

Surveillance report

Laboratory-confirmed travel-related infections in Scotland during 2018

Prepared by: James Munro & Chris Redman



Introduction

In Scotland, as elsewhere, surveillance of travel-related infections focuses on those infections that are considered greatest risk to travellers abroad whether they be infections common among travellers (e.g. causes of diarrhoea), or severe infections (e.g. malaria). In addition many infections acquired during travel may have the potential for transmission in transit or when the traveller arrives at home or another destination, although this potential is limited by effective public health measures. Surveillance of imported infection informs evidence-based health advice to the traveller, including higher risk groups such as those visiting friends and relatives, and helps protect the domestic population from imported pathogens.

The risk of infection in travellers varies with destination, point of origin and type of travel.^{1,2} Travel-related illnesses are not limited to the exotic: travellers may encounter infections abroad which are also found at home, where the risk of exposure is different. Fever, gastrointestinal and respiratory infections are common in travellers.^{3,4} Skin disorders are also commonly reported.^{5,6} Disease may also be observed in those arriving from permanent residence abroad.

Scotland has rigorous procedures for the management of people diagnosed with infections of high consequence, including viral haemorrhagic fever although Such occurrences are exceptional. Two diseases for which enhanced surveillance is carried out, malaria⁷ and schistosomiasis,⁸ will be reported separately.

In this report we summarise 1) recent UK and Scottish travel trends to give context and 2) laboratory notifications of travel-related significance.

Travel abroad 2000 - 2017

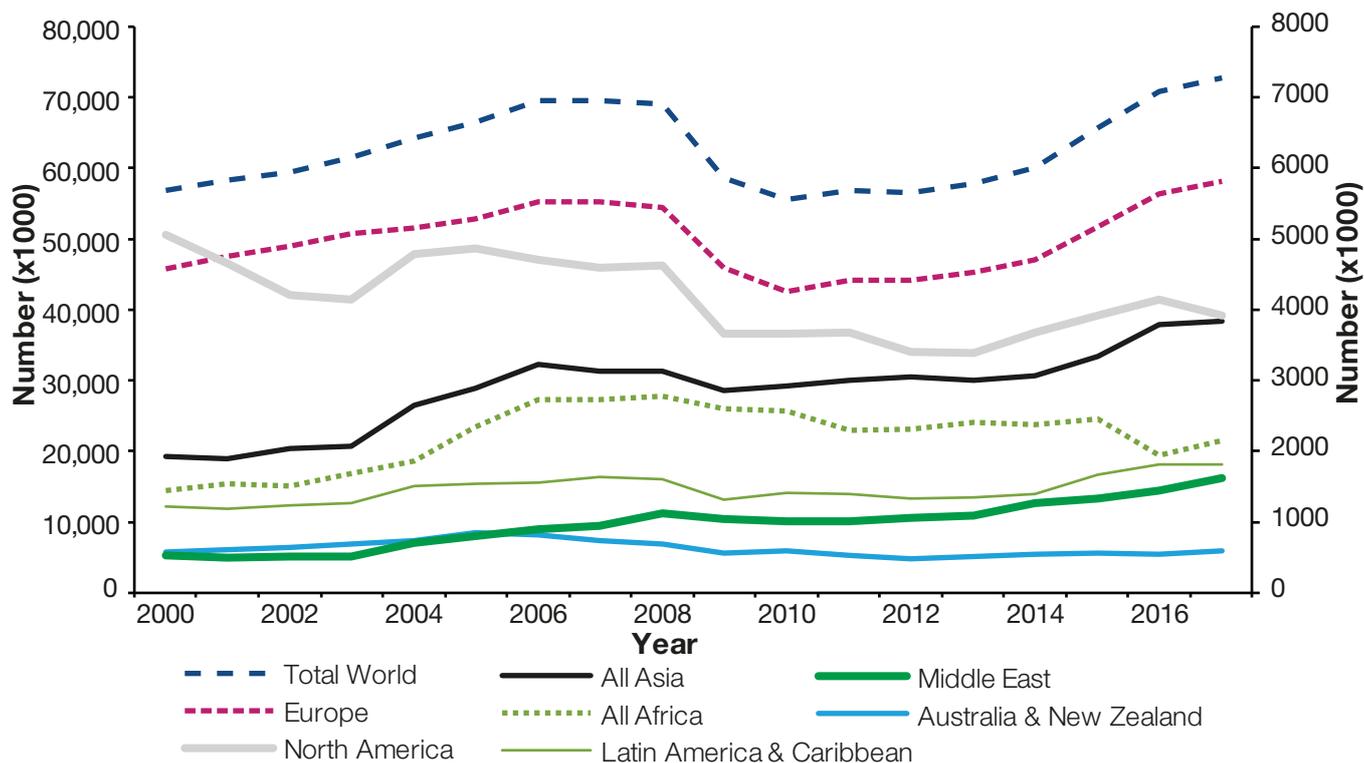
UK travel statistics for 2017 are the latest available at the time of publication of this report.

Travel from the UK

Travel from the UK increased from the start of the millennium until it began to fall in 2008/2009, declining to 55.6 million journeys in 2010 (Figure 1). Since that point, numbers have increased again to 72.7million in 2017; the driver for this observed trend is travel to Europe.⁹ Interestingly, travel to North America from the UK has not followed the overall pattern but has generally declined between 2000 and 2017, while travellers to Asia have increased in number since 2010. There has been a decrease in travel to Africa since 2008, which reflects a decline in travel to north Africa, while travel to Sub-Saharan Africa has gradually increased while travel to Latin America and the Caribbean has increased since 2012. Travel to the Middle East has risen gradually since 2000.



Figure 1: Travel Abroad from the UK, 2000-2017



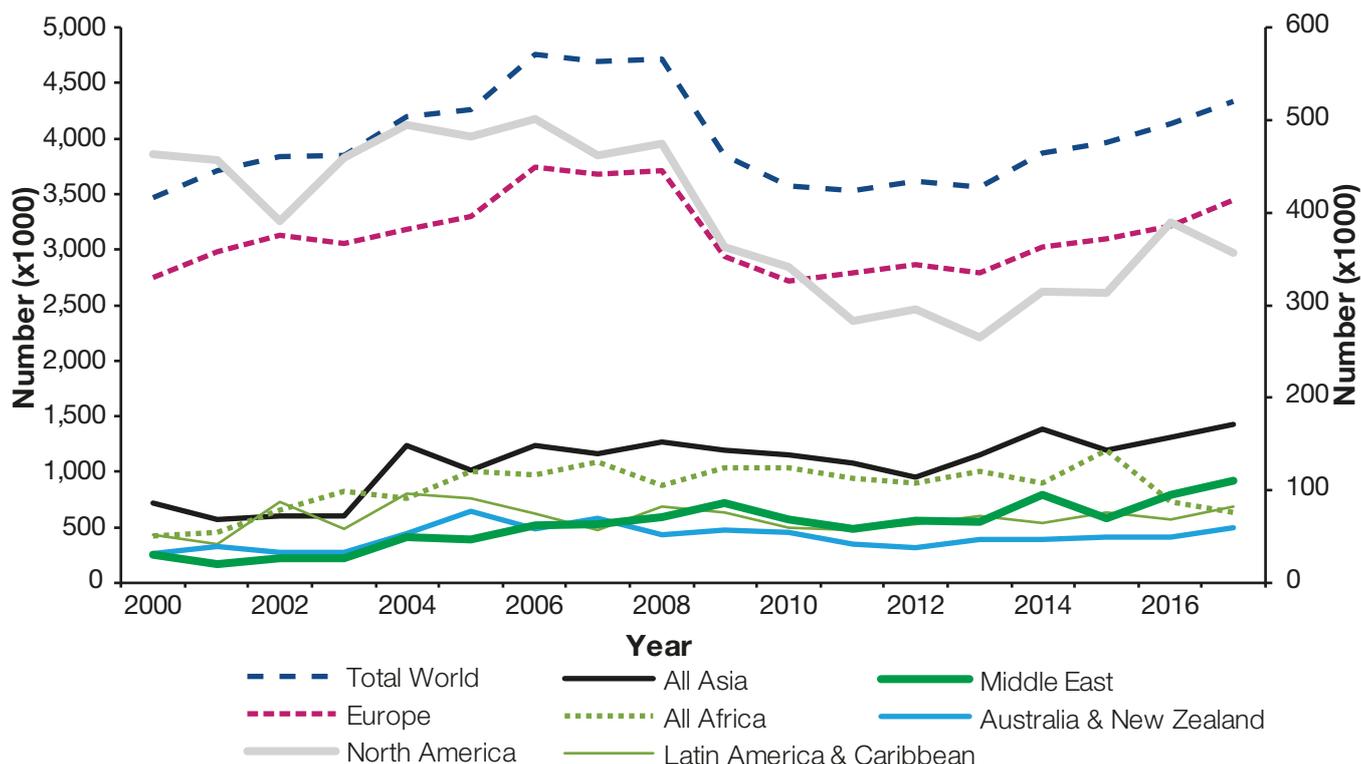
Note: the scale for World Total and Europe is shown on the left axis.

Of 72.7 million visits by UK residents to foreign countries in 2017, 80% were to Europe, with another 5%, 5%, 3% and 2% and 2% of journeys to North America, Asia, Africa, and Latin America & Caribbean respectively. A further 2% also travelled to the Middle East while travel to Australia and New Zealand accounted for 1% of foreign visits.

Travel from Scotland

The trend in travel abroad from Scotland generally reflects that of the UK as a whole (Figure 2). In 2017, there were 4.3 million journeys abroad from Scotland, representing 6% of total journeys from the UK. Europe (80%) was the most visited destination followed by North America (8%), Asia (4%), Africa (2%), the Middle East (3%), Latin America & Caribbean (2%) and Australia & New Zealand (1%).

Figure 2: Travel Abroad from Scotland, 2000-2017



Note: the scale for Total World and Europe is shown on the left axis.

Surveillance of travel-related infections

Method

Results of positive laboratory tests for a wide range of pathogens are received at Health Protection Scotland by electronic transfer through ECOSS.¹⁰ Clinical details are received by ECOSS only if they have been recorded in text accompanying the laboratory result. The data for 2018 for selected organisms were collated, episode criteria checked and duplicates removed.

HPS assumes vector-borne pathogens in humans (with the exception of *Borellia burgdorferi*) are always travel-related when they are identified in Scotland. Other infections are classified as imported when the appropriate information is recorded in the ECOSS report.

Schistosoma sp, *Plasmodium* sp (malaria), *Escherichia coli* O157, viral hepatitis and *Borellia burgdorferi* will be reported elsewhere by HPS. Zika virus totals for all of the United Kingdom are reported by Public Health England.¹¹

Results

Table 1: Travel-related pathogens reported to Health Protection Scotland, 2017-2018

Organism	2018			% Change Total since 2017	2017		
	Total	N imported	% imported		Total	N imported	% imported
Gastrointestinal bacteria							
Enteric fever							
<i>Salmonella paratyphi A</i>	6	4	67%	20%	5	3	60%
<i>Salmonella paratyphi B</i>	1	1	100%	NA	0	0	NA
<i>Salmonella typhi</i>	16	9	56%	60%	10	9	90%
Total enteric fever	23	14	61%	53%	15	12	80%
Shigella							
<i>Shigella boydii</i>	2	1	50%	0%	2	0	0%
<i>Shigella dysenteriae</i>	1	0	0%	NA	0	0	NA
<i>Shigella flexneri</i>	32	7	22%	39%	23	5	22%
<i>Shigella sonnei</i>	77	23	30%	103%	38	9	24%
<i>Shigella sp.</i>	3	1	33%	200%	1	0	0%
Total Shigella	115	32	28%	80%	64	14	22%
Vibrio							
<i>Vibrio cholerae</i> non 01/0139	2	2	100%	0%	2	2	100%
<i>Vibrio cholerae</i> non 01	1	1	100%	0%	1	1	100%
<i>Vibrio cholerae</i> not typed	10	10	100%	400%	2	2	100%
<i>Vibrio parahaemolyticus</i>	3	3	100%	50%	2	2	100%
Total Vibrio	16	16	100%	129%	7	7	100%
Gastrointestinal protozoa							
Cryptosporidium							
<i>Cryptosporidium hominis</i>	55	7	13%	-35%	84	2	2%
<i>Cryptosporidium cuniculus</i>	2	0	0%	100%	1	0	0%
<i>Cryptosporidium parvum</i>	120	2	2%	-13%	138	2	1%
<i>Cryptosporidium meleagridis</i>	0	0	NA	-100%	1	0	0%
<i>Cryptosporidium sp.</i>	360	36	10%	26%	285	25	9%
Total Cryptosporidium	537	45	8%	6%	509	29	6%
Cyclospora							
<i>Cyclospora</i> species	12	12	100%	-74%	46	19	41%
Total Cyclospora	12	12	100%	-74%	46	19	41%
Amoebae							
<i>Entamoeba histolytica</i>	6	0	0%	0%	6	1	17%
Total amoebae	6	0	0%	0%	6	1	17%

Giardia							
<i>Giardia duodenalis</i>	139	33	24%	-39%	229	53	23%
<i>Giardia intestinalis</i>	0	0	NA	NA	0	0	NA
<i>Giardia lamblia</i>	3	1	33%	NA	0	0	NA
<i>Giardia</i> sp.	84	25	30%	110%	40	3	8%
Total Giardia	226	59	26%	-16%	269	56	21%
Total gastrointestinal protozoa	781	116	15%	-6%	830	105	13%
Vector-borne bacteria							
Rickettsia							
<i>Rickettsia prowazekii</i>	4	4	100%	33%	3	3	100%
<i>Rickettsia</i> sp (Spotted Fever)	1	1	100%	NA	0	0	NA
Total Rickettsia	5	5	100%	67%	3	3	100%
Vector-borne protozoa							
<i>Leishmania amastigotes</i>	2	2	100%	NA	0	0	NA
<i>Leishmania viannia</i>	0	0	NA	-100%	1	1	100%
Total vector-borne protozoa	2	2	100%	100%	1	1	100%
Vector-borne viruses							
Chikungunya virus	5	5	100%	-55%	11	11	100%
Dengue virus	14	14	100%	-18%	17	17	100%
Total vector borne viruses	19	19	100%	-32%	28	28	100%
TOTAL EPISODES REPORTED	961	204	21%	1%	948	170	18%

All reports are subject to review. Results presented here may be revised in future publications of this or other HPS reports. A total of 961 episodes of infection is reported here, an increase of 1% from 2017.

Gastrointestinal protozoa

There were 226 episodes of *Giardia* in 2018, of which 59 (26%) were reported as imported.

Cryptosporidium continues to be the most commonly reported gastrointestinal parasite. In 2018, 537 episodes of *Cryptosporidium* comprised 120 (22%) *C. parvum*, 55 (10%) *C. hominis*, 2(0.4%) *C. cuniculus* and a further 360 (67%) episodes of unspiciated *Cryptosporidium*. Forty-five (8%) episodes were reported as imported.

Six episodes of *Entamoeba histolytica* were reported in 2018, none of which were reported as imported.

In 2018, all 12 episodes of *Cyclospora* were reported as imported.

Enteric fever (Salmonella)

Twenty-three episodes of enteric fever were reported to HPS in 2018, of which 7 (30%) were *Salmonella paratyphi* A and 16 (70%) were *S. typhi*. Fourteen (61%) enteric fever episodes were reported as imported.

Shigella

One hundred and fifteen *Shigella* episodes were reported to HPS in 2018. Of these, there were 77 (67%) *Shigella sonnei*, 32 (28%) episodes of *S. flexneri*, 2 (2%) *S. boydi*. One (1%) *S. dysenteriae* and 3 (2%) unspciated episode. Twenty-eight percent (32) of *Shigella* episodes were reported as imported in 2018.

Vibrio

Thirteen episodes of *Vibrio cholerae* were reported in 2018. Of these, 2 (15%) were non 01/0139, 1 (8%) was non 01 and 10 (77%) were untyped. There were also 3 episodes of *V. parahaemolyticus*. All *Vibrio* episodes in 2018 were reported as imported.

Vector-borne bacteria

Rickettsia

In 2018 there were 5 episodes of *Rickettsia*, 4 (80%) of which were *R. prowazekii* and 1 (20%) of which was unspciated. All were recorded as imported

Vector-borne viruses

All vector-borne viruses reported in Scotland in 2018 were imported. There were 14 episodes of dengue virus and 5 episodes of chikungunya virus.

Vector-borne protozoa

There were two reports of unspciated *Leishmania amastigotes* in 2018.

Discussion

Surveillance and significance of results

This report considers only the results of laboratory tests or examinations. Clinical diagnoses are submitted to the ECOSS surveillance system whose results are reported here. Positive results alone do not indicate severity of illness in the infections described here, nor do they indicate a wider challenge to public health.

HPS receives no information on infections acquired abroad that resolve before arrival in Scotland. Thus, ECOSS data alone cannot accurately estimate total levels of disease in the travelling population. Clinical and travel histories are frequently absent from laboratory reports. Effective surveillance relies on appropriate communication between patient, physicians and epidemiologists. The number of imported infections is likely to be underestimated as the appropriate information is recorded inconsistently in ECOSS.

For some pathogens e.g. flaviviruses,^{12,13,14} a positive test result may arise from vaccination or cross-reaction. Positive yellow fever IgG results are reported frequently, but unless followed by a rising IgG titre¹⁵ or accompanied by a positive IgM or PCR result they are discounted. Because of the frequency of IgG positives, any yellow fever result reported as an episode of infection must be verified. Positive IgG sandfly fever virus results are also common, but are

generally discounted in the same way. However, sandfly fever viruses are common in some popular tourist areas in Mediterranean Europe,¹⁶ so it is possible that some positive IgG results arise from previous infection rather than cross-reaction.

Gastrointestinal pathogens

Organisms such as *Shigella*, *Giardia* and *Cryptosporidium* causing traveller's diarrhoea (TD)¹⁷ remain the most commonly reported infections. Infections caused by *Vibrio* species, including *Vibrio cholerae* have been identified in increasing numbers in Scotland in recent years. While cholera continues to be geographically widespread,¹⁸ it is not certain that travellers from Scotland have been directly affected by increasing transmission in some countries, or if the affected travellers have been infected in particular circumstances presenting a higher risk of cholera. Cholera tends to occur in areas of crisis or extreme poverty, where tourists are rarely present. Cholera is unusual in travellers and where it does occur, occupational exposure may present the highest risk. Those infections identified in returning travellers may tend to be mild, at least by the time the traveller returns home where appropriate supportive treatment may be more readily available in endemic countries. The small number of episodes of *V. parahaemolyticus* is of interest, as this organism is found in warm seawater and thus may be encountered by travellers to areas with otherwise acceptable levels of hygiene.

Episodes of cyclosporiasis are reported for a fourth year in 2018 although numbers are declining. *Cyclospora* infections have been reported in Europe and North America in recent years, with Mexico frequently appearing in travel history.¹⁹ *Cyclospora* has a global distribution but most often occurs in tropical and subtropical regions of the world, where it occurs in the context of diverse and commonplace gastrointestinal infection. Travel-related cyclosporiasis has been associated with consumption of salad and soft fruit such as raspberries. It should be noted that cyclosporiasis may occur in an environmental context where diverse gastrointestinal pathogens are common.

Vector-borne infection

Dengue and chikungunya remained the most frequently-reported vector-borne viral infections in Scotland, although episodes reported to HPS have declined in number.

Dengue and chikungunya viruses occur from warmer areas of the temperate zone to the tropics. In 2018, there were outbreaks of dengue in France and Spain.²⁰ While these European outbreaks have been short-lived, they serve to remind of the importance of mosquito bite avoidance and consideration of vector-borne infection in the returning traveller. Despite these viruses' occurrence in Europe, limited travel history suggests the great majority of infections in travellers returning to Scotland originate in the tropical zone. Chikungunya and dengue viruses are unrelated to each other but may occur in the same areas and can be transmitted by the same *Aedes* sp mosquito vectors.²¹ Major outbreaks of dengue and chikungunya have been ongoing in the tropics and subtropics in recent years.^{22,23} In some regions, notably Latin America and South East Asia, these viruses have supplanted malaria as the most significant vector-borne infection.

Rigorous bite avoidance remains the most important method of preventing dengue and most other mosquito borne infections.²⁴ It may prove difficult to avoid being bitten in countries with high mosquito density and where this coincides with high viral incidence in humans or other animals, risk of infection may be higher.

Of the widely occurring vector-borne viruses, vaccines are available only for yellow fever, tick-borne encephalitis and Japanese encephalitis. Tick-borne encephalitis is the only vaccine-preventable arboviral infection that occurs with any frequency in Europe. It is widespread in the Alpine region although most travellers to that area are unvaccinated. Tick-borne encephalitis remains rare in travellers, although under-reporting may occur.²⁵

Vector-borne protozoan parasites other than malaria are rarely seen in travellers from Scotland. No vaccines are available and treatment can be challenging, so bite avoidance is essential in prevention. There is increasing recognition that *Trypanosoma cruzi*, the causative agent of Chagas' disease may spread by foodborne transmission.²⁶ Fresh-pressed fruit juices in South America are implicated in this process, particularly where outbreaks of infection occur. *Leishmania* infections also remain rare, although there is ongoing concern about the small number of infections appearing in southern Europe, particularly in Italy²⁷ and France.²⁸

Other significant infections with global distribution

In 2018 measles cases continued to increase in number on all continents, with declining vaccination.²⁹ Travellers are advised to be vaccinated against measles, as is recommended for living in the United Kingdom. Likewise, mumps remains an occasional risk in some popular destinations, such as New Zealand.³⁰

Influenza-like illnesses are among the infectious diseases most likely to affect travellers, even though they may not have the same awareness profile as more exotic infections. Travellers likely to be at risk of serious illness in the event of influenza are advised to be vaccinated where appropriate and feasible before travel. Avian flu is a particular matter of concern in Asian countries,³¹ although incidence in humans is very low and cases are vanishingly rare in travellers. Poultry markets are considered to present a risk of sporadic transmission to humans.

High Consequence Infectious Diseases attract public interest, but generally present a low risk to the majority of travellers.³² There is an ongoing outbreak of Middle Eastern Respiratory Syndrome (MERS-CoV) in Saudi Arabia,³³ although the infection may now better described as endemic or enzootic. The risk to most travellers remains small, with close contact with camels and subsequent health care-related infection being the most readily identifiable risk factors. A single case of MERS-CoV was imported into the UK in 2018.³⁴ Two cases of monkeypox were also imported into the UK in 2018, with one healthcare-associated secondary case.³⁵ None of these incidents directly affected Scotland, although HPS participated in the response to such events at a UK national level.

Attention is often directed towards the various viral haemorrhagic fevers, with two outbreaks of Ebola virus disease (EVD) reported in Democratic Republic of Congo in 2018, one of which has continued into 2019.³⁶ Lassa fever continues to be reported in west African countries, most commonly in Nigeria.³⁷ Scotland, in common with the rest of the United Kingdom has robust public health procedures in mitigation of importation of cases and onward transmission of High Consequence Infectious Diseases.

Conclusion

A fundamental protection against infectious disease while travelling abroad is to ensure all vaccinations have been received according to the UK schedule.

Food and water hygiene remain essential methods for protecting the health of the travelling public, as gastrointestinal infections are again the most commonly reported. Vaccination is also available for prevention for some food and water-borne diseases i.e. hepatitis A, typhoid, cholera and poliomyelitis.

Although vector-borne infections were less frequently reported in 2018, there remains the needs to highlight the importance of rigorous bite avoidance and vaccination where possible and appropriate. Yellow fever vaccination is strongly recommended for travellers to Brazil.

Contact with animals during travel presents a risk of infection. Hand hygiene is important following animal contact. Any mammal bite, particularly that of a carnivore or bat, should be taken seriously as rabies has an almost global distribution.³⁸

While the picture of imported infections imported into Scotland in recent years has remained consistent, this may change in the longer term. It is possible that climate change will modify the distribution and incidence of infectious disease through influence on biology of pathogens and/or humans or other animal hosts.³⁹

A traveller who becomes unwell during a trip should seek medical attention. Any returning traveller who becomes unwell should seek medical advice and report their travel history to their health care provider. HPS encourages all clinicians requesting laboratory testing for infectious disease to take a full travel history, and to provide this information on the laboratory request form.

It is important to diagnose and treat infectious disease in newly-arrived travellers promptly and appropriately and in so doing seek to improve the patient's condition and preserve public health. In this regard, the health of travellers and the health of resident populations are not considered to be entirely separate issues. In the context of migration, health professionals seeing new arrivals presenting with infectious diseases that are readily transmitted or are not normally seen here are encouraged to liaise appropriately with laboratory staff, infectious disease clinicians and health protection teams.

Up-to-date, expert advice on travel health and country-by-country disease risks is available to healthcare professionals on TRAVAX (www.travax.nhs.uk). Travellers are strongly advised to consult the fitfortravel website (www.fitfortravel.nhs.uk) in advance of their journey for information on how to stay healthy abroad. The website includes country-specific advice on recommended vaccines and antimalarial chemoprophylaxis, and details on safe food and water, accident avoidance, sun protection and insect bite avoidance. TRAVAX recommends that travellers consult a GP, practice nurse or travel health clinic at least 6 weeks before travel and follow evidence-based health guidance.⁴⁰

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NHS board abbreviations

AA Ayrshire & Arran	BR Borders	DG Dumfries & Galloway	GGC Greater Glasgow & Clyde
FF Fife	FV Forth Valley	GR Grampian	HG Highland
LO Lothian	LN Lanarkshire	OR Orkney	SH Shetland
TY Tayside	WI Western Isles		

HPS Surveillance Report

Published by: Health Protection Scotland

Meridian Court, 5 Cadogan Street, Glasgow G2 6QE

T: 0141 300 1100 **F:** 0141 300 1170

W: <http://www.hps.scot.nhs.uk> **Email:** NSS.HPSEnquiries@nhs.net

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