>1,927,955</td>
<td>11,423,618</td>
<td>133,979</td>
<td>23,723</td>
</tr>
<tr>
<td>Vaccination Zone (yellow)</td>
<td>1,873,283</td>
<td>6,225,637</td>
<td>101,501</td>
<td>19,698</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,982,344</strong></td>
<td><strong>19,216,815</strong></td>
<td><strong>254,170</strong></td>
<td><strong>43,799</strong></td>
</tr>
</tbody>
</table>

*Total livestock affected: 23,453,329*
Continuity of Business (Managed Movement)

Discussing Continuity of Business Planning

- **FMD Detection**
- **Hold Orders and Standstill Notices for Relevant Regions and Zones**
- **Quarantine and Movement Controls**
- **Managed Movement through Continuity of Business Plans**
- **Control Area Established**
Critical Activities: Quarantine, Movement Control, and Continuity of Business

- **Quarantine and movement controls**: Applied to premises in the regulatory Control Area to ensure infected animals, fomites, and products do not leave premises to stop the spread of FMD.
  - Quarantines are applied to Infected, Suspect, and Contact Premises.
  - Movement controls are applied to At-Risk and Monitored Premises. Consideration will be given to critical movements (i.e. feed trucks).
- **Continuity of business (managed movement)**: Intended to manage the movement for uninfected premises (At-Risk and Monitored Premises) in a regulatory Control Area to facilitate movement out of the Control Area.

Different tools, same goal: to prevent the transmission of FMD to uninfected premises, especially those outside the Control Area, using science- and risk-based approaches that facilitate continuity of business for uninfected premises.
Benefits of Continuity of Business (Managed Movement) Planning

Continuity of business (managed movement):

- Intended to manage the movement for uninfected premises (At-Risk and Monitored Premises) in a regulatory Control Area to facilitate movement out of the Control Area.

- Works with quarantine and movement controls to limit disease-spread while facilitating movement of non-infected animals and non-contaminated animal products.

  - Protects animal health, by working to stop the spread of FMD, limiting the number of infected premises and infected animals.

  - Minimizes disruptions to interstate commerce and international trade, thereby minimizing economic hardships.

  - Guards food security, by facilitating the movement of unaffected animals and animal products during an FMD outbreak.
Continuity of Business (Managed Movement) Planning—Understanding the Specifics

• **Pro-Active Risk assessments**: Determining transmission risk of product or animal movement.

• **Surveillance requirements**: How frequently samples will be collected, from what populations, and for how long.

• **Biosecurity guidance**: Appropriate precautions, PPE, and specific steps for various fomites.

• **Cleaning and disinfection procedures**: Cleaning and disinfection procedures.

• **Epidemiological information**: Information on movement on and off a premises, as well as number of animals, species, and age.

• **Permitting guidance**: Transparent, explicit guidance for Incident Command regarding movement requirements based on commodity.
Planning for an FMD Outbreak is Complex
FMD Response Goals

What Are Your FMD Response Goals?

What are Your FMD Preparedness Goal?
FMD Response Capabilities

Secure Food Supply Plans

NAHERC
National Animal Health Emergency Response Corps

Safeguarding Animal Health
National Veterinary Stockpile (NVS)

Safeguarding Animal Health
Safeguarding Animal Health

NVS Logistics Catalog

- Posted on NVS restricted Web site http://nvs.aphis.usda.gov
- Accessible by NVS planners
- Password protected
- Describes contents of Modules 1-8, large animal handling and poultry depopulation equipment, carcass disposal supplies, and communication equipment
Safeguarding Animal Health

Current Deployable Capabilities

- 24 Hour Push Packs of PPE and decon supplies
- PPE individual kits
- Antiviral medications
- Vaccine
- Poultry depopulation foaming units, CO2 carts
- Mobile refrigeration/vaccine storage & transport systems
- Animal handling equipment
- Response support services