



Epi Data Brief

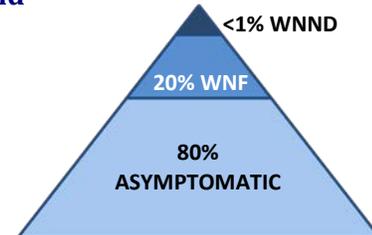
New York City Department of Health and Mental Hygiene

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West Nile Virus among New York City Residents, 1999-2012

In 1999, the New York City (NYC) Health Department identified the first U. S. outbreak of West Nile virus (WNV).¹ WNV is now considered endemic in the U.S. and is the leading cause of viral encephalitis. West Nile virus is transmitted to humans through the bite of an infected mosquito. In NYC, human cases typically start to appear in late July and continue through October. Although often asymptomatic in humans, a small portion of WNV infections result in illness ranging from a mild-moderate condition called West Nile fever (WNF) to a more severe condition called West Nile neuroinvasive disease (WNND) where patients suffer from aseptic meningitis and/or encephalitis and may develop acute flaccid paralysis. Persons aged 60 years and older are at greatest risk for more severe disease.

The West Nile virus human infection pyramid



- <1% (about 1 out of 150) of West Nile virus infections result in severe West Nile neuroinvasive disease (WNND)
- 20% result in West Nile fever (WNF)
- 80% of infections are asymptomatic

Source: *Emerging Clinical Syndromes of West Nile Virus Infection*. Dr. James J. Sevjar, 4th WNV National Conference, 2004.

Incidence of symptomatic West Nile virus infection in New York City, 1999-2012

Note: Unlike cases of WNND, cases of WNF often do not require hospitalization and may not seek medical care. Reports of WNF underestimate the true number of cases. Analysis is often restricted to WNND data as it is more consistently identified and reported.

- 292 cases of WNV infection were reported from 1999 to 2012, most of whom (239) had WNND; 53 cases had WNF.
- The total number of cases each year ranged from 3 in 2009 to 47 in 1999.
- The majority of cases were reported among persons aged 50 years and older; 49% of WNF cases and 77% of WNND cases.
- 58% of cases were male.
- Most cases were White (52%), followed by Hispanic (8%).

Characteristics of reported West Nile virus cases, overall and by type of illness, NYC, 1999-2012

	Overall		West Nile fever		West Nile neuroinvasive disease	
	N	(%)	N	(%)	N	(%)
Overall	292	~	53	(18%)	239	(82%)
Age						
<20	12	(4%)	6	(11%)	6	(3%)
20 – 49	70	(24%)	21	(40%)	49	(21%)
50+	210	(72%)	26	(49%)	184	(77%)
Gender						
Female	122	(42%)	29	(55%)	93	(39%)
Male	170	(58%)	24	(45%)	146	(61%)
Race/ethnicity						
Asian*	3	(1%)	0	(0%)	3	(1%)
Black*	21	(7%)	2	(4%)	19	(8%)
Hispanic	23	(8%)	3	(6%)	20	(8%)
White*	151	(52%)	11	(21%)	140	(59%)
Other**	3	(1%)	0	(0%)	3	(1%)
Unknown	91	(31%)	37	(70%)	54	(23%)

*non-Hispanic **includes Native American, Pacific Islander, Other race (not specified)
Source: NYC Department of Health Bureau of Communicable Disease

MORE New York City Health Data and Publications

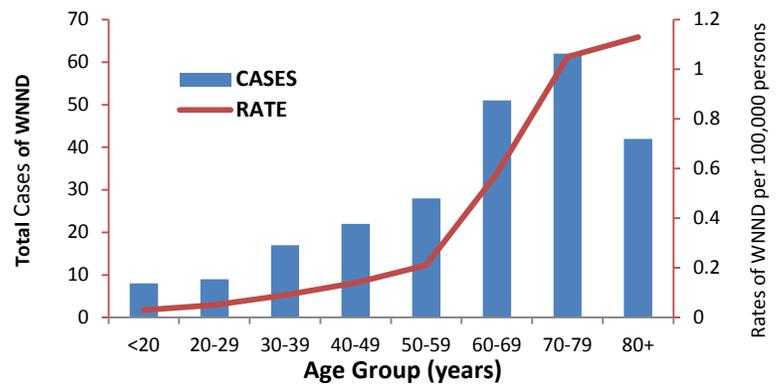
- For complete tables of data presented in this Brief, visit www.nyc.gov/html/doh/downloads/pdf/epi/datatable31.pdf
- Visit EpiQuery – the Health Department’s online, interactive health data system at www.nyc.gov/health/EpiQuery

Data and Statistics at www.nyc.gov/health/data

Risk for West Nile neuroinvasive disease and death increased with age

- Among cases of WNND diagnosed from 1999-2012, rates increased with each successive age group, with the highest rates among persons aged 60 years and older.
- The median age of WNND cases was 63 years with a range of 1 to 93 years.
- From 1999-2012, there were 35 deaths; all were among cases of WNND in NYC (case fatality rate of 15%). The age range among fatal cases was 32 to 93 with a median of 75 years.

West Nile neuroinvasive disease (WNND) cases and rates, by age group, NYC, 1999-2012

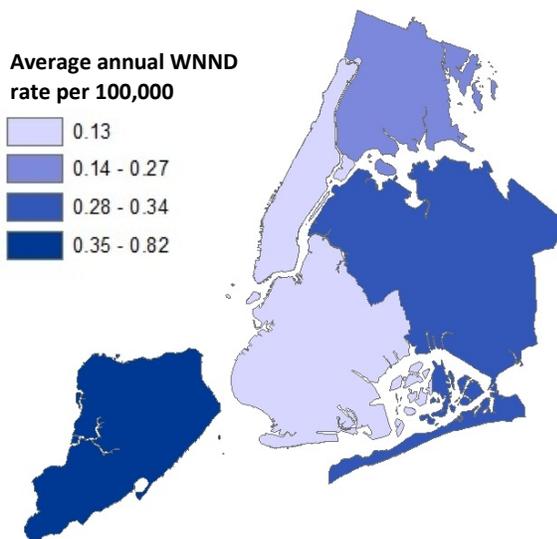


Source: NYC Department of Health, Bureau of Communicable Disease

Incidence of West Nile neuroinvasive disease by residential borough

- From 1999-2012, Queens reported the largest number of cases of WNND (99 cases, 41%), followed by Staten Island (41 cases, 17%), the Bronx (40 cases, 17%), Brooklyn (38 cases, 16%) and Manhattan (21 cases, 9%).
- While the largest number of WNND cases occurred in Queens between 1999 and 2012, during that period the average annual rate per 100,000 people was highest in Staten Island, followed by Queens and the Bronx. Brooklyn and Manhattan had the lowest rates of WNND. See map below for rates.

West Nile virus neuroinvasive disease rates by NYC borough of residence,* 1999-2012



*Does not include cases who likely acquired West Nile virus infection outside of New York City.

Source: NYC Department of Health, Bureau of Communicable Disease

Data Sources

Data presented are based on case surveillance of West Nile virus (WNV) illness conducted between 1999 and 2012 by the New York City Health Department.

Positive WNV laboratory reports and reports from medical providers were investigated by interviewing the medical provider and patient or a family member. Cases were categorized as West Nile Fever (WNF) or West Nile Neuroinvasive Disease (WNND).

Surveillance for WNV has occurred in two phases.

Phase 1: From 1999 through 2005, through active surveillance, the Health Department investigated all cases of aseptic meningitis and encephalitis, conditions associated with WNV that must be reported to the Health Department. Staff arranged to collect and transport diagnostic specimens obtained from hospitalized patients to the Health Department’s Public Health Laboratory (PHL) where WNV testing was conducted.

Phase 2: Because of increased availability of commercial testing, surveillance transitioned to the current, more passive system between 2006 and 2012. The Health Department discontinued transportation of diagnostic specimens to PHL in 2006 and routine WNV testing at PHL in 2010. Laboratory WNV test results are reported directly to the Health Department.

Additional data were gathered via comprehensive review of medical charts for patients diagnosed with WNND from 1999-2009.

Reference: ¹Nash D, Mostashari F, Fine A, et al. The outbreak of West Nile virus infection in the New York City area in 1999. *N Engl J Med* 2001;344:1807-1814.

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Clinical characteristics of patients with West Nile neuroinvasive disease

- Medical chart reviews for 166 patients with WNND from 1999 to 2009 found:
 - The most common symptoms were fever (92 %), muscle weakness (75%), fatigue (73%), nausea (62%) and altered mental status (61%).
 - The most frequent pre-existing medical conditions noted were a history of hypertension (59%), diabetes (30%), cancer (21%), cardiac disease (17%), and lung disease (17%).
 - The median length of hospital stay was 11 days. There were 57 cases (38%) admitted to the Intensive Care Unit (ICU), with a median length of stay in the ICU of 7.5 days; 31 cases (21%) required intubation (insertion of a tube to assist with breathing, an indication of severe illness).

Use of protective measures against mosquitos among West Nile virus cases

- Only 17% of WNV cases from 1999-2012 reported they used personal protective measures such as applying insect repellent to avoid mosquito bites, avoiding the outdoors at dusk and dawn, or wearing long sleeves and pants.

Learn more about what New York City is doing to reduce the risk of West Nile virus infection

- our WNV homepage: <http://www.nyc.gov/html/doh/html/environmental/wnv-home.shtml>
- our mosquito control program: [Comprehensive Mosquito Surveillance and Control Plan 2013](#)

Mosquito Surveillance and Control

NYC uses an integrated pest management (IPM) approach to monitor and control mosquito populations. Potential mosquito breeding sites are eliminated through the removal of standing water and by using biological larvicides (to kill the immature larval mosquitoes) to treat those areas of standing water that cannot be drained completely. The public is actively encouraged through public messaging to participate in the elimination of standing water around the home. In addition, the public can report sites with standing water using the 311 system. Inspections are conducted following all 311 complaints to look for the presence of larvae.

Mosquitoes are monitored Citywide throughout the mosquito season (April – October) by collecting larval and adult mosquitoes to determine their distribution, density and species. Adult mosquitoes are tested for WNV at the DOHMH Public Health Laboratory. Historically, the presence of WNV in mosquito populations typically precedes the first human cases by several weeks. If surveillance findings along with test results identify that the level of WNV activity in an area of NYC poses a significant threat to human health, adult mosquitoes will be controlled using ground applied adulticide. All adulticiding events are announced by a press release issued from the Health Department. Spray schedule for adult mosquito control in NYC is available at <http://www.nyc.gov/html/doh/html/environmental/wnv-spray.shtml>.

West Nile virus illness and treatment

CLINICAL ILLNESS: Most people infected with West Nile virus (WNV) have no symptoms. West Nile fever (WNF) often consists of a sudden onset of fever accompanied by headache, fatigue, muscle aches, weakness, nausea, vomiting, swollen lymph nodes and eye pain. Sometimes a fine rash appears on the body. Typically, those with West Nile neuroinvasive disease (WNND) have meningitis (inflammation of the membranes covering the brain and spinal cord) and/or encephalitis (inflammation of the brain). Symptoms include fever, muscle weakness and altered mental status. Persons 60 and older as well as persons with underlying immunosuppression are at greater risk for more severe disease.

TREATMENT: Treatment is supportive as there are no known effective antiviral medications. Patients with more severe disease often require hospitalization which may include respiratory support and fluid therapy. Rehabilitation may be indicated for patients with cognitive impairment and or residual muscle weakness or paralysis.

West Nile virus prevention

From June through October, when mosquitoes are most active in New York, take precautions:

- Wear long sleeve shirts and pants, particularly at dusk and dawn when mosquitoes are most active.
- Avoid shaded, bushy areas where mosquitoes like to rest.
- Limit outdoor activity at dusk and dawn.
- Use insect repellents containing DEET, picaridin, oil of lemon eucalyptus, or IR3535. Always read the repellent's label (see the [Insect Repellent Use & Safety FAQ](#)).
- Eliminate standing water that collects around your home: remove discarded tires and containers that may collect water (flower pots, wading pools, etc.), make sure roof gutters drain properly, and drain water from pool covers.
- Regularly clean and chlorinate swimming pools and hot tubs and change bird bath water every 3 to 4 days.
- Repair or replace damaged screens.