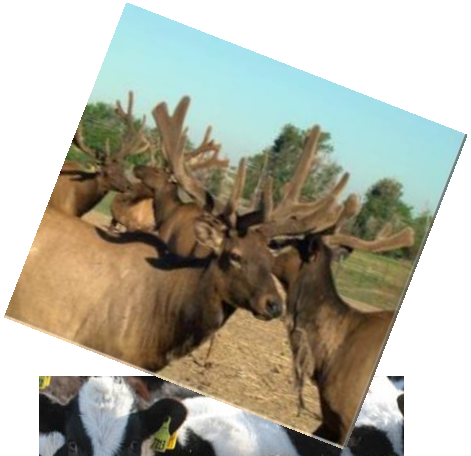
USDA
United States Department of Agriculture

Veterinary Services



USDA Influenza A Virus Surveillance Program in Swine

OFFLU SWINE INFLUENZA GROUP

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&
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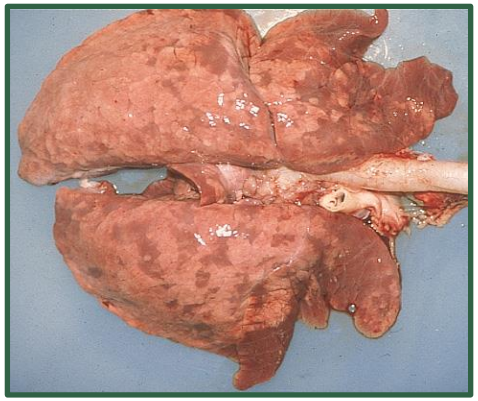
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services

12/3/15



3 Streams:

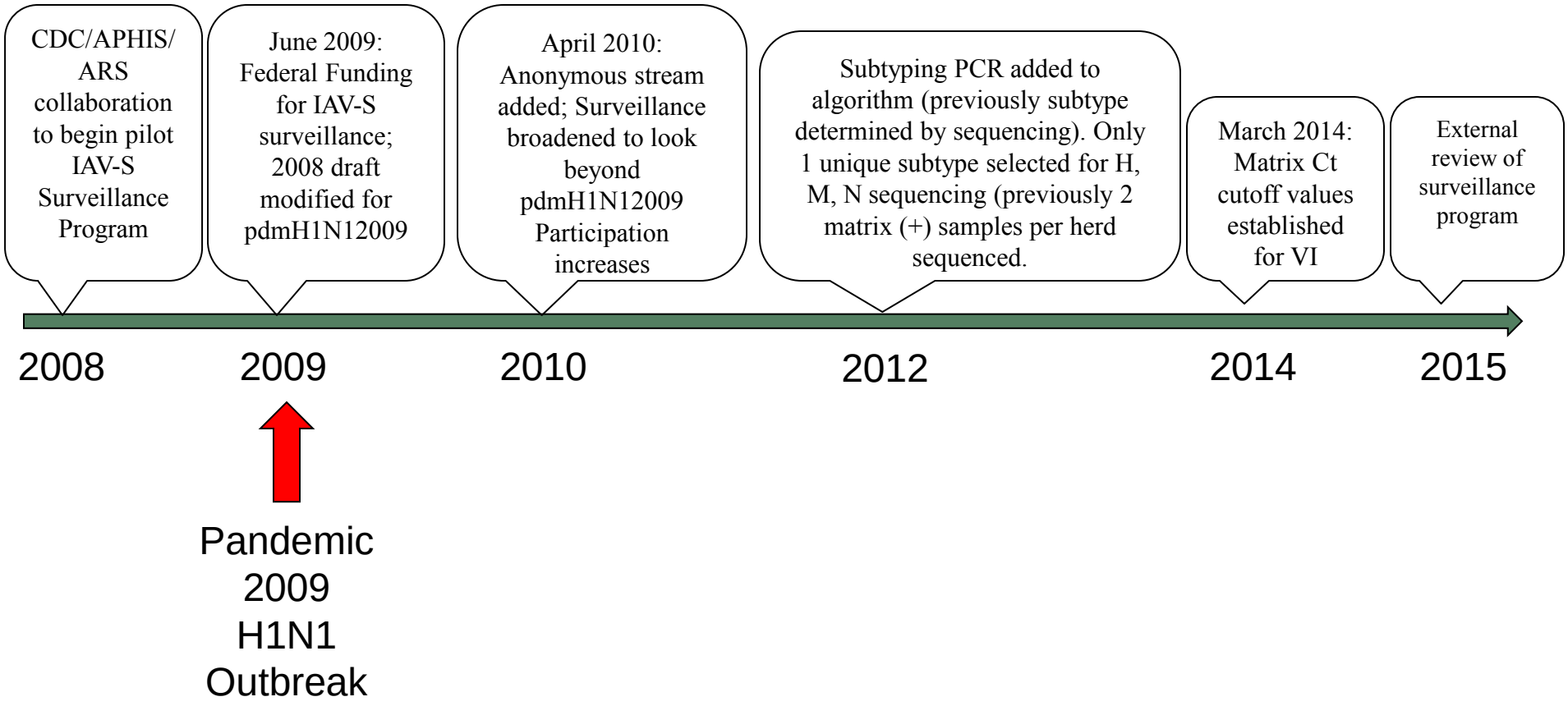
1. **Sick pig submissions – NAHLN system – 99+%**
2. **Pigs related to public health (PH) investigations of novel flu cases**
3. **Swine exhibiting influenza-like illness (ILI) at commingling events such as auctions, markets, fairs, or other swine exhibition events.**

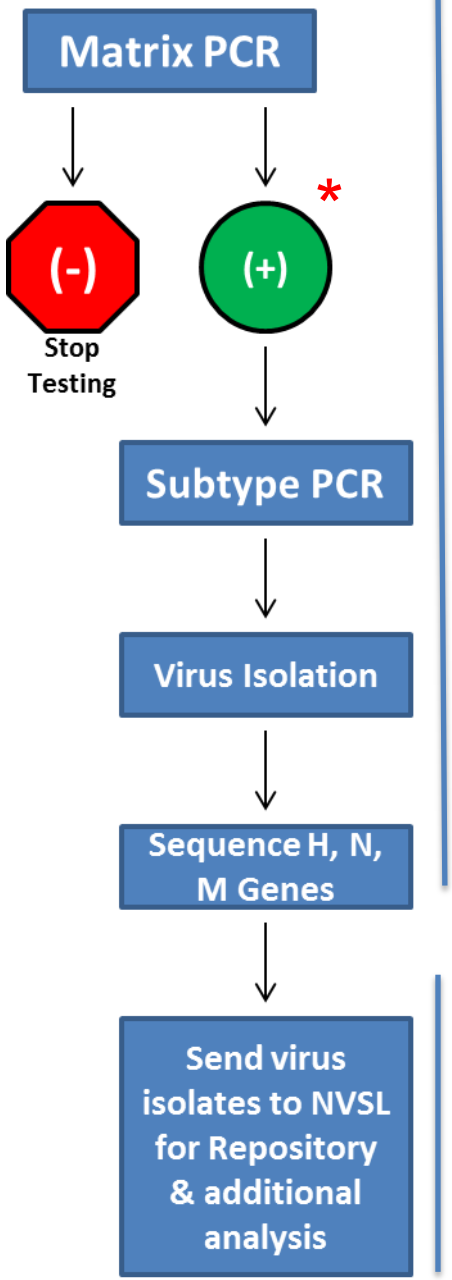


Data Disclaimers:

1. Surveillance is voluntary, passive, and anonymous
2. Does not indicate disease prevalence by
   a. time
   b. location
   c. subtype
3. State-level data summaries are not disclosed externally (internal state stakeholders may get state-specific data)

Surveillance Program Timeline History





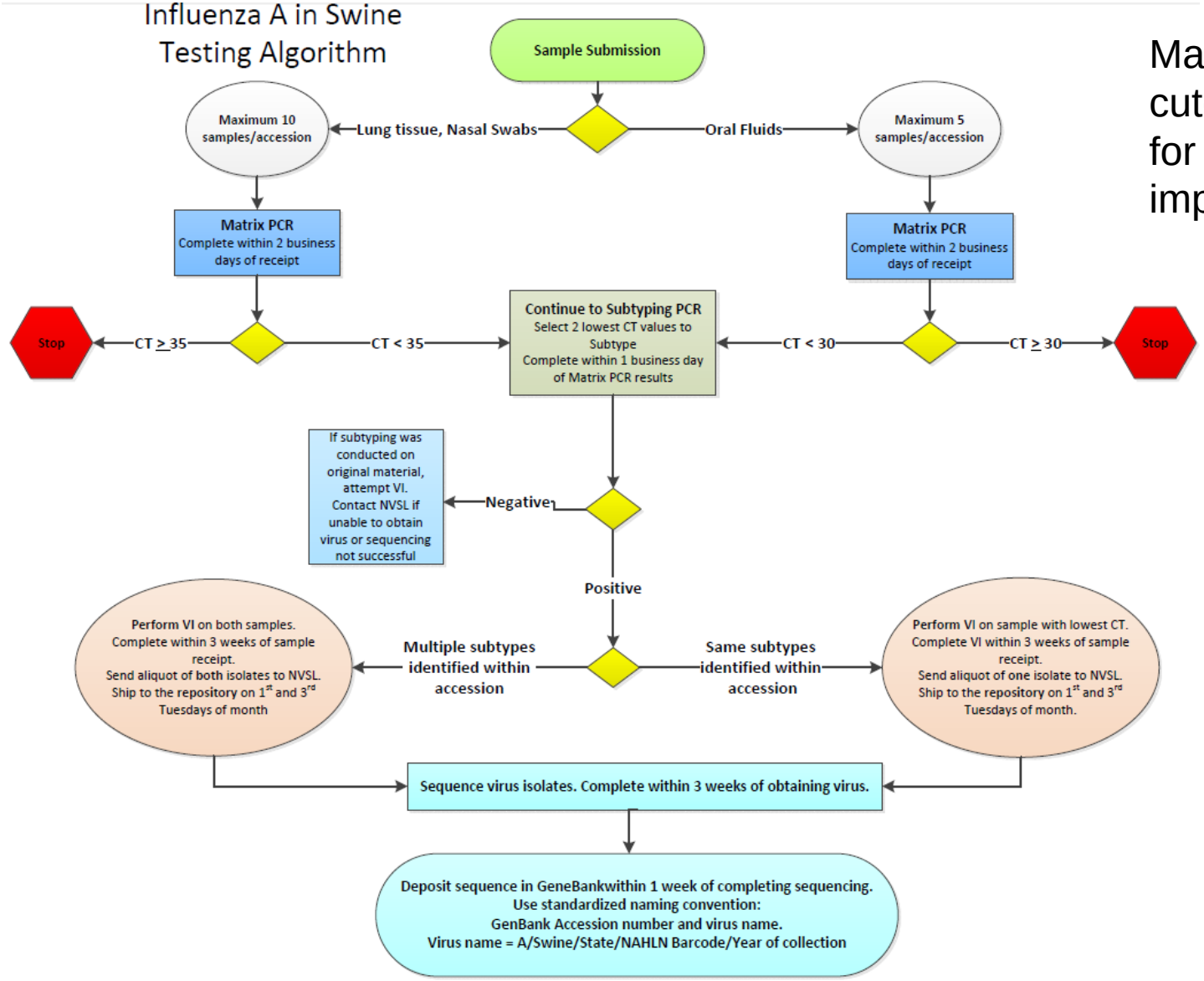
Testing Algorithm

- Testing at NAHLN lab if no human illness
- Testing at NVSL if known human illness

NAHLN

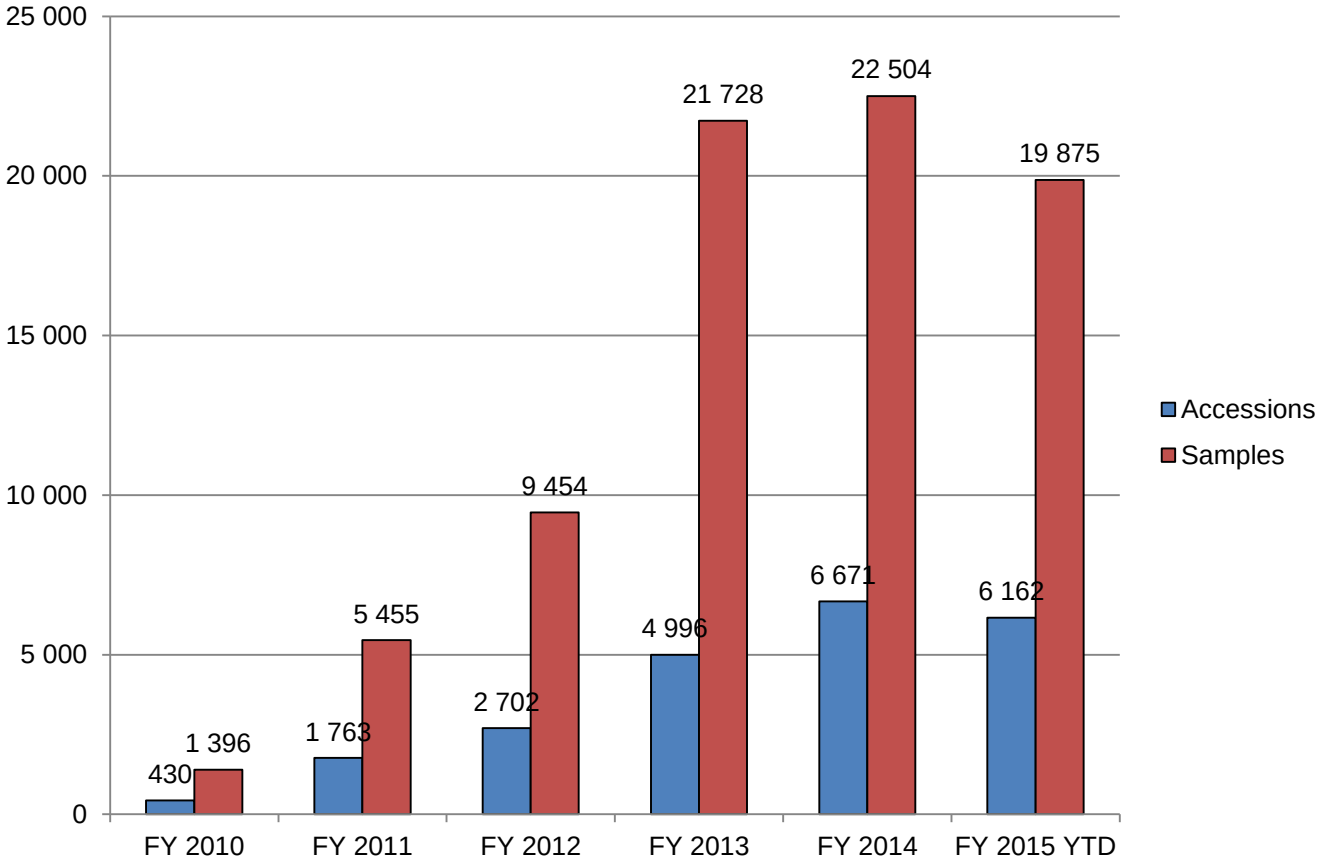
*No further testing if:
Lung/Nasal swabs ≥ 35 Ct
Oral fluid ≥ 30 Ct (implemented March 2014)

Additional Research,
Vaccine/Assay Development,
Data Analysis



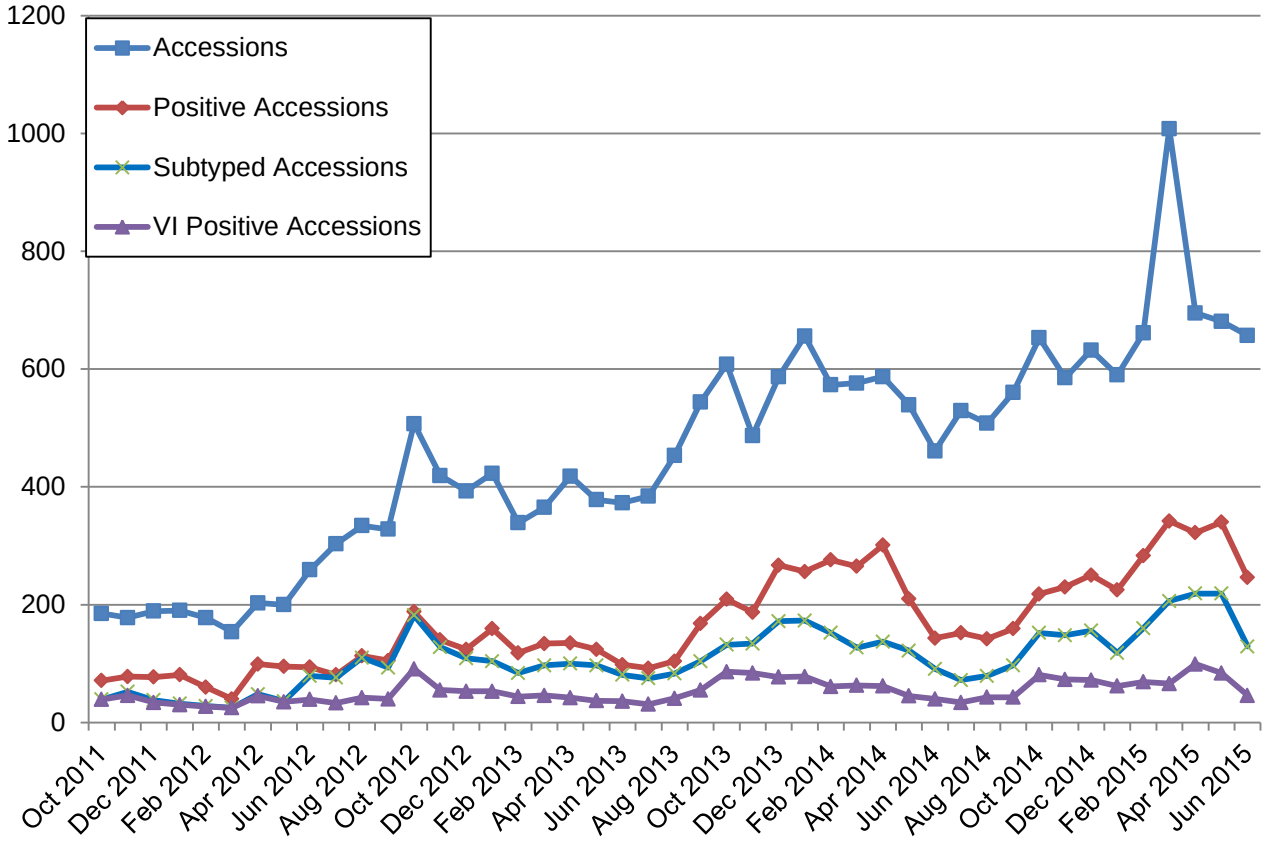
March 2014: Ct cutoff values for VI implemented

Number of laboratory accessions and samples tested, FY 2010 through FY 2015 Q3



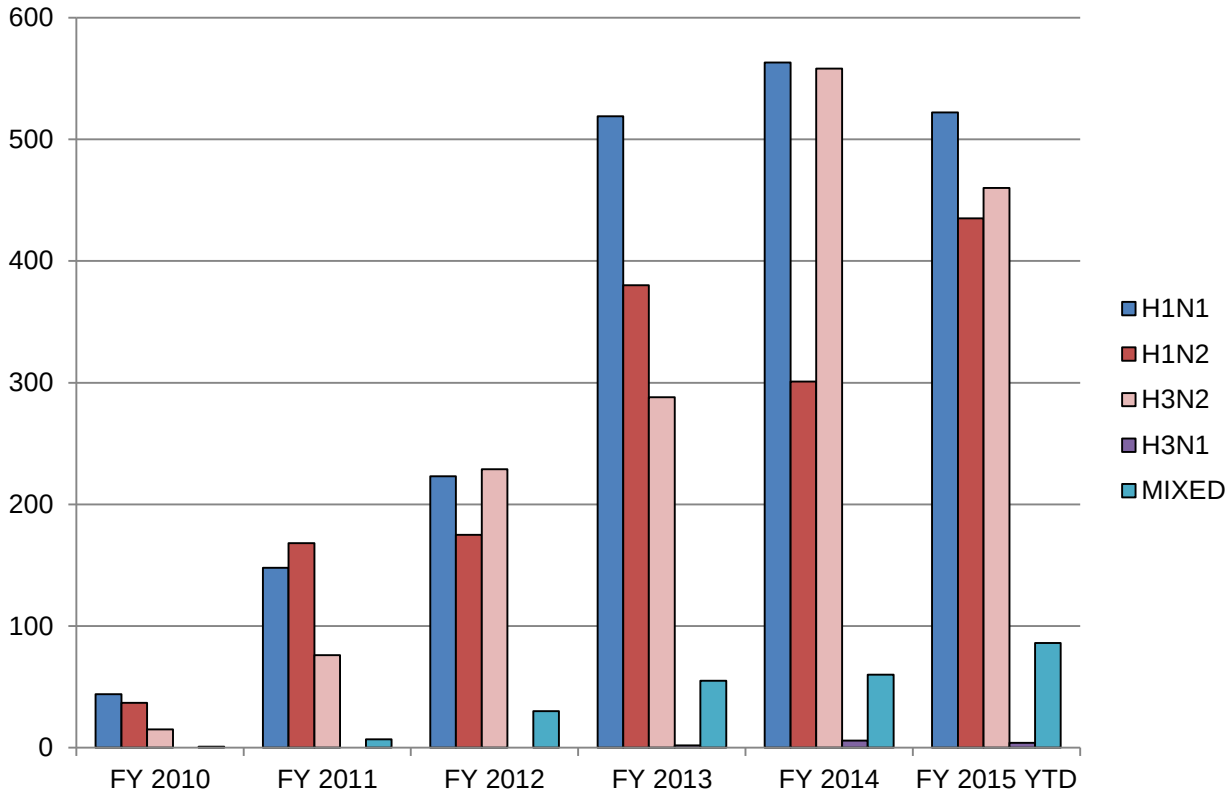
Courtesy of Dr. Sara Ahola

Number of accessions collected, subtyped, with matrix positive test results, and with virus isolation positive results, FY 2012 through FY 2015 Q3



Courtesy of Dr. Sara Ahola

Number of accessions with each virus subtype present, FY 2010 through FY 2015 Q3



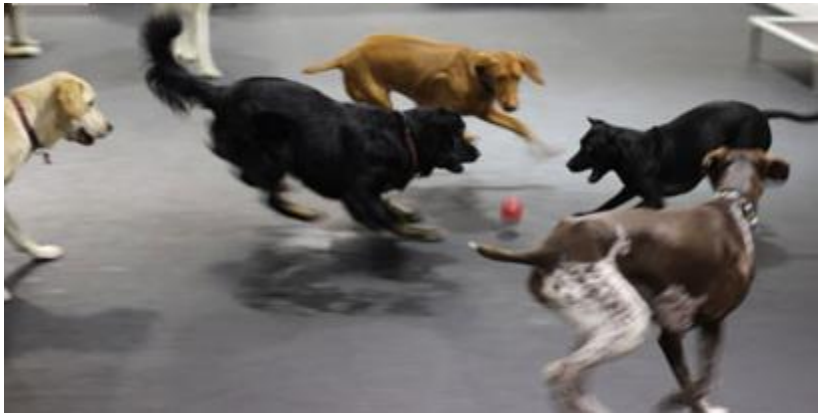
Courtesy of Dr. Sara Ahola

NVSL Roles

- Repository
  - ~4400 viruses (representing ~30 states)
  - Shipped-international, biologics companies, research, PH
- Full genome sequencing
  - Random viruses received
  - Representatives of each subtype (H1N1, H3N2, H1N2)
  - Representatives from each submitted state
- Confirmatory testing
- Public health investigations
- Other, as needed

2015 Canine Influenza

- Spring 2015 H3N2 detected in U.S. dogs
- Vet hospital in Chicago area submitted 19 canine and 2 feline samples to NVSL for testing in April
- Most animals had a cough and fever unlike the severe, persistent pneumonia seen in Asia
  - Nasal discharge, inappetance, lethargy, sneezing, vomiting



http://www.chicagonow.com/steve-dales-pet-world/2015/04/dog-flu-update-the-asian-dog-flu-attacks-chicago/

Testing

- Matrix PCR
  - 14/19 specimens positive
  - Feline all negative
- Virus isolation-MDCK-negative
- Virus isolation-embryonating chicken eggs
  - 9-11 days
  - Amniotic route
  - 8/19 samples positive
  - Pan HA RT-PCR=Eurasian H3
- Sequence=H3N2

Outcome

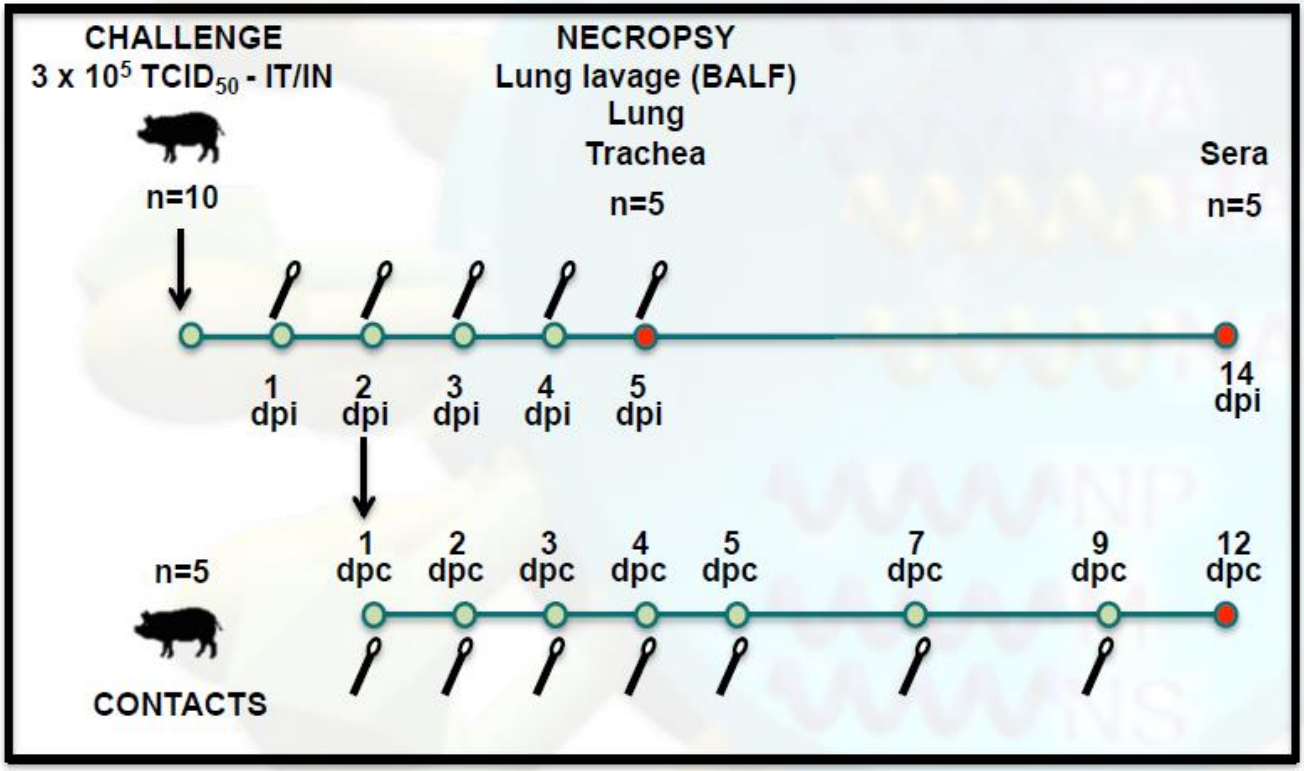
- Egg isolate was passaged on MDCK cells
- Virus made available to researchers and biologics companies
- Canine influenza virus vaccine licensed within ~6 months of virus isolation at NVSL

www.talklocal.com

Canine H3N2 infection in swine

A/canine/Illinois/12191/2015 (H3N2)

- Originated from a nasal swab of a golden retriever (April 15 2015)
- Isolated in embryonated chicken embryos, passaged in MDCK
- Obtained from NVSL USDA-APHIS



- Mild to no lesions observed in the lungs of principal pigs (n= 5).
- Low titers of virus detected in BALF (4/5 principal pigs).
- No virus was detected in lung tissues by IHC.
- Sero-conversion (as measured by HAI; ≥1:40) observed in 2/5 principal pigs, and 0/5 of the contact pigs.
- No virus detected in nasal swab samples by virus isolation in MDCK cells; RT-PCR will be applied as a more sensitive method to detect virus.

Dr. Amy Vincent

It Takes A Village…..Thank You!

- Producers, practitioners, NAHLN labs for supporting the surveillance and fair investigations
- State Animal Health Officials
- Local, State, and Federal Public Health
- Veterinary Services personnel
  - Dr. Ellen Kasari
  - Melinda Jenkins-Moore
- ARS personnel
  - Dr. Amy Vincent

Questions?