Public Health England

Protecting and improving the nation's health

Malaria imported into the United Kingdom: 2018

Implications for those advising travellers

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Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: @PHE_uk
Facebook: www.facebook.com/PublicHealthEngland

Prepared by: Travel Health and IHR
For queries relating to this document, please contact: travelhealth@phe.gov.uk

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Introduction

Malaria is a serious and potentially life threatening febrile illness caused by infection with the protozoan parasite, Plasmodium. It is transmitted to humans by the bite of the female Anopheles mosquito in tropical and subtropical regions of the world. There are 5 species of Plasmodium that infect humans: P. falciparum (responsible for the most severe form of malaria and the most deaths), P. vivax, P. ovale, P. malariae and P. knowlesi.

Malaria does not currently occur naturally in the UK but travel-associated cases are reported in those who have returned to the UK or arrived (either as a visitor or migrant to the UK) from malaria-endemic areas.

More information about malaria is available at:

https://www.gov.uk/government/collections/malaria-guidance-data-and-analysis

Methodology

This report presents data on malaria imported into the United Kingdom (UK) in 2018, mostly based on figures reported to the Public Health England (PHE) Malaria Reference Laboratory (MRL).

Although the MRL dataset is the most complete source of information about malaria available in the UK, and one of the most complete internationally, a capture-recapture study estimated that the MRL surveillance system captured only 56% of cases in England (66% for Plasmodium falciparum and 62% for London cases) [1]. Furthermore, some of the epidemiological information is incomplete [2].

Malaria surveillance data are used to inform the UK malaria prevention strategy [3] so it is essential that the data are as complete as possible. Since 2013, the PHE Travel and Migrant Health Section has further improved the quality of this dataset by ensuring any cases that have been reported in the PHE public health case management database (HPZone) are also included in the final dataset as well as supplementing epidemiological information, where available, from HPZone. This means that data reported from 2013 onwards may not be directly comparable with previous reports, although any differences are thought to be very small.

Malaria is a notifiable disease and clinical and laboratory staff are obligated under law to notify cases to their Proper Officer [4]. However, in 2018, only 11% of malaria cases reported to MRL were officially notified (provisional data) [5]. Clinical and laboratory staff are therefore reminded of the need to notify cases to the designated local public health authority and to report all cases to the PHE MRL; a form for this purpose is available at:

https://www.gov.uk/guidance/mrl-reference-diagnostic-and-advisory-services.

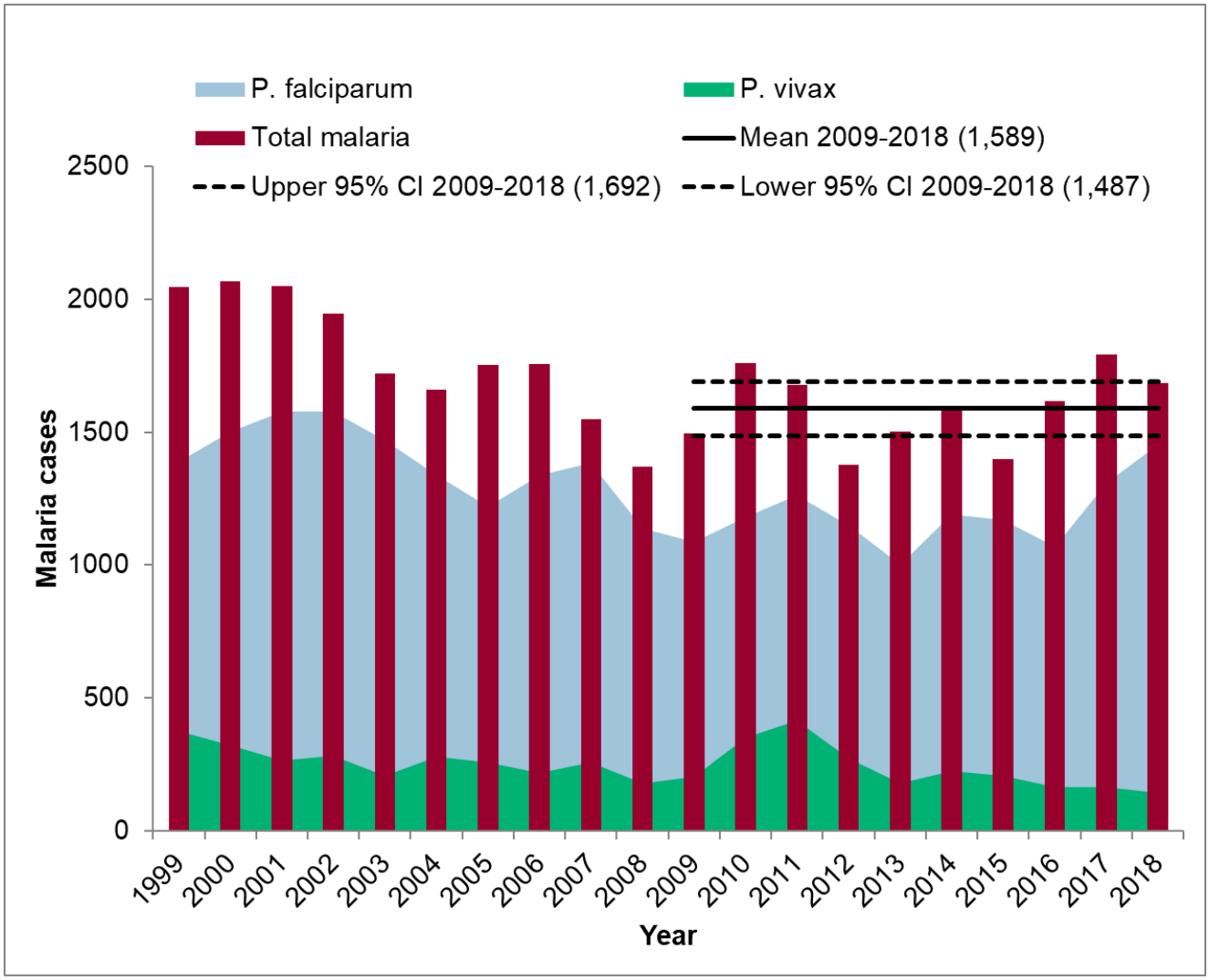
For more details on methods of MRL data collection, please refer to reference [6].

Data analysis for this report was conducted by PHE Travel Health and IHR and colleagues at MRL have reviewed and approved the report. For the purpose of the analysis, the United Nations regions were used to assign region of travel and each region was assigned based on the stated country of travel [6].

General trend

In 2018, 1,683 cases of imported malaria were reported in the UK (1,597 in England, 52 in Scotland, 23 in Wales and 11 in Northern Ireland), 6.1% lower than reported in 2017 (N=1,792) and 5.9% above the mean number of 1,589 cases reported between 2009 and 2018 [Figure 1].

Figure 1. Cases of malaria in the United Kingdom: 1999 to 2018



In the 10 years between 2009 and 2018, the total number of malaria cases reported in the UK each year has fluctuated around a mean of 1,589 (95% CI: 1,487-1,692), which is lower than the mean for the previous 10 years (1,792, 95% CI: 1,625-1,960). While the number of malaria cases in recent years has decreased, indicative data suggests that worldwide travel from or to the UK is increasing*.

* Data trends obtained from the International Passenger Survey from the Office of National Statistics

The great majority of cases in 2018 were caused by P. falciparum, which is consistent with previous years, and although the total number of cases caused by P. falciparum decreased compared to 2017, the proportion of the total number of cases remained stable. The proportion of cases caused by P. vivax and P. ovale also remained similar over the 2 years, with the proportion of cases caused by P. vivax decreasing slightly in 2018 [Table 1].

Table 1. Malaria cases in the UK by species: 2018 and 2017

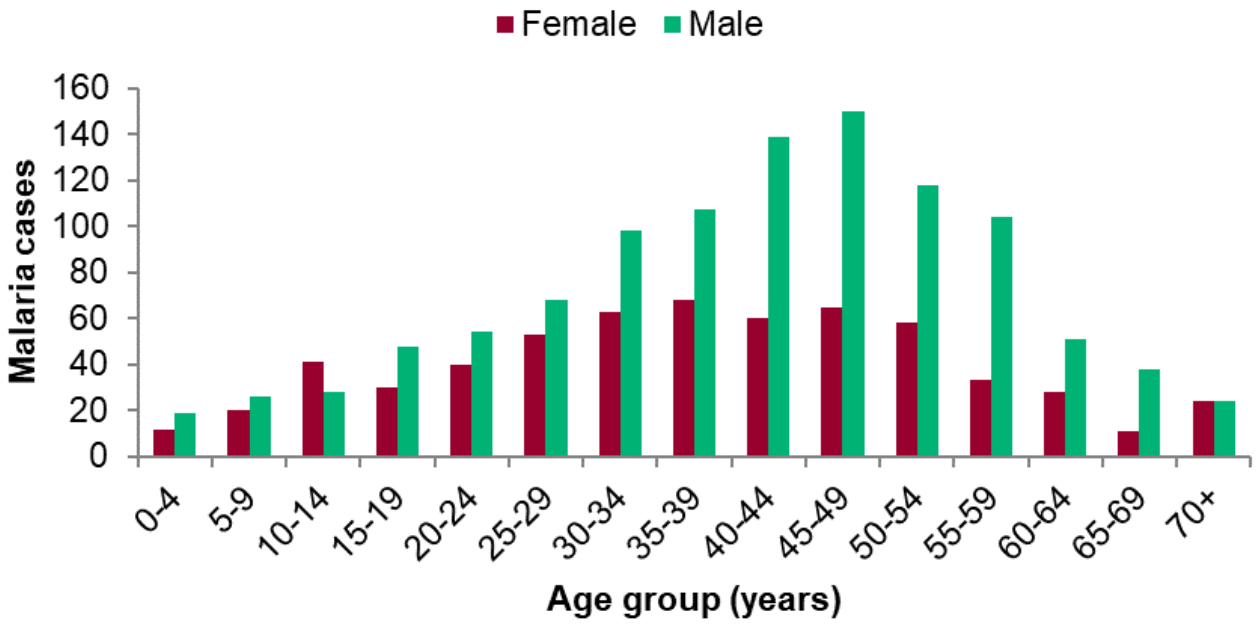
Malaria parasite	Cases (% of total)	
	2018	2017
P. falciparum	1,375 (81.7%)	1,452 (81.0%)
P. vivax	143 (8.5%)	164 (9.2%)
P. ovale	117 (7.0%)	108 (6.0%)
P. malariae	36 (2.1%)	55 (3.1%)
Mixed infection	9 (0.5%)	11 (0.6%)
P. knowlesi	2 (0.1%)	2 (0.1%)
Unspecified	1 (<0.1%)	0 (0.0%)
Total	1683	1792

There were 6 deaths from malaria reported in 2018, the same number as in 2017, 2016 and 2015. These were from falciparum malaria acquired in Western Africa (3), Middle Africa (1), and Africa unspecified (1), with travel region not stated for 1 case. There is usually a small variation in the number of deaths from malaria in the UK every year but the total for 2018 is in line with the annual average of 6 over the last 10 years. The number of deaths from vivax malaria in any year is very low (usually zero). PHE MRL data over 27 years were combined and demonstrated that older age is a major risk factor for both falciparum malaria and severe vivax, with all vivax deaths occurring in those aged over 50 years [8] [9]. During the period 2000 to 2018, the median age of those who died from falciparum malaria was 49 years, reflecting the relatively younger age profile of cases.

Age and sex

Age and sex were known for 1,678/1,683 cases of malaria. Of these, the majority (64%, 1,072/1,678) were male – consistent with previous years. Males were most common in all age groups apart from children aged between 10 and 14, where females were most common, and those aged over 70, where there were equal numbers of males and females. The median age was 43 years old for males and 38 for females. Children aged less than 18 years old accounted for 11% (188) of all cases with known age and sex.

Figure 2. Cases of malaria in the United Kingdom by age and sex: 2018 (N=1,678)



Geographical distribution

London continues to report the largest proportion of cases in England (816/1,597, 51%) with a 3% decrease in cases compared to 2017, consistent with the national decrease. Of note is the 23% and 29% decrease in cases compared to 2017 reported in the South East and South West respectively, as well as the 27% increase in the North East compared to 2016 [Table 2].

Table 2: Cases of malaria in the United Kingdom by geographical distribution, 2018 and 2017

Geographical area (PHE Centre)	2018	2017	% change
London	816	922	-11%
West Midlands	161	161	0%
South East	120	155	-23%
North West	137	128	7%
East of England	134	114	18%
Yorkshire and Humber	89	79	13%
South West	52	73	-29%
East Midlands	55	50	10%
North East	33	26	27%
England – total	1,597	1,708	-6%
Scotland	52	50	4%
Wales	23	24	-4%
Northern Ireland	11	10	10%
UK total	1,683	1,792	-6%

Travel history and ethnic origin

Of those with information available on travel history, reason for travel and/or country of residence (1,591/1,683, 95%), the majority of malaria cases were due to residents of the UK travelling abroad from the UK (1,098/1,591, 69%). Cases that travelled abroad from the UK included:

- travel for holiday
- business/professional
- civilian/air crew
- children visiting parents abroad
- armed forces
- visiting friends and relatives (VFR)

The remaining cases were in new entrants to the UK (also includes UK citizens living abroad and foreign students) accounting for 9% (139/1,591) and foreign visitors to the UK accounting for 5% (74/1,591).

Of the 6 deaths reported, where information on ethnicity was available, 2 were of Black African ethnicity, 1 was of White British ethnicity and 1 was of Black Caribbean ethnicity. 5 of these cases had known travel history, of which all 5 cases reported travelling abroad from the UK.

Of the 1,098 cases that travelled abroad from the UK, reason for travel was known for 925 (84%). Of these, 783/925 (85%) had visited family in their country of origin (also known as visiting friends and relatives, or VFR travellers), 85/925 (9%) travelled for business (including armed forces and civilian air crew) and 57/925 (6%) travelled for a holiday.

Country/region of birth for cases that travelled abroad from the UK

Country or region of birth information was known for 705 (64%) of 1,098 cases that travelled abroad from the UK, of which over two-thirds were born in Africa [Figure 3].

Figure 3. Region of birth for malaria cases who travelled abroad from UK: 2018 (N=705)

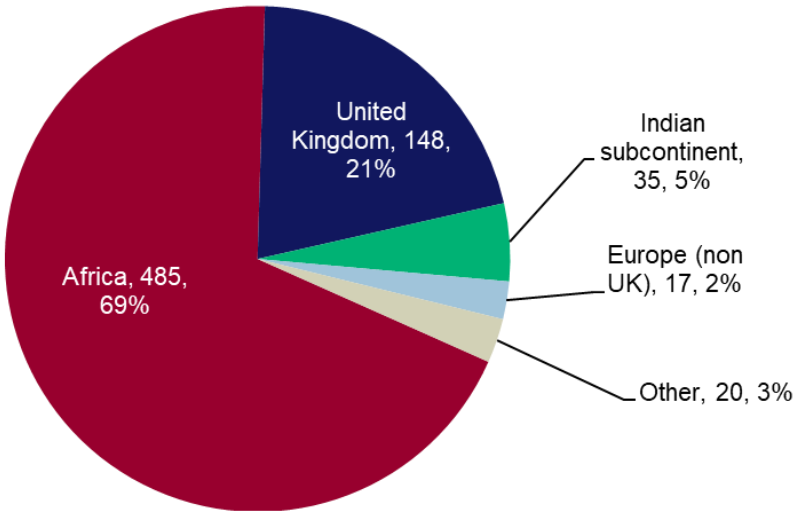


Table 3. Malaria cases who travelled abroad from the UK by region of birth and proportion of VFR travellers: 2018 (N=649)

Region of birth	N*	VFR**	% VFR
Africa	448	438	98%
Europe – UK	137	59	43%
Indian subcontinent***	30	30	100%
Other****	34	22	65%

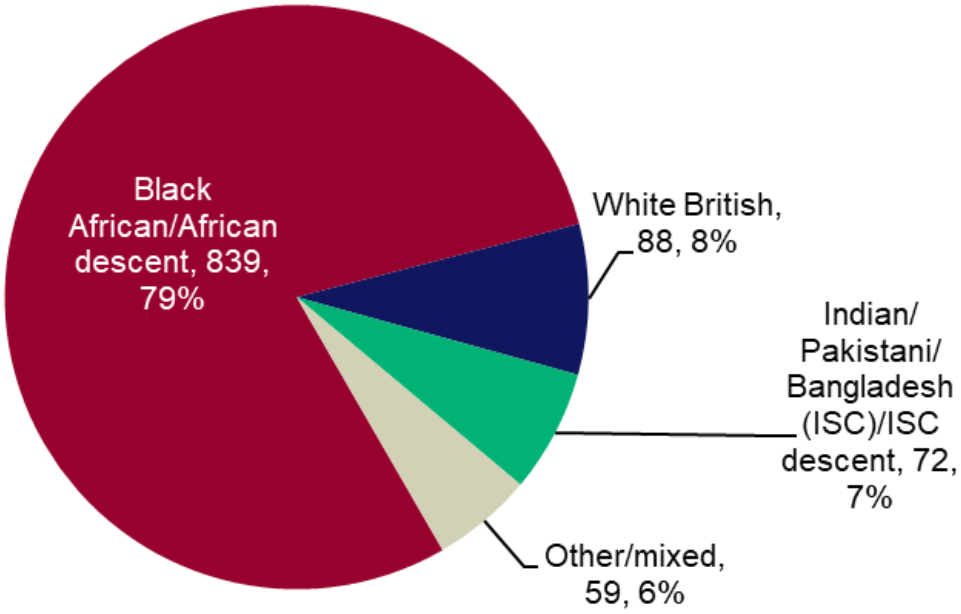
*N – cases where region of birth and reason for travel was known
**VFR – cases that have travelled to visit family in country of origin
*** Indian subcontinent here includes: Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka
**** includes non UK Europe

Ethnicity for cases that travelled abroad from the UK

Where ethnicity was known, more than three-quarters of malaria cases that travelled abroad from the UK were of Black African ethnicity or African descent (79%, 839/1,058) (African descent is determined from country of birth if ethnicity is not given) [Figure 4].

For non-white British cases, where reason for travel was known, 779/825 (94%) were VFR travellers. For cases where ethnicity was White British, 1/82 (1%) travelled to visit friends and relatives.

Figure 4. Ethnicity for malaria cases that travelled abroad from the UK: 2018 (N=1,058)



Country/region of travel for cases that travelled from the UK

Table 4 shows the breakdown of malaria cases reported by region of travel and parasite species and the top 20 countries of travel are shown in Table 5. Countries of travel for malaria cases reported in 2018 by count of cases is shown in a map in Figure 5. The majority of cases (where travel history was known) continue to be acquired in Africa, with 70% acquired in Western Africa (774/1,098), 8% in Eastern Africa (91/1,098) and 7% in Middle Africa (78/1,098) in 2018.

While it is important not to over-interpret changes in individual countries because numbers are low, the number of cases acquired in 7 of the top 20 countries increased in 2018 compared to 2017. Of note is the 100% increase in cases in Sudan[†], from 14 cases in 2017 to 28 cases in 2018, of which 86% travelled to visit friends and relatives. The number of cases acquired in 13 of the top 20 countries decreased in 2018, with a notable decrease in Uganda, where 24 cases were reported to have travelled there in 2018, compared to 50 in 2017.

No cryptic cases were reported in 2018.

Table 4. Cases of malaria that travelled abroad from the UK by species and region of travel: 2018 and 2017

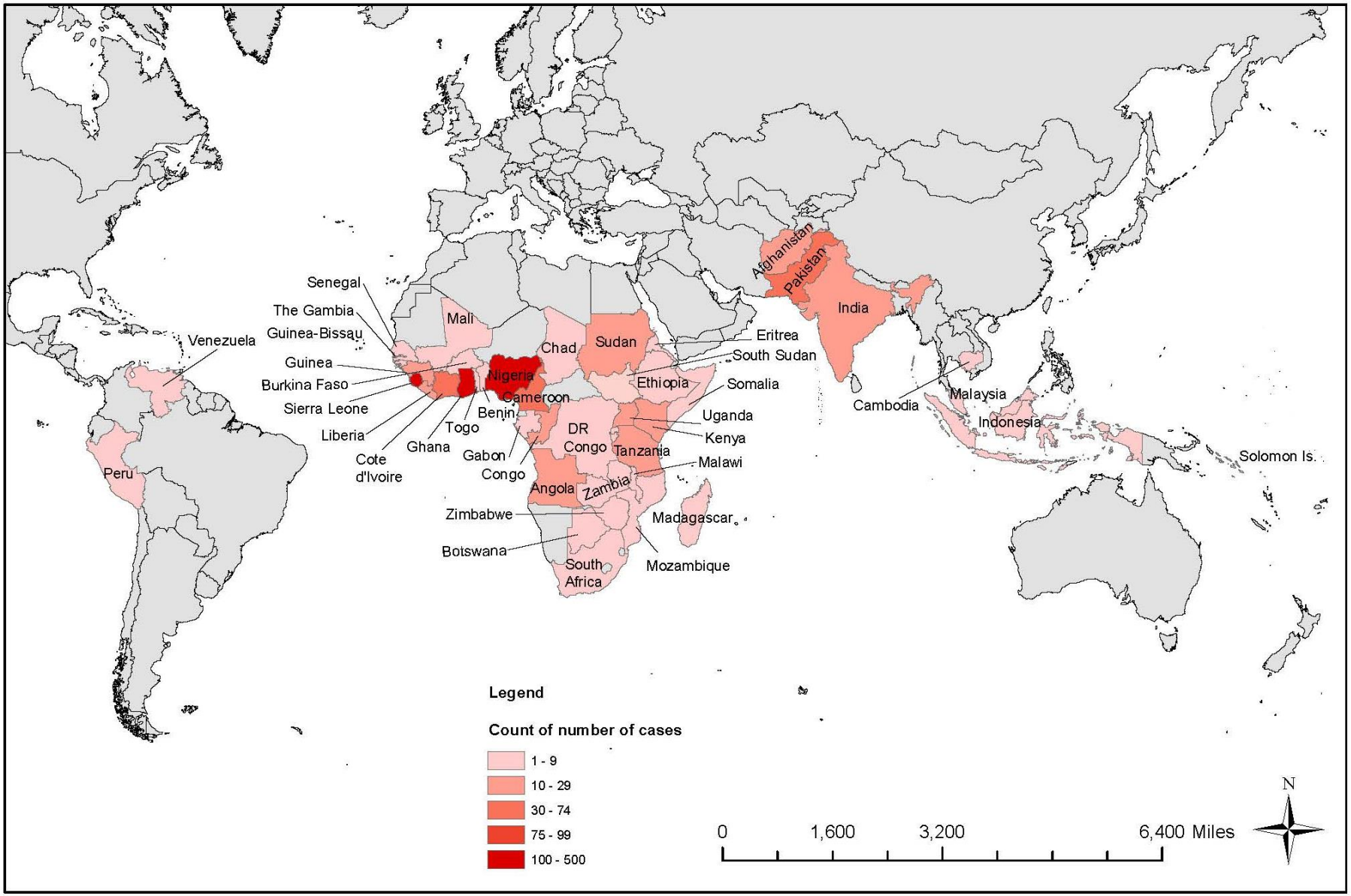
Region of travel	P. falciparum	P. vivax	P. ovale	P. malariae	Mixed	P. knowlesi	2018 total	2017 total
Western Africa	703	1	51	15	4	-	774	810
Eastern Africa	77	2	7	4	1	-	91	155
Middle Africa	68	1	4	4	1	-	78	94
Southern Asia	2	69	-	-	-	-	71	89
Northern Africa	27	1	-	-	-	-	28	14
Southern Africa	7	-	2	-	-	-	9	8
South-eastern Asia	1	4	-	1	-	2	8	4
Africa unspecified	5	-	-	-	-	-	5	11
South America	-	2	-	-	-	-	2	6
Oceania	-	1	-	-	-	-	1	2
Western Asia	-	-	-	-	-	-	-	3
Not stated	23	4	1	2	1	-	31	25
Total	913	85	65	26	7	2	1,098	1,221

[†] Note that some travellers or laboratories may not differentiate South Sudan from Sudan in their reporting.

Table 5. Cases of malaria that travelled abroad from the UK by species and top 20 countries of travel: 2018 and 2017

Country of travel	P. falciparum	P. vivax	P. ovale	P. malariae	Mixed	P. knowlesi	2018 Total	2017 Total
Nigeria	383	1	32	10	3	-	429	470
Sierra Leone	108	-	6	3	1	-	118	123
Ghana	101	-	6	1	-	-	108	113
Côte D'Ivoire	53	-	4	-	-	-	57	56
Cameroon	38	-	2	1	-	-	41	45
Pakistan	-	39	-	-	-	-	39	53
Sudan	27	1	-	-	-	-	28	14
Uganda	23	-	-	1	-	-	24	50
Guinea	17	-	2	1	-	-	20	13
Kenya	14	-	1	2	-	-	17	27
Afghanistan	-	17	-	-	-	-	17	14
Tanzania	11	-	3	1	-	-	15	21
Congo	12	1	-	2	-	-	15	24
India	2	13	-	-	-	-	15	22
Liberia	10	-	1	-	-	-	11	5
Angola	9	-	-	1	-	-	10	15
Malawi	8	-	1	-	-	-	9	13
South Africa	6	-	2	-	-	-	8	7
South Sudan	6	-	-	-	1	-	7	9
DR Congo	5	-	1	-	1	-	7	3
Other Western Africa	31	-	-	-	-	-	31	30
Other Eastern Africa	15	2	2	-	-	-	19	35
Other Middle Africa	4	-	1	-	-	-	5	7
Other Southern Africa	1	-	-	-	-	-	1	1
Africa unspecified	5	-	-	-	-	-	5	11
South America	-	2	-	-	-	-	2	6
South-Eastern Asia	1	4	-	1	-	2	8	4
Western Asia	-	-	-	-	-	-	-	3
Oceania	-	1	-	-	-	-	1	2
Not stated	23	4	1	2	1	-	31	25
Total	913	85	65	26	7	2	1,098	1,221

Figure 5. Countries of travel for cases of malaria that travelled abroad from the UK by count of cases: 2018



Prevention and treatment

Chemoprophylaxis

Among patients with malaria that travelled abroad from the UK, where the history of chemoprophylaxis (antimalarial medication) was obtained, 663/755 (88%) had not taken chemoprophylaxis. Although 2018 data are similar to the last 5 to 6 years, in the early 2000s the proportion of those with malaria who had not taken chemoprophylaxis was much lower (52% in 2000 and 59% in 2001).

Of those that had taken some form of chemoprophylaxis (N=92), 81 stated which drug they took and of these, 68 (84%) had taken a drug that was recommended to UK travellers for their destination by the PHE Advisory Committee for Malaria Prevention (ACMP) [3]. This represents 9% (68/755) of the total cases where chemoprophylaxis information was available. The proportion of the total cases with chemoprophylaxis information that took a drug recommended by the ACMP has remained between 9% and 16% since 2000. Note that whether the cases had taken the drug regularly or appropriately was not known and should also be taken into consideration when interpreting these data.

These data imply that health messages about the importance of antimalarial chemoprophylaxis are still not reaching groups who are at particular risk of acquiring malaria, or that travellers are either not understanding or acting on these messages.

The groups at particular risk include those who are visiting family in their country of origin, particularly those of Black African heritage and/or born in Africa. It seems likely that these groups are either not seeking or not able to access medical advice on malaria prevention before they travel, or they are not being given good advice, or they are not adhering to it. They may not perceive themselves to be at risk because the destination is familiar to them, they may have been born or lived there or they may have concerns about the cost of drugs. Probably all these factors contribute. The burden of falciparum malaria in particular falls heavily on those of Black African heritage, and this group is important to target for pre-travel advice. The PHE MRL is working with ADAAM (African Diaspora Action Against Malaria) towards facilitating diaspora-led initiatives to improve malaria prevention.

An analysis of malaria deaths over 20 years old in the UK [9] showed that the risk for mortality is higher in those born outside Africa and travelling for other reasons (such as holiday travellers). There is also a strong association between increasing age and mortality, so elderly travellers should also be considered a particular at-risk group.

Prevention advice

Malaria, an almost completely preventable but potentially fatal disease, remains an important issue for UK travellers. Failure to take chemoprophylaxis is associated with the majority of cases of malaria in UK residents travelling to malaria-risk areas. The number of cases in those going on holiday is small but there is continuing evidence that those of African or Asian ethnicity who are non-UK born and going to visit family are at increased risk of malaria, as well as a number of other infections [10]. The elderly are at particular risk of dying from malaria if they acquire the infection. Those providing advice should engage with these population groups wherever possible, including using potential opportunities to talk about future travel plans outside a specific travel health consultation, such as during new patient checks or childhood immunisation appointments [11].

The ACMP guidelines [3] and resources available from the National Travel Health Network and Centre [http://travelhealthpro.org.uk/] should assist clinicians in helping travellers to make rational decisions about protection against malaria.

Useful resources for travellers, including translated leaflets, are also available on GOV.UK.

Taking fever seriously on return from a malaria risk area

P. falciparum can progress to severe and life-threatening illness, including cerebral malaria, if it is not diagnosed and treated promptly. Travellers returning from malaria risk areas should seek urgent medical advice, including a same-day result malaria blood test, for any symptoms, especially fever, during their trip or in the year following their return home.

Treatment guidelines and algorithms for clinicians are available from the British Infection Society: https://www.journalofinfection.com/article/S0163-4453(16)00047-5/fulltext.

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