Emergency Preparedness and Response

Malaria: Haiti Pre-decision Brief for Public Health Action

1. Key recommendations

- A reliable malaria surveillance system should be established as soon as possible. The system should detect cases and monitor trends, based upon laboratory confirmation of Plasmodium falciparum infection in persons with fever. This may require strengthening existing systems.
- Use of Rapid Diagnostic Tests (RDTs) at peripheral health facilities will be important to target appropriate treatment and differentiate malaria from other causes of febrile illness, and to help define the local epidemiology.
- If an increase in the number of malaria cases is detected, treatment should be initiated, and targeted vector control strategies based on an entomologic assessment should be implemented; active case detection may be useful, including screening (using RDTs) of febrile individuals living in the same household as the index case.
- If there is a large malaria epidemic, mass RDT-screening by mobile teams of all individuals in the region of the outbreak and treatment of persons with positive tests (regardless of additional symptoms) may be indicated. If it is operationally difficult to obtain laboratory confirmation for each case, presumptive treatment of malaria/fever cases based on a standard case definition could be considered to reduce morbidity and mortality.
- Because P. falciparum malaria has non-specific symptoms, can be fatal, and is easily treated if therapy is begun promptly, it is important to include malaria in the differential diagnosis of febrile illnesses. Unless there is another obvious cause of illness, all cases of fever should be tested for malaria and treated based on the results.
- Primaquine, an antimalarial with activity against the reproductive stage of P. falciparum, is recommended for use with chloroquine in treatment of malaria in Haiti, and could help to reduce transmission.
- Entomologic assessments should be done to characterize breeding sites, assess levels of insecticide resistance, and monitor mosquito abundance to measure the impact of vector control interventions such as larviciding, spraying or deploying insecticide-treated materials.

2. What was the situation in Haiti prior to the earthquake?

- Falciparum malaria is endemic in low-lying (<300 meters altitude) areas of Haiti. The island of Hispaniola is the only island in the Caribbean region where malaria has not been eliminated. Transmission peaks following the two rainy seasons, with a primary transmission peak during November-January and a second in May-July. There is no appreciable transmission of other Plasmodium species (P. vivax, P. ovale, P. malariae) on Hispaniola.
- Expert microscopy of a blood smear to detect malaria parasites is the gold standard diagnostic test for malaria. Few facilities in Haiti had the capacity to perform good quality microscopy on a routine basis, and RDTs are not yet widely used.
- The routine surveillance system in Haiti reports on cases of suspect malaria, but the quality of the data is uncertain.
- A population-based study in the Artibonite valley in 2006 showed a prevalence of P. falciparum infection of 3.1% by PCR (see map). The Haitian Ministry of Health (MOH) has conducted several small studies to assess the malaria prevalence in some regions of the country. The most recent study in 2007, estimated the prevalence of P. falciparum infection in febrile patients presenting to health facilities to range from 1.5% to 15.7% across the regions of Nord-Ouest, Nord, Artibonite, Centre, Ouest, Nippes, and Grand-Anse. Because of the relatively low malaria transmission in Haiti, all age groups are affected.
- Chloroquine is the first-line treatment for uncomplicated malaria in Haiti and the Dominican Republic. Although chloroquine remains highly effective based on clinical evidence, one recent study documented a 6% prevalence of a mutation associated with chloroquine resistance in P. falciparum isolates in Haiti. Accordingly, the MOH has recognized that routine surveillance of chloroquine efficacy needs to be conducted. As per Haiti national policy, a single dose of primaquine is recommended in addition to chloroquine to reduce malaria transmission.
- The primary malaria vector in Haiti is Anopheles albimanus. Though its behavior patterns may vary somewhat geographically, this vector tends to bite and rest outside and be more active early in the evening, potentially compromising the overall effectiveness of vector control tools such as indoor residual sprays or insecticide treated nets.

3. What is the likelihood of cases/outbreaks of this disease developing in the near future?

- The Haitian MOH has reported localized, recurrent outbreaks of malaria in the areas of Côte des Arcadins and Ouanaminthe, last reported in 2005 and 2006 respectively (see map). In 1963-1964, Haiti experienced a falciparum malaria epidemic following a hurricane; approximately 75,000 cases were estimated to have occurred.
- Although malaria outbreaks usually do not occur after natural disasters, there was a documented outbreak of P. vivax malaria in Costa Rica following both an earthquake and heavy rains in 1991.
- Malaria outbreaks can occur when climatic conditions such as increased rainfall promote increased mosquito populations; when there is failure of malaria treatment or control interventions; or when there are large population movements from areas of low malaria transmission to areas of high
transmission, as a result of which, individuals with relatively less acquired immunity are infected at high rates.

- Published examples of conditions associated with malaria outbreaks include: increased rainfall leading to an epidemic in Ethiopia; lack of control measures addressing breeding sites for mosquitoes, limited use of personal protection, and weak case detection in India; increased breeding sites, a poor quality indoor residual spraying campaign, and sub-standard antimalarial drug procured for treatment in Pakistan.

4. Should an outbreak occur, how would this be detected?

- An outbreak of falciparum malaria would be detected by an increased number of cases of acute febrile illnesses, with laboratory confirmation of *P. falciparum*. The most common symptoms of malaria are non-specific—fever, chills, sweats, headaches, muscle pains, nausea and vomiting. Severe malaria can present with altered consciousness, seizures, and/or profound anemia.
- Currently WHO and Haiti recommend that all suspected cases of malaria should be confirmed through laboratory testing. Because the symptoms of malaria are non-specific, parasitological confirmation is necessary to differentiate it from other infectious illnesses.
- Laboratory confirmation of malaria cases can be easily achieved using RDTs that detect *P. falciparum* with acceptable levels of sensitivity and specificity. The following is a link to an interactive website supported by WHO and the Foundation for Innovative New Diagnostics (FIND) designed to help select malaria RDTs with the specific performance characteristics required by the National Malaria Control Program: [http://www.finddiagnostics.org/programs/malaria/find_activities/product_testing/malaria-rdt-product-testing/](http://www.finddiagnostics.org/programs/malaria/find_activities/product_testing/malaria-rdt-product-testing/). Smear microscopy is considered the gold standard for diagnosis. RDTs are currently available at the National Public Health Laboratory (LNSP).

5. What options for public health action should be considered in the event of an outbreak?

- Effective control measures for malaria include: (1) early case detection and treatment, through prompt active screening of febrile persons in the area of the outbreak; and (2) vector control, based on local assessment of the situation and implemented with a variety of potential tools (e.g., insecticides delivered as treated bednets or other materials; indoor residual spraying; and larvicidal treatment of breeding grounds). The choice of vector control strategy depends on the behavior and species of the local mosquito vectors, as well as local environmental factors.
- In large epidemics, after confirmation that *P. falciparum* is the cause, mass screening and treatment, or presumptive treatment based on a standardized clinical definition, could be considered.
- Currently there is no effective vaccine for malaria.
References


