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Malaria imported into Réunion Island: is there a risk of re-emergence of the disease?

E. D'Ortenzio[a,*], D. Sissoko[a], J.S. Dehecq[b], P. Renault[a], L. Filleul[a]

[a] Regional office (Cire Réunion-Mayotte) of the French Institute for Public Health Surveillance (Institut de veille sanitaire, InVS), Réunion, France
[b] Vector control team, Regional office for sanitary and social services (DRASS), Réunion, France

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ABSTRACT

After a long period of endemicity until the 1950s, the World Health Organization considered autochthonous malaria eliminated from Réunion in 1979. To prevent secondary transmission and re-emergence of autochthonous malaria, permanent epidemiologic and entomological surveillance and vector control measures are conducted.

The objective of this study is to report sociodemographic characteristics of imported malaria patients and incidence rates from 2003–2008 using mandatory notification with the aim of identifying risk groups and destinations.

During this period, 684 imported malaria cases were reported. Median age of patients was 34.4 years and 22.1% were children ≤ 15 years. Men represented 67.7% of cases and 59.1% of patients reported having taken chemoprophylaxis based on chloroquine alone. Incidence of malaria was considerably different by country destination. For Comoros, incidence was stable and high during the period accounting for 1481 cases per 100 000 travels in 2008. The rate was lower for travels to Madagascar, South Africa and Mayotte and decreased over the period to 37, 19 and 3 per 100 000 respectively, by 2008.

To avoid re-emergence of malaria on the island and to protect themselves, travelers should reduce their risks of acquisition and importation of parasites by using adequate preventive measures. A special preventive program and social mobilisation should be a priority, essentially for the Comorian community in Réunion.

1. Introduction

Malaria is currently endemic in over 100 countries, which are visited by more than 125 million international travelers every year, including 30 000 reporting to contract malaria after returning home.[1] International travelers from non-endemic areas are at high risk of malaria and its consequences because they lack immunity. Immigrants from endemic areas who return to their country of origin to visit friends and relatives (VFR) have a higher risk of malaria transmission than other travelers probably due to a higher risk of exposure or insufficient protection measures.[2] Migrants VFRs may also be more exposed as they visit their families in rural areas with higher malaria transmission rates.[2] Nevertheless, a persistence of acquired immunity to *Plasmodium falciparum* malaria after several years of non-exposure in African immigrants has been described and probably protects them against severe illness.[3]

Réunion island, a French overseas territory with 810 000 inabitants, is located in the south-west Indian Ocean, 700 km east of Madagascar and 1500 km south-east of Comoros archipelago (including the Union of the Comoros (Grande Comore, Moheli and Anjouan) and Mayotte which remains a French territory).

In Réunion Island, malaria had been endemic for more than a century after a probable introduction of parasites by

* Corresponding author. Tel.: +262 262 939 458; fax: +262 262 939 457.
E-mail address: eric.dortenzio@sante.gouv.fr (E. D'Ortenzio).

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infected slaves from Madagascar and Eastern Africa during the nineteenth century.[4] The first documented outbreak of malaria occurred on the east coast in 1868, followed by several others over the next 10 years.[5] After a long period of endemicity until the 1950s, the World Health Organization (WHO) considered autochthonous malaria eliminated from Réunion in 1979,[6] following improvement of housing infrastructure and intensive control measures, including vector control focused on house spraying with long term insecticides and repetitive antimalarial drug treatment.[7] Nevertheless, *Plasmodium* continues to be imported on to the island by infected travelers returning from neighbouring endemic malaria countries. Furthermore, a specific competent vector for *Plasmodium*, *Anopheles arabiensis*, is widespread in most areas of the island.[8,9] To prevent secondary transmission from someone returning with malaria, and re-emergence of autochthonous malaria, permanent epidemiologic and entomological surveillance and vector control measures are conducted.[10] Incidence rates of imported malaria by country destination are unknown in Réunion. The objective of this study is to report sociodemographic characteristics of imported malaria patients and incidence rates from 2003–2008 using mandatory notification with the aim of identifying at-risk groups and destinations. This could assist physicians and public health authorities in advising travelers, to protect them from malaria and to minimize the risk of re-emergence of autochthonous malaria in Réunion.

2. Methods

Malaria (imported and autochthonous) has been a notifiable disease in Réunion Island since 1979. The passive malaria surveillance system relies on the notification by clinicians and biologists to Local Public Health Authorities (LPHA). This notification was complemented by an enhanced questionnaire that provides individual details on socio-demographic characteristics, travel history, prophylaxis and illness since 2003. The case definition of imported malaria, which remained unchanged over the study period, was parasitologically confirmed malaria that had been acquired in an endemic area by a traveler who was diagnosed in Réunion, non-endemic area. Malaria imported into Réunion Island is both from residents returning from malaria endemic areas and non-resident individuals infected with malaria visiting the island either as tourists or on business. We provided the total number of cases of malaria annually reported to LPHA during the years 1979–2008. For the purpose of this study, annual data on airline passenger numbers at departure from Réunion to each of the malaria endemic countries as defined by the WHO[1] were obtained from the Chambre de Commerce et d'Industrie of Réunion (CCIR) for the period 2003–2008. Réunion has direct flights to the following malaria endemic territories: Madagascar, Grande Comore, Mayotte and South Africa. The incidence rate of imported malaria cases was defined as the number of travelers (resident and non-resident of Réunion Island) who visited malarious countries in the south west Indian Ocean divided by the number of malaria cases diagnosed on Réunion Island. Denominator data did not account for time spent in the malaria-transmission area. Patients' characteristics, between 1 January 2003 and 31 December 2008, were described. Because of the considerable difference in incidences between malarious travelers returning from Comoros and those arriving from other countries, we compared epidemiologic characteristics in these two groups, using Stata 9.0 for data analysis (StataCorp LP, College Station, TX, USA). Differences between two proportions were analysed by χ^2 test or Fisher's exact test when appropriate.

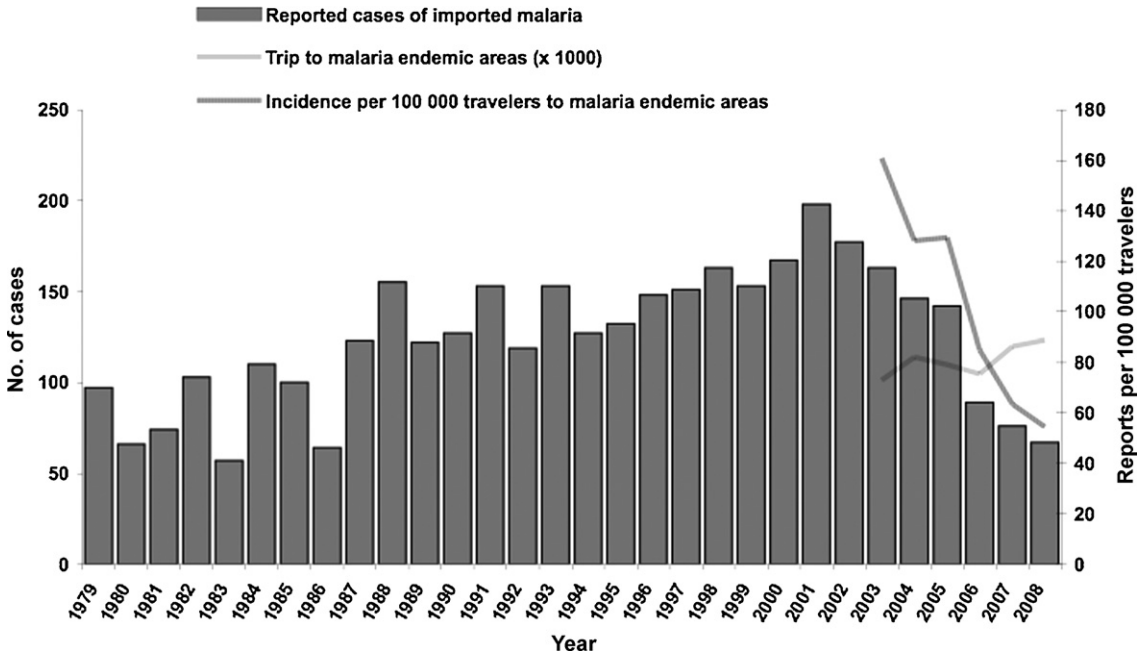

Figure 1. Number of malaria cases and incidence of imported malaria in travelers diagnosed on Réunion Island from 1979 to 2008.