RISK MANAGEMENT

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Malaria Continues To Be a Serious Health Concern

Background

Global pandemic crises have emerged as one of the leading environmental risk factors for organizations doing business in developing regions. Individuals working in these areas may combat such risks when properly armed with the appropriate information, equipment and medication.

Malaria specifically is a major worldwide health problem resulting in an estimated 207 million infections, including 627,000 deaths in 2012, according to the World Health Organization (WHO) World Malaria report 2013. Malaria is the third largest killer of children in the world, even though the disease is preventable and treatable. There are roughly 3.2 billion people (almost half of the world's population) who are at risk.

The illness is caused by four primary species of malaria parasites: Plasmodium (P.) falciparum, P. malariae, P. ovale and P. vivax. Recently, a fifth species has been identified, P. knowlesi, found in Southeast Asia.

All species of Malaria are transmitted by bites of infected female Anopheles species (spp.) mosquitoes, which are primarily nighttime biters, including evenings and early mornings. Transmission also occurs through blood transfusions, organ transplants, needle sharing, or congenitally from mother to fetus. The main concern is mosquito bites, as this is the most common form of transmission.

Although progress has been made in reducing the global prevalence of malaria, the concern is still very relevant and the use of preventative measures by travelers can be inadequate.

Implications for Employers

Malaria poses a substantial risk to personnel working in Africa. While the direct risks to your personnel are health related, there are significant business impacts for employers to consider. These peripheral costs include diminished operational capacity; recruitment and placement costs to replace an ill employee; addressing health concerns brought by coworkers of an ill employee; medical evacuation and/or local treatment costs; increased

workers' compensation insurance premiums; and significant drain on management personnel dealing with an ill employee.

Signs and Symptoms for Self-monitoring

The first symptoms of Malaria are: fever, chills, sweats, headaches, muscle pains, nausea and vomiting. Physical findings are: elevated temperature, increased perspiration and tiredness. For severe Malaria cases (caused by Plasmodium falciparum), clinical findings include: confusion, coma, neurological focal signs, severe anemia and respiratory difficulties. If your personnel report or complain of such symptoms, referral to a physician is immediately warranted.

Preventive Measures

Chemoprophylaxis is available and recommended when traveling to a malaria-endemic country. These medications include: Atovaquone-proguanil (Malarone), Chloroquine phosphate, Doxycycline, Hydroxychloroquine sulfate and Mefloquine. No Antimalarial drug is 100% protective, so personal preventive measures must be combined: insect repellant, long sleeves, long pants, sleeping in a mosquito-free area or using a mosquito mask/insecticide-treated bednet. These countermeasures should be strictly followed for the duration of the stay, as well as any other recommended country specific measures. Consultation with a physician is required to receive a prescription for the appropriate chemoprophylaxis.

Recommendations for Exposure

Malaria can be treated effectively during the early stages of the disease, but delayed treatment can cause serious or fatal consequences! As soon as symptoms are detected, it is highly advised to seek a medical evaluation as soon as possible. Treatment options depend on: the species of malaria, the likelihood of drug resistance, the age of the patient, pregnancy status and the severity of the infection. Detailed CDC treatment measures can be found at: http://www.cdc.gov/malaria/diagnosis_treatment/treatment.html.

Since the first signs of Malaria often resemble the same symptoms as the "flu" or other infectious diseases, a clinical test confirming a malaria infection is recommended. In addition to malaria-specific diagnostic testing, a complete blood count (CBC) and routine chemistry panel should be performed to detect severe anemia, hypoglycemia, renal failure, hyperbilirubinemia and acid-base disturbances.

Various test kits are available to detect antigens derived from malaria parasites such as the immunologic test or BinaxNOW Malaria test, which can detect infections in 2-15 minutes. They are also known as "Rapid Diagnostic Tests" (RDTs). These tests are often used as an alternative to microscopy when reliable microscopic diagnosis is not readily available.

Blood Smear Exams (BMS) identify parasites on smears of peripheral blood. This remains the primary method for malaria diagnosis, which can detect the degree of parasitemia, the species of malaria and identify mixed infections.

Terminal Prophylaxis (Preventative treatment for the conclusion of employee assignments)

In addition to chemoprophylaxis, presumptive antirelapse therapy (also known as terminal prophylaxis) can be used towards the end of the exposure period to prevent any relapse or delayed-onset symptoms of malaria. Since the majority of the world where malaria is endemic (with the exception of the Caribbean) has at least one

species of relapsing malaria, travelers have a risk of contracting the P. vivax or P. ovale malaria strains, although the actual risk to the traveler is often difficult to determine. Terminal prophylaxis is generally only applied to travelers who have had a prolonged exposure in malaria-endemic areas.

Primaquine is the only FDA approved drug to help fight against hepatic parasites (hypnozoites) of the P. vivax and P. ovale malaria species. It is important to note this medication must not be given to glucose-6-phospahte dehydrogenase (G6PD) deficient individuals because of the risk of hemolytic anemia. Also, pregnant or breastfeeding women should not take primaquine since fetal G6PD status is still unknown. Consultation with a physician is required to receive a prescription for the appropriate Primaquine treatment.

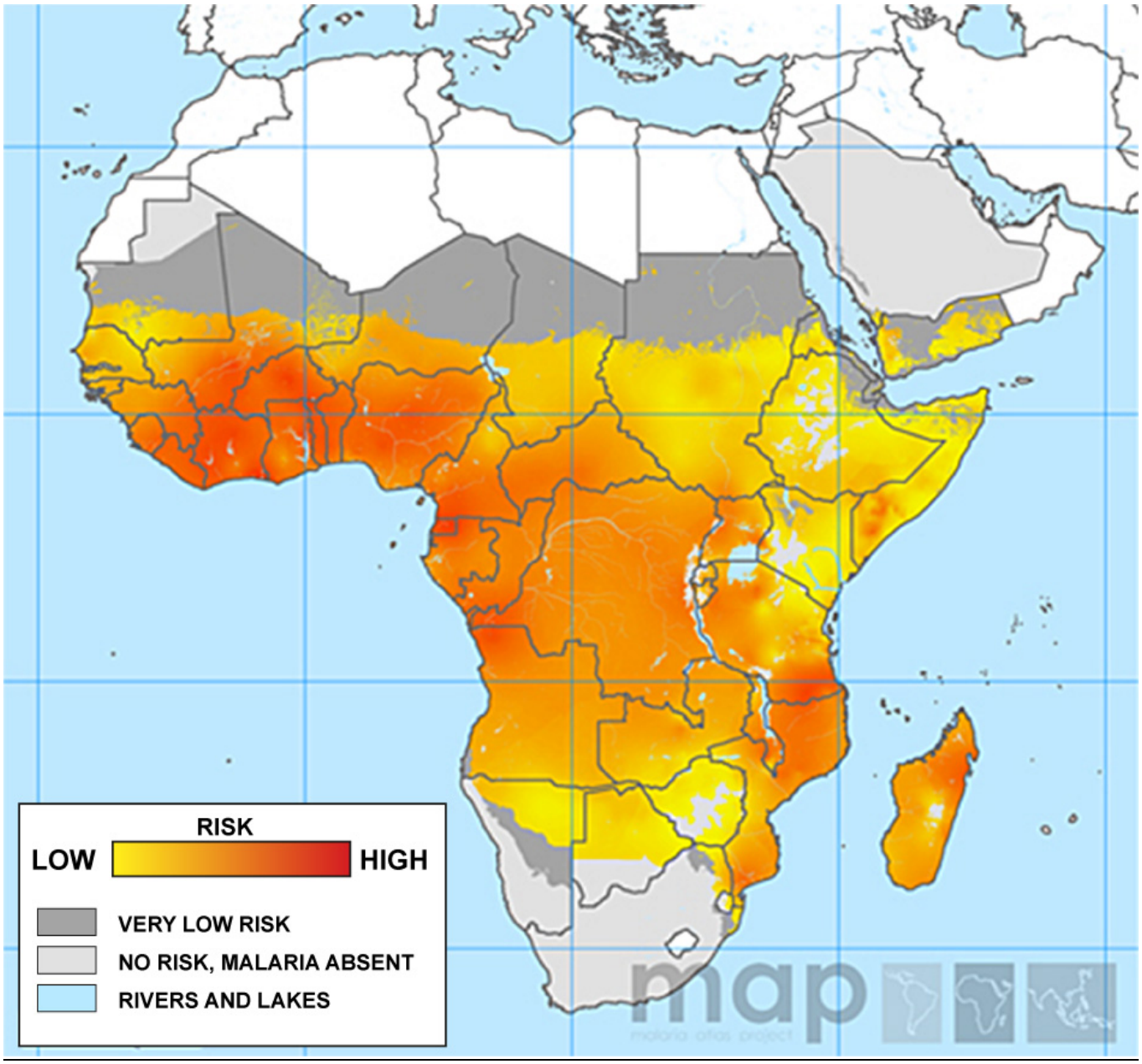
Taking Primaquine along with other antimalarial medication for asymptomatic patients after leaving an endemic area is known as presumptive anti-relapse therapy (PART). Terminal prophylaxis with primaquine is not required for personnel deployed shorter than 30 days and recommendations should be based on individual risk. Affected personnel will need a consultation with a physician in order to provide appropriate chemoprophylaxis and terminal prophylaxis treatment plan.

Affected Regions of Africa

The prevalence of malaria in Africa, particularly Sub-Saharan Africa, is primarily due to the tropical climate Africa experiences year round, where as other tropical areas in the world experience cool seasons. It's during these cool seasons where eradication is most effective since malaria parasites' life cycles take a longer time to produce and stop completely when temperatures reach below 16 degrees Celsius, which Africa does not experience. Extremely poor rural conditions and lack of resources are other factors that compound the issue of controlling malaria outbreaks and the implementation of effective methods for eradication.

In 2015, 89% of all new cases and 91% of deaths due to malaria occurred in sub-Saharan Africa. The most common strain of Malaria found in Africa is P. falciparum.

Risk of Contracting P. falciparum in Africa (2009)



Malaria-endemic countries in Africa

Summary

Malaria poses a significant risk to the health, safety and productivity of your personnel working in most areas of Africa. This risk can be mitigated to the greatest degree by educating and equipping your personnel prior to travel; preparing a detailed response plan for individuals believed to have contracted Malaria while in-country; and offering appropriate terminal prophylaxis for personnel at the conclusion of their assignments.

This information is provided as an information resource only, and is not to be used or relied on for any diagnostic or treatment purposes. This information is not intended to be patient education, does not create any patient-physician relationship, and should not be used as a substitute for professional diagnosis and treatment.

References

1. Division of Parasitic Diseases and Malaria. "Choosing a Drug to Prevent Malaria." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 9 Nov. 2012. Web. 01 Sept. 2016.
2. @unicefusa. "Preventing Malaria." *UNICEF USA*. US FUND For UNICEF, 1 Jan. 2016. Web. 30 Aug. 2016.
3. Arguin, Paul M., and Katherine R. Tan. "Chapter 3 Infectious Diseases Related to Travel." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 10 July 2015. Web. 02 Sept. 2016.
4. WHO 2016. "Fact Sheet about Malaria." *World Health Organization*. World Health Organization, 01 Mar. 2016. Web. 02 Sept. 2016.
5. Army Public Health Center. *Http://wrairwww.army.mil/Documents/TropMed/ArticlesandResources/TG336_MalariaFieldGuide.pdf*. Rep. no. APHC TG 336. Army Public Health Center, May 2016. Web. Aug.-Sept. 2016.

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