

Malaria

Agent(s): Four different species of protozoan parasites: *Plasmodium falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*

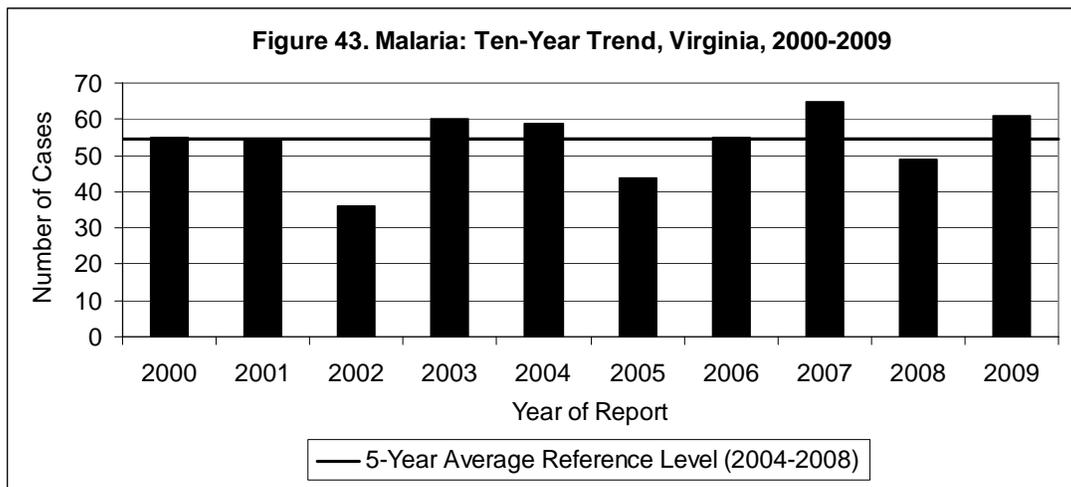
Mode of Transmission: Transmission through the bite of an infected, female *Anopheles* mosquito. Transmission might also occur from infected mother to child during pregnancy or delivery, by blood product transfusion or through transplanted organs from infected donors. Humans and certain *Anopheles* mosquito species are the only natural reservoirs for malaria.

Signs/Symptoms: Typically, high fevers, chills, sweats, severe headache, muscle and joint pain, anorexia, nausea, flu-like illness, anemia and an enlarged spleen. *P. falciparum* infections may progress to severe malaria if not treated promptly; symptoms include acute alteration of brain structure and function (i.e., cerebral malaria), severe anemia, jaundice, renal failure and coma.

Prevention: Appropriate medication for malaria prophylaxis should be taken by travelers when traveling to malaria-endemic countries. Anopheline mosquitoes bite only at dusk, dawn or during night-time hours and tend to enter buildings. Control measures include staying in structures with adequate screening and equipped with bed nets, and when outdoors, wearing longsleeved, loose fitting, light-colored clothing and mosquito repellents.

Other Important Information: Almost all infections reported in Virginia occur in persons who were infected in other countries. Although malaria is not endemic to Virginia, it may be brought to this region by travelers or immigrants with dormant or inapparent infections. Malaria might also arrive in Virginia by infected mosquitoes transported in aircraft or ships arriving from foreign destinations. There are two potential mosquito vectors for malaria in Virginia: *Anopheles quadrimaculatus* and *An. punctipennis*.

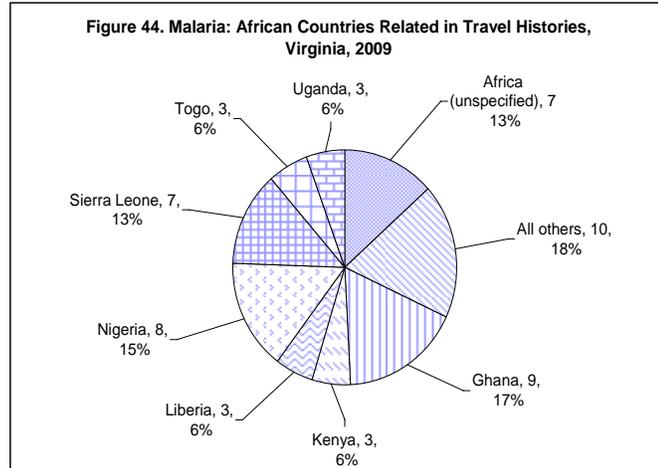
During 2009, 61 cases of malaria were reported in Virginia. This is a 24% increase from the 49 cases reported in 2008, and a 12% increase from the five-year average of 54.4 cases per year (Figure 43).



The highest incidence rate (1.3 per 100,000) was observed in the 20-29 year age group, followed by a rate of 0.9 per 100,000 in four age groups (the 10-19, 30-39, 40-49, and 50-

59 year age groups). Although race was missing for 33% of reported malaria cases, among the cases for which race information was reported, the highest number of cases and incidence (31 cases, 2.0 per 100,000) occurred in the black population, followed by a much lower incidence in the “other” and white populations (0.7 and 0.1 per 100,000, respectively). Incidence in males was more than twice the rate among females (1.1 and 0.5 per 100,000, respectively). Sixty-nine percent of the cases were reported from the northern region, resulting in the highest regional incidence rate (2.0 per 100,000). Rates in other regions ranged between 0.2 and 0.6 per 100,000. No deaths due to malaria have been reported in Virginia since 2005.

All but two cases reported a history of travel outside of the United States within the four years before disease onset. Among cases where specific travel information was provided, 90% of the infections occurred in persons arriving from or returning from countries in Africa. Other countries mentioned in travel history included India and Pakistan. The most frequently referenced African countries in the travel histories included Ghana, Nigeria, and Sierra Leone (Figure 44).



Information on malaria prophylaxis usage was obtained for 51 (84%) of the reported cases. Of these, 18 (35%) reported receiving prophylaxis for malaria, although 13 of the 18 patients reported missing at least one dose. The largest proportion of 2009 cases (47%) occurred in the third quarter of the year, which is a pattern historically seen in Virginia. However, cases of malaria are usually acquired outside the United States and any observed seasonality patterns would be related to the travel patterns to endemic countries.