

Price \$3.00

THE

Sept. 27, 1999

NEW YORKER



Sustaining Surveillance for West Nile Virus in New York City, 1999-2004

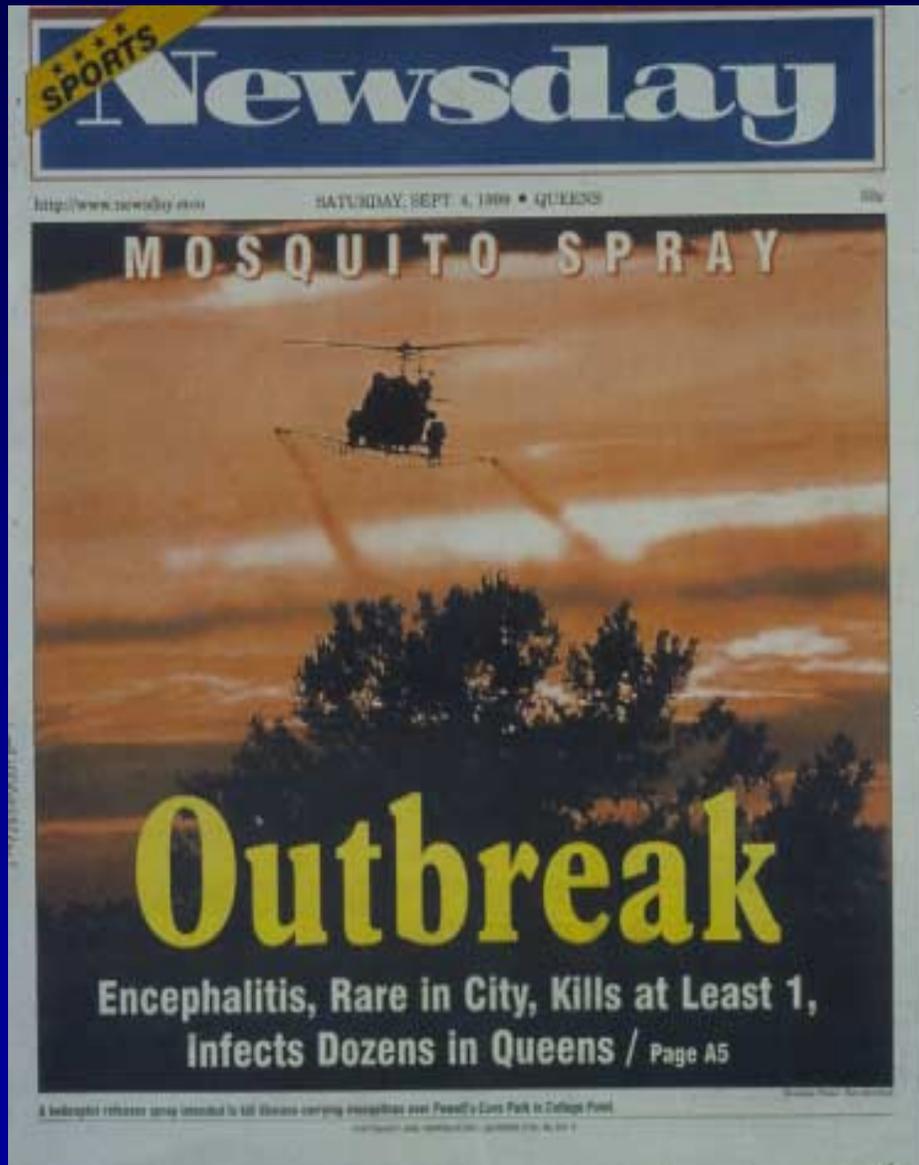
Annie Fine, MD

**New York City
Department of
Health and Mental
Hygiene**

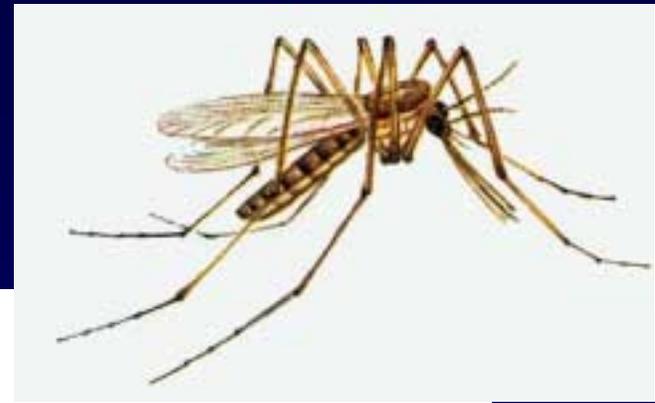
From hysteria to humdrum



1999



2004



METROPOLITAN DESK

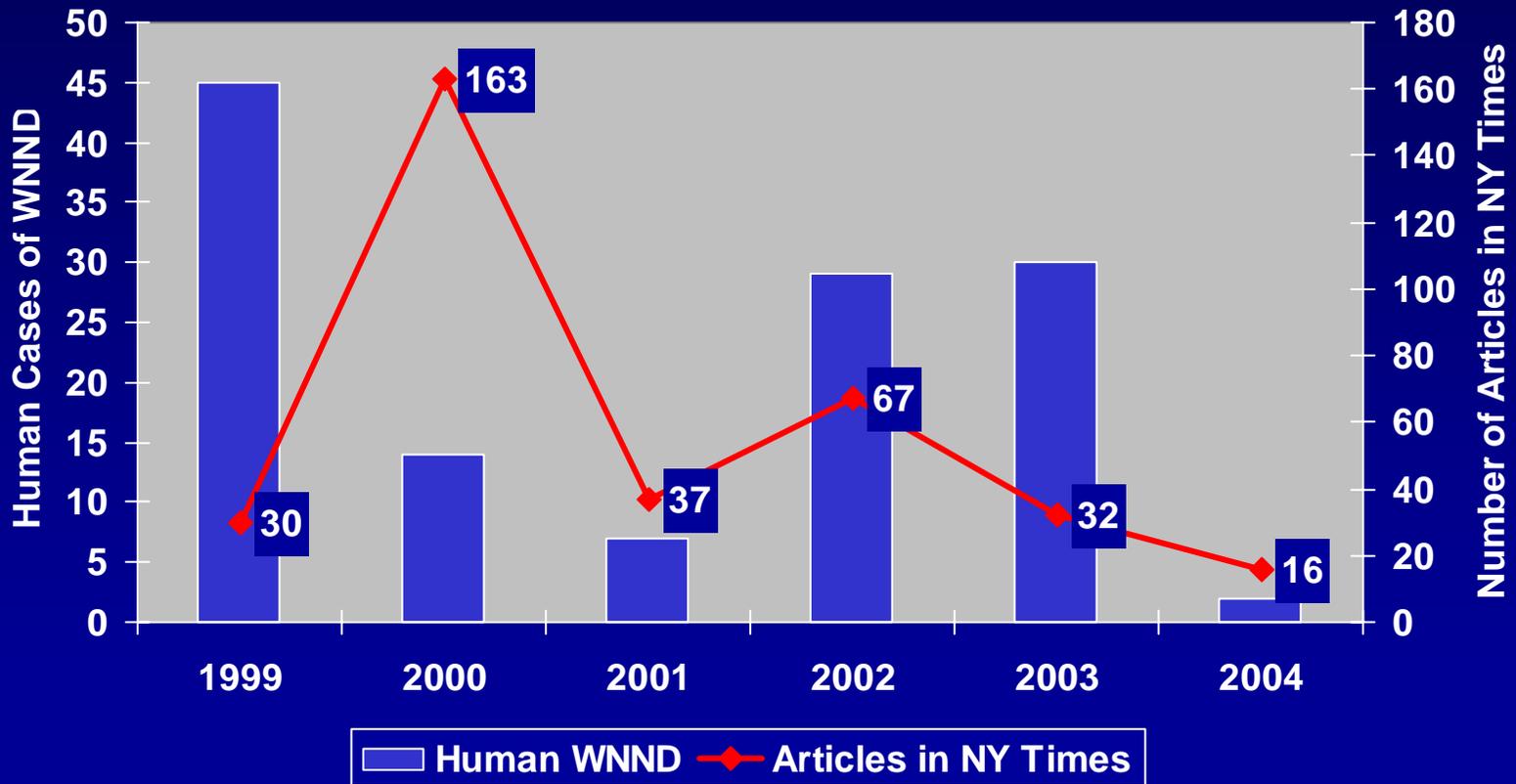
Who's Afraid of This Little Fellow?; West Nile Is Still Here, but the Furor and Anxiety Have Ebbed

By RICHARD PÉREZ-PEÑA (NYT) 1379 words
Published: September 21, 2003

Remember those fears that once loomed so large but now seem like overblown relics? Killer bees . . . flesh-eating bacteria . . . that Y2K thing . . . West Nile virus.

All right, fear of West Nile is no misty memory to the people reeling from it in the Plains states. They see more new cases each week than New York has had in four years. Still, in our metropolitan area, where the West Nile form of mosquito-borne encephalitis first made the leap from Old World to New in the summer of 1999, it has come to feel ho-hum -- quite a change from the great attention and anxiety it drew back when.

Human Cases of WNND and Number of New York Times Articles on WN virus, NYC, 1999-2004



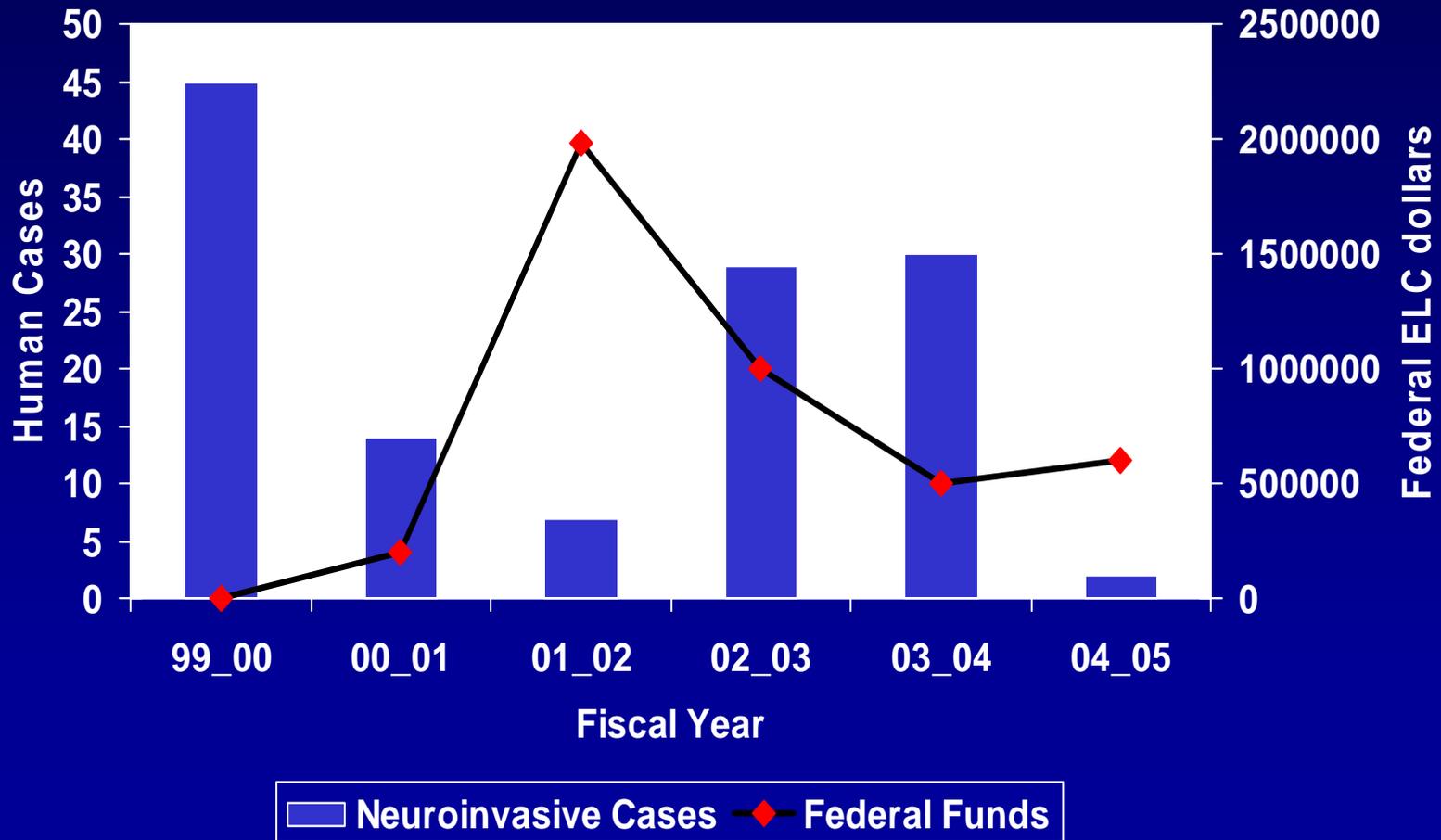
Challenges in Sustaining Surveillance and Control as WN becomes endemic

- Decreased funding
- Uneven medical provider awareness and reporting
- Decreased media interest
- Waning public interest/awareness
- Need to balance WN morbidity and mortality with other public health priorities
 - WN virus still unpredictable and can cause outbreaks

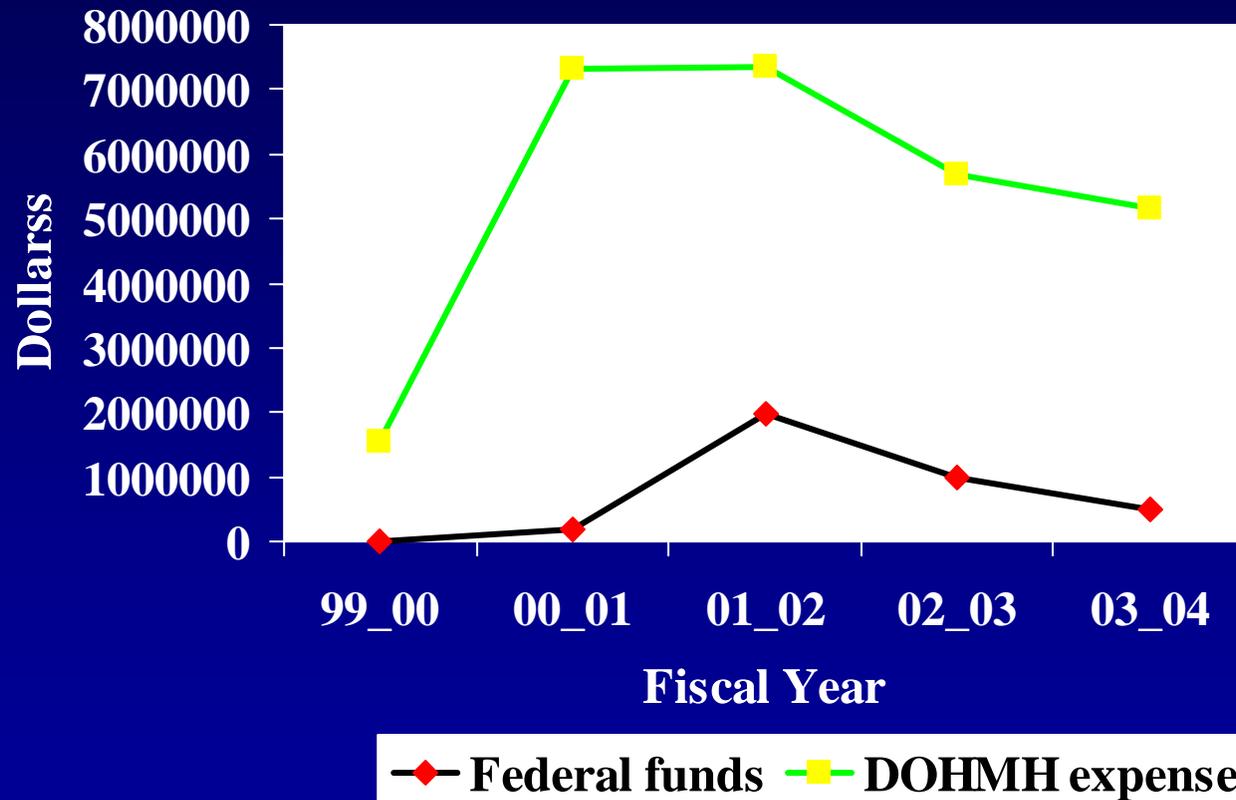
Specific Concerns for Large Cities

- Need for rapid response capacity – dense population increases potential risks of outbreak
- Need for fine texture in determining risk to humans
- Need for very judicious use of adulticide
 - Avoid exposure of large numbers of people unnecessarily
 - Community/environmental sensitivity or opposition
- Diverse population
- Need to “do everything” – public health is local

Federal Funding to NYC for West Nile Virus Surveillance (ELC \$), and human WNND Fiscal Years 1999-2004



NYC DOHMH expenses for arbovirus surveillance and control*, FY 99-04



***Does not include in kind services for human surveillance and other activities; also does not include non-DOH agency spending.**

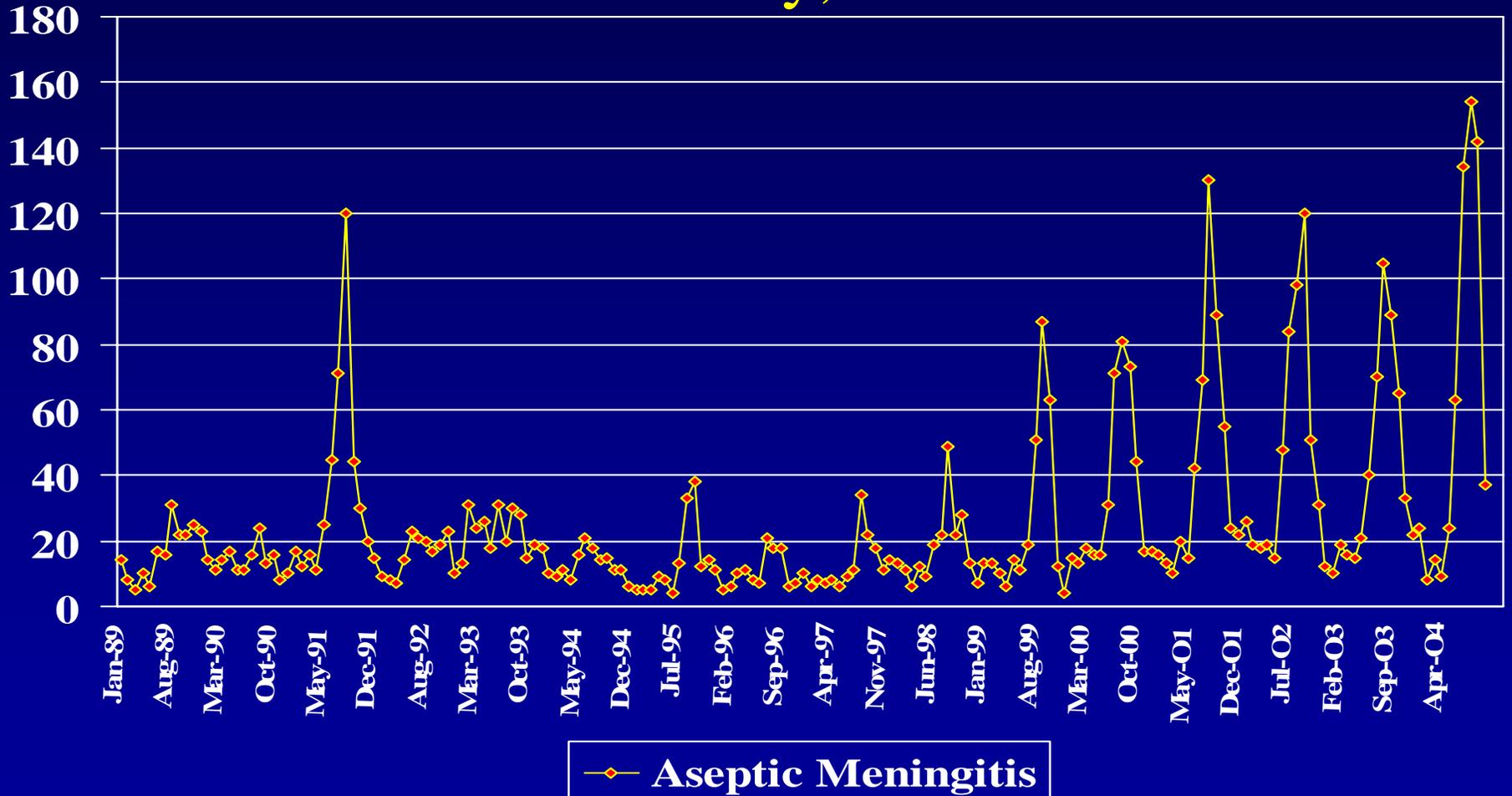
Surveillance - Human

- Maintaining provider awareness and reporting is a challenge –
 - Still emphasize reporting and testing of hospitalized cases and WNND
 - Few requests for grand rounds
 - Use health alert system
 - Clinical presentation of WN may be subtle, need to “think WN”
 - Many hospital-based providers were not here in 1999
- NYC still actively manages suspect cases – still emphasize timely detection
 - Offer free testing and free transportation of specimens to City PHL
 - Little commercial testing in NYC
- Rolled into general disease surveillance
- Ended active surveillance

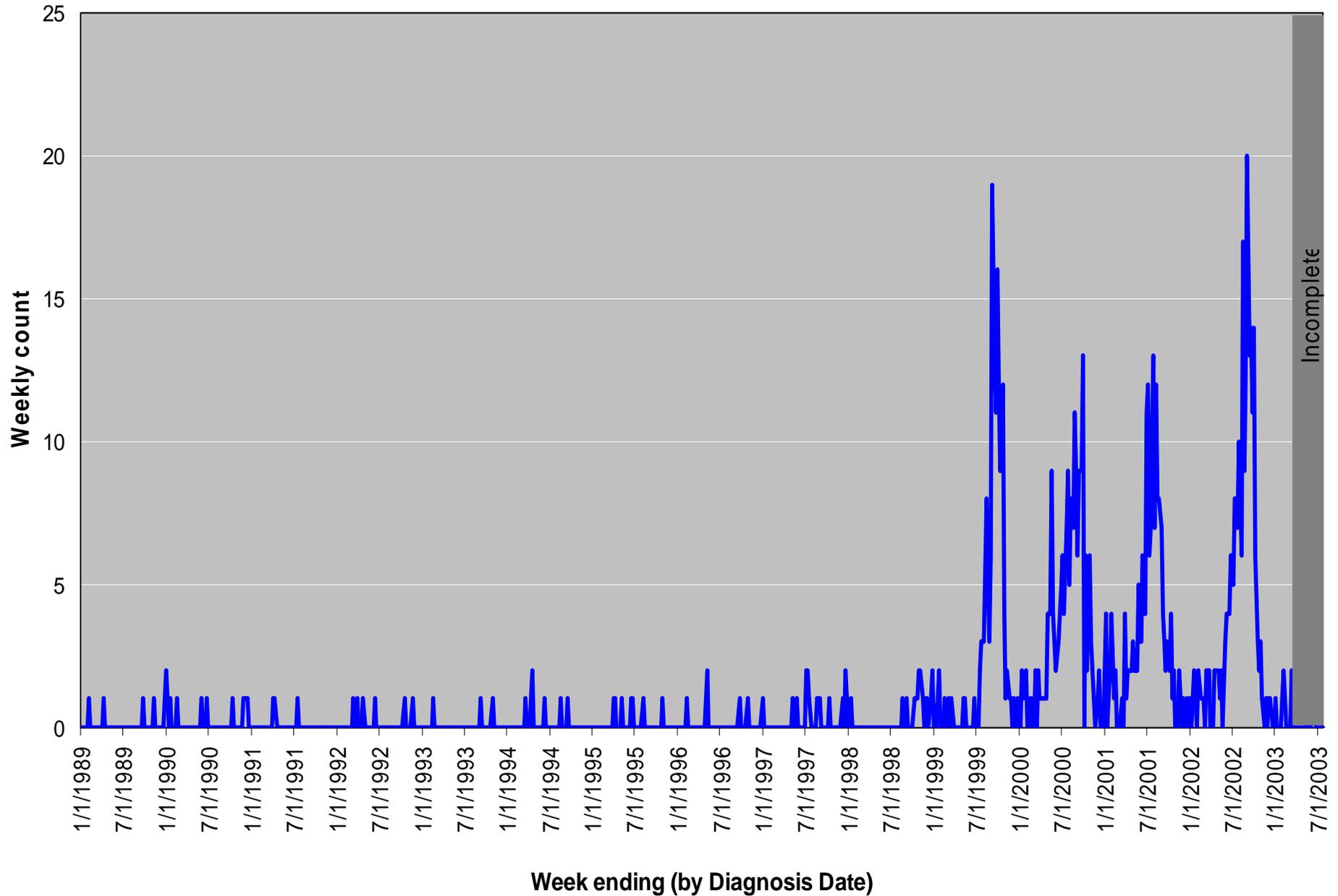
Surveillance – Human (cont.)

- Since WN 1999 we have greatly improved surveillance data for aseptic meningitis and encephalitis, pick up other outbreaks
- Shared database with lab serves as model for other outbreak investigation databases

Aseptic Meningitis by Month, New York City, 1989-2004



Weekly count of primary encephalitis reports in OCDS (ENP, CASE=1)
New York City, Jan 1989 - Oct 2002



Surveillance - Mosquitoes

- Dense network of traps (83 permanent trap sites per week, 111 supplemental trap sites) over 321 square miles
 - Over 221,000 mosquitoes ID'd in 2004
 - 10,687 pools tested in 2004
 - 184 pools infected with WN virus
- Probably “best” measure of risk to humans, but still hard to quantify
- Consider sampling strategies

West Nile Virus Activity In New York City (2004)

Human Cases (5)

- Contracted in New York City (2)
- Contracted in Arizona (3)

WNV Infected Pools (184)

Pool Range (Sites)

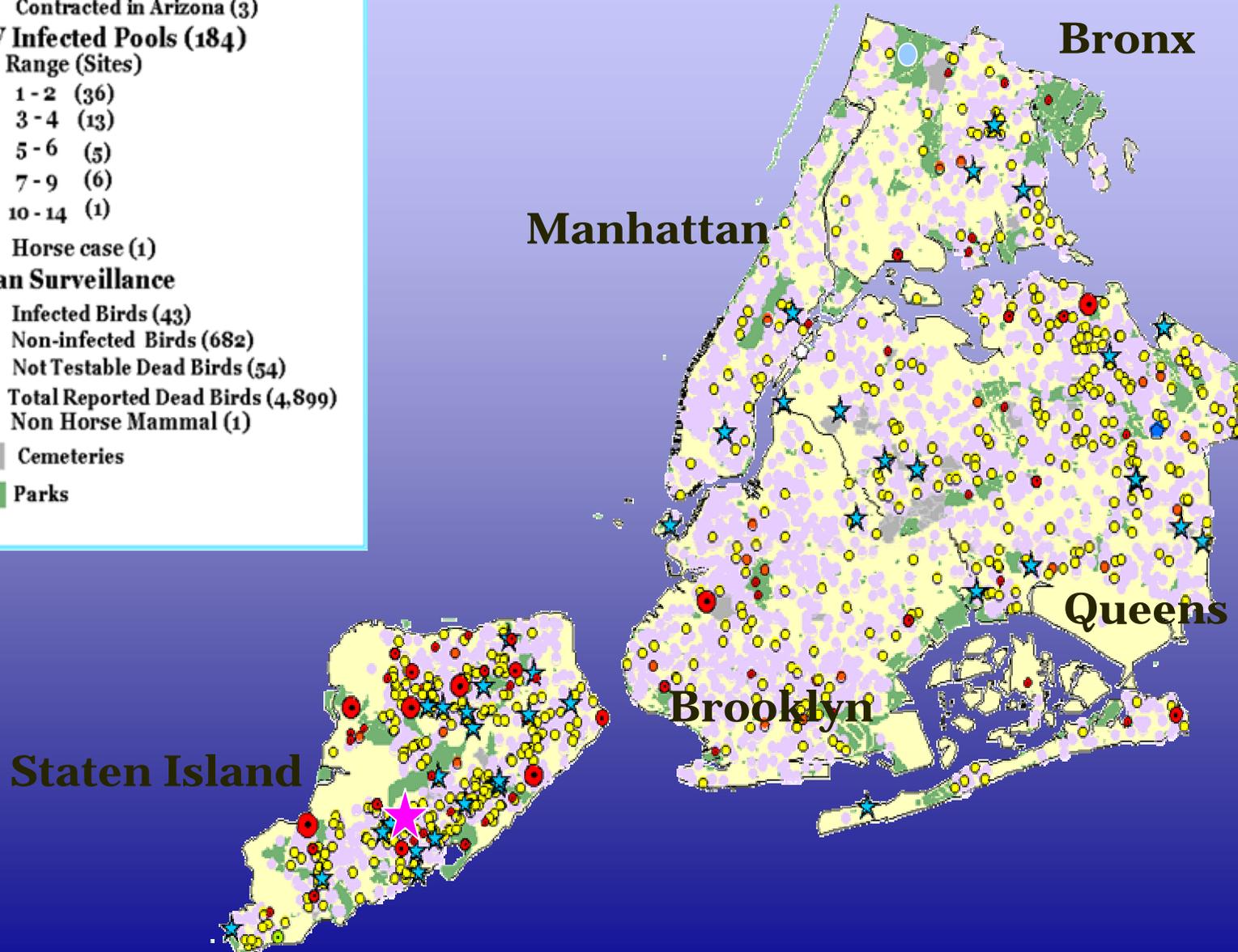
- 1 - 2 (36)
- 3 - 4 (13)
- 5 - 6 (5)
- 7 - 9 (6)
- 10 - 14 (1)
- Horse case (1)

Avian Surveillance

- ★ Infected Birds (43)
- Non-infected Birds (682)
- Not Testable Dead Birds (54)
- Total Reported Dead Birds (4,899)
- Non Horse Mammal (1)

■ Cemeteries

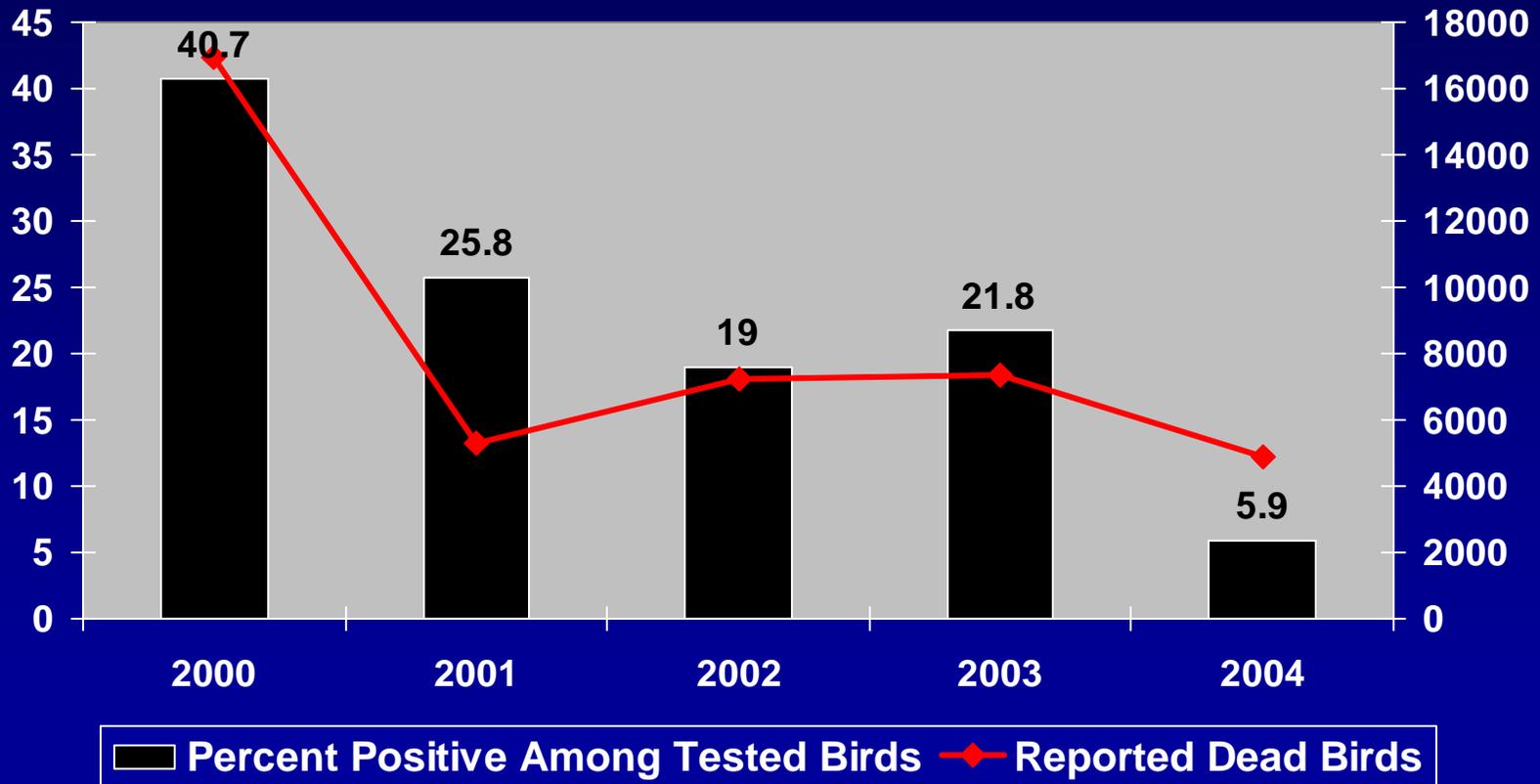
■ Parks



Surveillance – Dead Birds

- Value for targeting control measures unclear
 - Early warning system
 - In densely populated area, can you use dead bird data to pinpoint areas of higher risk?
 - Reported dead bird clusters in space and time - data has not proven extremely helpful in targeting control, though used for enhancing surveillance
 - Value of dead bird data may change over time
 - Dependent on public reporting (311, website)
 - Changing seroprevalence in resident or migrant populations
 - Depletion of corvids
 - Turn around time is critical to usefulness but NYC discontinued in house bird testing due to costs, ltd lab capacity
- May need to reduce these activities substantially

Dead bird reports, positive dead birds, NYC, 2000-2004



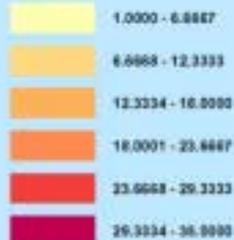
Hotspots* for Dead Bird Clustering - Updated September 12, 2003

Positive Mosquito Pools, Positive Dead Birds, and Human Cases Shown

Legend

Frequency in Cluster Area

Scale



NYC Blood Donor Infections

Classification Status

- Confirmed Infection
- Preliminary Infection

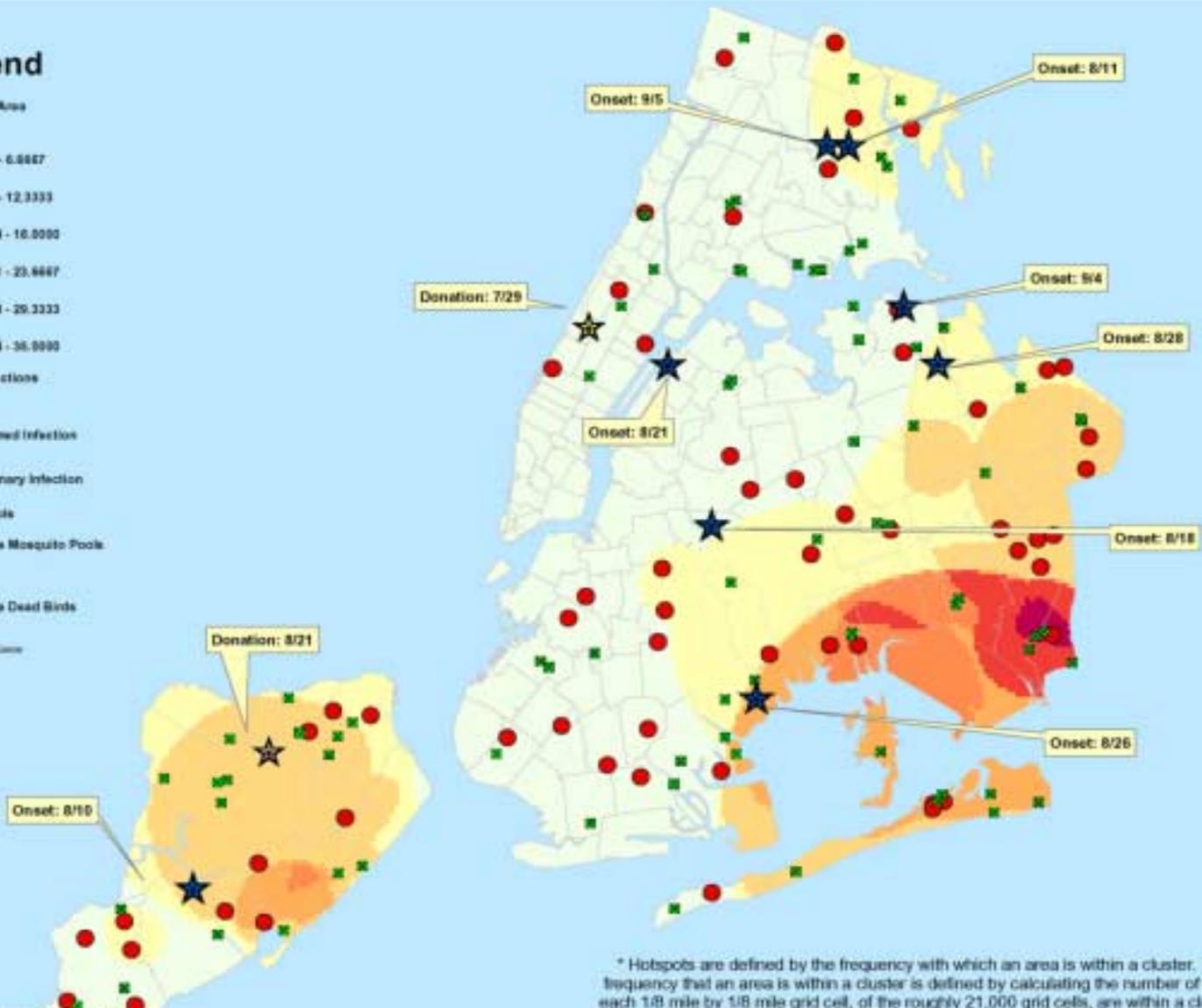
Positive Mosquito Pools

- Positive Mosquito Pools

Positive Dead Birds

- Positive Dead Birds

- Human Cases

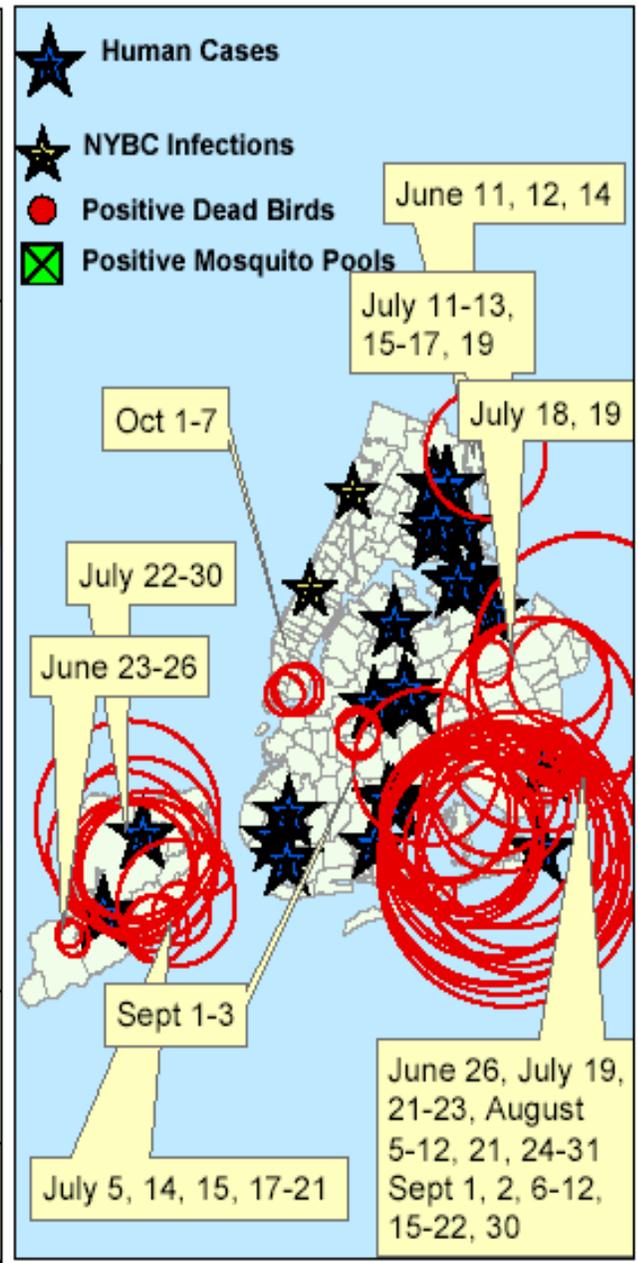


Additional Confirmed Human case in a 65 yo homeless man Date of onset 8/21

* Hotspots are defined by the frequency with which an area is within a cluster. The frequency that an area is within a cluster is defined by calculating the number of times each 1/8 mile by 1/8 mile grid cell, of the roughly 21,000 grid cells, are within a cluster. To date there are 66 clusters.

Dead Bird Clustering 2003

Focus on October 7 Cluster in Manhattan



Analysis of Surveillance Data

- Not simple – tried time space cluster detection methods, ROC curves, other complex methods
- Will likely need to look at combinations of indicators rather than a single indicator
- Most critical need is for expert data analysis of the wealth of data we have gathered, both in NYC and in other large cities
- People, like birds, do move around, and in a densely populated area, using human cases as the outcome measure may make risk assessment even more difficult.

Mosquito Control

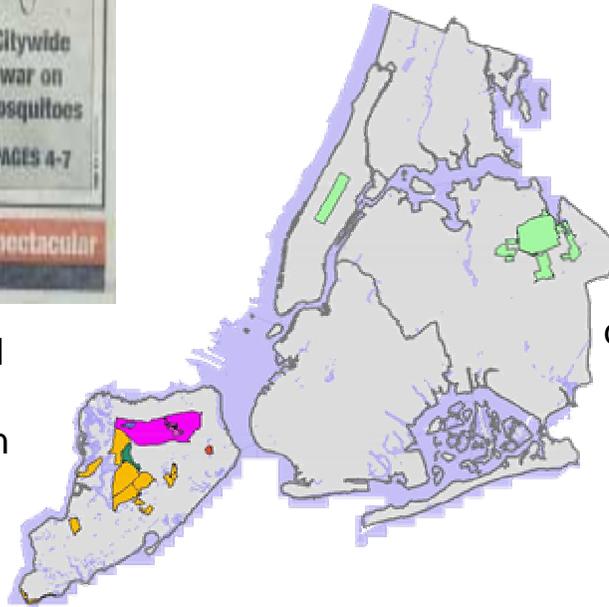
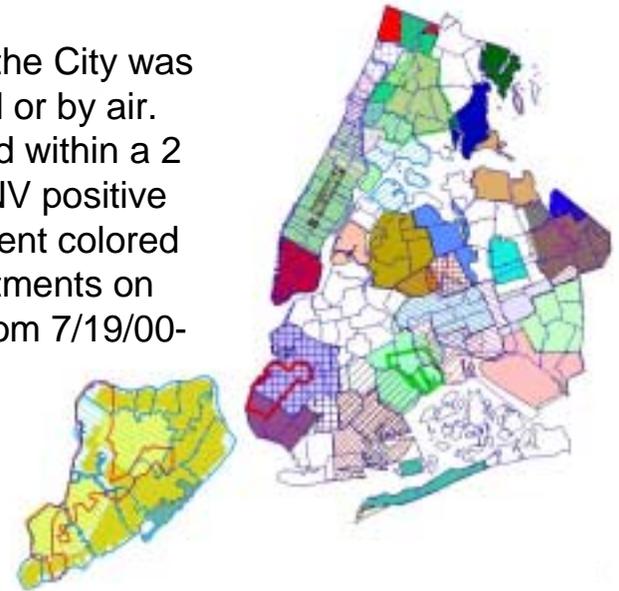
- In urban area, especially where unaccustomed to mosquito control activities, adulticiding needs to be targeted and used judiciously
- Heavy emphasis on larviciding
 - Catch basins
 - Green areas, cemeteries
 - Aerial
- Proactive pesticide resistance management
- When to use adulticide – NOT straight-forward, controversial and difficult to evaluate effectiveness
 - Qualitative algorithm
 - Still some subjective elements, especially in determining boundaries of spray zones

Adult Mosquito Control, NYC, 1999 - 2001



In 1999, the whole City was treated twice by air (outer boroughs) and truck (Manhattan). Parts of northern Queens and southern Bronx were treated 4 times.

In 2000, most of the City was treated by ground or by air. Spraying occurred within a 2 mile radius of WNV positive dead birds. Different colored areas reflect treatments on different nights from 7/19/00-9/24/00.

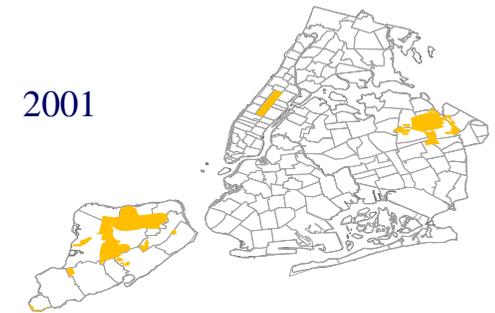


In 2001, there were only 6 spray events in 3 boroughs. Spraying was targeted to areas of WNV detection in birds, mosquitoes, and humans. Different colored areas reflect treatments on different nights from 8/14/01-9/2/01.

Adult Mosquito Control -Program Comparison 2001-2004

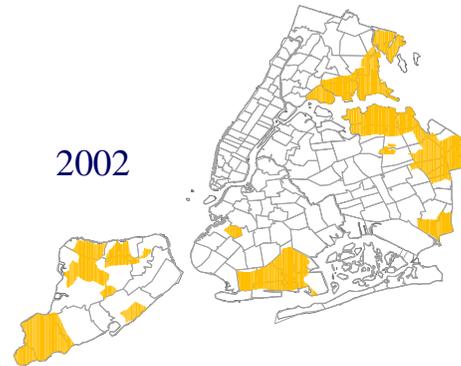
2001:

- 6 events
- 16,846 spray zone acres
- 41 gal. Anvil 10+10 used
- 8.7 % of NYC treated



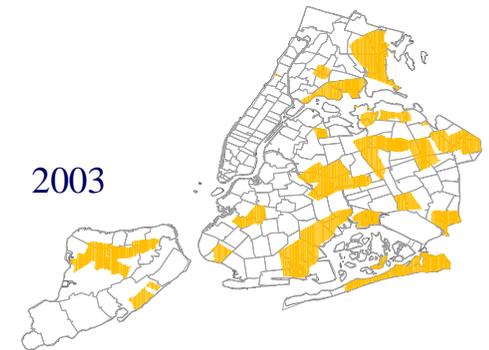
2002:

- 12 events
- 43,783 spray zone acres
- 131.25 gal. Anvil 10+10 used
- 22.6% of NYC treated



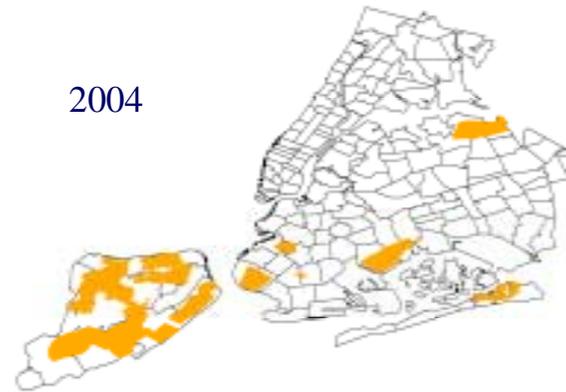
2003:

- 20 events
- 79,006 spray zone acres
- 235.7 gal. Anvil 10+10 used
- 40.7% of NYC treated



2004:

- 14 events
- 39,263 spray zone acres
- 118.8 gal. Anvil 10+10 used
- 19.8% of NYC treated



Public Knowledge and Preventive Behaviors

- WN fatigue
- Perception that WN has moved “west”
- Public is used to spraying, environmental activism has died down
- Media does not carry stories
- More challenging to notify the public
 - Few resources (and little interest in) for public education campaigns when disease is endemic
- Persistently low levels of knowledge and use of insect repellent – esp. Spanish-speaking

Public Knowledge and Preventive Behaviors

(cont)

- Target education to elderly, during high risk periods
 - Have materials in “back pocket”
 - Keep message SIMPLE
- Use students – flyers, community groups and elected officials, radio
 - Combine the messages – spray notification and high WN activity – use protection
- Offer individuals e-mail notification of spray events
- NOV’s issued for standing water

Coordination of WN Activities

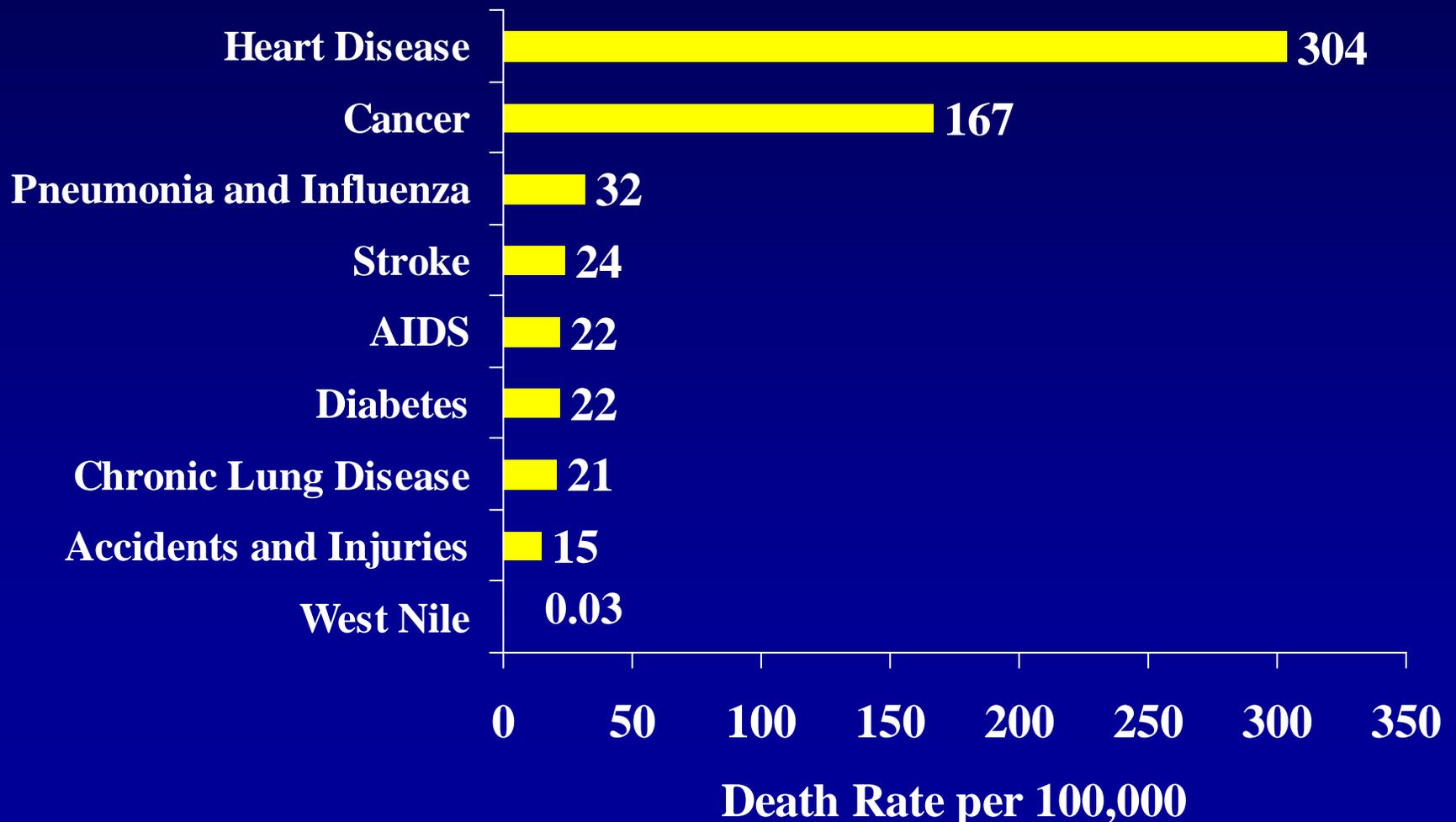
- Now routine, roles well-defined
- Steering committee meetings once a week during mosquito season, share data
- WN response has served as a learning opportunity and model for DOHMH emergency response system
- \$\$ currently being used to improve public health emergency response would help in another WN outbreak

Balancing West Nile with other Public Health Priorities in NYC

2003

New AIDS diagnoses	4946
New HIV diagnoses	4086
New TB cases	1140
Invasive Pneumococcal Disease	944
Primary and Secondary Syphilis	531
West Nile	30

Cause-specific Death Rate in NYC, 2000



Conclusions

- **WN virus has not “gone away.” Indeed, certain focal areas seem to remain at higher risk (Queens, Staten Island) from year to year**
- **As WN becomes endemic, public health needs to oppose dismantling of basic mosquito control programs and be cautious regarding decreasing resources for prevention (TB as a lesson)**
- **WN is still unpredictable and difficult to forecast**
- **Decisions about adulticiding require more quantitative risk assessment data**
- **Local and state HD’s need to be strategic about using designated funds, and leveraging other resources for WN prevention and control**

Next year in Hawaii

Acknowledgments

Waheed Bajwa

Edgar Butts

Barbara Edwin

Jessica Hartman

Jacqueline Kellachan

Farida Mahmood

Farzad Mostashari

Iqbal Poshni

Ann Marie Reagan

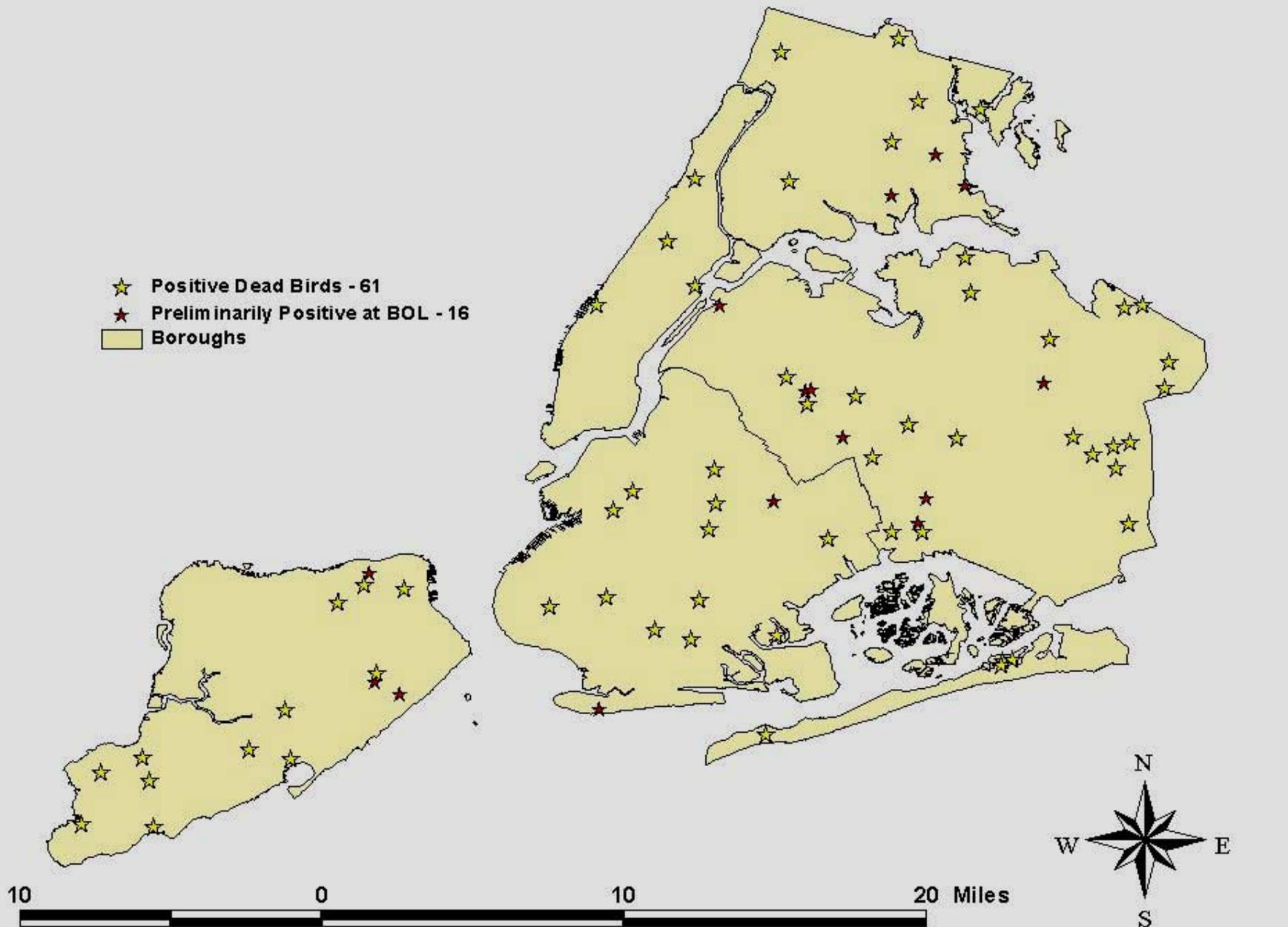
Huimin Shen



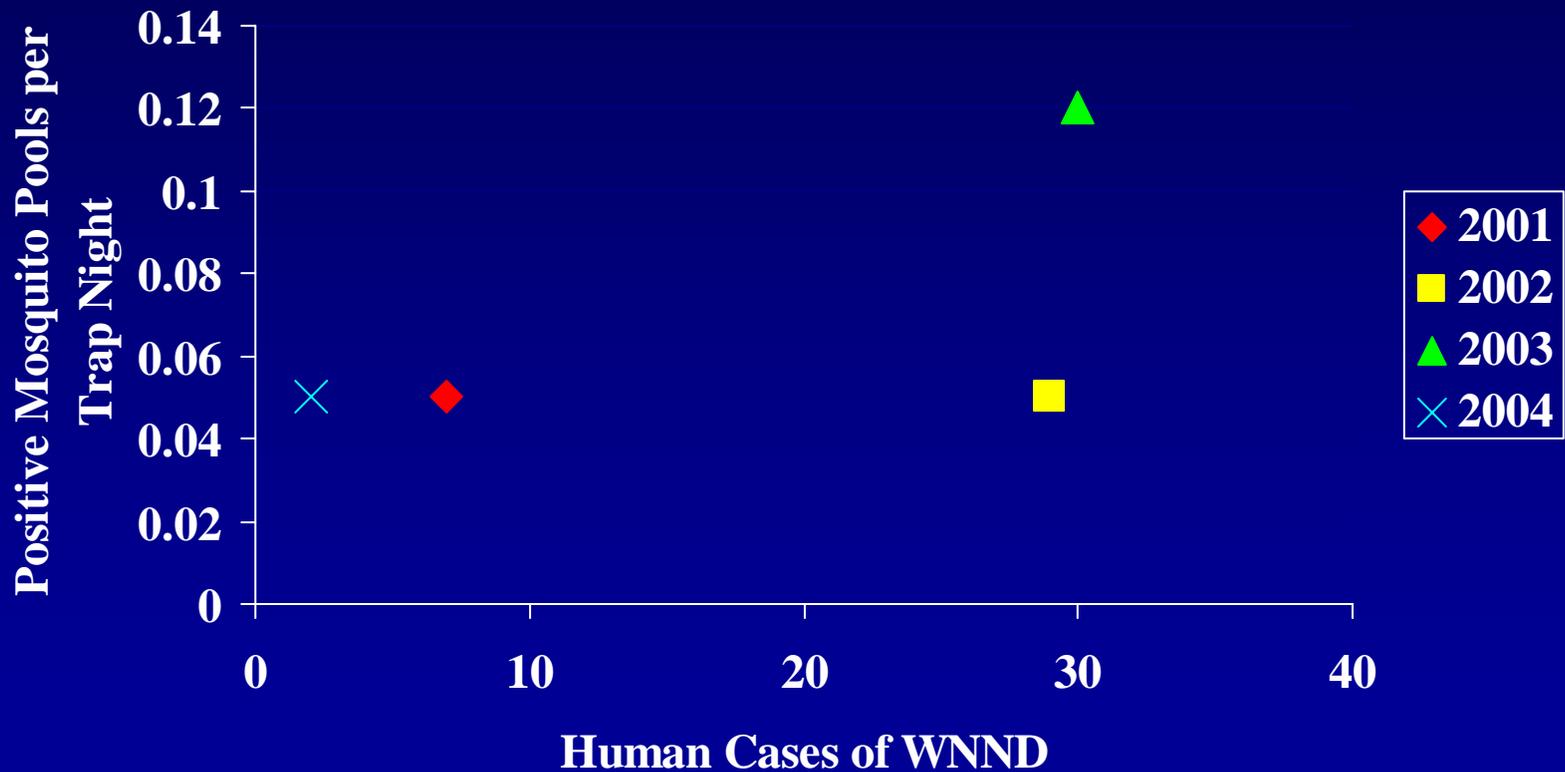
National Library of Medicine

1915 NYC Board of Health Report: "The city can have as much reduction of preventable disease as it wishes to pay for. Public health is purchasable; within natural limitations a city can determine its own death rate."

West Nile Positive Dead Birds 2003



Correlation between positive mosquito pools and number of human cases



West Nile Virus Activity and Adult Mosquito Control New York City 2004

Legend

Infected Mosquito Pools (184)

Infected Mosquito Pools Per Site

(	1	(	6
(	2	(	7
(	3	(	8
(	4	(	9
(	5	(	14

Infected Birds (43)

▲ WNV Infected Birds

Human Cases (5)

! 2 Case, New York City.

↑ 3 Cases, Imported, Arizona.

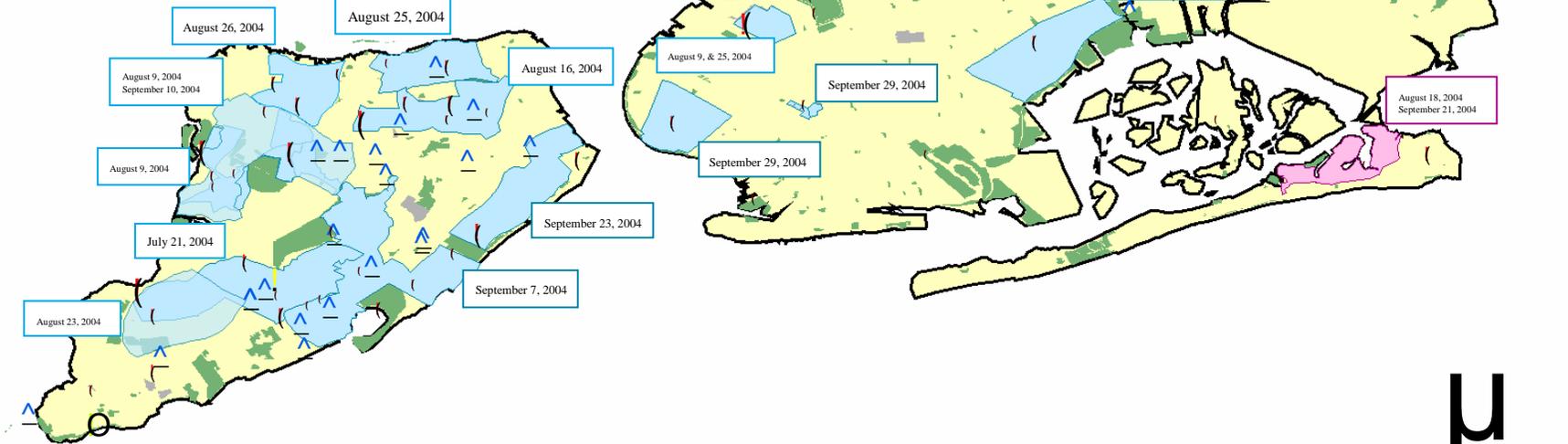
Horse Case (1)

○ Horse Case

Adulticide Events (14)

■ WNV Infected Mosquitoes

■ Nuisance Mosquitoes



Human West Nile Virus in New York City Reported Suspected and Confirmed Cases and Rates June 1 – Oct 31, 2001-2004*

	2001	2002	2003	2004
Total Reports	511	695	629	836
Suspect WN (meeting criteria*)	349 (4.4 per 100,000)	540 (7.0 per 100,000)	479 (6.2 per 100,000)	625* (7.8 per 100,000)
Encephalitis	148 (1.8 per 100,000)	219 (2.7 per 100,000)	150 (1.9 per 100,000)	134 (1.7 per 100,000)
Aseptic men	192 (2.4 per 100,000)	270 (2.5 per 100,000)	251 (3.1 per 100,000)	429* (5.4 per 100,000)
Other/Unknown	11	60	80	80
West Nile Neuroinvasive Disease	7 (0.9 per million)	29 (3.5 per million)	30 (3.7 per million)	2 (0.2 per million)

*2001-2003: Suspected Case of WN virus = encephalitis and/or unexplained motor weakness compatible with WN viral disease (any age) or aseptic meningitis (> 16 years of age); 2004: Same definition except aseptic meningitis cases of all ages are included.

Human Cases (5)

- Contracted in New York City (2)
- Contracted in Arizona (3)

WNV Infected Pools (184)

Pool Range (Sites)

- 1 - 2 (36)
- 3 - 4 (13)
- 5 - 6 (5)
- 7 - 9 (6)
- 10 - 14 (1)

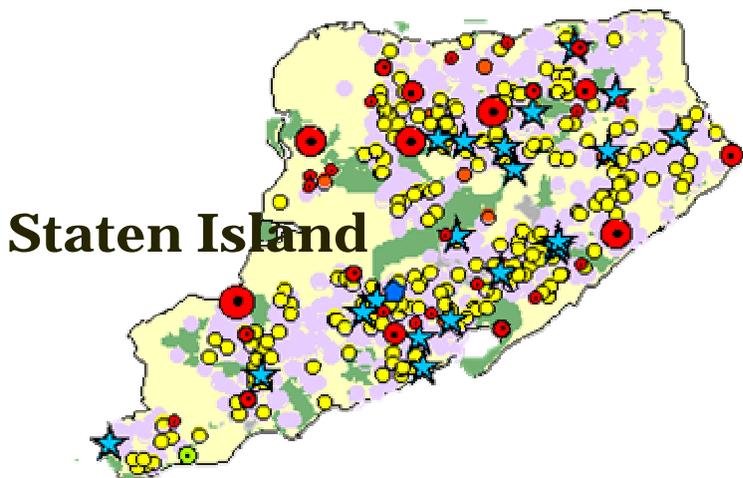
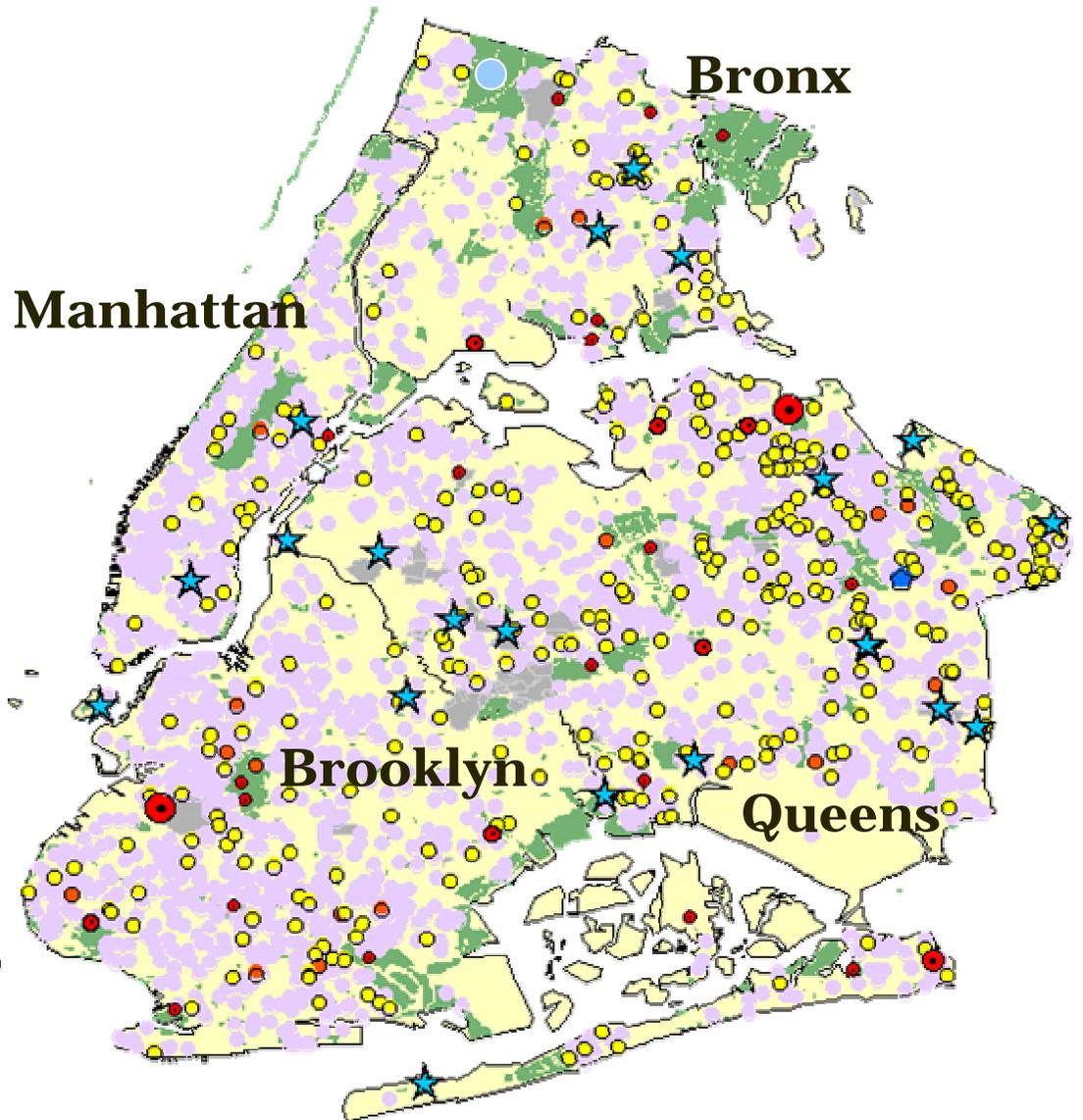
- Horse case (1)

Avian Surveillance

- ★ Infected Birds (43)
- Non-infected Birds (682)
- Not Testable Dead Birds (54)
- Total Reported Dead Birds (4,899)
- Non Horse Mammal (1)

■ Cemeteries

■ Parks





IT'S OK, GUS!
IT TESTED NEGATIVE
FOR THE WEST
NILE VIRUS!

NICK ANDERSON
© 2011

West Nile Virus NYC Positive Human Cases

- Human 2002
- ▲ Human 2001
- ★ Human 2000
- Human 1999

