Setting up an Arboviral Surveillance Program

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Ins and Outs of an Arboviral Surveillance Program

Importance of surveillance

Surveillance mechanisms

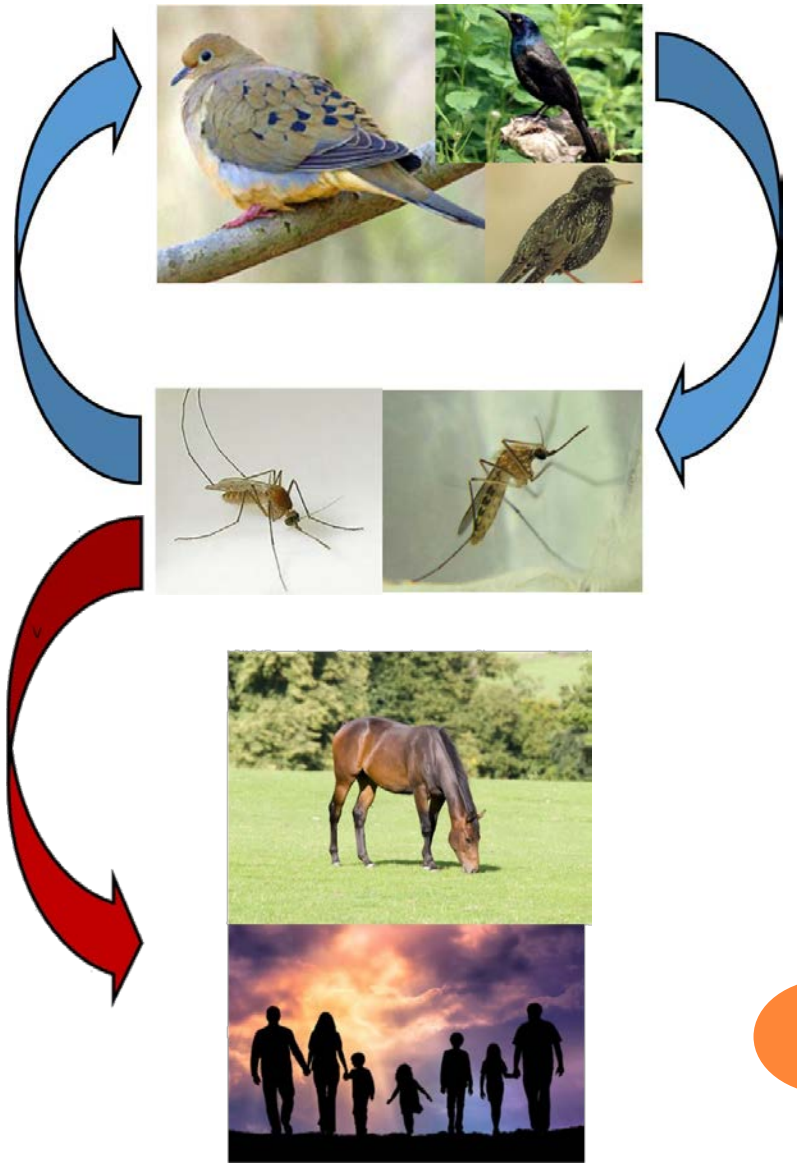
Typical program in Florida

Pros and Cons

Why Conduct Arboviral Surveillance

Why: EEE, SLE, WNv

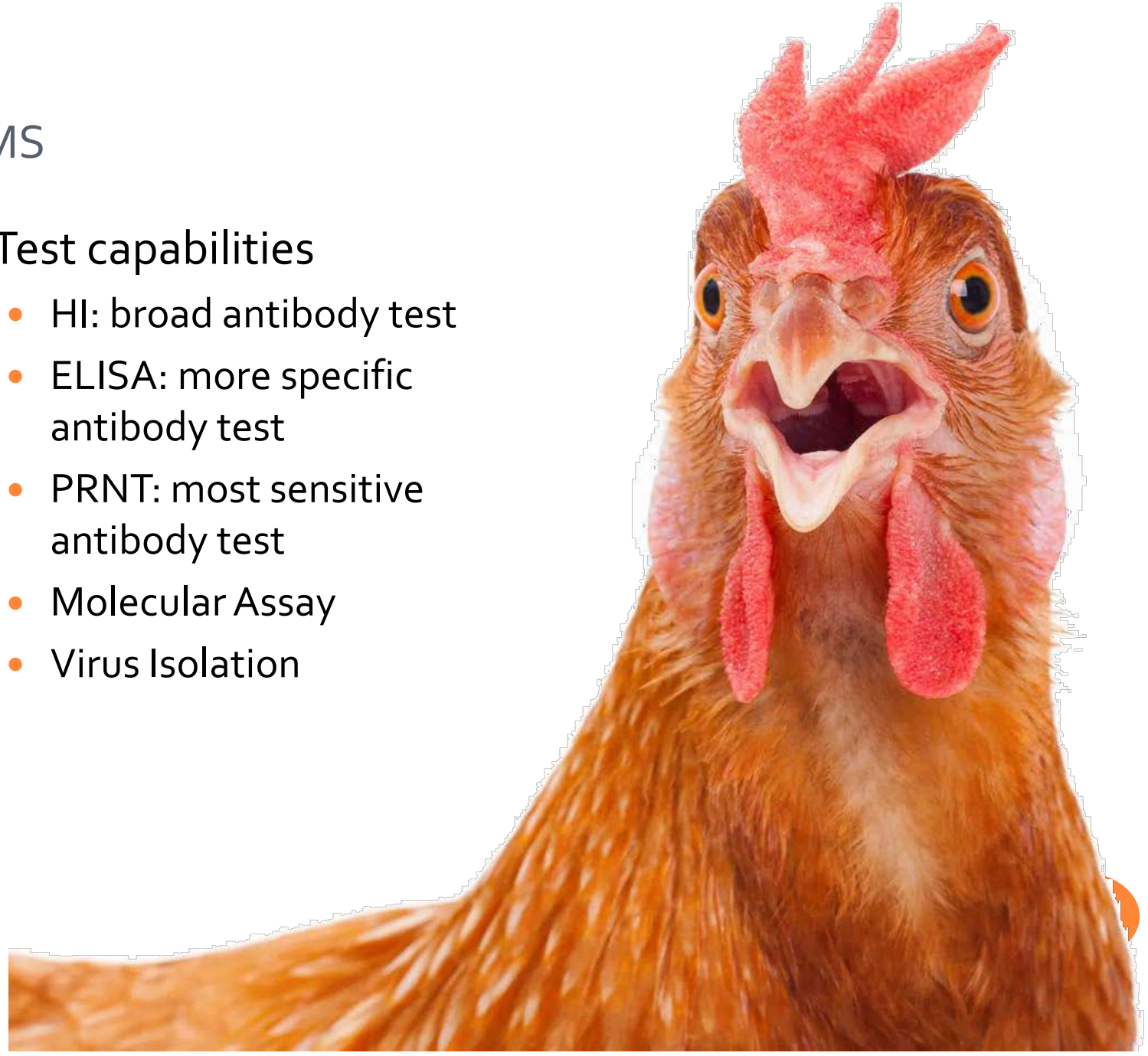
- Mosquitoes transmit diseases, especially viruses
- One mosquito, one bite
- Vectors typically prefer birds
  - *Culex pipiens quinquefasciatus*
  - *Culex nigripalpus*
- Bridge vectors are not always clear
- Don't want people becoming ill
- New viruses



Surveillance Mechanisms

- People
- Horses
- Mosquitoes
- Avian
  - Dead Birds
  - Wild bird sero surveys
  - CHICKENS

- Test capabilities
  - HI: broad antibody test
  - ELISA: more specific antibody test
  - PRNT: most sensitive antibody test
  - Molecular Assay
  - Virus Isolation



Mosquito Surveillance

- Traps
  - CDC
  - Gravid
  - BGS???
- Bait
- Anesthetizing agent or chill table
- Decent stereoscope and light source
- Dry Ice
- Person capable of identification
- Microcentrifuge tubes
- Testing capabilities
  - RAMP: Rapid Analyte Measurement Platform
  - VecTest: dip stick test, primarily WNv
  - Lab

Avian Surveillance: Dead Birds

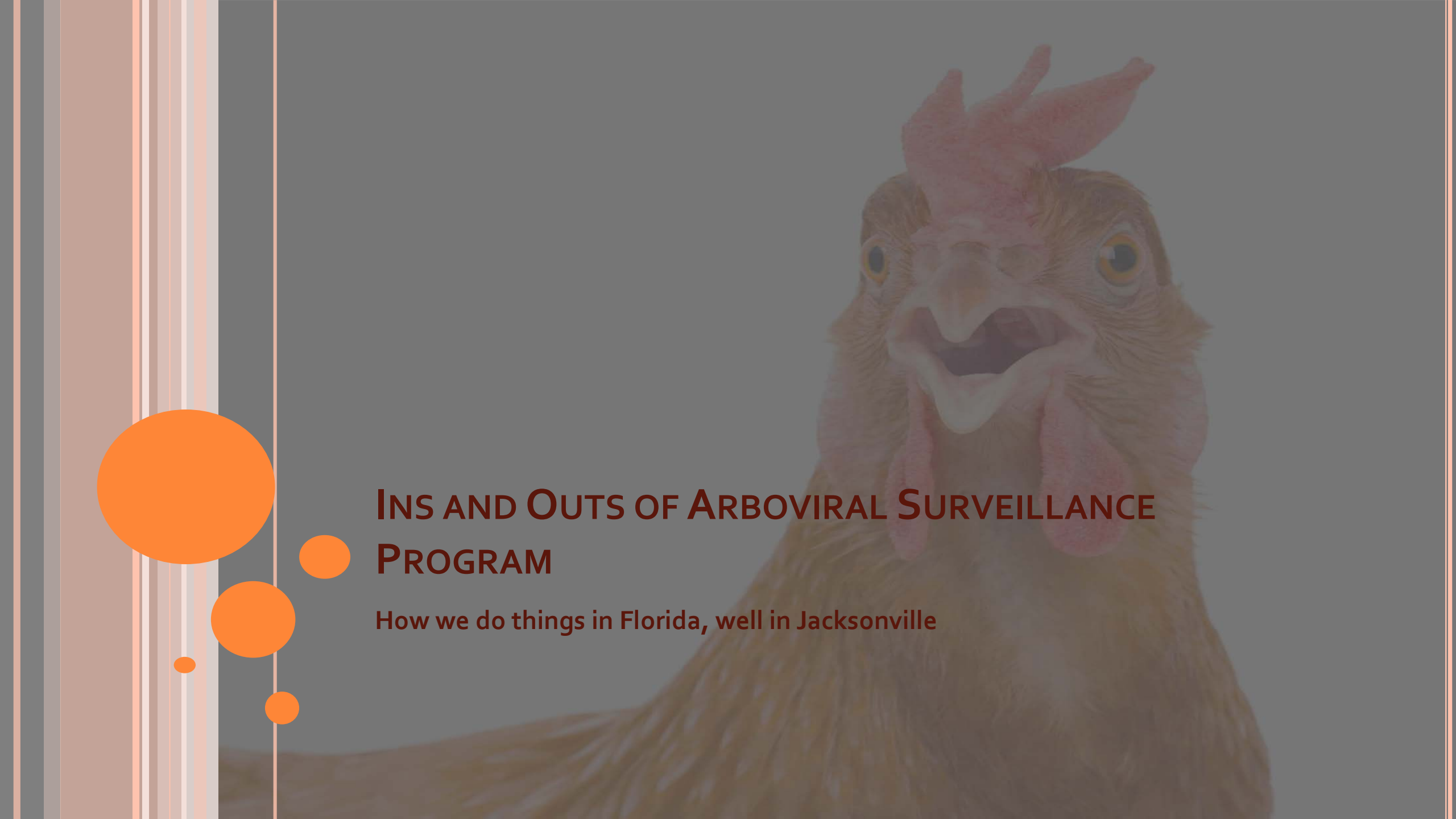
- Types of birds
  - Corvids
  - Passeriformes
- Condition of bird:
  - How long?
  - How much decomposition?
- People willing to participate
- Handling dead birds can be risky
- Storage and shipping

Avian Surveillance: Wild Birds

- Traps
- Time
- Types of birds
- Viremic period
  - (trap and release study)

Avian Surveillance: Sentinel Chickens

- Captive "audience"
- Shelter/Food/Water/Protection
- Larger bird = larger sample
- Consistent testing
- Short viremic period
- EGGS



Ins and Outs of Arboviral Surveillance Program

How we do things in Florida, well in Jacksonville

Why Sentinel Chickens?

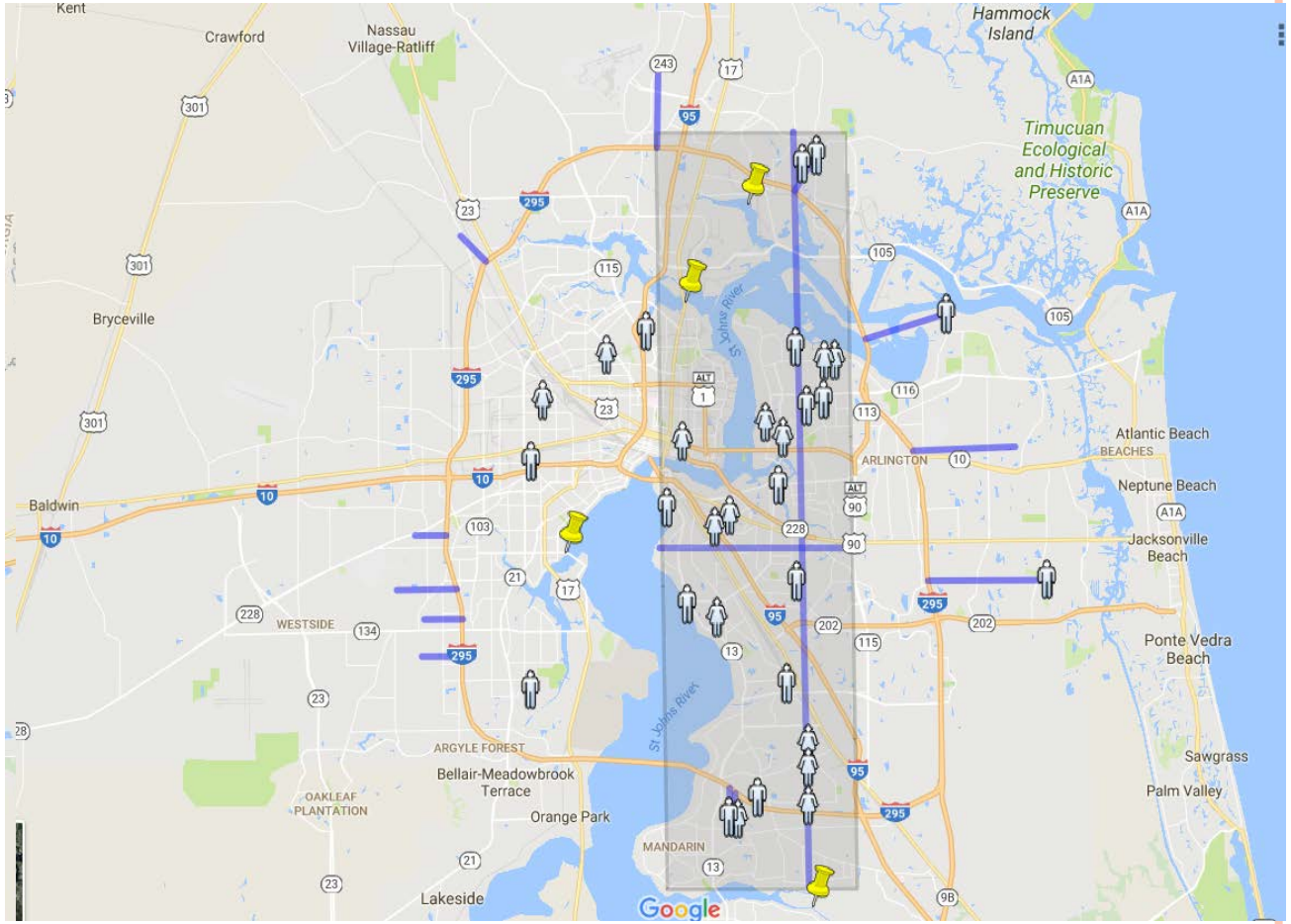
- Short viremic period
- Low viremia
  - less risk of incidental infection
- Easily handled
- Readily available
- Set up to be a front line indicator for the presence of viral activity

What you Need to Start…

- Pullets or chicks
  - Some districts raise own chicks
  - Others acquire pullets (15-17 weeks of age) at start of program
- Individuals capable of using needle/syringe
- Locations of known activity and landowners willing to participate

Placement

- Initially, sites were focused on SLE, EEE surveillance
- After WNv became endemic, began to focus sites in areas where potential was great
- Reviewed human infection maps from 2001-2012
- Learned that cases had similar environmental characteristics



Cage Design

- Need to protect birds from predators
  - Racoons, opossums
- Allow access to chickens
  - Prevent stress
- Easily cleaned
- Moveable
- Food and Water Troughs

Sera Collection Supplies

- 25 gauge 3/8 inch luer-lock syringe
- 3-5 mL sera separation collection tube for each sample
- Label for each specimen includes:
  - Bird number
  - Collection date
  - Site ID
  - County
- Gloves (new pair for each site)
- Alcohol swabs
- Disinfectant, hand soap or sanitizer
- Appropriate hazardous waste collection receptacles
- Cooler with ice pack for samples
- Centrifuge

And of Course Chickens…

- 10-12 weeks of age at the start of the season
- Designation Band
  - Metal wing clip
  - Metal leg band
  - Colored Zip Ties!!!
- Chicken feed
  - Egg Makers Crumbles
  - Dried Meal Worms
- Electrolyte/Probiotic tablets
- Oyster shell
- May occasionally need an antibiotic

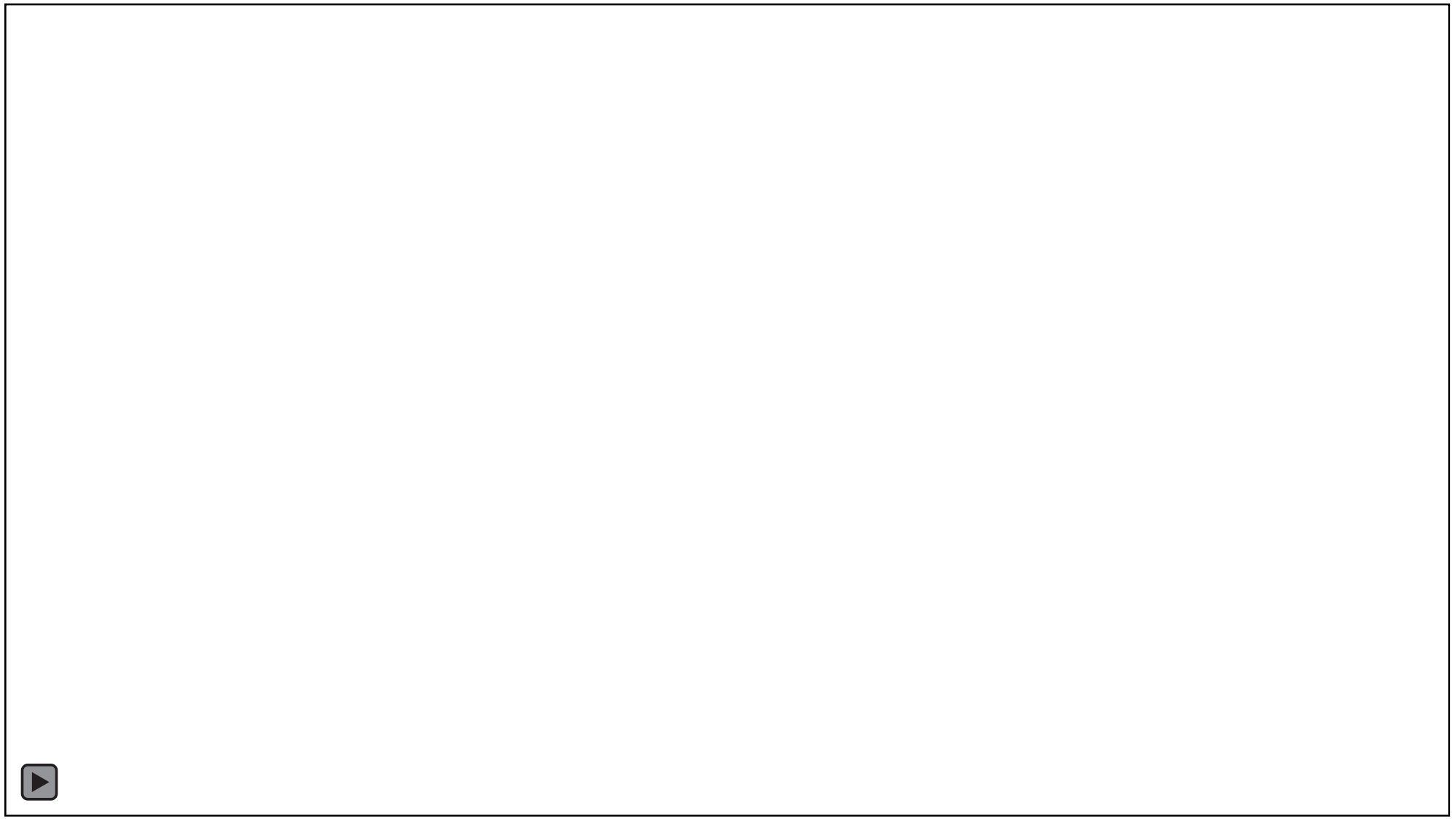
Sera Collection Procedures

- Can vary from state to state
- FLDOH Protocols
- Collect sample from wing of chicken (jugular is also acceptable)
- Samples collected an submitted each week
- Collect 2mL blood
- Using centrifuge, separate clot from serum
- Send to lab in cooler with ice pack, next day if not delivering in person

Wing

Jugular

Roosters versus Hens…



- Sentinel Chicken post comb stick (California testing procedures)

Why Mosquitoes?

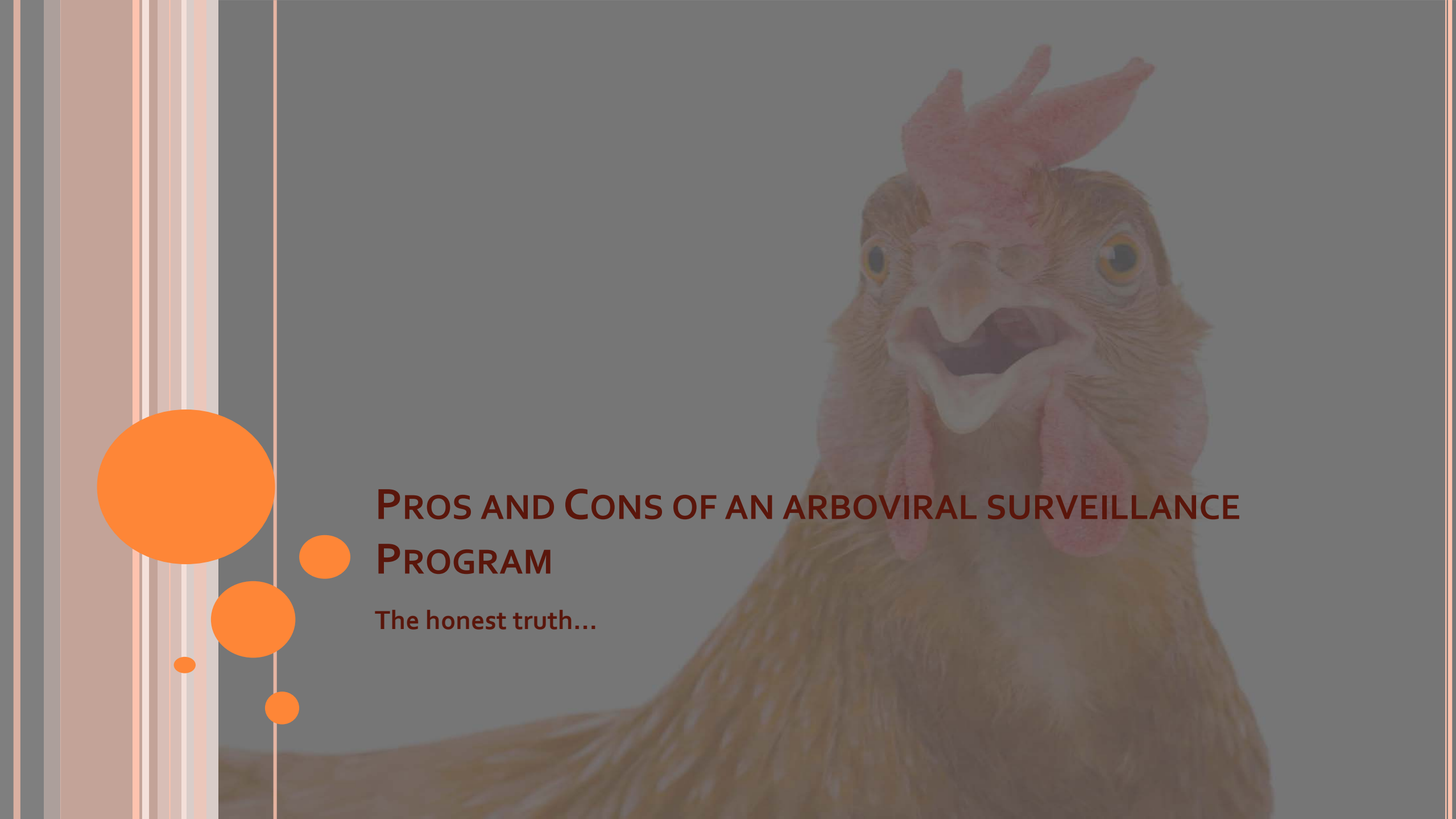
- Traps are easily placed and relocated
- Easy to ship pools of mosquitoes
- RAMP or VecTest is a testing option

Collecting Mosquitoes: Sentinel Site

- CDC style CO_2 baited traps
- Set early afternoon
- Collected next morning
- Collections could either be frozen or anesthetized
- Speciated
- If have sub zero freezer, can pool in groups of 50 if need to submit for later testing

Collecting Mosquitoes: Viral Hot Spot

- CDC style CO_2 baited traps
- Can be easily and inconspicuously placed
- Placed mid afternoon
- Collected early morning
- Collections are anesthetized, pooled and submitted on dry ice to state lab for molecular assay and virus isolation tests



Pros and Cons of an arboviral surveillance Program

The honest truth…

Pros

- Goal of preventing human exposure
- Wealth of knowledge about the virus cycle for your specific district
- Learn more about potential vector mosquitoes
- You become the local chicken expert…
- PUBLIC HEALTH!

Cons

- Cost for tests
- Timeline can be skewed
- Employee availability (two person teams)
- There is a load of crap you have to deal with

Questions?