



Epi Data Brief

New York City Department of Health and Mental Hygiene

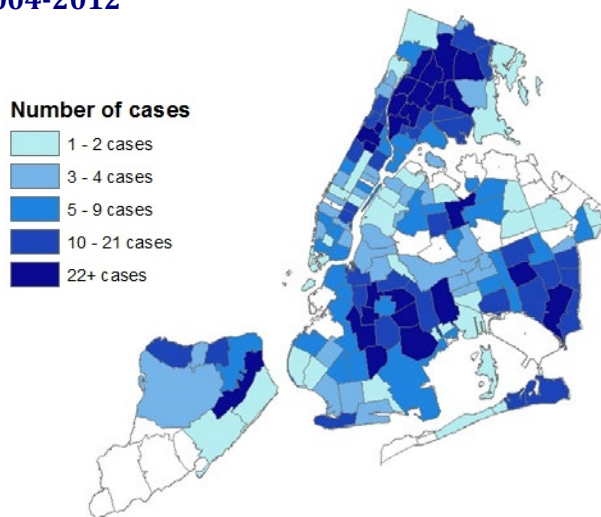
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Malaria in New York City 2004-2012

Malaria is an infectious disease spread by the bite of a female *Anopheles* mosquito infected with the *Plasmodium* parasite. Malaria transmission occurs primarily in sub-Saharan Africa, Southeast Asia, and parts of Pacific Islands and South America.

- Globally, there were 200 to 500 million malaria infections per year during 2004-2010.
- Local transmission of malaria by mosquito in the United States has been rare and relatively isolated to southern Florida.
- Malaria is a mandated reportable disease in NYC, and between 2004 and 2012, there were about 200 cases of malaria diagnosed annually, with 66% of these infections occurring in men.
- The most common age category was 40-59 (36% of cases), followed by children less than 18 years old (22%).
- Most cases occurred among residents of the Bronx (36%) and Brooklyn (25%), reflecting the large immigrant populations from West Africa residing in those boroughs.

Number of malaria cases by NYC neighborhood, 2004-2012



Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease

Characteristics of New York City residents with malaria, 2004 - 2012

	N	%
Total Cases	1,899	~
Gender		
Male	1,251	66%
Female	648	34%
Age (average=34.5 years, range= 0-91 years)		
0 - 17 years	424	22%
18 - 39 years	645	34%
40 -59 years	692	36%
60+ years	138	7%
Race/Ethnicity		
Non-Hispanic Black	1596	84%
All Other	303	16%
Borough of residence		
Bronx	677	36%
Brooklyn	466	25%
Queens	336	18%
Manhattan	324	17%
Staten Island	93	5%

Source: NYC Department of Health and Mental Hygiene, Bureau of Communicable Disease

Effects of Malaria Malaria may cause no, mild, or severe symptoms. Severe malaria complications include: cerebral infection, severe anemia, renal failure, acute respiratory distress syndrome, and death.

VFRs are US residents who travel back to their country of origin to visit friends and relatives.

Data Sources: Malaria Surveillance Data. The NYC Health Code mandates reporting of malaria diagnoses by laboratories and primary care providers to the Health Department, which investigates each report of malaria by conducting a patient or provider interview and/or a medical chart review. This report used malaria surveillance data from 2004 – 2012.

Supplemental Knowledge, Attitude and Belief (KAB) questionnaire. NYC residents diagnosed with malaria from August 14 to October 8, 2011, who traveled outside the US were interviewed with a KAB questionnaire as part of a special research study (n =32).

Authored by: Lucretia Jones

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Populations at increased risk for malaria

Malaria in VFR travelers

- Research has shown that VFR travelers are at considerably higher risk for several diseases, including malaria, compared with those who travel for other reasons. Their increased risk has been attributed to under-utilization of travel clinics, pre-travel medical advice, and appropriate chemoprophylaxis.
- Between 2004 and 2012, two-thirds (67%) of NYC malaria cases reported VFR as the reason for travel; 75% traveled to West Africa, and the most common destination among these VFR travelers was Nigeria (26%).

Malaria among children and pregnant women

- Globally, malaria illness and death rates are higher among children and pregnant women than among the rest of the population.
 - Child VFR travelers are at particular high risk if they do not receive chemoprophylaxis and are more susceptible to developing severe malaria
 - Pregnancy increases susceptibility to malaria and increases severity of the illness.
 - Malaria during pregnancy can lead to spontaneous abortion, preterm delivery, stillbirth, and maternal death.
- Between 2004 and 2012 in NYC, nearly 20% of female cases 18-39 years occurred in pregnant women.

Malaria chemoprophylaxis and treatment

- Malaria in travelers can be prevented with pre-travel medical advice and correct use of preventive measures, such as taking appropriate chemoprophylaxis medications and avoiding mosquitoes. (See box below)
- Only 16% of NYC malaria cases between 2004 and 2012 had taken any chemoprophylaxis; two thirds of those individuals who took chemoprophylaxis drugs did not adhere to the full regimen.
- Between 2004 and 2012, 75% of malaria cases identified in NYC required admission to a hospital for treatment. Six cases were fatal (<1%).

Malaria prevention for travelers to malaria-endemic regions

The most effective prevention is appropriate use of medication, which usually prevents human infection if bitten by a mosquito infected with malaria. Mosquito avoidance is necessary as well.

Measures that can be taken to avoid mosquitoes:

- Sleeping under an insecticide-treated bed net at night
- Using insect repellents containing DEET or picaridin
- Wearing long sleeve shirts and pants, especially at night or in rural areas and wearing clothing that has been treated with permethrin-based products
- Using air conditioners, ceiling fans, and window and door screens to avoid unprotected open windows and doors

Risks and outcomes among malaria cases in New York City residents, 2004-2012

	N	%
Total Cases	1,899	~
Reason for Travel		
Visiting Friends and Relatives (VFR)	1,279	67%
All Other Reasons for Travel	620	33%
Region of Travel		
West Africa	1,429	75%
Other regions in Africa	123	6%
Asia	127	7%
Caribbean, Central Am, Mexico	119	6%
South America	55	3%
All Other Regions of Travel	46	9%
Pregnant at diagnosis		
Among females 18-39 years (n=254)	49	19%
Chemoprophylaxis Use and Adherence		
Adhered to all pills	98	5%
Took some pills	211	11%
No pills taken	1,501	79%
Unknown	89	5%
Admitted to Hospital		
Yes	1,421	75%
No	452	24%
Unknown	26	1%
Fatal case		
Yes	6	0.3%
No	1,826	96%
Unknown	67	4%

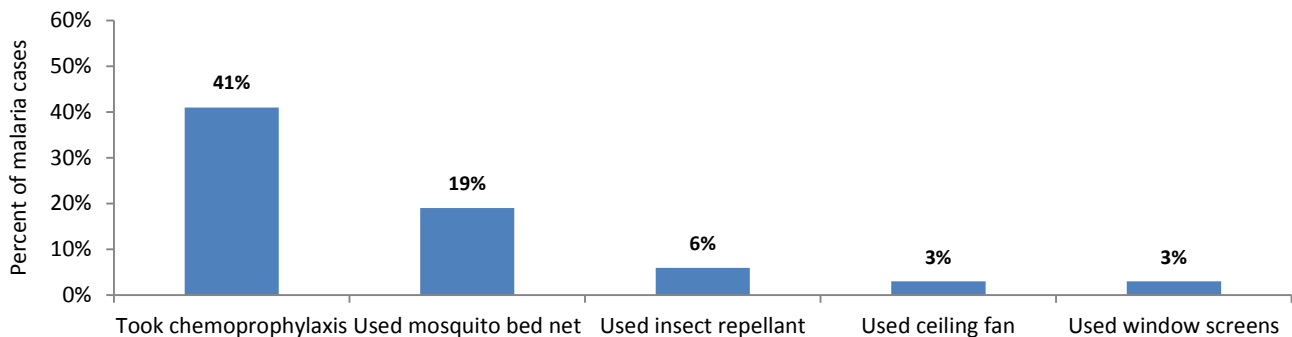
Source: New York City Department of Health and Mental Hygiene Bureau of Communicable Disease

Knowledge, attitudes and beliefs about malaria among New York City cases

Individuals who travel to visit friends and relatives (VFR) in endemic regions are at increased risk for contracting malaria because of their knowledge and attitudes regarding the disease and malaria chemoprophylaxis. To better understand knowledge, attitudes and beliefs about malaria, all cases diagnosed with malaria in NYC from August 14 – October 8, 2011 who reported travel from NYC (n=32) were interviewed with an additional questionnaire:

- All 32 cases traveled to malaria endemic areas; most (88%) were VFR travelers.
- 88% stated they were not worried about getting sick when traveling.
- 34% stated they knew the health impact of malaria but still did not take chemoprophylaxis.
- 41% traveled with children.
- 41% took at least some chemoprophylaxis.
- 31% used another preventive measure with or without chemoprophylaxis use.
- 27 individuals had any health insurance (84%); among them, two thirds reported having private insurance.

Use of malaria prevention measures among 32 cases, New York City, August-October 2011



Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease, Supplemental Knowledge Attitude, Belief (KAB) questionnaire, 2011

More information on malaria

- “[Your Guide to Safe and Healthy Travel](#)” provides information and advice for VFR travelers to prepare for their trip back home. It describes illnesses commonly found in Asia, Africa, Latin America and the Caribbean along with tips on how to avoid them.
<http://www.nyc.gov/html/doh/downloads/pdf/cd/cd-travel-health-brochure.pdf>
- Centers for Disease Control and Prevention (CDC) Traveler’s health Yellow Book
<http://wwwnc.cdc.gov/travel/yellowbook/2012/chapter-3-infectious-diseases-related-to-travel/malaria>
- CDC Morbidity and Mortality Weekly Report (MMWR) Malaria Surveillance – US 2010
<http://www.cdc.gov/mmwr/pdf/ss/ss6102.pdf>
- [Global TravEpiNet](#) is a network of U.S. travel clinics that collects data about individuals who travel internationally from the United States; <http://www2.massgeneral.org/id/globaltravepinet/>

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/datatable29.pdf
- Visit EpiQuery – the Health Department’s online, interactive health data system at www.nyc.gov/health/EpiQuery

Health Department Data & Statistics at www.nyc.gov/health/data