

Emerging Diseases 2019: Epidemiological profile of imported malaria in Morocco between 2011 and 2016 - Houda Moumni Abdou - Ministry of Health

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Malaria remains a problem for many countries classified as malaria free through cases coming from endemic regions. Imported cases to non-endemic countries often result in delays in treatment, are expensive to treat, and can sometimes cause secondary local transmission. The movement of malaria in endemic countries has also contributed to the spread of drug resistance and threatens long-term eradication goals. Here we focused on quantifying the international movements of malaria to improve our understanding of these phenomena and facilitate the design of mitigation strategies.

Malaria remains a major public health problem and a real threat to global health. According to WHO in 2015, there was an estimate of 212 million malaria cases with 429,000 deaths worldwide. This disease is endemic in tropical and subtropical countries with a high risk for travelers. Morocco was certified in 2010 by WHO as free from endemic malaria transmission. Nevertheless, an increasing number of imported cases are reported each year. Thus, we studied its epidemiological characteristics to determine its trends and to guide recommendations for its control.

A retrospective descriptive study was conducted on reported cases from the surveillance system of parasitic diseases at the Directorate of Epidemiology and Disease Control between 2011 and 2016. Frequencies and proportions were calculated on socio-demographics data and trends. Our records showed a total of 2422 imported malaria cases including 26 deaths. The 3-year moving average reveals a slight constant trend increase (2%). Imported malaria was predominant among Moroccans (82.3%) than foreigners (17.7%). Males were over represented with a sex ratio of 12.2:1. The disease was reported by both civilian and military sectors (56% versus 44%). The median age was 32 years (range: 1 to 80). Outside the military, workers accounted for 48.6%, students 17% and the truckers 11.5%. *Plasmodium falciparum* was predominant (66%). Almost all of cases (96%) came from African countries. In 54% of cases, chemoprophylaxis was not taken by travelers.

Imported malaria is an important cause of morbidity and mortality. Prevention strategies for travelers need to be strengthened in order to educate them on the need for prophylaxis and the importance of preventive measures. In addition, targeting high-risk groups and strengthening

continuous education training for clinicians would significantly reduce the risk of imported malaria in Morocco.

Since the elimination of the autochthonous malaria in Morocco in 2010, the control of imported malaria, based on epidemiological monitoring of the parasite carriers and on vector control, is a priority. This retrospective study is focused on imported malaria cases identified by optical microscopy at the Laboratory of Public Health in Marrakesh, Morocco, from 1996 to 2016. 208 cases were observed. Males accounted for 89% of cases. The cases were imported from 24 African countries, especially from Equatorial Guinea (28%), Guinea Conakry (11%), Ivory Coast (9%), Burkina Faso (8%) and Mali (7%). The highest incidence was recorded in 2012 and 2014 with 32 cases each. *Plasmodium falciparum* was the most frequent parasite (85%) followed by *Plasmodium ovale* (12%), while lower rates were detected for *Plasmodium malariae* (3 cases) and *Plasmodium vivax* (2 cases). Increasing malaria cases have been recorded since 1996. This may be related to Morocco's openness to the sub-Saharan Africa with an increase in international travels and migration flow from malaria endemic countries. To keep the status of autochthonous malaria free country, since 2011 the Ministry of Health has developed and implemented a strategy adapted to Moroccan context, to maintain malaria elimination and prevent its reintroduction.

Information about imported malaria is to an extent captured by national authorities where, for most high-income countries, malaria is a notifiable disease. Such deficiencies have prompted the initiation of surveillance networks such as GeoSentinel and EuroTravNet, which now play a key part in the surveillance of imported malaria, in the identification of changing trends in malaria importation, in tracking drug-resistance patterns, and in establishing the changing profile of malaria risk at traveller destinations. Nevertheless, nationally reported data continue to be widely collected and still provide valuable information about the trends, composition, and drivers of imported malaria for most non-endemic countries, with annual data compilations and analyses of statistics providing the main source of information guiding national policies on imported malaria. However, a contemporary global assembly of such nationally reported data, and assessment of patterns and variations has not previously been undertaken.