Multifocal Autochthonous Transmission of Malaria—Florida, 2003

THE MAJORITY OF MALARIA CASES DIAGNOSED in the United States are imported, usually by persons traveling from areas where malaria is endemic.1 However, small outbreaks of locally acquired mosquito-borne malaria continue to occur.2–4 During July-September 2003, an outbreak of malaria (eight cases of Plasmodium vivax malaria) occurred in Palm Beach County, Florida.5 During the same period, two patients were evaluated for malaria in neighboring Okeechobee County, approximately 75 miles from the Palm Beach County transmission area. One patient was thought to have acquired infection with the same parasite species (P. vivax), and concerns were raised about a possible link. To determine whether infection was acquired in Okeechobee County and whether a possible link existed to the Palm Beach County transmission area, one patient reported travel to the Palm Beach County transmission area, the other patient visited the area. In addition, blood smear microscopy and testing confirmed the case as imported malaria. These findings underscore the importance of a rapid and thorough investigation of any malaria case suspected to be acquired through local mosquito-borne transmission.

In August 2003, two men were evaluated for malaria at an Okeechobee County clinic after 4 days of fever, chills, myalgias, fatigue, nausea, and headache. The first patient was a native of Uganda (patient 1) who had arrived in the United States 2 months before onset of symptoms; the second patient was a U.S.-born Florida resident (patient 2) with no recent foreign travel to areas where malaria is endemic or other risk factors for malaria. Both patients were treated presumptively for symptoms with doxycycline and diclofenac, and thick and thin blood smears were obtained for testing. A private laboratory identified P. vivax on the smear from patient 1; no malaria parasites were identified on the smear from patient 2. Because of increased malaria awareness from the Palm Beach County outbreak, smears for both patients were forwarded to the Florida State Laboratory (FSL) and CDC for confirmation.

After microscopic examination of both smears, FSL and CDC observed that the smears had been prepared poorly. However, malaria parasites were confirmed on the smear labeled as collected from patient 2 rather than patient 1, and P. vivax was identified as the most likely species. Because neither patient reported travel to the Palm Beach County transmission area, investigators considered the possibility of local mosquito-borne transmission in Okeechobee County.

Discrepancies in the smear results reported by the private laboratory, FSL, and CDC prompted investigators to suspect the smears were switched en route to FSL. An audit was conducted to trace the positive smear to the correct patient. In addition, blood smear microscopy, serology, and polymerase chain reaction (PCR) were conducted on specimens drawn from both patients after treatment was started. The audit revealed that the positive smear originated from patient 1. No evidence of previous or current infection was confirmed in specimens for patient 2. For patient 1, serology confirmed either previous or recent infection with malaria, and PCR revealed current infection with P. ovale, not P. vivax. These conflicting results prompted a review of the original microscopic diagnosis of P. vivax. Because whole blood specimens from the original positive smear were not available, PCR analysis of material scraped from the original positive blood smear confirmed infection with P. ovale as the diagnosis for patient 1.

In September, additional case finding was initiated to determine whether local mosquito-borne transmission occurred in Okeechobee County. Medical charts were reviewed for 232 patients with unexplained febrile illness during the 2 weeks before symptom onset for patients 1 and 2; no other cases of malaria were found. After P. ovale was identified in patient 1, whose only risk factor was recent travel to malaria-endemic Uganda, investigators concluded this was a case of imported malaria, and measures to control local transmission of malaria were decreased. Patient 1 received additional treatment with primaquine to prevent relapse of P. ovale. Education materials about recognizing symptoms of malaria and preventing mosquito-borne diseases were distributed to neighbors of patient 1. Patient 2 recovered from his symptoms without further treatment, and a nonspecific viral syndrome was diagnosed.

During September-October, Okeechobee County physicians continued to evaluate patients with febrile illness for malaria; no additional cases were found. Mosquito trapping and testing in the county confirmed the presence of competent vectors (Anopheles sp.), but no mosquitoes tested positive for malaria.

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tests. Local and state health officials should recognize that a patient who has malaria with no risk factors for malaria should be considered to have acquired the infection locally through mosquito-borne transmission until proven otherwise and investigated immediately.

REFERENCES


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Neural tube defects (NTDs) are serious birth defects of the spine (e.g., spina bifida) and the brain (e.g., anencephaly) that occur during early pregnancy, often before a woman knows she is pregnant; 50%-70% of these defects can be prevented if a woman consumes sufficient folic acid daily before conception and throughout the first trimester of her pregnancy. In 1992, to reduce the number of cases of spina bifida and other NTDs, the U.S. Public Health Service (USPHS) recommended that all women capable of becoming pregnant should follow the USPHS recommendation and consume 400 µg of folic acid daily. Three approaches to increase folic acid consumption were cited: (1) improve dietary habits, (2) fortify foods with folic acid, and (3) use dietary supplements containing folic acid. Mandatory fortification of cereal grain products went into effect in January 1996; during October 1998–December 1999, the reported prevalence of spina bifida declined 31%, and the prevalence of anencephaly declined 16%. Other studies have indicated similar trends. To update the estimated numbers of NTD-affected pregnancies and births, CDC recently analyzed data from 23 population-based surveillance systems that include prenatal ascertainment of these birth defects. This report summarizes the results of that analysis, which indicate that the estimated number of NTD-affected pregnancies in the United States declined from 4,000 in 1995-1996 to 3,000 in 1999-2000. This decline in NTD-affected pregnancies highlights the partial success of the U.S. folic acid fortification program as a public health strategy. To reduce further the number of NTD-affected pregnancies, all women capable of becoming pregnant should follow the USPHS recommendation and consume 400 µg of folic acid every day.

The numbers of annual NTD-affected birth defects were calculated from a 24-month prefortification period (1995-1996) and a 24-month postfortification period (1999-2000). To calculate the number of NTD-affected pregnancies (including live births, stillbirths, fetal deaths, and elective terminations), CDC estimated prevalence for spina bifida and anencephaly obtained from eight population-based surveillance systems that collect data systematically from sources that perform diagnostic prenatal ultrasounds as part of their surveillance programs. The numbers of spina bifida–affected pregnancies and anencephaly-affected pregnancies were calculated separately and then added together to provide an estimated total of NTD-affected pregnancies. Because the eight systems did not separate prenatally ascertainment of these birth defects. The number of NTD-affected births were calculated from a 24-month prefortification period (1995-1996) and a 24-month postfortification period (1999-2000). To calculate the number of NTD-affected births, CDC recently analyzed data from 23 population-based surveillance systems that include prenatal ascertainment of these birth defects. This report summarizes the results of that analysis, which indicate that the estimated number of NTD-affected births in the United States declined from 4,000 in 1995-1996 to 3,000 in 1999-2000. This decline in NTD-affected births highlights the partial success of the U.S. folic acid fortification program as a public health strategy. To reduce further the number of NTD-affected births, all women capable of becoming pregnant should follow the USPHS recommendation and consume 400 µg of folic acid every day.

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