

West Nile virus in Tarrant County, TX: Surveillance Program Improvements Post- Outbreak

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Tarrant County Public Health



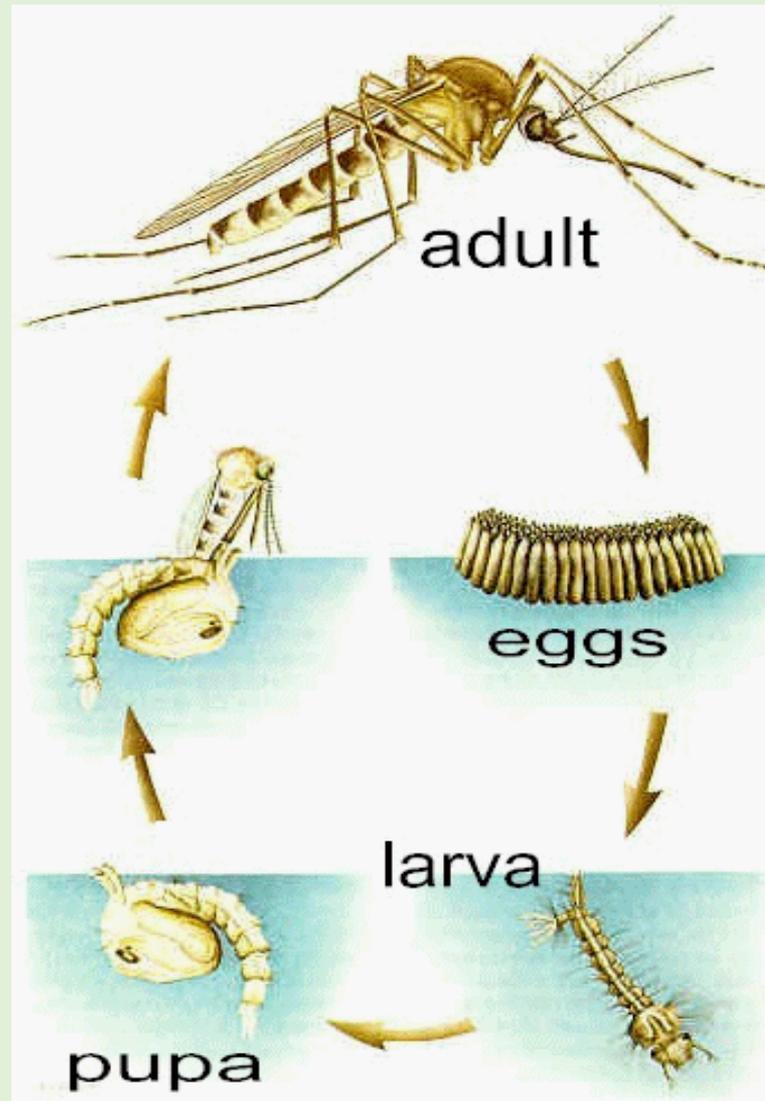
Overview

- What's needed for West Nile virus (WNV) surveillance
- Mosquito life cycle
- Traps used
- ID and processing
- Data needed
 - MIR/VI
 - Response plans
- Investigations
- Media
- National Funding Trends
- Tarrant County 2002-2011
 - Personnel
 - Traps used and how
 - Response and control
- 2012 (the awakening)
- Tarrant County 2013 and after
 - Changes made after 2012

What's needed for WNV Surveillance in environmental?

- Gravid trap/CO2 trap
 - Why?
 - Trap, stand, bin, net, batteries
- Bins to brew gravid water/Dry Ice
- Battery charger
- Aspirators (optional)
- Freezer/CO2/Tri-ethyl amine
- Dissecting microscopes
- Forceps
- Counters
- Petri dishes/sorting trays
- Sample tubes
- Lab/sample processing
- Personnel
 - Medical entomologist and team
- Licenses/training
- Response plan
- Control
 - Larvicide
 - Adulticide
 - Equipment for dispersal
- Educational material
- Collaborators/contracts
- Methods of communication
- Databases
 - Mosquito, human, dead bird

Mosquito life cycle



Vectors

- *Culex quinquefasciatus*
- *Culex restuans*



<http://nathistoc.bio.uci.edu/diptera/>



<http://bugguide.net/node/view/417889>

In Tarrant County

- *Culex tarsalis*



<http://bugguide.net/node/view/83951/bgpape>

Further west

Gravid traps vs CO2



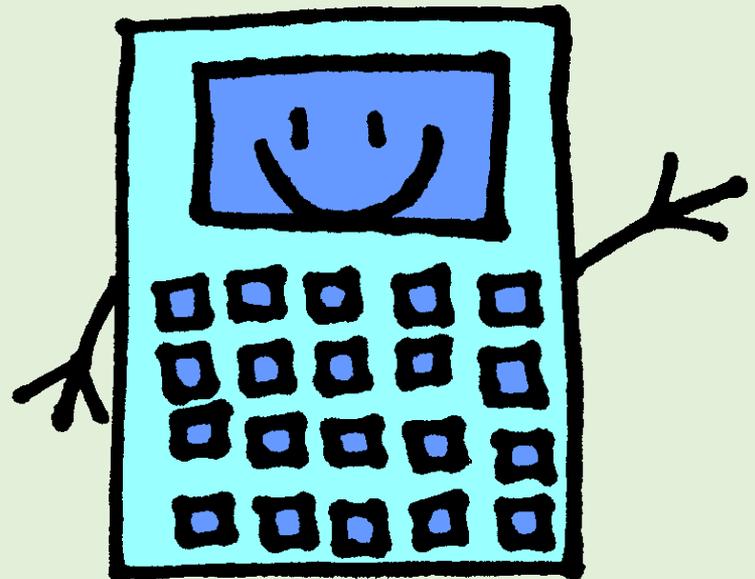
<https://www.flickr.com/photos/fairfaxcounty/6026092831/>

Identification, sorting and preparation



Why is this data needed?

- Risk Assessment
 - Minimum infection rate (MIR)
 - $\text{How many pools test positive} / (\text{total number of mosquitoes tested})$
 - Vector index (VI)
 - MIR multiplied by the average number of mosquitoes/trap
- Response Plan
 - Communication
 - Mosquito control
 - Education outreach



Investigations, education and control



Remember the
“Four D’s”
to defend yourself against
West Nile virus



DUSK / DAWN

are the times of day you should try to stay indoors. This is when infected mosquitoes are most active.



DRESS

in long sleeves and long pants when you're outside. For extra protection, you may want to spray thin clothing with repellent.



DEET

(N, N-diethyl-m-toluamide) is an ingredient to look for in your insect repellent. Follow label instructions, and always wear repellent when outdoors.



DRAIN

standing water in your back yard and neighborhood — old tires, flower-pots, and clogged rain gutters. These are mosquito breeding sites.



Tarrant County
Public Health

<http://health.tarrantcounty.com>

Ah, the media

- Media coverage of WNV
 - Prior to 2012 maybe a few reports a season
 - After 2012

5 NBCDFW.com

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WEST NILE VIRUS

COMPLETE COVERAGE OF THE WEST NILE VIRUS IN NORTH TEXAS

Irving to Spray for Mosquitoes Despite Zero...

The City of Irving is spraying for mosquitoes in Las Colinas even though no mosquitoes have tested positive for West Nile virus.

WFAA 8 abc

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Local News

West Nile season is underway in Tarrant County

As more people forego using chemicals on their lawns and gardens and seek organic produce, many in the local green community were outraged that cities in the Dallas-Fort Worth area were ramping up efforts to combat mosquitoes carrying West Nile virus by spraying pesticides in urban neighborhoods.

This summer, North Texas has been at the center of a West Nile virus outbreak with the most confirmed cases reported in the U.S. The Centers for Disease Control and Prevention said there have been almost 700 cases of confirmed West Nile virus in the U.S. and 26 deaths this year. Texas reported the most cases with the majority concentrated in Dallas, Tarrant and Denton counties, which combined have had almost 500 confirmed cases and 13 deaths. (mosquito photo: shutterstock)

As a result, Metroplex cities are escalating efforts to combat mosquitoes, which carry the disease. Dallas has opted

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WEST NILE VIRUS

City of Duncanville Mosquito Ground Spraying Sunday Night

The city of Duncanville will begin spraying for mosquitoes in the areas between Hwy. 67, Westfield Road and Baxter Dr Trail starting at 6 p.m. tonight. CBSDFW.COM-06/08/2014

Research May Predict West Nile Virus Trends

For the second summer, dozens of live mosquito traps are set up all over the city, collecting any where from a few to thousands of mosquitoes per trap each week. 06/06/2014

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Dallas - Fort Worth Green community members alarmed over West Nile Spraying

By Julie Thibodeaux

As more people forego using chemicals on their lawns and gardens and seek organic produce, many in the local green community were outraged that cities in the Dallas-Fort Worth area were ramping up efforts to combat mosquitoes carrying West Nile virus by spraying pesticides in urban neighborhoods.

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Events

June	S	M	T	W	T	F	S
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
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Lewisville Lake Environmental Learning Center: Outdoor Yoga - Lewisville

Sun, 06/22/2014 - 8:00am

Lewisville Lake Environmental Learning Center: Medicinal/Herbopart Plant Walk - Lewisville

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4 counties work together to fight West Nile virus in North Texas

Posted Monday, Apr. 07, 2014 | 1 comments | Print | Reprints | Share | Like | 20

BY GILL HAMBA
gillhamba@star-telegram.com

Area health officials still don't really know what caused the 2012 West Nile season to become such a bad one — or why the number of cases dropped so dramatically in 2013.

With that uncertainty, Tarrant, Dallas, Denton and Collin counties are working on a coordinated effort to combat West Nile. It includes year-round trapping and a public awareness campaign urging residents to take more precautions outdoors and around their homes.

"What we've learned is it is difficult to predict how bad a West Nile season will be," said Anita Kulan, associate health director of Tarrant County Public Health.

West Nile precautions

All four North Texas counties are urging residents to take the following steps to avoid being infected by West Nile virus.

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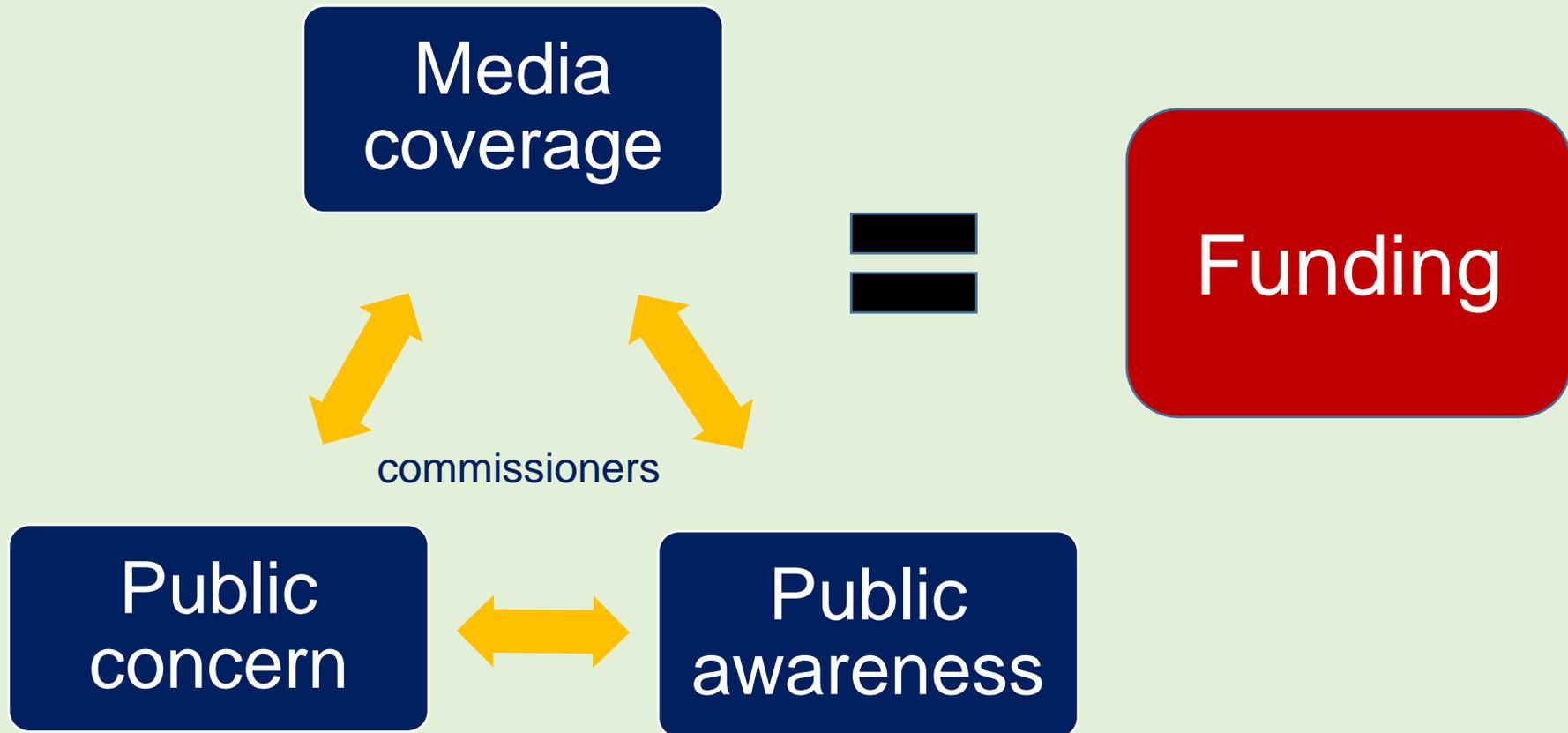
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Where was I in 2012

- Lake County, CA
 - Entomologist
 - DFW area West Nile virus outbreak made national news
 - Eye on the area for job opportunities
-
- Why?



Media Coverage = Funding!

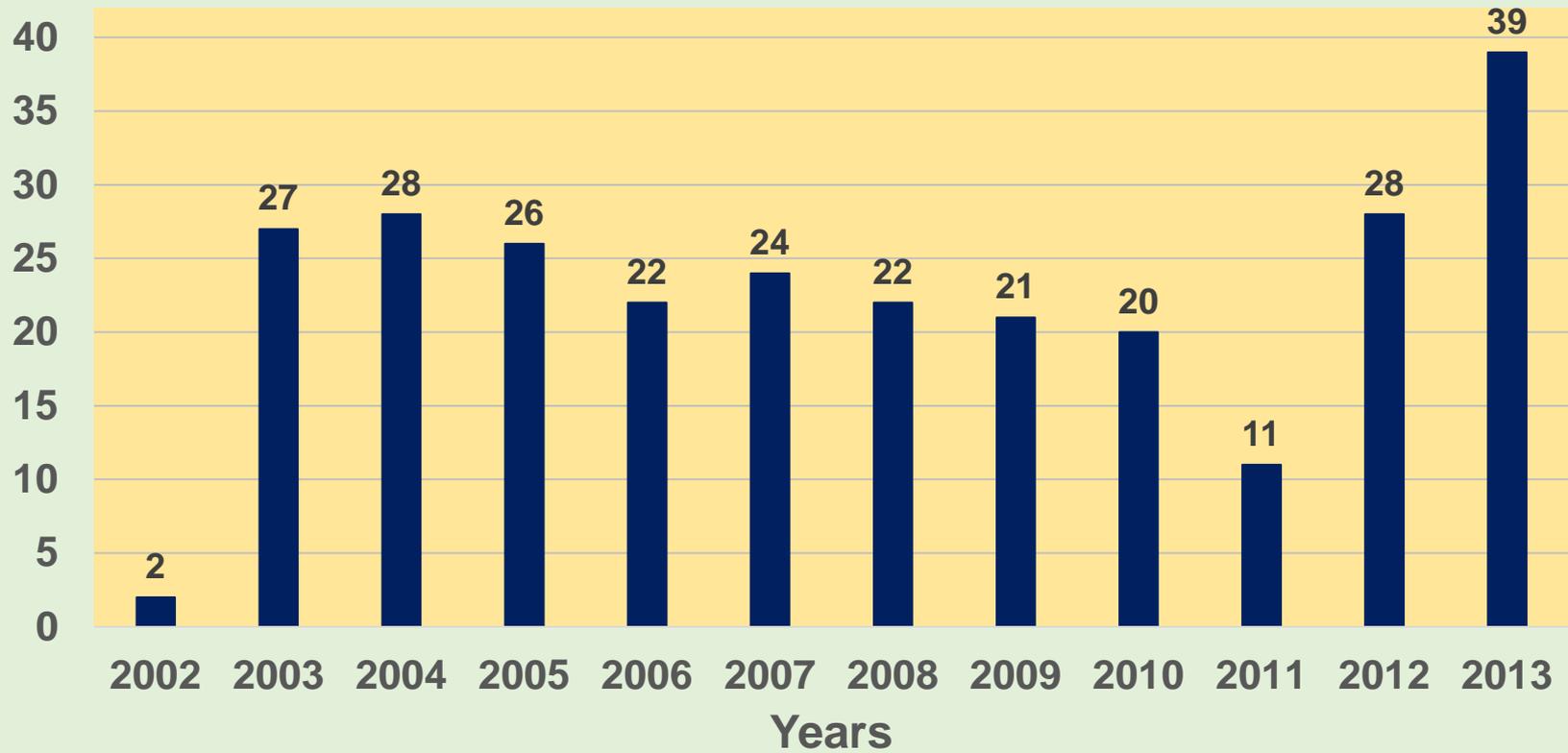


Lack of Funding

- Lack of activity in WNV = lack of interest
 - Virus is gone!
 - Viruses have cycles
 - Periods of activity and periods of inactivity
- “Prevention is never sexy”. –Dr. Anita Kurian
- Analogies
 - Don’t remove your fire stations just because there are no fires
 - Don’t stop brushing your teeth just because you don’t have cavities

City participation over time

Number of Participating Cities 2002-2013





Funding Trends for WNV Surveillance (National)

- 1999-2002 = new disease = federal funding available (new disease)
- From 2004 to 2012, Epidemiology and Laboratory Capacity (ELC) funding for WNV surveillance decreased by 61% (Hadler et al 2014).¹
- 74% decrease since 2002 (American Mosquito Control Association, 2013)²
- Since 2006 federal funding decreased 61% despite WNV season since 1999, with 2873 cases of WNND and 286 deaths. (Council of State and Territorial Epidemiologists, 2013)³

Funding Trends for WNV Surveillance (Local)

- 2008- Will County, IL- funding cut from 45K to 20K⁴
- 2009- Georgia 400K to 148K⁵
- 2010 Lackawanna County, PA 105K to 71.3K⁶
- 2011⁷
 - Lee county FL- down 13%
 - Sac-Yolo CA- down 10%
 - Reno, NV- down 16%
 - DE- down 25%
 - Kanawha county, WV- 100% funding = equipment, but no personnel
 - Fort Collins, CO- down 33%
 - NC- Public Pest Management Section in the Department of Environmental and Natural Resources completely laid off
- 2012- DFW area outbreak
- 2013- Extra funding in Tarrant County (the WNV addition)

Vector Control Program in Environmental Health

2002: Start WNV surveillance, resting collection, samples to state lab, borrowed personnel

2004: WNV Surveillance added to one of the sanitarian's job duties



2003: Gravid trapping, samples to North Texas Regional Lab, *Gambusia* program, Bti for larvicide, static maps to website, education outreach



<http://www.lawestvector.org/MosquitoFish.htm>

Vector Control Program in Environmental Health

2011: Great decline in sample submission, interactive map for internal site in the works

2013: 3 new dedicated positions, samples increase, increase in types of larvicides used, aerial spray contract implemented, MIR/VI calculated

2012: Outbreak, 3 new trucks w/ ULV sprayers, spray contracts, interactive map to website



The improvements

2003-2012

- Borrowed personnel
- *Gambusia* and Bti dunks
- Positives = education and increased larviciding
- No adulticiding
- Surveillance = is it there, or not there? (not all traps were static locations)

2012 and beyond

- 3 Dedicated positions
- *Gambusia*, Bti/Bs (dunks and granules), IGRs (methoprene and novaluron), oils
- Positives = adulticiding, education and increased larviciding
- Additional ULV contracts for ground and aerial spraying in place if needed
- Surveillance = is it there and if so, is there a need to implement greater control methods? (static traps, calculate MIR and VI)

This year and beyond

- Reference collection
- New trapping methods
 - New Jersey Light Traps
 - CO₂ baited CDC miniature light traps
 - Tree hole surveillance
 - Resting collections
 - BG Sentinel traps
- Continual experimenting of new larvicides
- Setting gravid trap transects to find sources
- Resistance testing in areas with regular spraying



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Acknowledgments

- Tarrant County Public Health
 - Environmental Health Division
 - North Texas Regional Laboratory
 - Participating cities
 - Leadership team

