The Hog Inventory Survey

Emilola J. Abayomi

May 15, 2019

Disclaimer

The findings and conclusions in this presentation are those of the author(s) and should not be construed to represent any official USDA or U.S. Government determination or policy.

Outline

- Sample design
- Survey process
- Implications of shock

Survey Administration

- December – base survey
- March, June, September – follow-on surveys
- Target population – agricultural operations that own one or more hog or pig

Primary Estimates

- Total inventory
- Breeding herd
- Market inventory
  - <50 lbs, 50-119 lbs, 120-179 lbs, 180+ lbs
- Sows farrowed (monthly breakdown)
- Pig crop (monthly breakdown)

NASS List Frame

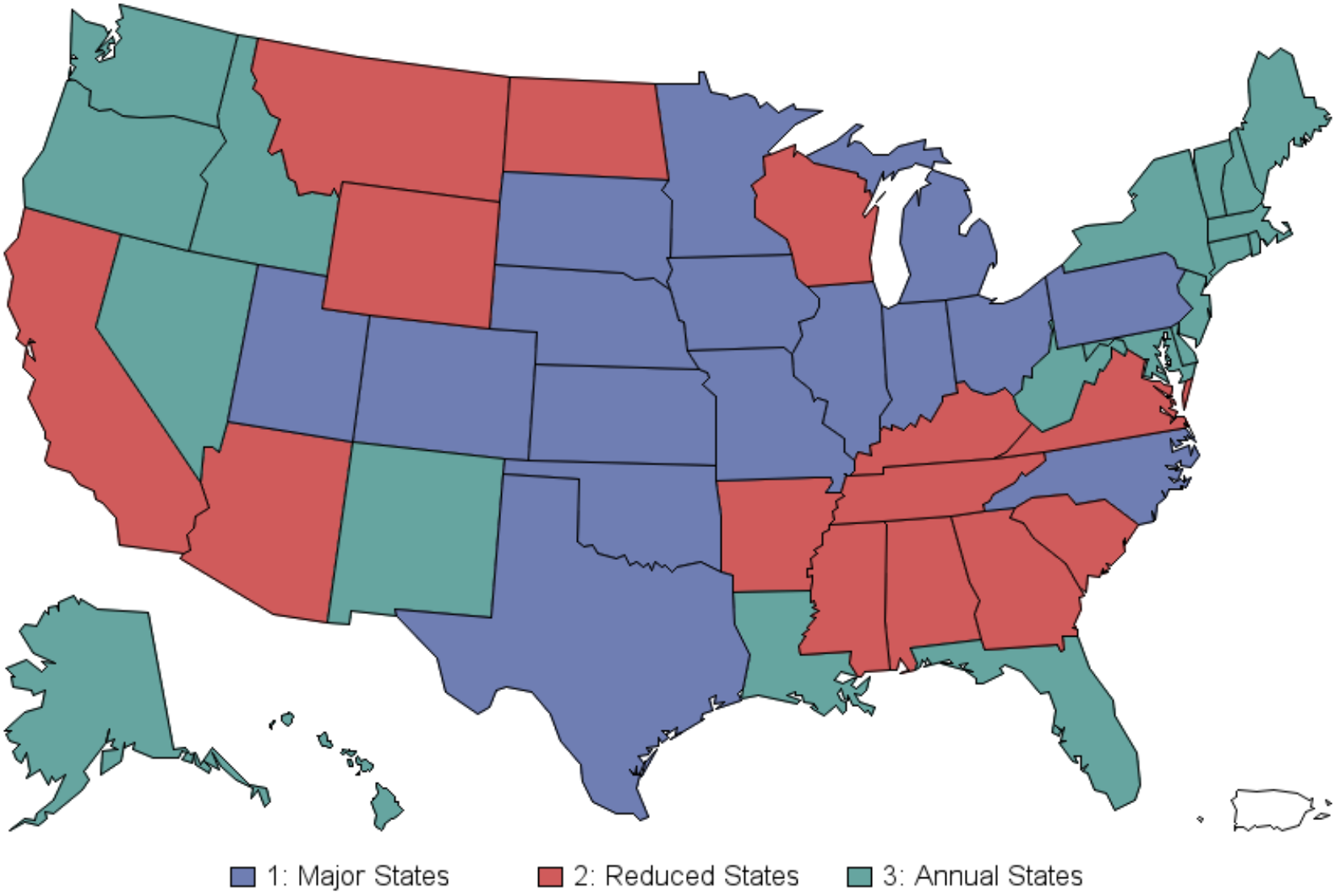
- All known agricultural operations

- Data maintained on frame:
  - Contact Information
  - Control Data:
    (1) profile for type of agricultural entity
    (2) define items of interest for sampling populations
  - Demographic Information

- Sources used for list building:
  - Feed company client lists
  - Slaughter facilities
  - State veterinarian lists

Hog Survey List Frame

- All operations on NASS list frame with positive hog control data
- Accounts for 97% of hog inventory



- States published quarterly – majority target CV of 6% (IL, IN, IA, MN, MO, NE, NC target CV of 3%)
- States sampled but not published quarterly – target CV of 6%
- Annual states – combined target CV of 6%

Stratified Design for Iowa

Stratum	Number of Hogs and Pigs	Sampling Weight
80	1-99	24.00
82	100-999	2.19
86	1,000-9,999	1.53
88	10,000-29,999	1.00
90	30,000-49,999	1.00
92	50,000-89,999	1.00
98	90,000+	1.00

- Stratified sample drawn from each state
- Strata categorized by the total inventory owned by an operation
- Control data used to determine stratum boundaries

Stratified Design for Colorado

Stratum	Number of hogs and pigs	Sampling Weight
80	1-99	31.92
82	100-499	1.00
98	500+	1.00

- Stratum boundaries vary by state

Area Frame

- Used to adjust undercoverage of the list

- Area frame sample identified in June
  - Area frame records matched to the list
  - Non-overlap (NOL) records: records NOT on the list
  - NOL sample with positive hog control data are NOL for the hog survey

- December survey – data collected for NOL sample

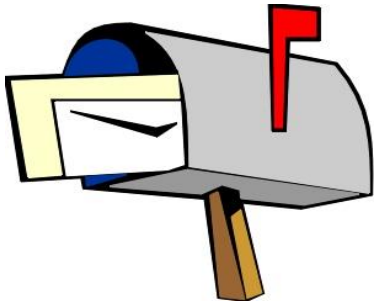
- Follow-on surveys – data modeled for NOL sample

Survey Timeline

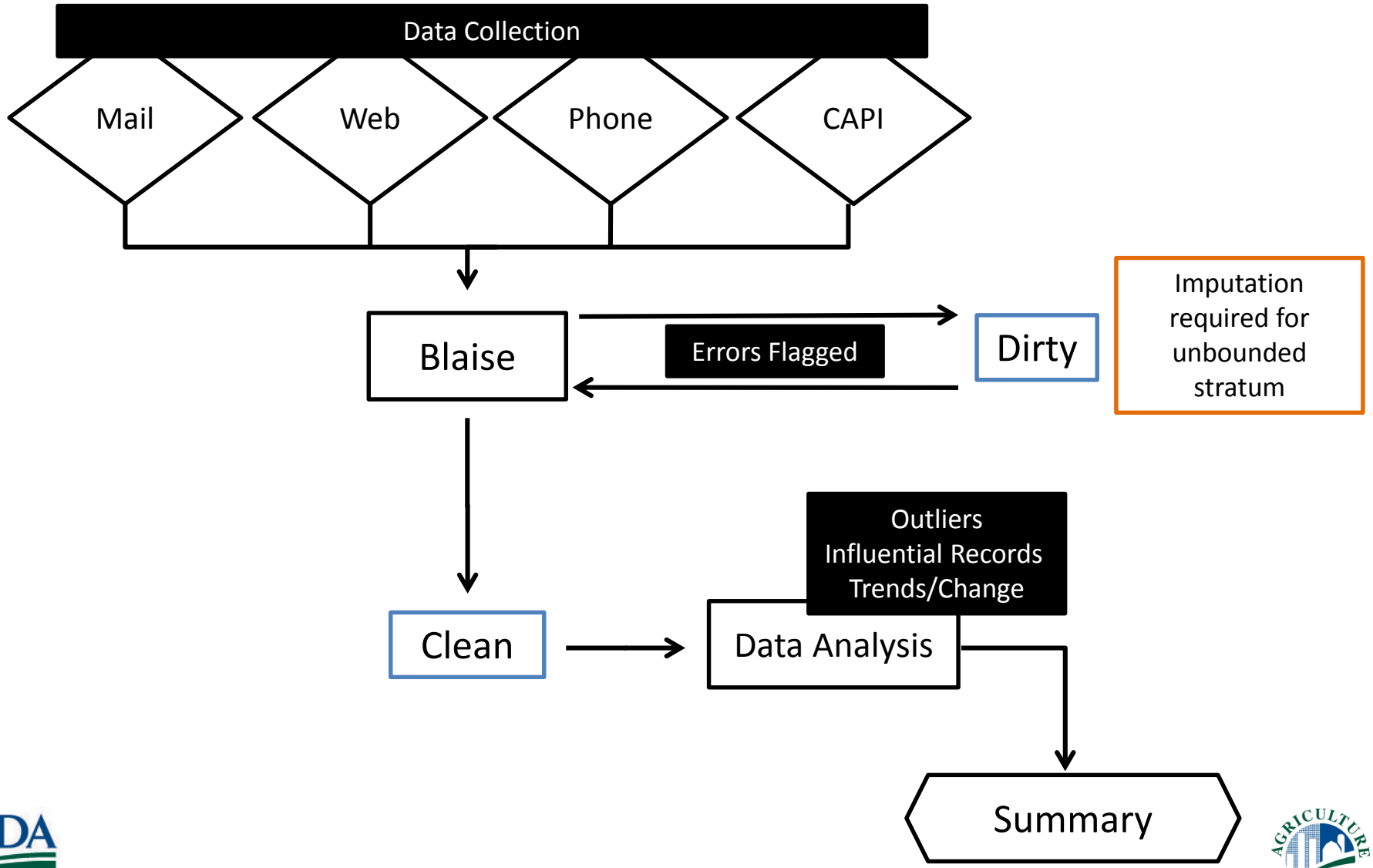
- 15 days – data collection begins on the reference date
- 4-5 days – edit, analyze, summarize, interpret results
- 5-6 days – national review, reconcile state estimates to national, prepare official estimates
- Last week in survey month – release to the public

*OMB Statistical Policy Director No. 3: “Economic indicators must be released promptly……. reduces the chance of unauthorized, premature disclosure”

Data Collection Methods



Editing Process



Shock

- An event that causes sudden change in inventory

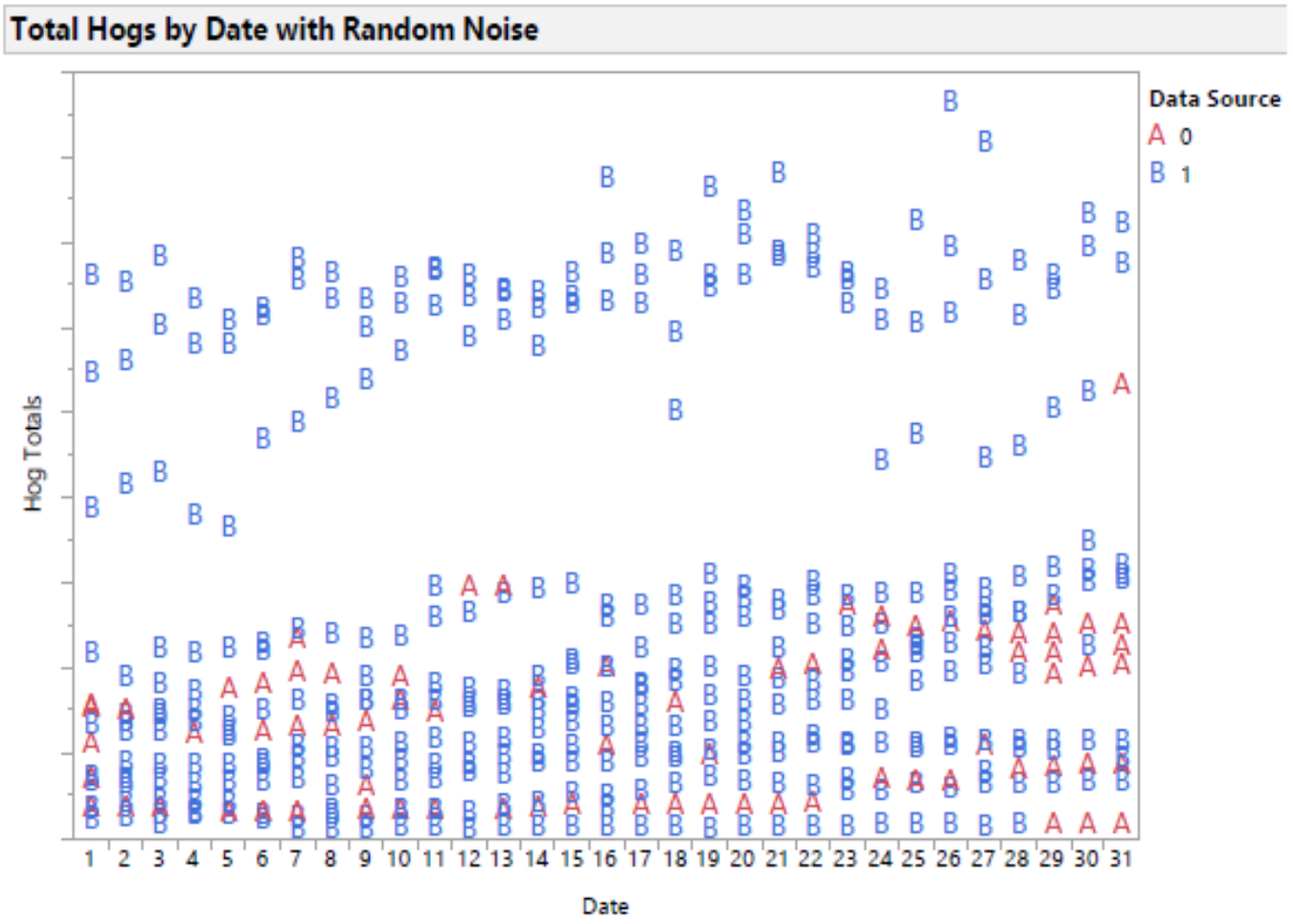
- Natural Disaster:
  - 2018 Hurricane Florence (North Carolina) and Hurricane Michael (Florida, Georgia, the Carolinas)
  - 2019 Flooding (Nebraska and Iowa)

- Disease:
  - 2013 Porcine Epidemic Diarrhea Virus (PEDv): high mortality rate for young swine

- Challenging to estimate inventory

Impact of Data Imputation

- Operations with reports from March 2010 to December 2017
- Comparison of reported and imputed data
- Potential imputation bias during a shock is unclear



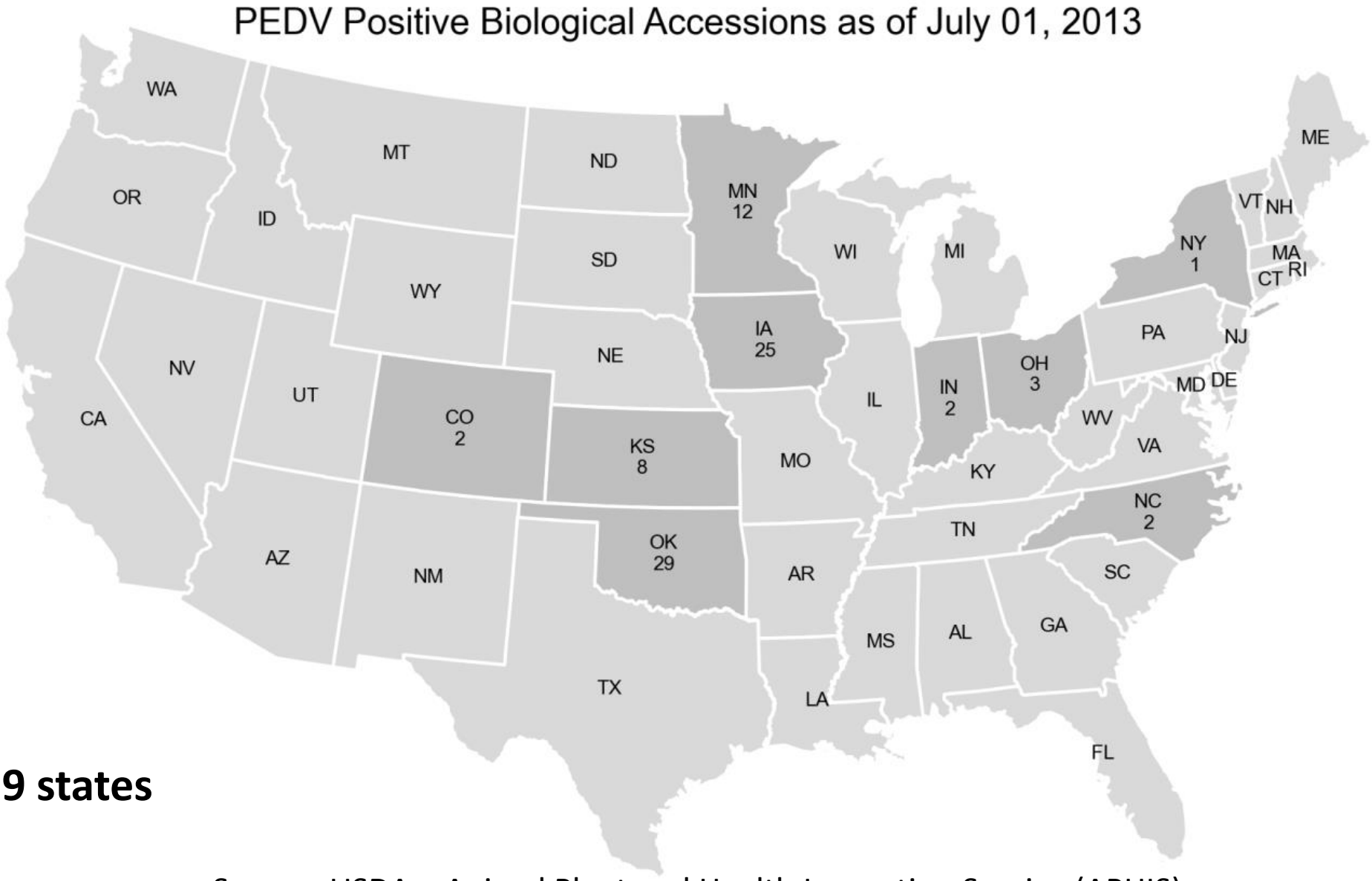
Impact of Disease Spread

- National Animal Health Laboratory Network (NAHLN):
  - University of Illinois Veterinary Diagnostic Laboratory
  - Texas Veterinary Medical Diagnostic Laboratory, Texas A&M University
  - Athens Veterinary Diagnostic Laboratory, University of Georgia
- NAHLN program office produced weekly reports on positive PEDv accessions

Accession Data

- Number of positive samples identified
- Does not indicate the number of infected herds
- Does highlight the geographical element of virus spread

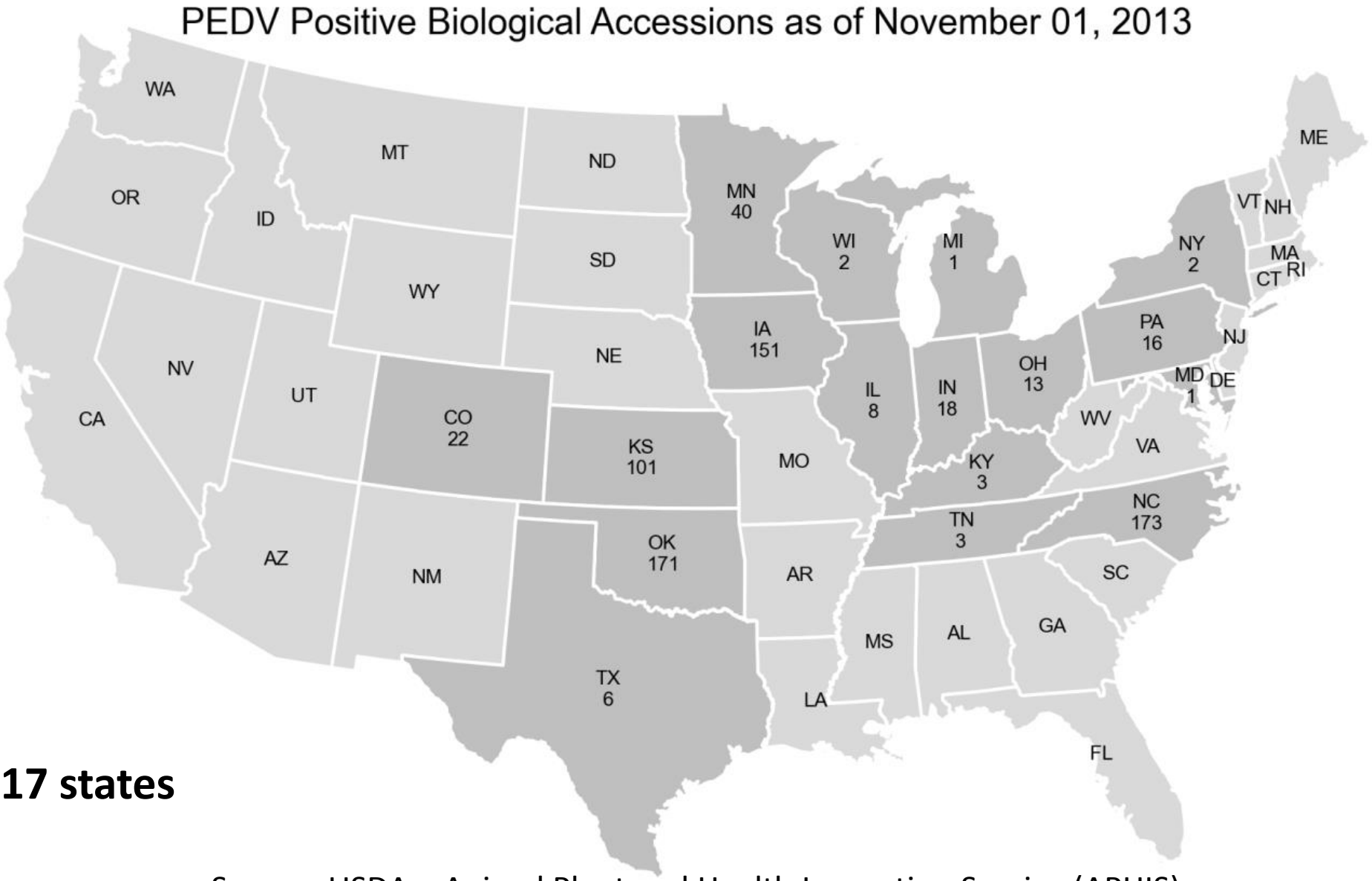
Positive PEDv Accessions



9 states

Source: USDA – Animal Plant and Health Inspection Service (APHIS)

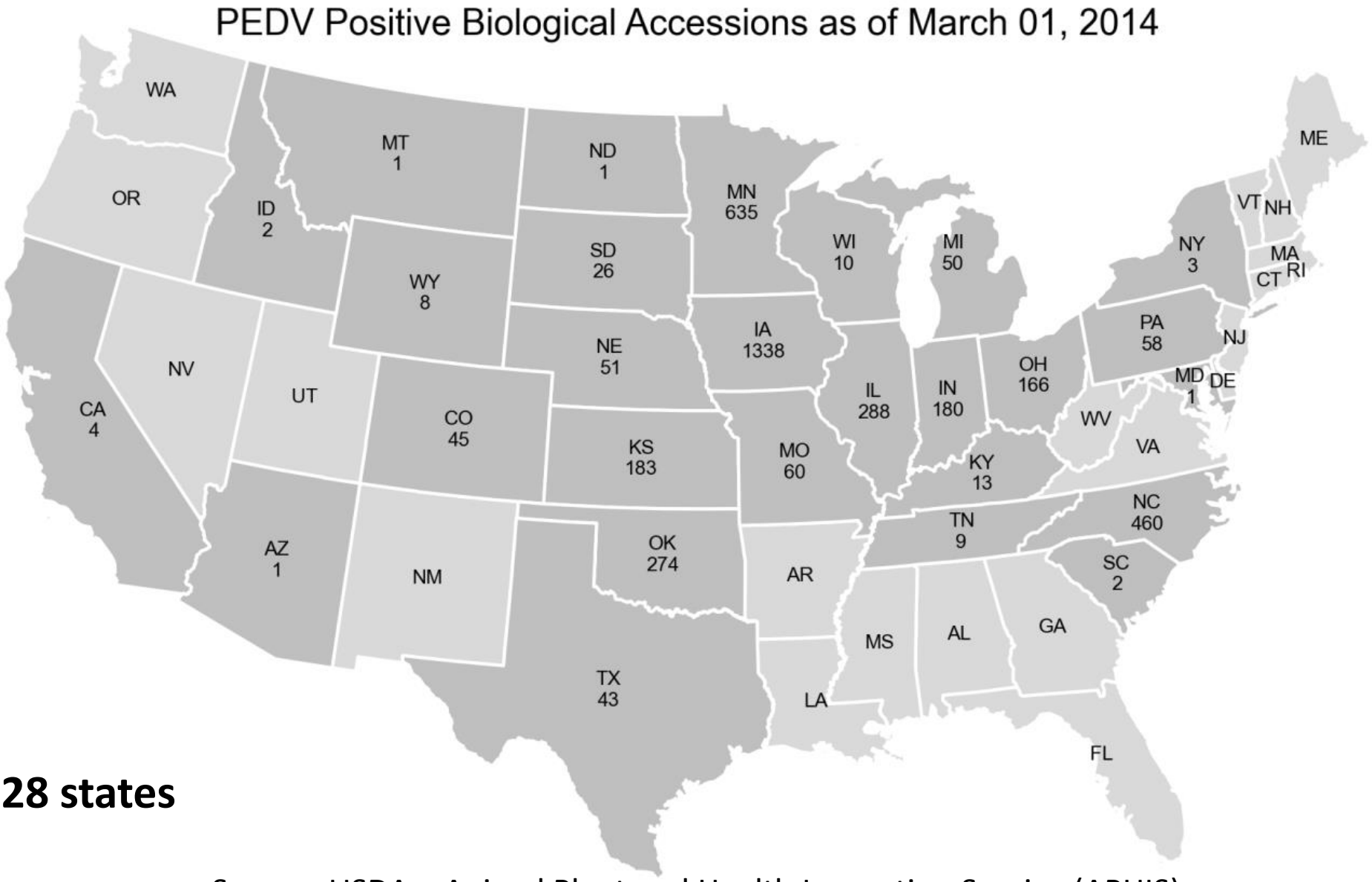
4 Months Later



17 states

Source: USDA – Animal Plant and Health Inspection Service (APHIS)

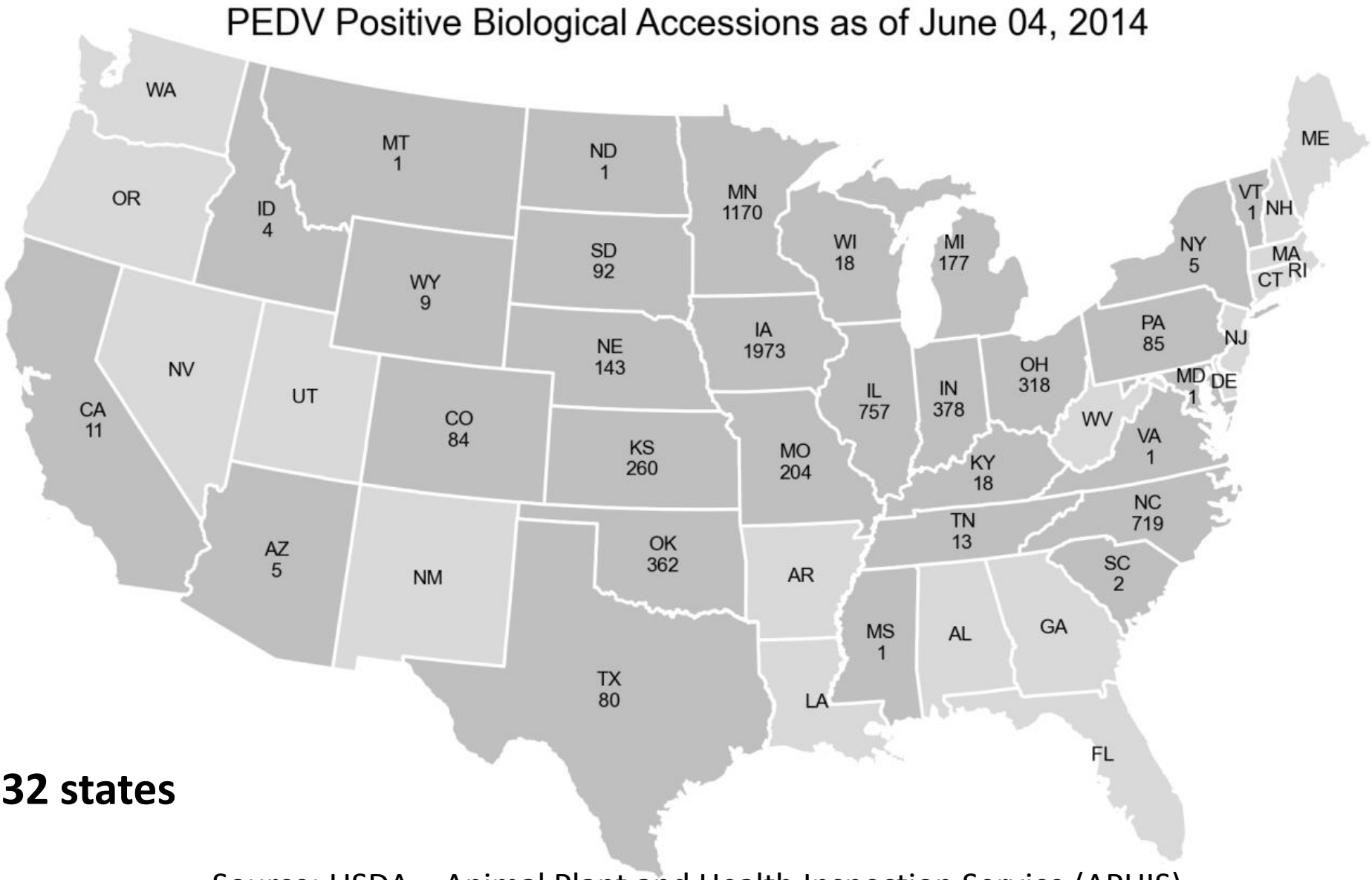
8 months later



28 states

Source: USDA – Animal Plant and Health Inspection Service (APHIS)

11 months later



32 states

Source: USDA – Animal Plant and Health Inspection Service (APHIS)

Disease Spread Conclusion

- The number of states with detected PEDv increased from 9 to 32 within a short time span
- Good illustration of geographic proximity and virus transmission
- There is a need to predict shocks quickly so estimates can be adjusted accordingly