

Vector Control and Surveillance Program

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Overview

- Pinal County's Vector Program
- Diseases transmitted by Mosquitoes
 - West Nile Virus
 - Outbreak History in the USA
 - Clinical Presentation
 - Transmission
 - Western Equine Encephalitis, St. Louis Encephalitis
 - Yellow Fever
 - Malaria
- Mosquito Biology
- Vector Control Procedures / Complaint Investigation
- Challenges
- Disease Prevention Program vs. Nuisance Mosquito Abatement

Pinal County Vector Control Program

- Environmental Health Services and the Vector Control program are under Public Health Services District.
- Two Vector Control Specialists who report to Environmental Health Services.
- Graduate student intern assigned to study mosquito surveillance and abatement in Pinal County during summer of 2013.
 - Data used to identify thresholds.
 - When to larvacide?
 - When to adulticide?



West Nile Virus

- Virus
 - First found in 1937 in the West Nile District of Uganda
 - Historically found in the Old World
 - Discovered in New York City in 1999
 - How did it get there?
 - Spread from New York across the nation



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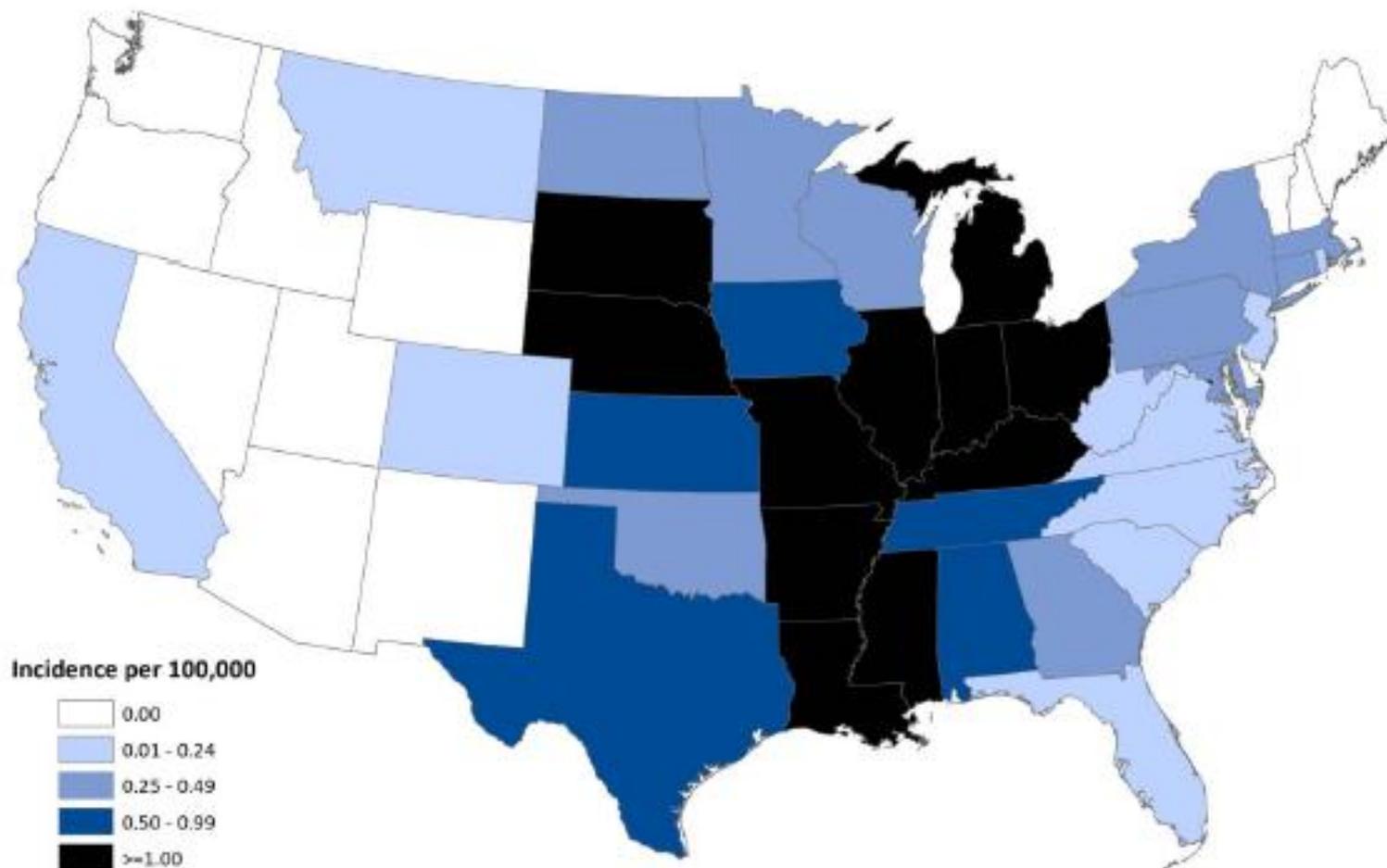
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 1999



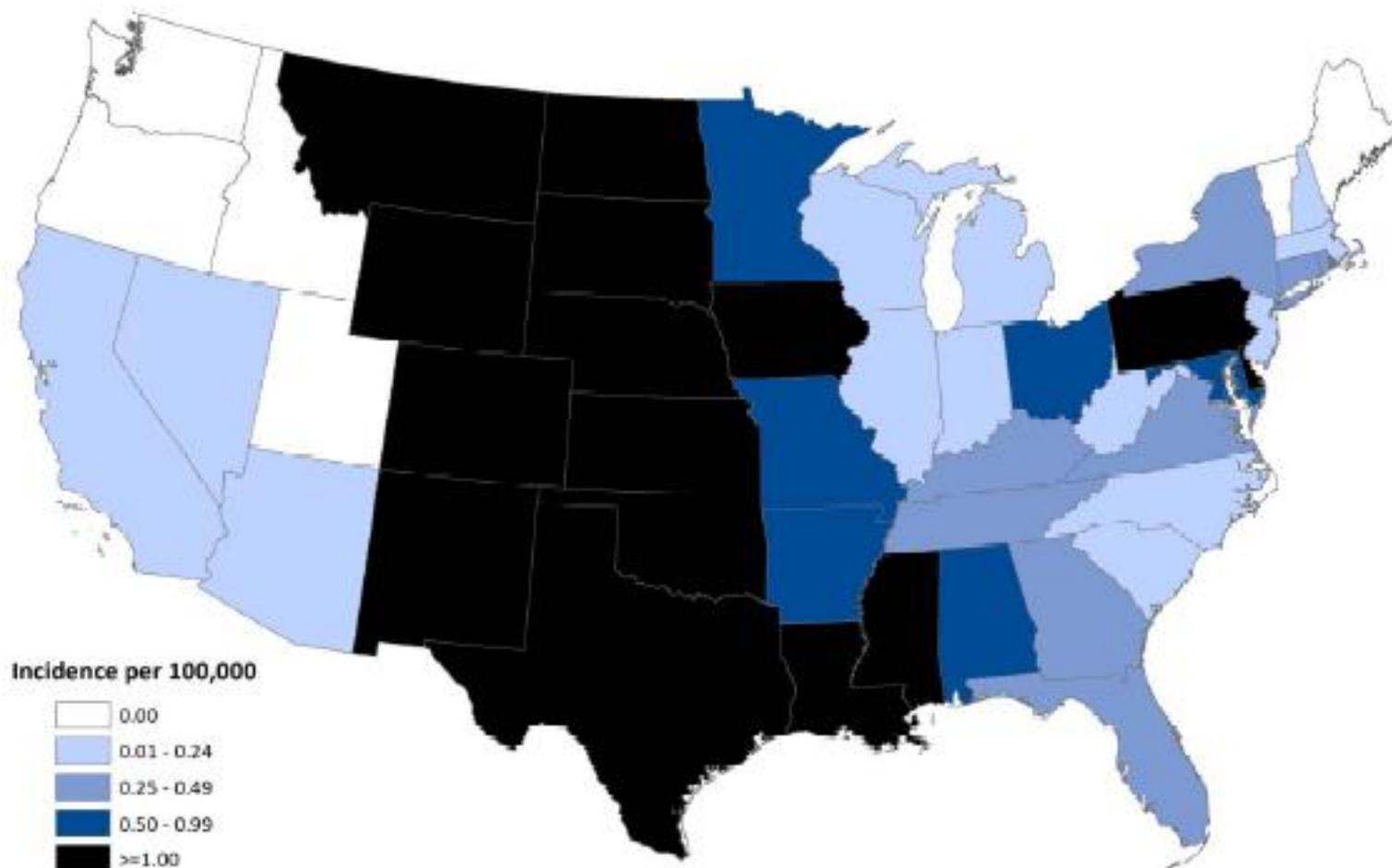
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2001



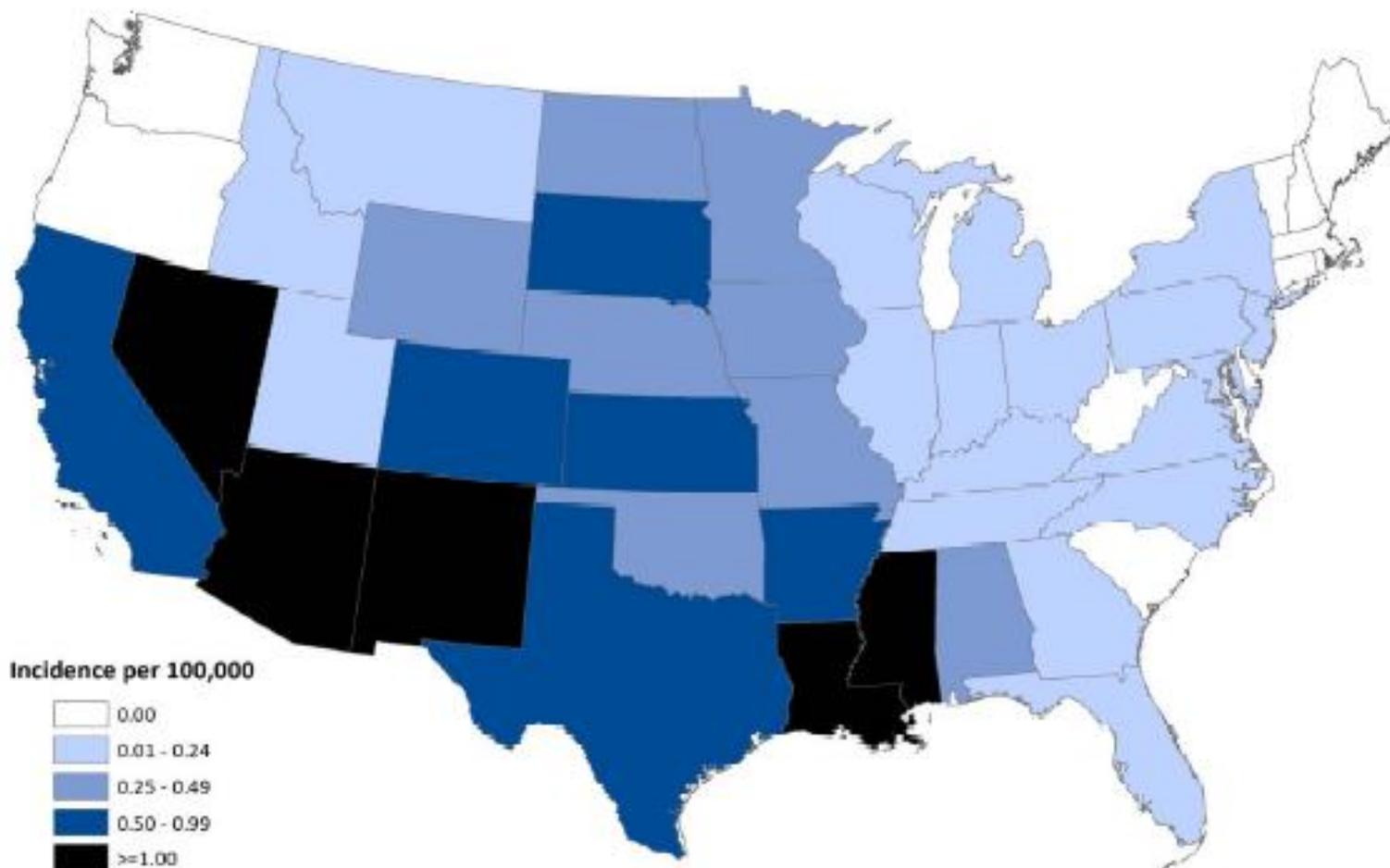
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2002



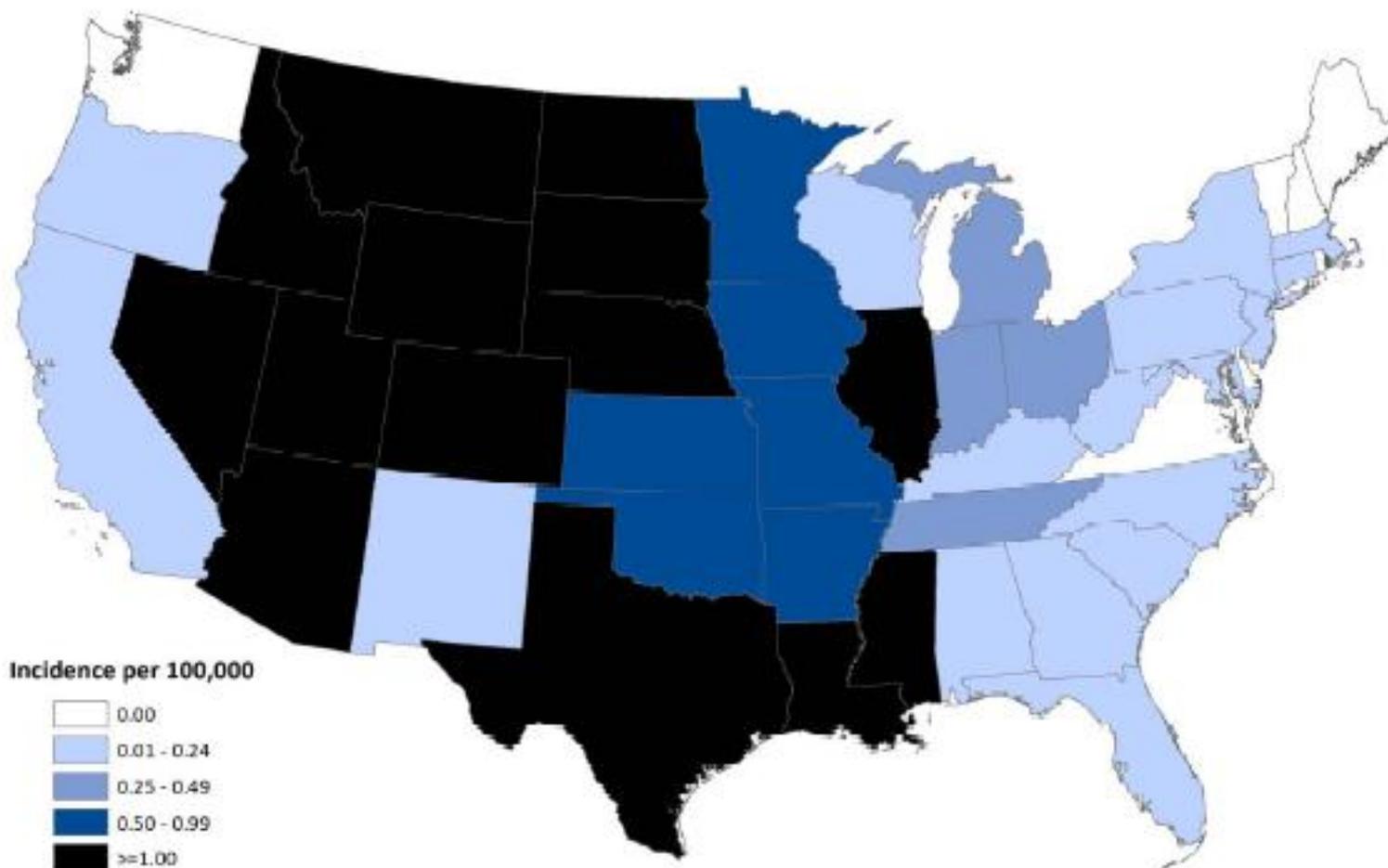
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2003



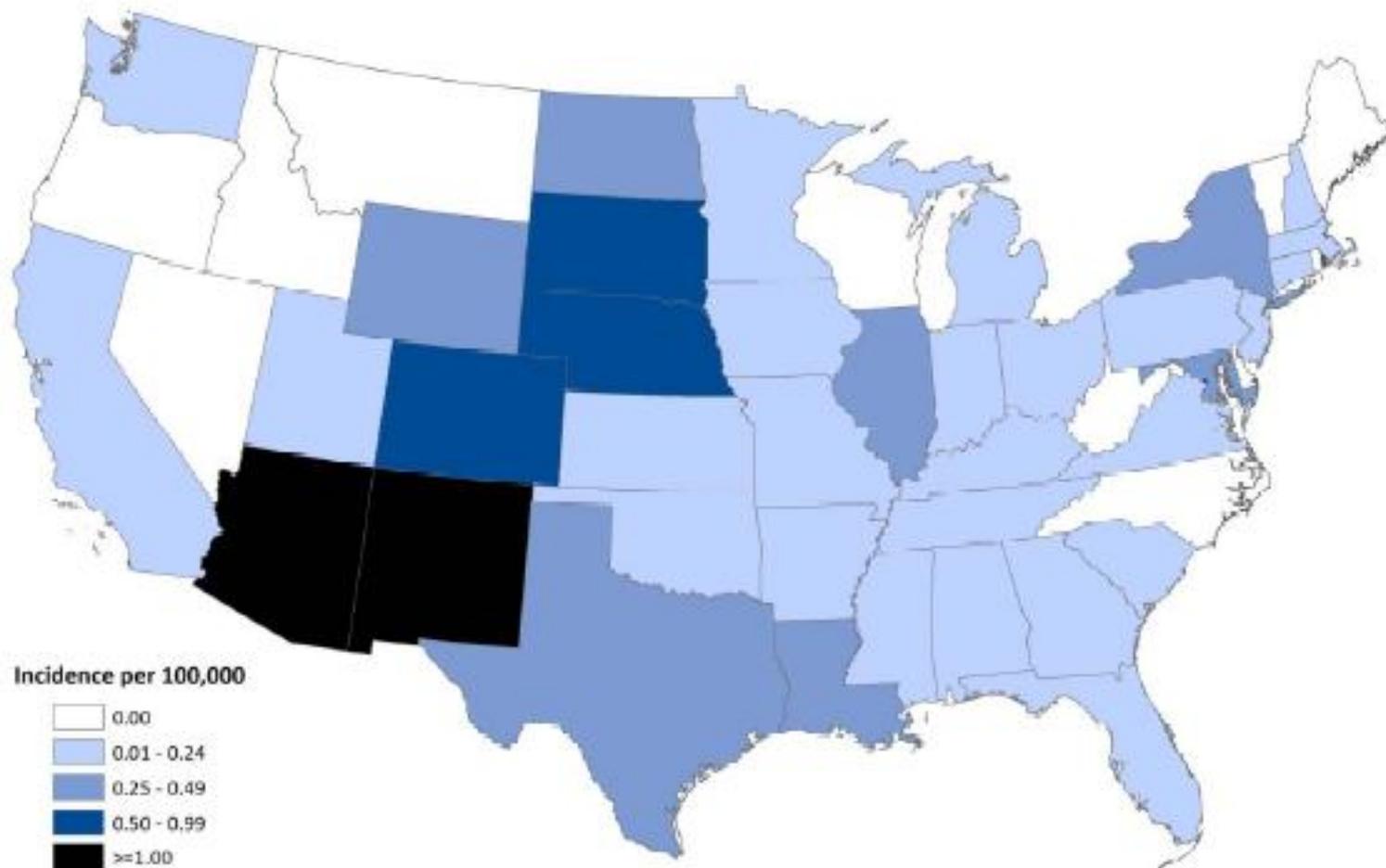
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2004



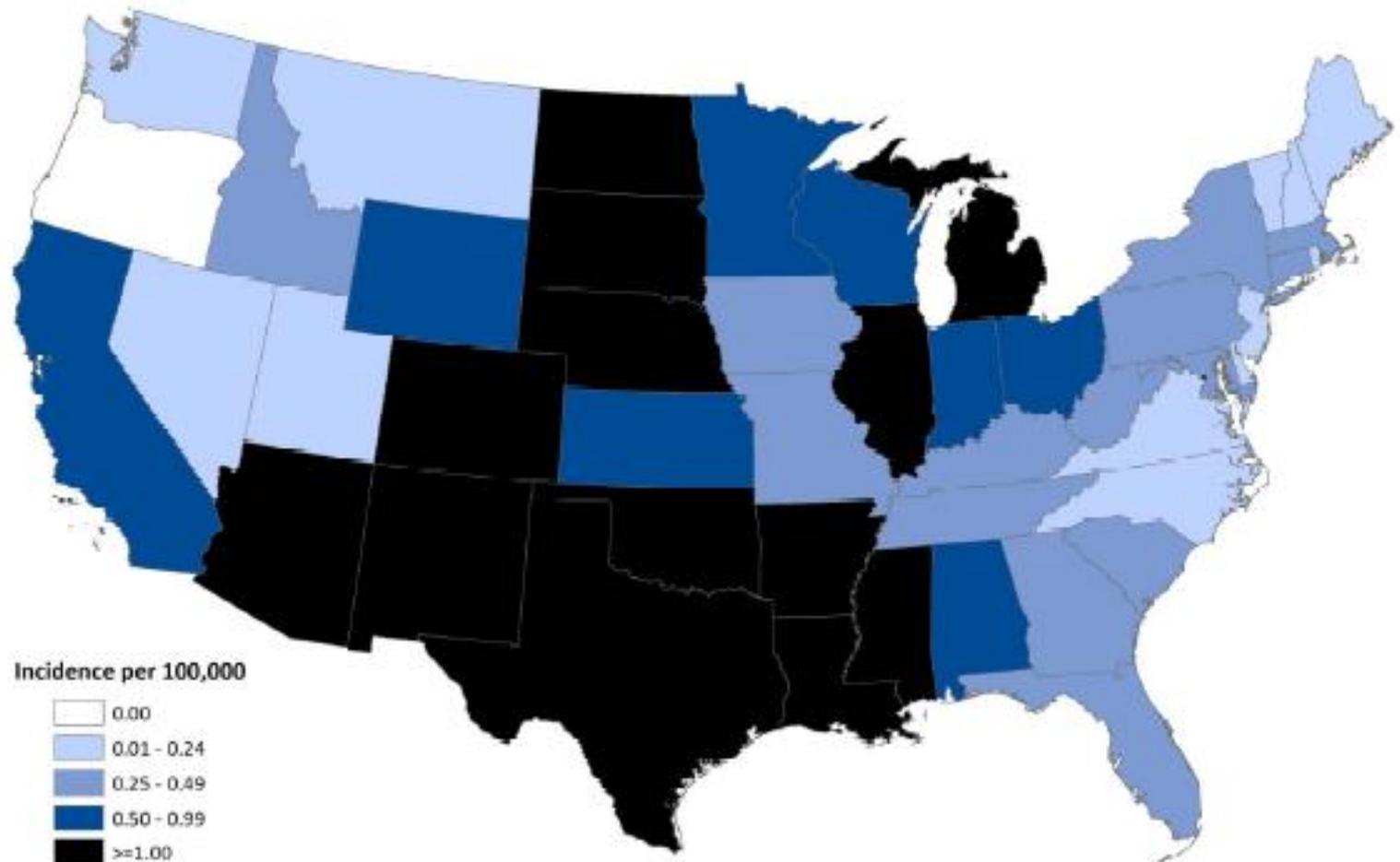
West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2006



West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2010



West Nile virus neuroinvasive disease incidence reported to ArboNET, by state, United States, 2012



Clinical Presentation

- For those with symptoms, they begin 3-14 days after bite
- 1 out of 150 will develop severe or life threatening disease
- It is fatal for approximately 1 out of 1000 cases
- Risk of severe disease increases with age, those >50 at highest risk



Clinical spectrum of human WNV infections

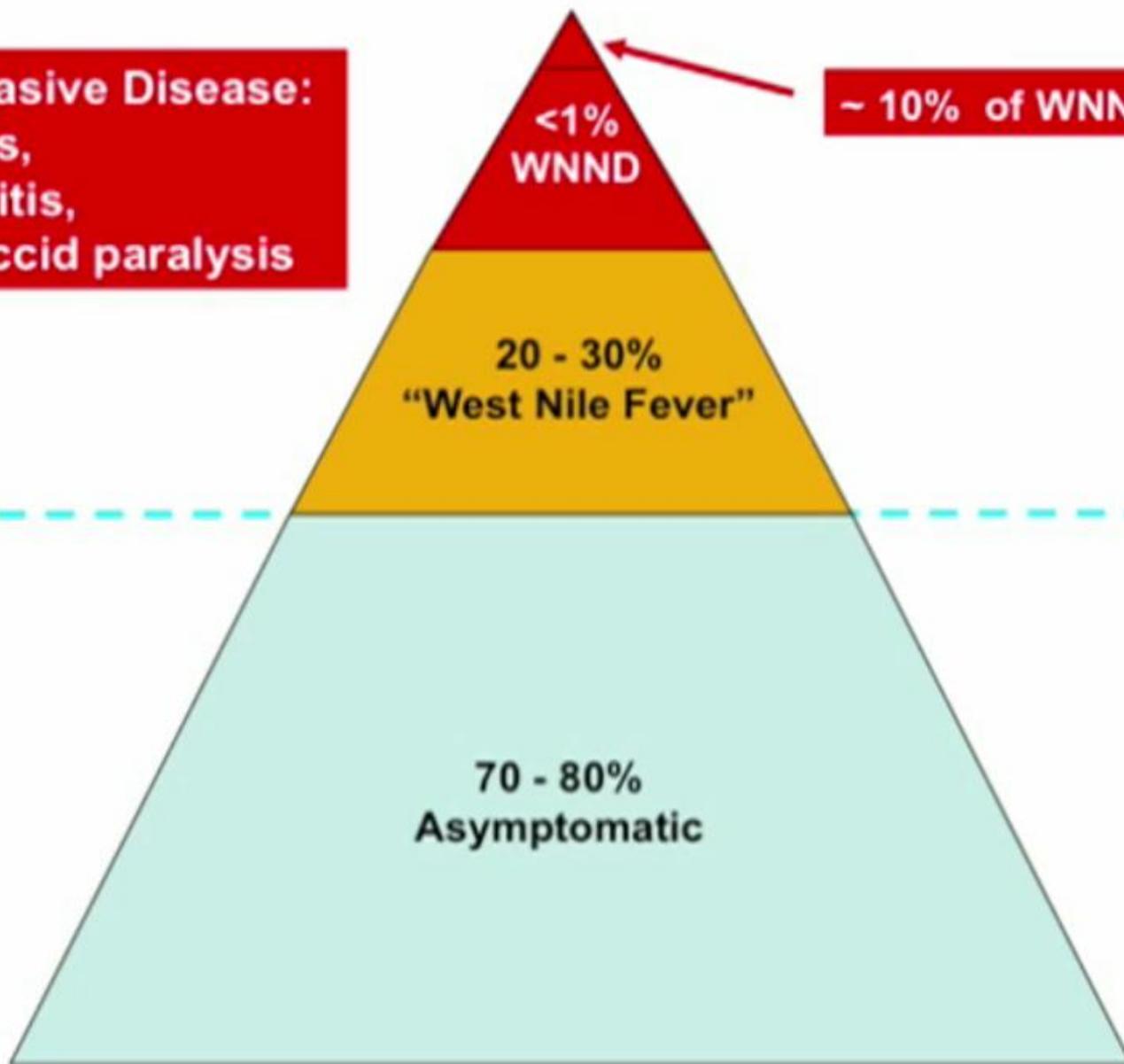
**Neuroinvasive Disease:
Meningitis,
Encephalitis,
Acute flaccid paralysis**

**<1%
WNND**

~ 10% of WNND are fatal

**20 - 30%
"West Nile Fever"**

**70 - 80%
Asymptomatic**



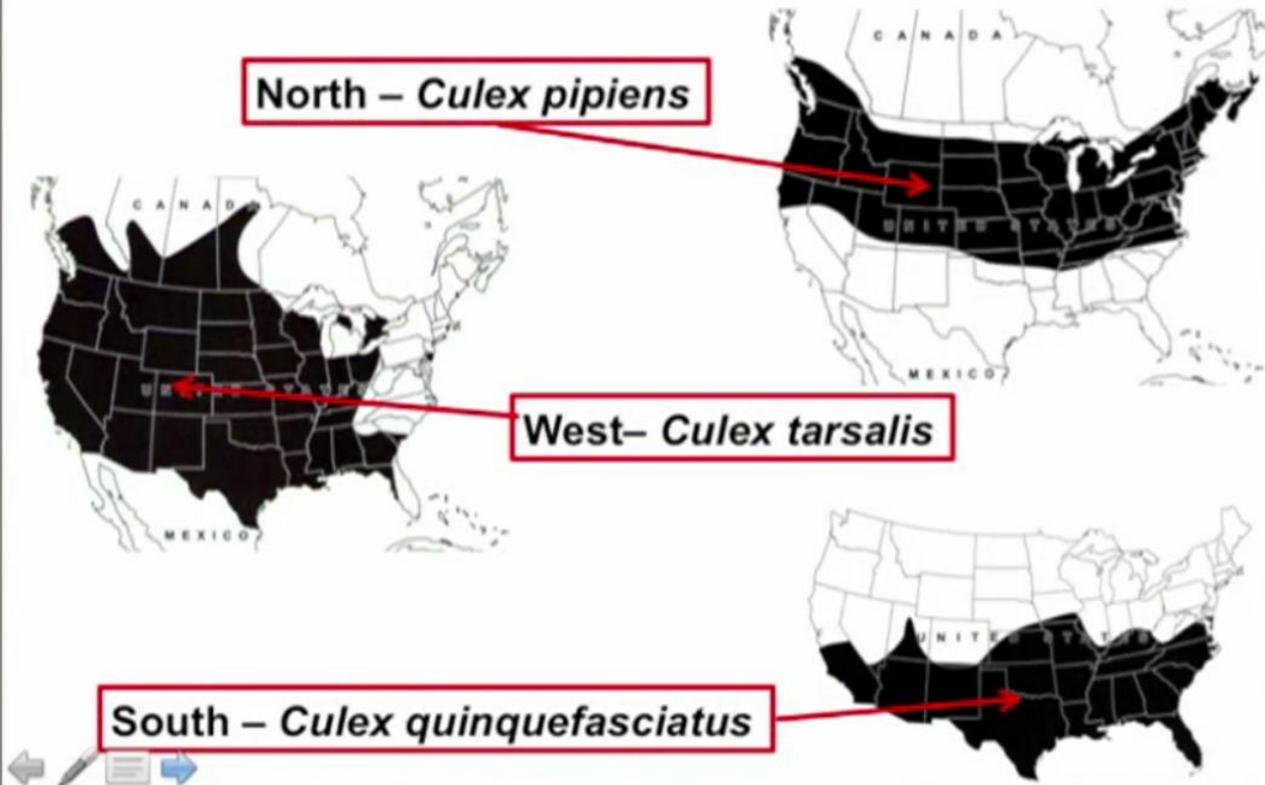
Do all mosquitoes transmit WNV?

- Typically transmitted by certain species of mosquitoes. (From birds not people.)
- By far, the main concern is *Culex spp.*



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Primary WNV vectors differ by region



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History of Vector Control in Pinal County

- Good surveillance
 - Mosquito traps
 - Dead birds
 - Human cases
- Adulticide (fogging) in areas where positive samples or human cases.
- Fogging focus is public safety, not nuisance mosquitoes



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Monitoring

- Trapping Known Sites
- Investigating Citizen Complaints
 - Mosquitoes Biting
 - Standing Water
 - Green Pool
 - Abandoned Pool
 - Investigate and take appropriate action
- Human Cases

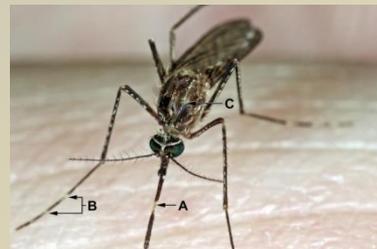


How do Vector Control staff identify areas of concern?

1. Trap mosquitoes.
2. Identify species of concern.



3. Test samples.



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What do we do when we find positive samples?

- Conduct an area survey looking for a breeding site.

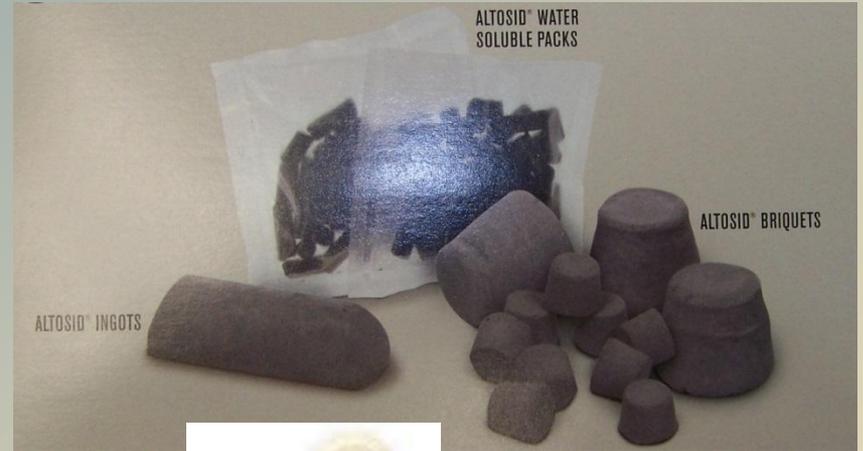


- Treat the breeding site.



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Fogging vs. Larvaciding



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Vector Control Program Goals

- Focus on disease prevention with a focus on a science based proactive approach.
 - ID problem areas through monitoring.
 - Site survey to identify breeding locations.
 - Treat the source(s) with larvacide.
 - Follow-up monitoring.
 - Develop threshold to mobilize fogging procedures.
 - Prevent WNV cases.
- Educate the Public
- Investigate Nuisance Complaints



Typical mosquito breeding habitat



This site was next to a school.



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More mosquito breeding habitat



**This is the
type of
area we
treat with
larvicide.**



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Green pools are also a major problem



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Results of Pro-Active Approach

# Trapped Before	Larvacide Applied	# Trapped After	% Change
200	Yes	58	-71%
123	Yes	10	-92%

When we are able to find the breeding site, larvacide can be very effective at reducing numbers of mosquitoes.



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Summary of Pinal Strategy

- Focus on scientific/public health model of prevention not on nuisance mosquitoes.
- Analyze breeding sites for public health threats and act based on those threats.



Summary of Pinal Strategy

- Reduce reliance on short term solutions like fogging and concentrate on prevention of breeding long term.



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Where do we want to be?

- Effectively reduce disease amongst our citizens.
- Make decisions based on science and current methods.
- Maintain efficiency to get the most 'bang for the buck' in disease prevention
- Be innovative in solving problems.
- Educate the public to be partners in prevention.

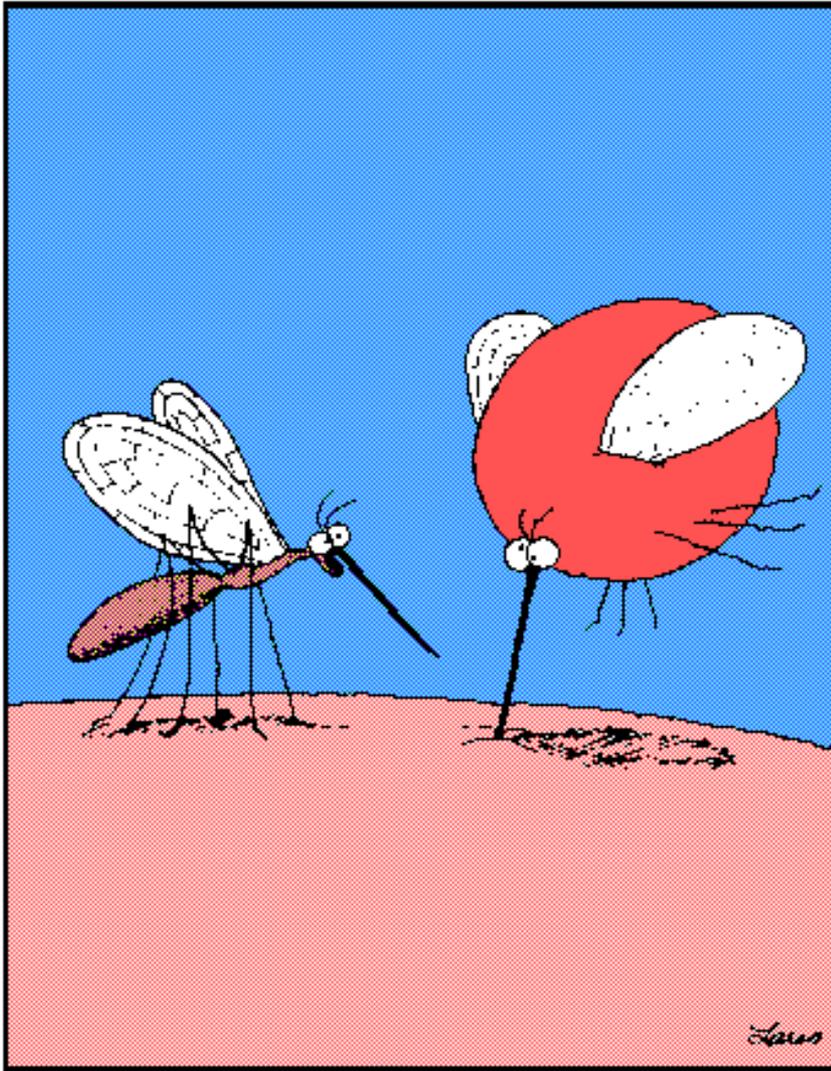


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Questions or Comments?



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"Pull out, Betty! Pull out! . . . You've hit an artery!"