The background of the slide is a photograph of a desert landscape. In the foreground, there is a flat, arid plain with sparse, low-lying vegetation. In the middle ground, several large, flat-topped red rock buttes or mesas are visible, some with vertical erosion patterns. The sky is a clear, pale blue. The title text is overlaid on the upper portion of the image.

# *2015 Update of the odd Zoonotic Diseases on Navajo*

Dr. Scott Bender, DVM

Tribal Veterinarian

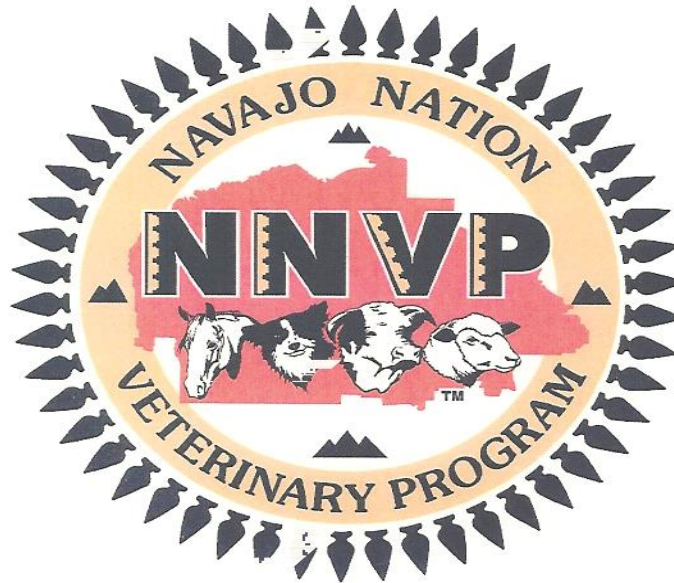
Navajo Nation Veterinary Program

Navajo Nation Dept. of Agriculture

Navajo Nation

# OR THE ANSWERS ARE:

- “Flu like symptoms”
- And
- “tetracycline”.... Ok.... Doxycycline!



## **MISSION STATEMENT**

**The Mission of the Navajo Nation Veterinary & Livestock Program is to provide reasonable cost, comprehensive veterinary services for the protection of animal health, to alleviate animal suffering, to conserve livestock resources, to promote public health and the advancement of medical knowledge.**



# Rabies

REPORTED IN THE  
STATE, BRAZIL

01311-000,  
il.com

INSTITUTO PASTER

35% 49%  
12% 14%

2001 2011

people per 10,000 inhabitants  
in state of Sao Paulo, Br.  
(SES-SP)

Animal species

Animal species	2001	2011
Canine	0.14	0.14
Feline	0.27	0.27
Other sp.	3.51	3.51
Unidentified	9.98	9.98

social species involved in the past  
Sao Paulo, Br., in years 2001 and 2011  
(SES-SP)

DISCUSSION

ON RITA BLUES

Scott Bender

## EVALUATION OF BAIT FLAVORS FOR POTENTIAL USE IN ORAL RABIES VACCINE DELIVERY TO FERAL DOGS (*Canis familiaris*)

Scott Bender<sup>1</sup>, Peggy Bender<sup>2</sup>, Krista Heusing<sup>3</sup>, Ane Benoitson<sup>1</sup>, David Bergman<sup>1</sup> and Kurt VanCausanen<sup>1</sup>  
<sup>1</sup>Navajo Nation Veterinary Program and Department of Agriculture, Navajo Nation, Arizona  
<sup>2</sup>USDA Wildlife Services, Phoenix, Arizona  
<sup>3</sup>USDA National Wildlife Research Center, Fort Collins, Colorado

**Introduction:** Feral domestic dogs are a primary vector of rabies in many parts of the world. It is estimated that < 20% of domestic dogs on tribal lands in the United States are vaccinated against rabies. One potential method to increase vaccination rates may be through the hand distribution of oral rabies vaccine (ORV) bait. ONRAB® is the primary ORV bait used in Canada to vaccinate striped skunks (*Mephitis mephitis*) and raccoons (*Procyon lotor*).

Research suggests the most common non-target animals that may ingest these baits are feral domestic dogs. To investigate the potential use of ONRAB® ORV baits to vaccinate feral domestic dogs against rabies on tribal lands, we performed a flavor preference study to evaluate ORV acceptance of several bait flavors.

**Study Subjects:** Thirteen domestic dogs were included in the study. Study subjects were either surrendered by owners or were feral dogs captured by animal control officers.

study took place at the Many Farms Animal Hospital, Navajo Nation, Arizona.

1.0 x 0.5 cm flavored blocks consisting of edible material used to coat vaccine blister packs. We used chicken, cheese, dog food, hazelnut, marshmallow, peanut butter and sardines in pairs to 13 domestic dogs. We offered possible combinations of bait pairs over a period of ten days, with each bait offered six times. We recorded if each bait was consumed first using the MIXED procedure in SAS with "contrast" statements for

# What you need to know.....

- Last terrestrial case on Navajo 1949
- Closest Endemic areas are in Eastern NM, Southwestern AZ
  - Skunks – New Mexico and Southern Arizona
  - Gray Fox – Central Arizona
- Bats- 9/26/13, Sawmill, AZ
- Bat to Skunk & Fox. Flagstaff 2000.....

# Management Protocol:

- Wound care critical
- Animal quarantine before any Rabies treatment (Dog/Cat)
  - 100% die within 10 days of signs IF POSITIVE
- Rabies Antibody – Day 0
- Human Vaccinations - Day 0, Day 3, Day 7, Day 14
- Unless bat bite – start immediately.

# Plague

- Don't ever blame the p. dogs!
- Continuing to move east and north
- Entered via San Francisco from China.
- Currently hot zone is NM
- A genetic disease resistance.....700 years old.....

# Three Forms

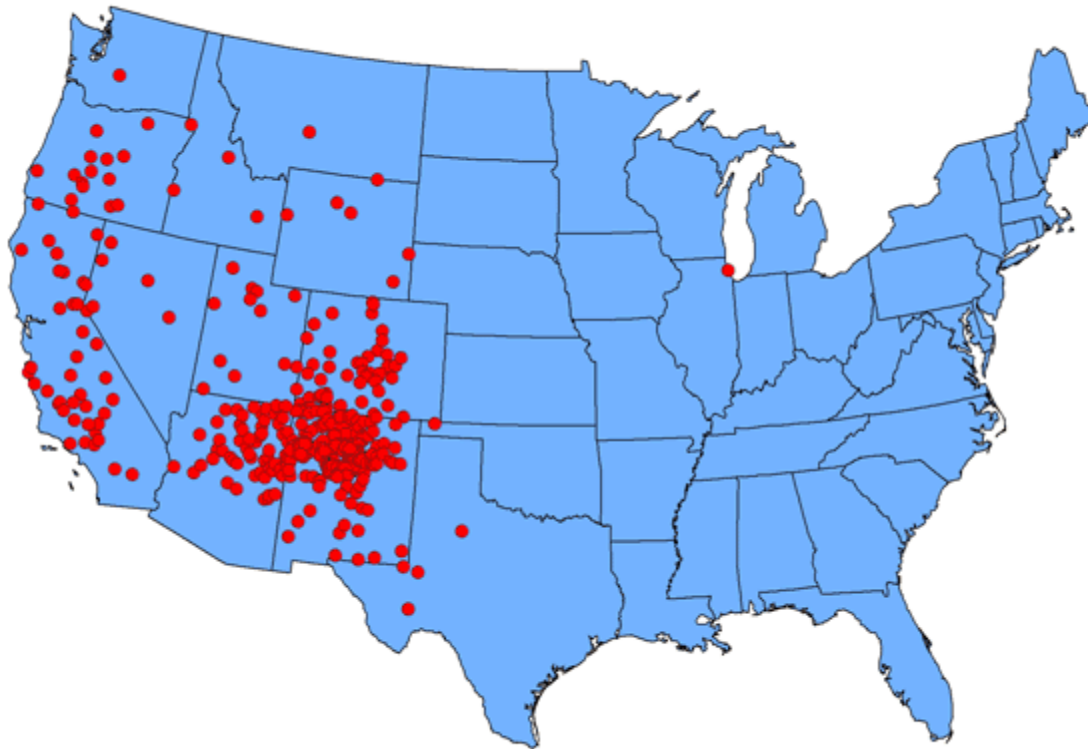
- **Bubonic plague:** enlarged, tender lymph nodes, fever, chills and prostration
- **Septicemic plague:** fever, chills, prostration, abdominal pain, shock and bleeding into skin and other organs
- **Pneumonic plague:** fever, chills, cough and difficulty breathing; rapid shock and death if not treated early



# THE BUBONIC



## Reported cases of human plague--United States, 1970-2012



1 dot placed in county of exposure for each plague case

# Plague on Navajo

- Ft. Defiance 2009, 2010, 2012
- Window Rock 2008
- Ganado 2003
- Blood samples collected
- Dog Titer 19,800 : 1
- Treated with Oxytetracycline
- Recovered fine.
- P Dog Vaccine trial- slated for this year.
  - Ganado and NAPI areas, and 5 other US sites.

# Plague Surveillance

- Watch the Prairie dogs
- Pet exposures- Usually CATS





Treat me Next!





# Fly Larva infections “Myiasis”

- Can happen to any species
- Humans usually secondary
  - Rodent / rabbit hunting
- Occasional untreated wound infections
- Some types used for septic wound debridement.
- Two primary types: Blowfly & Botfly
- Screw worm in S. America.

# Blowfly Larva

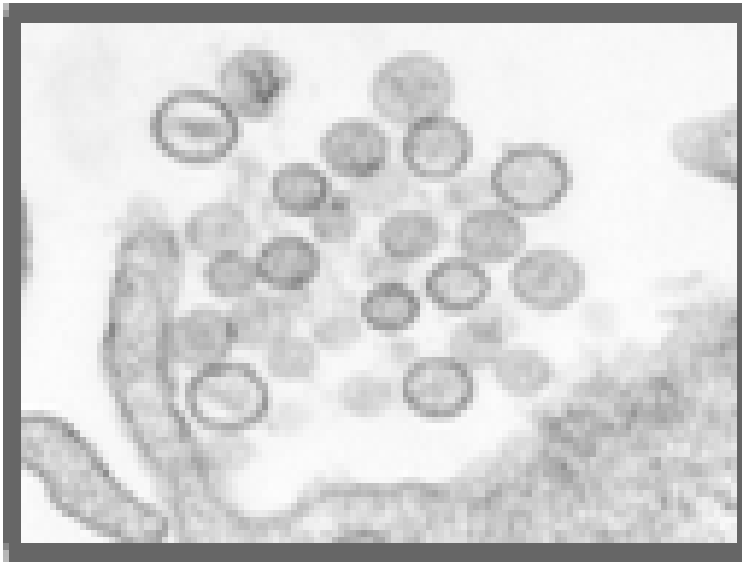


# Botfly Larva

 University of Nebraska  
Department of Entomology



# Hanta Virus



# East VS West

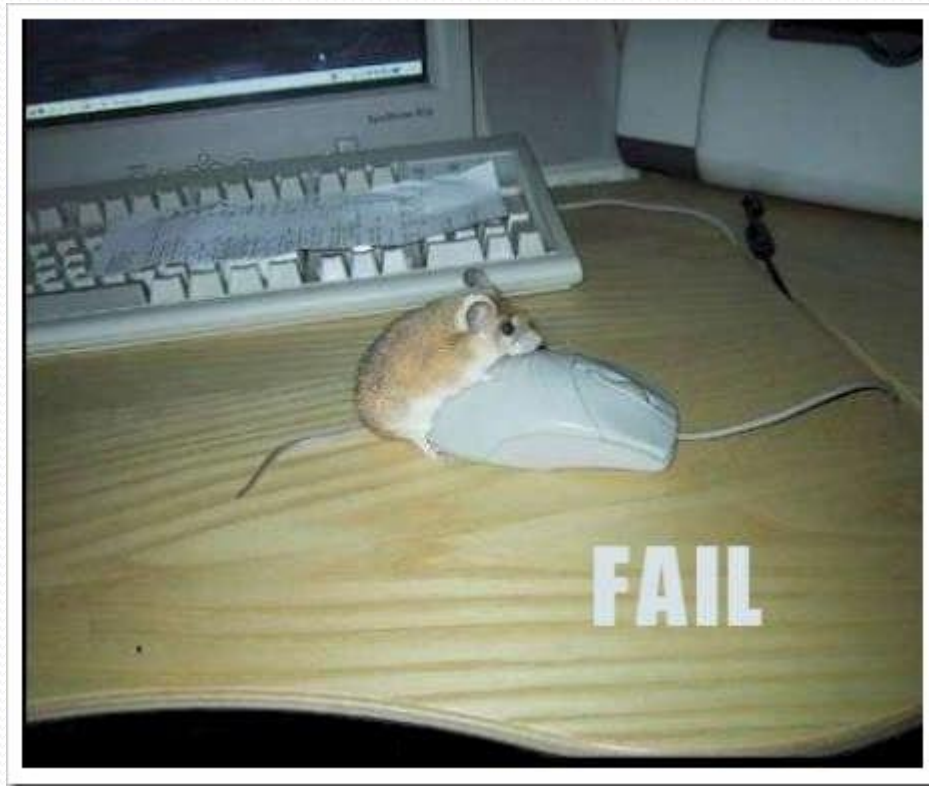
- Old World.
- Generally kidney – hemorrhagic
- First big outbreak- Korean War
- New World
- Respiratory HVPS
- Largely unknown until the 1990
- May have been historical Navajo “outbreaks” – oral reports that fit syndrome.
- Arena Virus are EXTENSIVE in N & S America ~22 types identified so far, all rodent assoc.



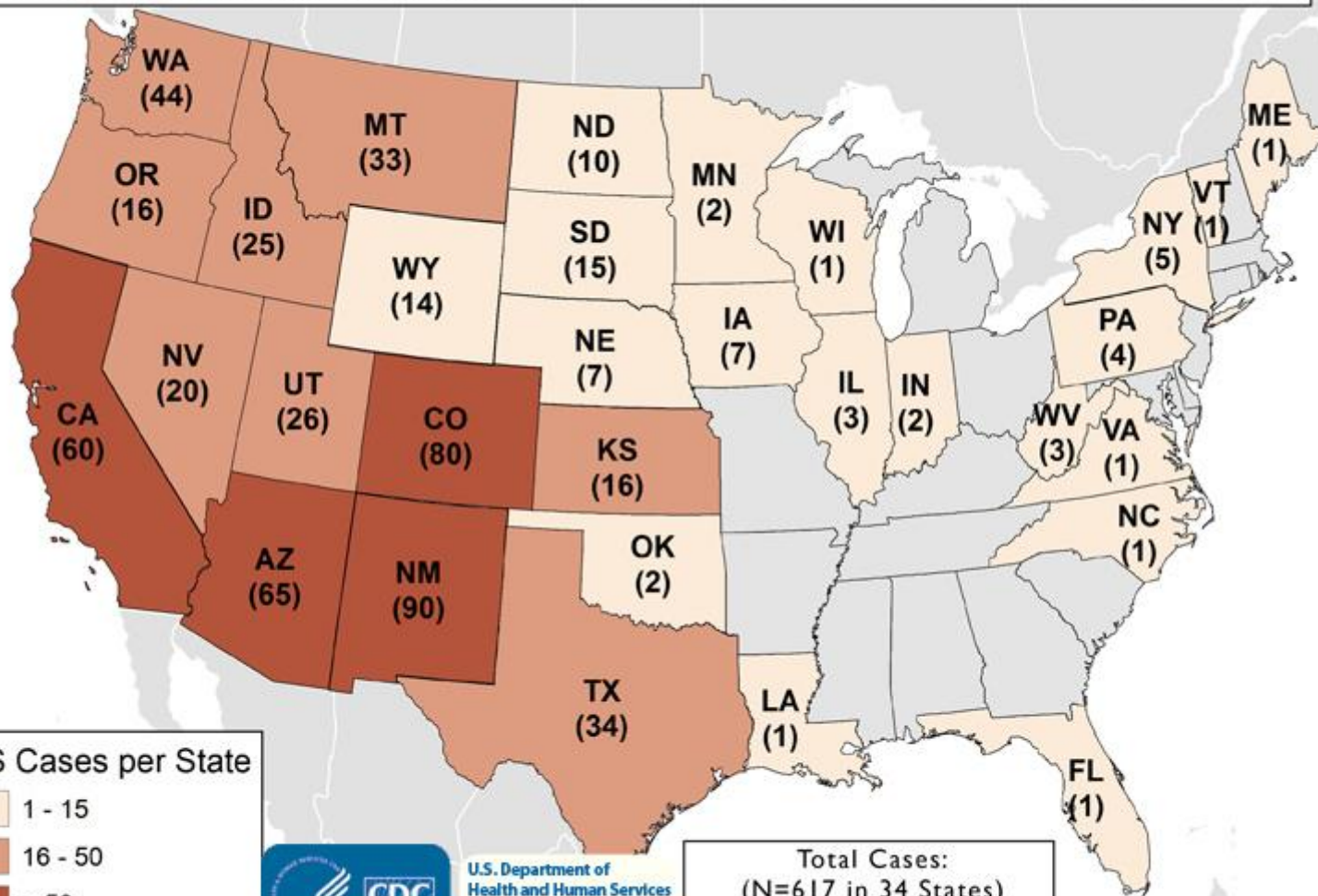
# WEST and EAST



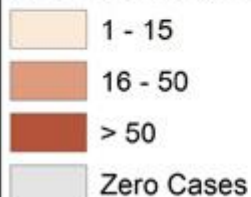
# Hanta – Polygamy VS Monogamy!



## Hantavirus Pulmonary Syndrome (HPS) Cases, by State of Exposure



### HPS Cases per State



U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

Source: Viral Special Pathogens Branch, CDC

Total Cases:  
(N=617 in 34 States)

27 Cases With an Unknown State  
of Exposure. Cumulative Case Count  
Per State Valid as of February 28, 2013.



# Sanitation, sanitation, sanitation.....

- This infects humans by the fecal – respiratory route....
- So how do we prevent this.....
  - SANITATION.....(Bleach it 'til it GLOWS!!!)
  - Exclusion



# Onchocerca

- Parasitic worm family
- *Cervicalis* (horse, cattle), *Cervipedis* (deer, elk)
- *Oncocerca lupi*
- Mediterranean area- Greece, Turkey, Iran
- Human case in Lukachukai
- All affect Humans
- Confused with and more common:
  - Visceral and Cutaneous Larval Migrants
  - (Toxocara canis and Ancylostoma spp.)



# Dog Onchocerca



# Human Symptoms

- Takes 6-12 months to develop
- Microfilaria spread by large biting insects (horse or deer flies)
- Usually skin lesions.
- Dx- Skin Biopsy
- Dx: DNA or adult female morphology
- Rx: Ivomec

# Human and Animal Cases







A real WORKING Dog  
breed

# Bed Bug associated MRSA?

We do have Bed bugs on Navajo.....





# Chaga's Disease

(*Trypanosoma cruzi*)

“Kissing” or “Assassin” Bug

Heart Disease

Report of high titers in SW wildlife



# Competent Vector?

- Yes- in Central – South America
- Unknown in North America
- Navajo- *Triatoma navajoi*??

Mule Bridge, Grand Canyon

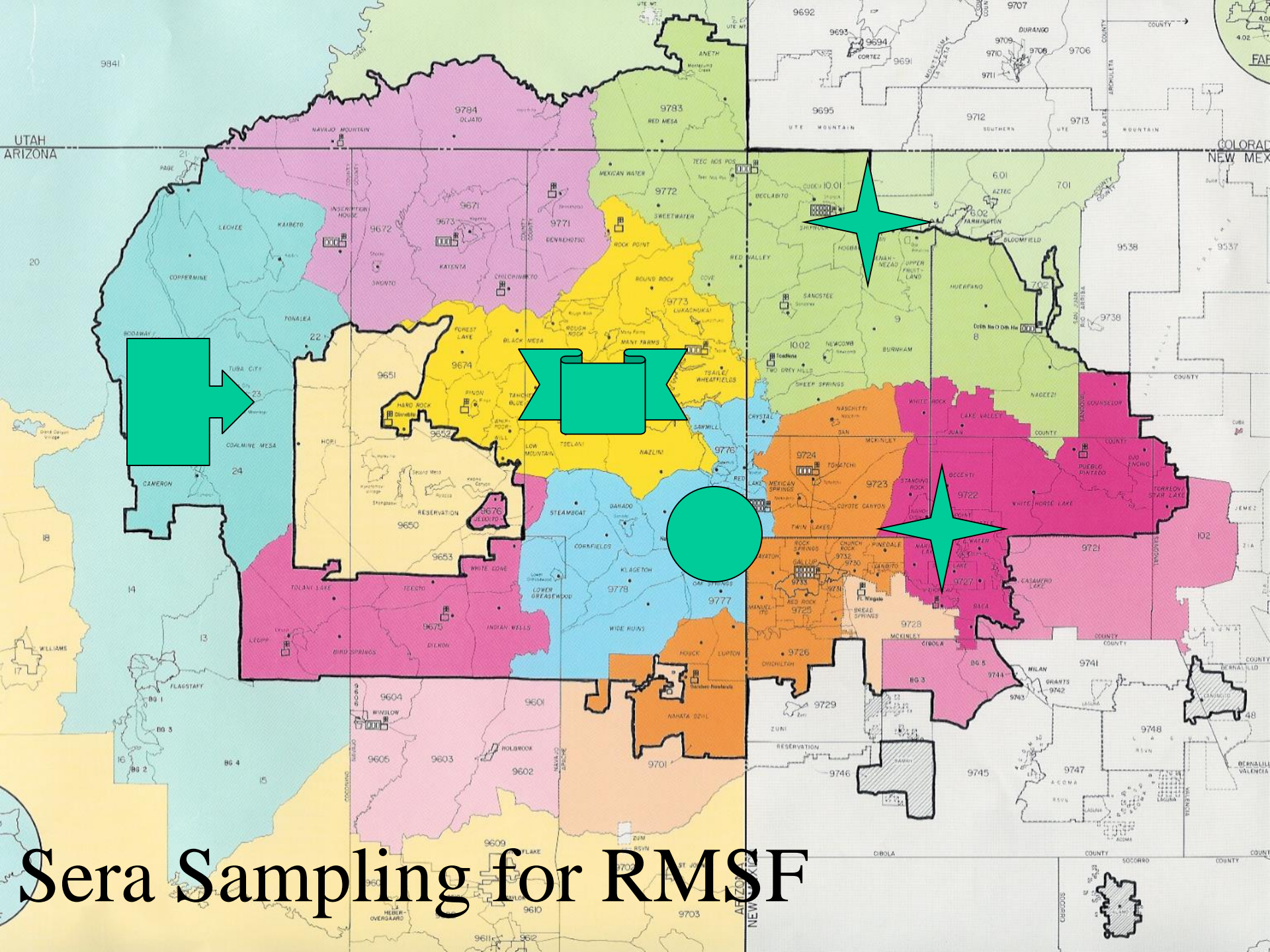
# Rocky Mt Spotted Fever

- Continues to be an issue on White Mountain, San Carlos, Tohono O'odham, Salt River
- Ticks moved on DOGS move RMSF
- Known as “black measles”
- Most deaths in children
- “malaise and fever” (commercial lab test questionable) and petechial rash.
- Navajo: Three FALSE positives so far this 2012-
  - MUST have increase in titer over two weeks to be a confirmed positive
- Rx: tetracycline, Doxycycline

# Background issues....

- Brown Dog tick involved
  - Tick control important
  - Dogs on east Navajo have higher titers in survey 2006
  - CDC repeated Study 2012
  - SAME FINDINGS!!!!
- 
- \$1,000,000 QUESTION!
    - Why do we have high background titers to RMSF in our folks.....
    - A nature “VACCINATION”?????
    - 5 OF 10 positive in Farmington area. (Q fever investigation)





# Sera Sampling for RMSF





# Bartonella spp

- “New Disease”???
- “Cat scratch fever” in this class.
- 30 new Bartonella species
- One human case in NC of sheep associated
  - Endocarditis
- Present in some Navajo sheep
- Found in Sheep Keds....
  - (But not known to bite humans)
- Still an unknown.....

# Q FEVER

First Human positive in several years (2011)  
Generally sheep and goat associated  
Abortions of small ruminants  
Originally slaughter house disease  
Likely local human cases  
Single titer doesn't "prove"

**ANY PERSON POSITIVE MUST HAVE A  
2<sup>nd</sup> TITER TO BE CALLED POSITIVE**

Goat outbreak in Farmington area  
-10 people tested, all negative.  
(5 positive for RMSF!!!)

"Watch for Animals; Next 140 miles" US160, Navajo Nation





# “Tulie”- Tularemia

- Rabbit skinner's disease
- Insect spread
- Human- open wound or scratch
- Eating undercooked rabbit or rodent species.
- Rez has “hot spots”
  - Last cases 2009 in White Cone area..
  - Road kill rabbit for dinner = 2 human cases

# Triconella spiralis- 8 species identified

- Pig to human (undercooked pork)
- Bears to Humans (undercooked meat)
- Pig species killed by freezing
- Bear (silvatic) species is NOT killed by freezing
- 100% of dogs in Shiprock & Chinle infected.

# Brucella canis

- First confirmed case on Navajo 4/2011
- Second 2013
- Both dogs from central Navajo
- Zoonotic- ~ 60 human conf. cases
- 4% background antibodies (human)
- Fever, malaise, Heart
- Significance??????

# Leptospirosis- 5 serovars

- Human bloody diarrhea
- Kidney infections- urine contamination.
- Dx: Silver stain on urine
- Water associated
  - So around the San Juan???
- Outbreak in Cottonwood, AZ in 2010
- Southern New Mexico Cattle abortions 2013
- Sero survey on Navajo 116 dogs....
  - NO POSITIVES
  - (so may not be an issue???)





I was blind....

Not because I could not see,  
But because I wasn't looking.  
(SCB.DVM)

