Malaria surveillance in Italy: the 2000-2008 national pattern of imported cases

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Summary - The present study analyzes the trend of the imported malaria cases in Italy in the period 2000-2008, focusing on the changes in epidemiological features occurring in Italian and foreigners, in particular in settled-immigrants visiting relatives and friends (VRFs). According to other studies carried out in EU countries, this group is the most at risk of contracting malaria, being often unaware to have lost their transient immunity. Malaria cases recorded by the Ministry of Health and confirmed by the Istituto Superiore di Sanità were analyzed, using dedicated software. In the study period a constant decrease of the imported malaria cases was observed in both groups. In details, among Italians the reduction was 60%, while among foreigners was 33%. The mortality remains quite stable and always below the average of the other European countries. However, the risk of contracting malaria, in particular *P. falciparum* malaria (83% of the total cases) still remains very high in particular for people visiting African countries (93% of cases).

Key words: Imported malaria, Italy, Epidemiology, Malaria incidence, Travel medicine

BACKGROUND

Malaria still represents the commonest imported disease into Italy, as well as into the other European countries (WHO-CISID web site; Boccolini *et al.*, 2007; Jelinek, 2008). In this last decade the Italian National Health Service (NHS) has increased its efforts to promote the awareness of travelers to malaria endemic countries about the risk of this infection, giving them up-to-date information on new effective prophylaxis drugs. In our country, since the eradication in the early 1950's, malaria is a mandatory reportable disease. The Ministry of Health (MoH) and the Istituto Superiore di Sanità (ISS), the Italian National Health Institute, are in charge of a surveillance system that provides diagnosis confirmation and a continuous outline of the epidemiological situation and, in case of necessity, an appropriate prevention and vector control intervention plan. In Italy, imported cases of malaria reached the peak of more than 1,000 in 1999 (Romi *et al.*, 2001). Since then the total number of reported cases among both Italians and foreigners has been declining (Boccolini *et al.*, 2007a). Nevertheless this disease still remains the main health threat for people travelling tropical and sub-tropical countries, in particular for settled-immigrants travellers, visiting relatives and friends (VRFs). The present study analyzes the trend of the imported cases in the period 2000-2008, with particular reference to the changes in epidemiological features occurring in Italian and settled-immigrant groups.

METHODS

The 2000-2008 malaria cases recorded by the MoH (Department for Health Prevention, Section Infectious Diseases and International Prophylaxis), from the Local Health Units of the NHS, and microscopically confirmed by the ISS (Malaria Unit, Department of Infectious, Parasitic and Immune-Mediated Diseases) were analyzed, using *ad hoc* software. Malaria cases have been classified by origin following the World Health Organization terminology (World Health Organization, 1963).

RESULTS

In the study period the number of reported malaria cases reached a total 6,377. Among these nine were autochthonous cases originated by accidental events as transfusion (N=1), transplantation (N=1), nosocomial (N=4) or baggage malaria (N=3) (Moro *et al.*,

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2002; Zamparo *et al.*, 2005; Menichetti *et al.*, 2006). 6,368 cases were imported, 1,749 (27.5%) occurred in Italian citizen and 4,619 (72.5%) in foreigners, more than 80% of which occurred in settled-immigrant group (Tab. 1). From 2000 to 2008, imported malaria cases dropped from 977 to 583 respectively, with a total reduction of about 40%. In details, among Italians the reduction was 60%, while among settled-immigrants was 33% (Fig. 1).

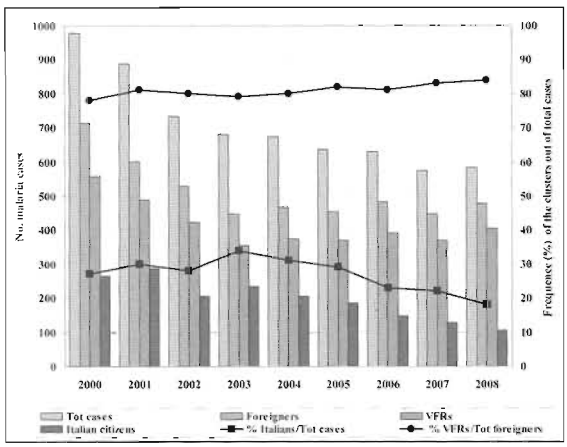

Figure 1 – Trend of imported malaria cases in Italy in 2000-2008. Dark grey columns represent settled-immigrants (VRFs) out of the foreigner cases (medium grey columns). The square black line shows the declining rate of Italians within the total cases; the round black line shows the rate of VFRs out of foreigner total number (right axe).

Most of the total cases were contracted in Africa (93%). In particular, as shown in previous studies (Romi *et al.*, 2001a; Boccolini *et al.*, 2007; 2007a), the majority of cases among foreigners (89.5%) originated from Western African countries, being Nigeria, Ghana, Ivory Coast, Burkina Faso, Senegal and Cameroun the countries mainly involved (Tab. 2). *Plasmodium falciparum* was the etiological agent in 83% of the total cases and 82% of these contracted in Africa, *P vivax*, responsible in average for 8.4% of the total infections reported, is predominant outside Africa, (76%, 87% and 85% in Asia, Central-South America and Papua New Guinea respectively). *P. ovale* was responsible of 6.5% of the total cases and *P. malariae* of about 1.6%, most of which (>95%) contracted in Africa for both species. Mixed infection were 22, 21 of which arose from Africa and one from Asia (*P.f.+P.v.*). Twenty-seven deaths, due to *P. falciparum*, occurred in the study period, corresponding to an annual average fatality rate of 0.5% (Tab. 1). A marked difference of fatality rate between the population group of Italians (about 1.6%) and foreigners (0.2%) was also recorded (Fig. 2).

DISCUSSION

In Italy in 2000-2008 a constant decrease of the imported malaria cases was observed, both in Italians and settled-immigrant groups. The mortality remains quite stable and always below the average

Table 2 – Imported malaria cases in Italy (2000-2008) in immigrants visited Africa. Cases are detailed by main visited West Africa (W.A.) countries.

Cases from Africa 4,411 (95.5%) Cases from West African Countries 3,946 (89.5%)	
Nigeria	1,047
Ghana	811
Senegal	800
Ivory Coast	499
B. Faso	327
Cameroun	228
Other W.A. Countries	234

Table 1 – General features of imported malaria in Italy 2000-2008. In brackets the relative frequencies (%) by nationality with respect to the total reported cases.

Features	Total cases	Italians	Foreigners
Malaria cases	6,377	1,756	4,621
Autochthonous	9	7	2
Imported	6,368	1,749 (27.5%)	4,619 (72.5%)
P. falciparum	5,301 (83.1%)	1,284 (73.1%)	4,017 (87.0%)
P. vivax	536 (8.4)	284 (16.2)	252 (5.5)
P. ovale	413 (6.5)	153 (8.7)	260 (5.6)
P. malariae	105 (1.6)	31 (1.8)	74 (1.6)
Mixed infections	22 (0.3)	4 (0.2)	18 (0.4)
*Africa	5,922 (93.0%)	1,511 (86.4%)	4,411 (95.5%)
Asia	296 (4.6)	142 (8.1)	154 (3.3)
C.S. America	123 (1.9)	71 (4.1)	52 (1.1)
Oceania (Pap.NG)	27 (0.4)	25 (1.4)	2 (0.04)
Deaths	27	20	7
P.f. fatality rate	0.51%	1.56%	0.20%

*autochthonous cases (N=9) not considered

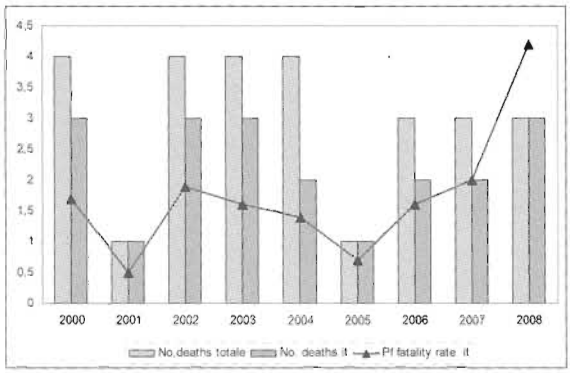

Figure 2 – Number of total deaths and deaths occurred in Italians in 2000-2008 (histograms). Line indicates *Plasmodium falciparum* fatality rate in Italian travellers (right axis).

of the other European countries (WHO-CISID web site; Jelinek, 2008). Nevertheless the risk of contracting malaria, in particular *P. falciparum* malaria, is very high for people visiting African countries. According to other studies carried out in EU countries (Schlagenhauf *et al.*, 2003; Angell and Behrens, 2005; Askling *et al.*, 2005), also in Italy, malaria continues to be a challenge in the population group of VRFs that are often unaware to have lost their transient immunity. In Italy the main source of settled-immigrants is represented by people from African "French speaking" countries, as already recorded in the previous decade (Romi *et al.*, 2001a). The entity of this population is constantly rising up, representing only 15% of the imported malaria cases among non Italian citizens in the last decade of the 1900's (being predominant at time immigrants at the first entry in Italy) versus more than 75% in the study period (Boccolini *et al.*, 2007a). Low use of prophylaxis in this population is of major concern for Italian Health Authorities especially in light of recent high rates of severe malaria (Jelinek, 2008). Primary care physicians play an important role in pre-travel advice to prevent the complications of malaria (Bisoffi *et al.*, 2003; Lehky, 2005; Lalloo and Hill, 2008; Schlagenhauf and Petersen, 2008). Further efforts are needed to educate travelers, in particular settled-immigrants, about the need for prophylaxis and other protection measures when visiting tropical and sub-tropical countries endemic for malaria.

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