



# Response to an FMD outbreak: Use of vaccination in control strategies

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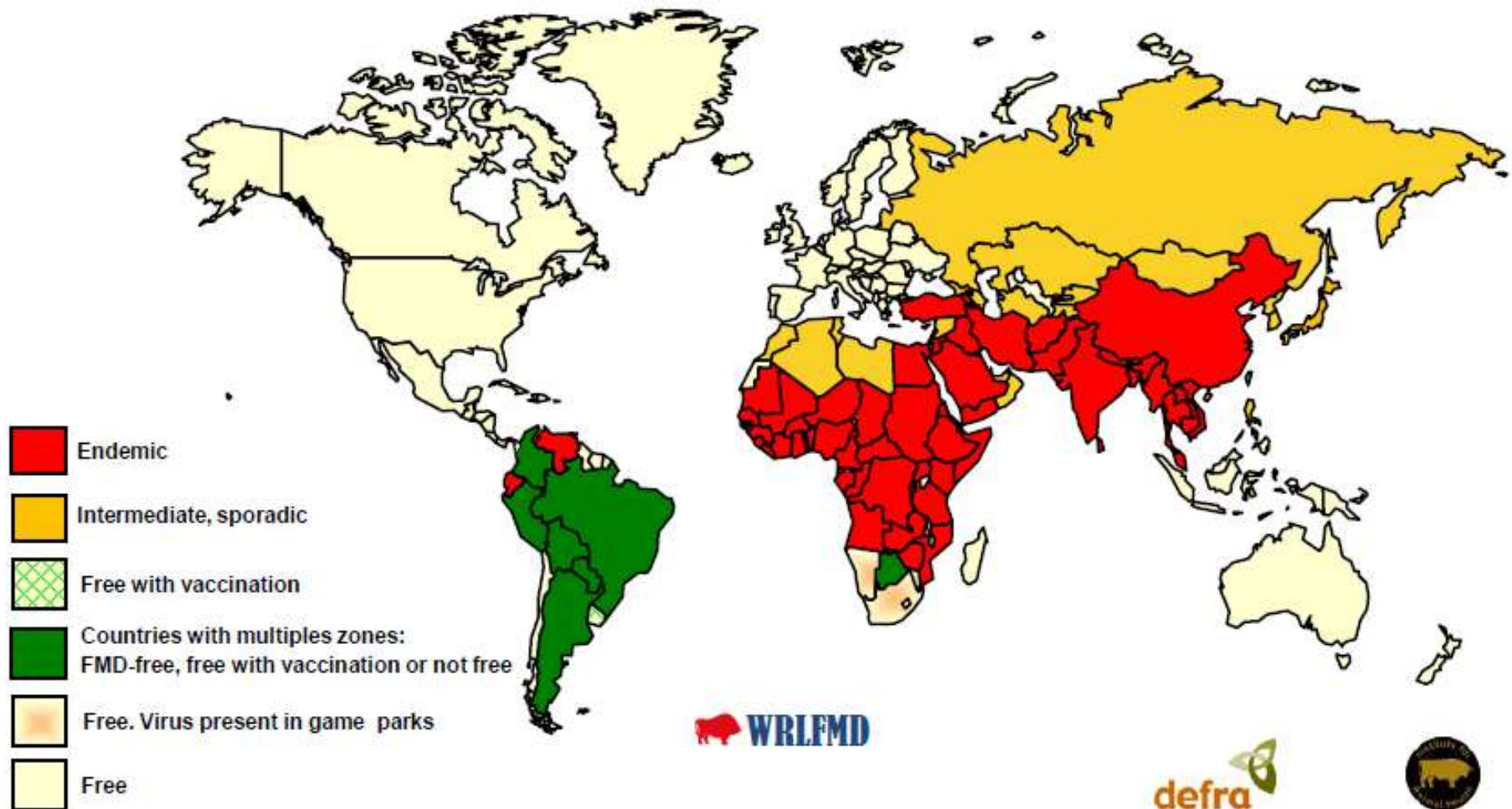




Preparing for and responding to foreign animal diseases (FADs) are critical activities to safeguard our nation's animal health, public health, and food supply.



# Conjectured world status of FMD



# Consequences of an FMD Outbreak

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- Disruptions to interstate commerce
- International trade halted
- Commodity prices will fall
- Damage to collateral markets (grain & poultry)



# Preparing for an FMD Outbreak

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- Response activities are complex
- Requires significant planning and preparation
- Plans must be flexible and dynamic
- Requires multi-state and stakeholder coordination
- We must plan together now!





# FMD Response Goals

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- Detect, control, and contain FMD
- Eradicate FMD using strategies that stabilize animal agriculture, the food supply, the economy, and protect public health.
- Provide science and risk-based approaches to facilitate continuity of business for non-infected animals and non-contaminated animal products.





# Traditional FMD Response Strategy

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- **Stamping Out and Disposal – Federal**
  - 9 CFR Part 53.4 (a) “...animals infected with or exposed to disease shall be killed promptly after appraisal and disposed of...”
  
- **Stamping Out and Disposal - State**
  - Some State regulations are circa 1963 and mandate that “...burial occur within 24 hours of death at least 3 feet underground with a covering of quick lime...”



# Challenges of Depopulation

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- **Depopulation**

- **Labor and time intensive**

- Cattle – estimated 80+ days to depopulate a single 100K cow feedlot using standard captive bolt device and head-gate restraint

- Swine - estimated capacity of 600 feeder pigs/hour using mobile electrocution units which are expensive and not yet domestically available

- New methods of depopulation are being developed by APHIS, but many are not yet ready or available for field deployment



# Magnitude of Disposal Challenge

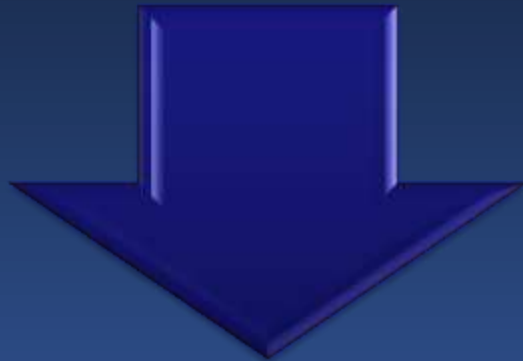
Quantity	One Feedlot (100K cows)	Amount from One Feedlot is Equivalent to:	All FMD Susceptible Livestock in US (NASS, 2010)
Pounds of Biomass	100,000,000	Weight of Titanic when it sank	153,000,000,000 (76M tons = weight of 600,000 locomotives)
Number 30-ton truckloads	1,667	Trucks end-to-end would cover $\frac{1}{4}$ the distance around the Capital Beltway	2,550,510 (trucks end-to-end would encircle the earth at the equator)
Length of Burial Trench	151 miles	Approximate distance from Richmond, VA to Baltimore, MD	231,030 miles (about distance from earth to moon)
Gallons of Leachate per day	4,000	Over 5 years, enough leachate to fill 11 Olympic-sized swimming pools	6,120,000 (about the total gallons of oil BP skimmed off the surface of the Gulf)

Potential Public Health Hazard	DISPOSAL OPTION					Pathways of Agents to Humans
	Rendering	Incineration	Landfill	Pyre	Burial	
Campylobacter, E. coli (VTEC), Listeria, Salmonella, B. anthracis, C. botulinum, Leptospira, Mycobacterium, TB v. bovis, Yersinia	Green	Green	Yellow	Green	Red	<ul style="list-style-type: none"> <li>■ Private water supplies</li> <li>■ Direct contact</li> <li>■ Recreational water use</li> <li>■ Possibly also shellfish</li> </ul>
Cryptosporidium, Giardia	Green	Green	Yellow	Green	Red	<ul style="list-style-type: none"> <li>■ Water supplies</li> <li>■ Crops, shellfish</li> <li>■ Direct contact</li> <li>■ Recreational water use</li> </ul>
Clostridium tetani	Green	Green	Yellow	Green	Red	<ul style="list-style-type: none"> <li>■ Contact with contaminated soil</li> </ul>
Prions for BSE, Scrapie	Yellow	Green	Yellow	Yellow	Red	<ul style="list-style-type: none"> <li>■ Water supplies via leachate, runoff, ash burial</li> </ul>
Methane, CO2	Green	Green	Yellow	Green	Red	<ul style="list-style-type: none"> <li>■ Migration into buildings</li> </ul>
Fuel-specific chemicals, metal salts	Green	Green	Green	Red	Green	<ul style="list-style-type: none"> <li>■ Inhalation</li> <li>■ Deposition into food chain</li> </ul>
Particulates, SO2, NO2, nitrous particles	Green	Yellow	Green	Red	Green	<ul style="list-style-type: none"> <li>■ Inhalation</li> </ul>
PAHs, dioxins	Green	Yellow	Green	Red	Green	<ul style="list-style-type: none"> <li>■ Inhalation</li> <li>■ Deposition into food chain</li> </ul>
Disinfectants, detergents	Green	Green	Yellow	Yellow	Red	<ul style="list-style-type: none"> <li>■ Water supply</li> <li>■ Inhalation of products?</li> </ul>

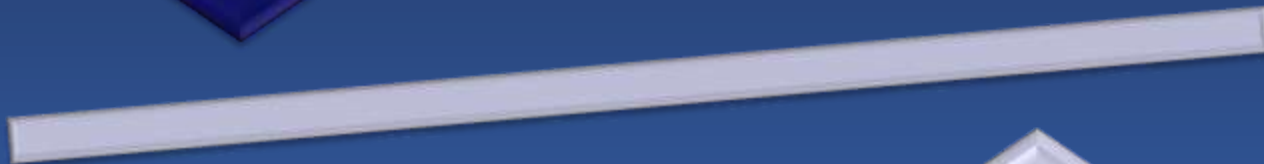
From "A Rapid Qualitative Assessment of Possible Risks to Public Health from Current FMD Disposal Options", UK Dept. of Health, June 2001.

# Response Goals Moving Forward

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Control Outbreak;  
Protect  
Environment;  
Minimize Waste;

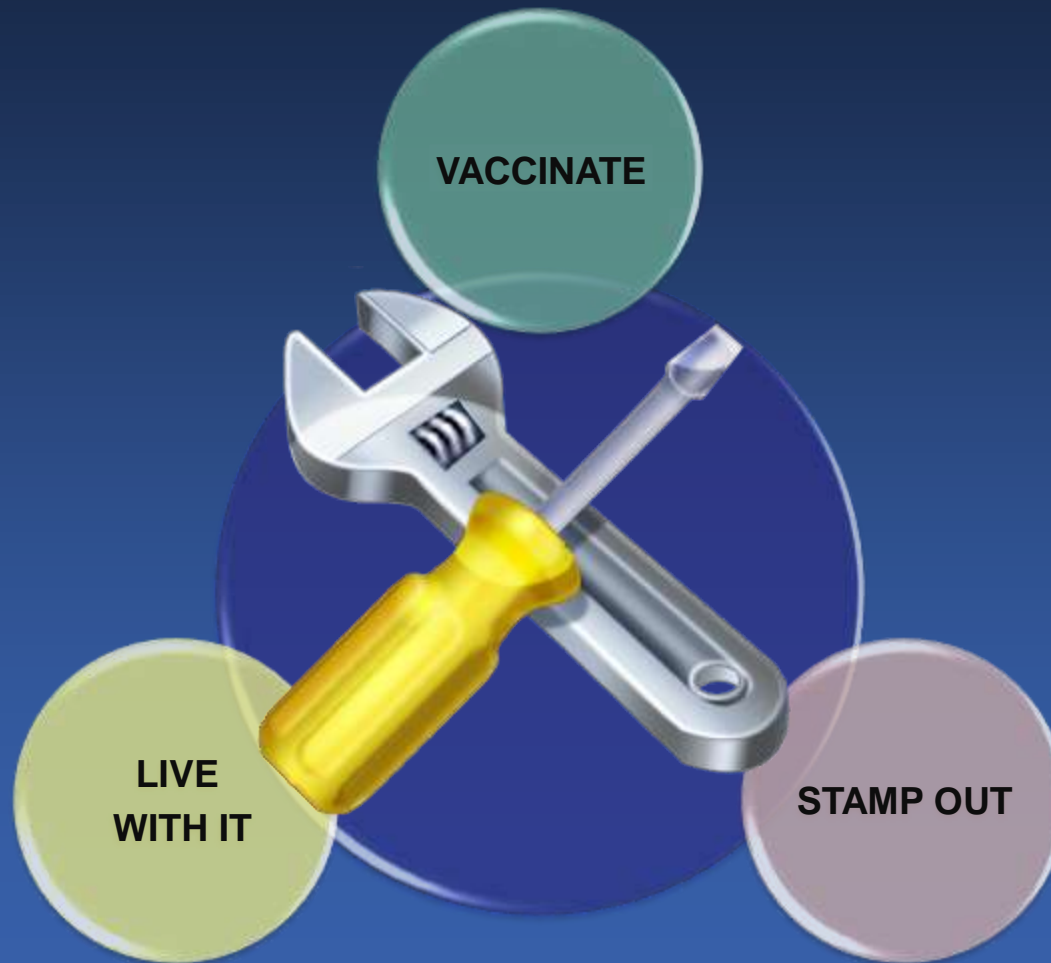


Limit Economic  
Losses;  
Maintain Food  
Supply



# US May Need All the Tools in the Toolbox

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# FMD Response Strategies: Moving Forward

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- Options other than stamping-out alone must be considered
- FMD vaccination is a tool that can be used:
  - to augment eradication
  - as a long-term control strategy
- Currently there are 3 response strategies recognized by the OIE that include use of vaccine:
  - Stamping-out modified with emergency vaccination to slaughter
  - Stamping-out modified with emergency vaccination to live
  - Vaccination to live without stamping-out



# How to Optimize a Response?



**REDUCE**  
*Minimize  
Stamping  
Out*



**REUSE**  
*Vaccinate  
for Food  
Chain*



**RECYCLE**  
*Rendering  
or  
Composting*



# Stakeholder Engagement

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- Series of Stakeholder meeting
- May 2, 2011 meeting specific to FMD Vaccination
- Continued engagement of State, Tribal and Industry Partners



# Stakeholder Feedback

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- Concerns:
  - Engaging “all” the right Stakeholders
  - Prioritization and triggers for use of vaccine
  - Vaccine logistics and deployment
  - Movement Controls
  - Communications and Outreach
  - Collateral impact on non-susceptible species and commodities
- Questions:
  - Vaccine science
  - Vaccination policy and procedural questions



# Stakeholder Feedback cont.

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- Moving forward:
  - Vaccine technology and testing capability
    - Consider allowing production of “less dangerous” vaccines in the US
  - Collaborative communication and information sharing
    - Shared website, blogging and standing phone calls
    - Participants sharing information with their colleagues and groups they represent
  - Broader outreach, communications and education
    - Suggestions for expanded Stakeholder list and outreach methods
  - Use of Advisory teams during and outbreak
    - Coordinated and collaborative decision making on vaccine use, prioritization and vaccination strategies.
  - Take advantage of lessons learned from other countries



# Planning and Policy Development

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- FAD PReP documents specific to FMD Vaccination
  - FMD Response Plan (Red Book)
    - Chapter 5 General FMD Outbreak Response
    - Chapter 6.16 Vaccination
  - NAHEMS Guidelines: Vaccination for Contagious Diseases
    - Appendix A: FMD
  - NVS Countermeasures Documents
    - National Veterinary Stockpile Countermeasures Working Group Report Foot-and-Mouth Disease
  - FMD Vaccination SOP – under development



# Planning and Policy Development cont.

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- Support tools
  - Developing decision tool to help determine appropriate control option(s) in an outbreak
  - Other models and projects to help inform vaccination policy development
- FMD Vaccination Policy – under development
  - National level guidance on FMD vaccination

