

Evaluation of National Animal Health Laboratory Network Diagnostic Capacity for a Foot-and-Mouth Disease Outbreak

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Key Question:

Are we (Veterinary Services and NAHLN) prepared to respond to the diagnostic testing needs of an extensive Foot-and-Mouth Disease (FMD) outbreak in the United States?

Objective

This evaluation estimated:

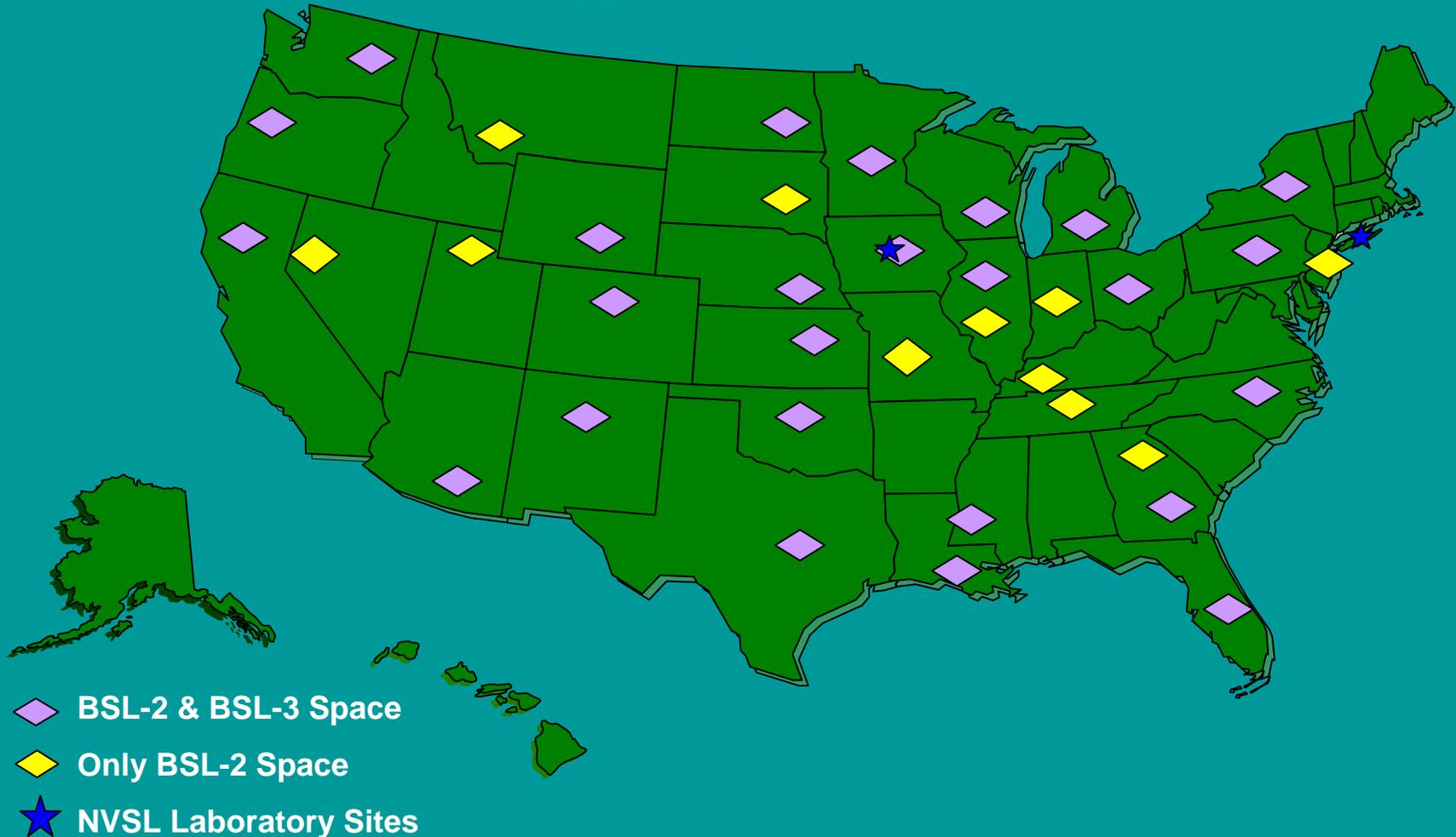
- number of samples to be tested daily
- the respective approximate number of premises represented
- when those numbers would overwhelm NAHLN's FMD-Approved laboratories' combined diagnostic facilities

During a simulated extensive FMD outbreak in the US

Methods

- modeled a simulated extensive national Foot and Mouth Disease (FMD) outbreak in the United States using “stamping out” strategy
- used an FMD Outbreak Surveillance Sampling Tool to identify the number of daily samples to be collected throughout the simulated outbreak using Active Observational Surveillance
- identified and provided laboratory extraction and rRT-PCR testing capacities for Four NAHLN FMD-Approved Laboratory-Use Scenarios

National Animal Health Laboratory Network FMD-Approved Laboratories



Thirty-six NAHLN FMD-Approved Laboratories and the National Veterinary Services Laboratories – Diagnostic Virology Laboratory, Ames, IA and Foreign Animal Disease Diagnostic Laboratory, Greenport, NY

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Four NAHLN Laboratory Testing Capacity Scenarios

1. Extraction and rRT-PCR conducted in BSL-3 (13 Laboratories)

- Manual Extraction occurring in 3 laboratories*

2. Extraction conducted in BSL-3 with available extraction equipment added from BSL-2, then rRT-PCR conducted in BSL-2 and BSL-3 (25 Laboratories)

- Manual Extraction occurring in 7 laboratories*

* Manual extractions take 30 minutes longer to conduct than robotic extractions

Four NAHLN Laboratory Testing Capacity Scenarios

3. Extraction and rRT-PCR conducted in BSL-3 with available equipment added from BSL-2 (25 Laboratories)

- Manual Extraction occurring in 7 laboratories*

4. Extraction and rRT-PCR conducted in all available BSL-2 and BSL-3 (36 Laboratories)

- Manual Extraction occurring in 7 laboratories*

* Manual extractions take 30 minutes longer to conduct than robotic extractions

Methods (cont'd)

Four NAHLN FMD-Approved Laboratory Testing Capacity Scenarios were identified

Each of the Four scenarios were evaluated for:

- epithelial tissue sample testing capacities
- swab sample testing capacities

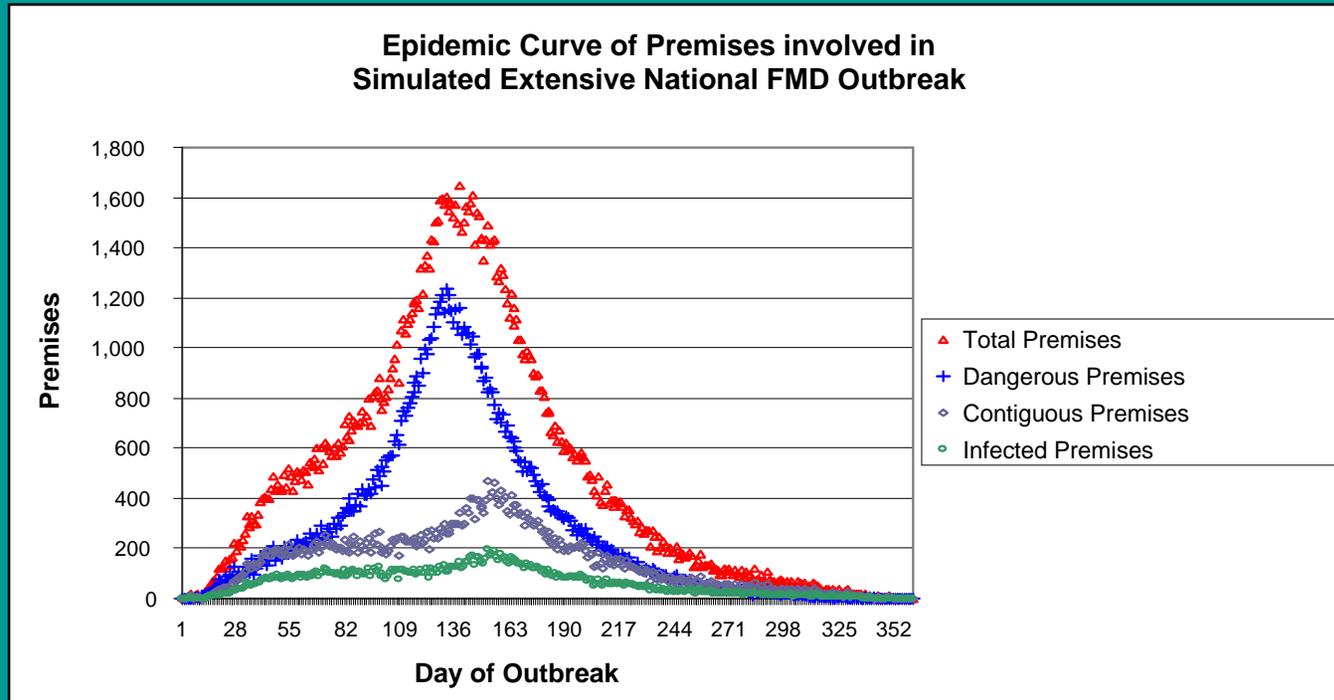
Each of the above were evaluated for testing capacities at:

- one 8-hour shift
- two 8-hour shifts
- one 10-hour shift
- two 10-hour shifts

Final Total = 32 diagnostic testing capacity options evaluated

Results

Epidemic Curve



Number of Infected States:	44 states
Number of States involved in the FMD outbreak response:	50 states
Duration of simulated FMD outbreak:	353 days
Total number of premises sampled throughout the outbreak scenario (over 6.5 % of U.S. cattle and swine herds):	173,934 premises
Total number of samples processed for the outbreak scenario:	2,941,917 samples
Largest number of premises sampled daily:	1,647 premises
Largest number of samples processed daily:	27,798 samples

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Graphs

Sample Testing Capacity for the Four NAHLN Laboratory Scenarios by one and two 8- and 10-hour shifts

Swab Samples

Scenario 1 – Swab Samples

