

## Profile of medical information sought by Polish travelers

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**A** – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

**Summary Background.** International travel is growing constantly throughout the world, with an annual growth rate estimated at 4%. According to the United Nations World Tourism Organization, the number of international travelers reached 1.184 billion in 2015. Owing to unprecedented interest in foreign travel, including travel to tropical countries, it is important for travelers to gain access to information on the most prevalent health hazards in destination countries and on recommended prevention measures.

**Objectives.** This article describes the profile of medical information sought by Polish travelers on a website run by the Department of Epidemiology and Tropical Medicine, Military Institute of Medicine (Gdynia, Poland).

**Material and methods.** The retrospective study was based on the statistical analysis of the number of visits to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) between 2012 and 2015 and in the individual months of 2015.

**Results.** Analysis shows a significant increase in the number of visits to the travel medicine website, from 76,369 in 2012 to 456,613 in 2015. In 2015, the website was most often visited in January, June, and the October–December period. Internet users most commonly sought information on vaccinations before going to Thailand, India, Kenya, Tanzania/Zanzibar, as well as on illnesses like yellow fever, HIV/AIDS, typhoid fever, and Ebola hemorrhagic fever during its outbreak in West Africa.

**Conclusions.** The considerable increase in the number of visits to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) in recent years is evidence of a growing interest in travel medicine and a greater awareness of health among travelers. The majority of website searches concerned Asia, Africa, and Central America, which may suggest a growing interest in travel to tropical countries.

**Key words:** international travel, travel medicine, website.

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## Background

Foreign travel continues to grow all over the world, with an annual growth rate estimated at 4% [1]. A similar trend can be seen in Poland [2]. According to the United Nations World Tourism Organization, the number of international travelers was 1.184 billion in 2015 (50 million more than in 2014). The greatest movement of travelers is observed in Europe (609 million; 51%), Asia and the Pacific (277 million; 23%), and North and South America (191 million; 16%). The majority of travelers (and money spenders) come from China and the USA. In countries experiencing major economic crises, such as Russia and Brazil, the number of international journeys has decreased. In spite of the unstable geopolitical situation in various parts of the world, the upward trend is likely to continue, with the number of travelers exceeding 1.6 billion in 2050 [1]. According to the Ministry of Sport and Tourism, Polish travelers over the age of 15 make approximately 10 million trips abroad per year (9.3 million in 2012, 10.3 million in 2014). The average length of stay abroad is 10 days. Polish travelers most frequently travel to Germany (2.1 million), Great Britain (0.8 million), and Italy (0.8 million). 56% of Poles travel for recreational purposes, 32% go abroad in order to visit their friends or relatives, 7.5% travel on business, and 4.5% travel for other reasons [2, 3]. Polish holidaymakers most often visit Croatia, Italy, Turkey, Spain, and Greece, but each year an increasing number of travelers visit more distant countries in Asia, Africa, South and Central America. An increasing number of Polish travelers organize their trips on their own instead of going on a package holiday. They usually travel by plane.

Over the last several decades, the world has become a global village, and intercontinental travel has become commonplace. Until relatively recently, some areas remained inaccessible to tourists, but at present there are no such regions. Distant travel is relatively inexpensive, which means that nearly everybody can afford it. Travel has become popular among all categories of people – adults, young children, the elderly, pregnant women, people with various disabilities, and those suffering from chronic diseases. The risk of developing a health problem while abroad depends on a number of factors, such as the level of endemicity in a given area, the general health of the traveler (e.g., whether he or she has a properly functioning immune and thermoregulatory system, or suffers from chronic diseases), the appropriate disease prevention measures, the length of stay, and types of activities undertaken [4]. The risk is considerably higher in countries with tropical or subtropical climates, where travelers are exposed to a variety of pathogens, including those transmitted by vectors, food, water, air, and sexual contact. One of the major health problems often seen in areas characterized by low standards of sanitation is diarrhea, which affects 25–90% travelers. The lower the standards of sanitation in the destination country and the higher the sanitary standards in the travelers' home countries, the greater the risk of developing a diarrheal disease. Another travel-related health problem is malaria. The risk of acquiring the *Plasmodium* infection depends on the destination (the highest prevalence being reported in Sub-Saharan Africa) and on the use (or nonuse) of antimalarial chemoprophylaxis [5]. Sexually transmitted diseases (STDs) also pose considerable health hazards for international travelers, especially those who are likely to engage in unprotected sex while abroad. It



is estimated that approximately 5% of European travelers engage in casual sex with local people, including commercial sex workers (CSWs). 50% of travelers do not use condoms, although prevalence rates of STDs among CSWs in Africa, Asia, and South and Central America are exceptionally high. STDs range from cosmopolitan (AIDS, syphilis, gonorrhea) to tropical (chancroid, granuloma inguinale, and lymphogranuloma venereum) [6, 7].

All travelers – including holidaymakers, tourists visiting friends or relatives, businessmen, and students – are at risk of developing health problems while staying in harsh environmental areas. Travel medicine is a relatively new branch of medicine. Its primary objective is to promote prophylactic and therapeutic activities that can prevent travel-related illnesses and control the spread of tropical diseases. Owing to the growth in foreign travel (including travel to tropical countries), it is important for traveler to be aware of the prevailing health hazards and recommended prevention measures in the destination countries [5, 8].

## Objectives

The article describes the profile of the medical information sought by Polish travelers on a website run by the Department of Epidemiology and Tropical Medicine of the Military Institute of Medicine (Gdynia, Poland).

## Material and methods

The retrospective study was based on a statistical analysis of the number of visits to the [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) website between 2012 and 2015, and in the individual months of 2015.

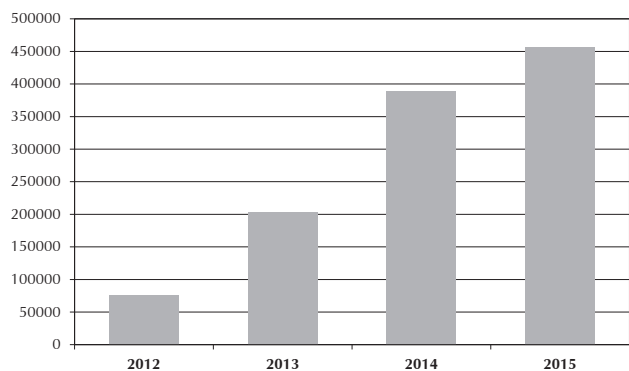
The website, run by the Department of Epidemiology and Tropical Medicine at the Military Institute of Medicine, was created in 2011 to serve as freely available source of information on travel medicine. Its main function is to share information on health hazards and the appropriate prevention measures to be taken in different countries; the advice is intended both for longer-term voyagers and for short-term travelers. Internet users are given free access to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) without needing to log in or use a password. As visitors are not required to fill in any questionnaires that might ask about their age, sex, education, place of residence, etc., the data is limited to the frequency with which individual pages are accessed. This analysis, however, makes it possible to determine the place and time of the scheduled journeys and the prevention measures that may

be taken by the travelers. This data may thus prove useful for travel agents and health care providers.

Statistical analysis was carried out using Statistica suite version 12.0 (StatSoft, Inc., 2014; [www.statsoft.com](http://www.statsoft.com), SN-JGNP3087539302AR-E) and Microsoft Excel.

## Results

Statistical analysis showed a considerable increase in the number of visits to the travel medicine website in recent years, from 76,369 visits in 2012 to 456,613 in 2015 (Fig. 1) ( $\chi^2 = 320886.80$ ;  $p = 0.0001$ ). This statistically significant increase in the number of website visits is potentially associated with a growing interest in travel medicine and greater health awareness among travelers.



**Figure 1.** Number of visits to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) between 2012 and 2015

Internet users visiting the site most commonly searched for information on vaccinations before going to Thailand, India, Kenya, and Tanzania/Zanzibar. Also sought was information on vector-borne diseases (such as yellow fever), sexually transmitted diseases (HIV/AIDS), food-borne and water-borne diseases (typhoid fever), and Ebola hemorrhagic fever during its 2014 outbreak in West Africa (Tab. 1). In 2016, numerous cases of the Zika virus have been reported in South and Central America [9]. The increased number of trips to the Caribbean and to the Olympic Games in Rio de Janeiro, Brazil in August this year resulted in much greater media interest in Zika fever [10]. This increased coverage will potentially lead to a growth in the number of visits to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) as people seek information about the disease.

**Table 1.** Most commonly accessed pages on [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) between 2012 and 2015 ( $n$  = number of visits)

Webpage accessed	2012	2013	2014	2015	Total
Thailand vaccinations	526	2658	1183	2213	6580
India vaccinations	815	1765	580	768	3928
Kenya vaccinations	657	2054	446	587	3744
Tanzania/Zanzibar vaccinations	426	774	485	1675	3360
Sri Lanka vaccinations	343	681	302	515	1841
China vaccinations	185	863	129	233	1410
Gambia vaccinations	–	571	169	473	1213
Vietnam vaccinations	184	383	169	451	1187
Malaysia vaccinations	176	542	179	271	1168
Indonesia vaccinations	324	556	104	104	1088
Dominican Republic vaccinations	178	274	95	518	1065
Ebola	–	–	5177	79	5256

**Table 1. Most commonly accessed pages on www.medycynatropikalna.pl between 2012 and 2015 (n = number of visits)**

Webpage accessed	2012	2013	2014	2015	Total
Yellow fever	42	1244	719	1899	3904
HIV/AIDS	–	–	744	1550	2294
Typhoid fever	–	323	544	959	1826
Leprosy	–	82	694	590	1366
Rabies	–	–	278	917	1195
Chancroid	–	–	224	587	811
Amebiasis	–	–	149	533	682
Poliomyelitis			114	550	664
Malaria	132	103	120	139	494
Dengue	–	–	115	198	313
<b>Total</b>	<b>3988</b>	<b>12 873</b>	<b>12 719</b>	<b>15 809</b>	<b>45 389</b>

**Table 2. Most commonly accessed pages on www.medycynatropikalna.pl in the individual months of 2015 (n = number of visits)**

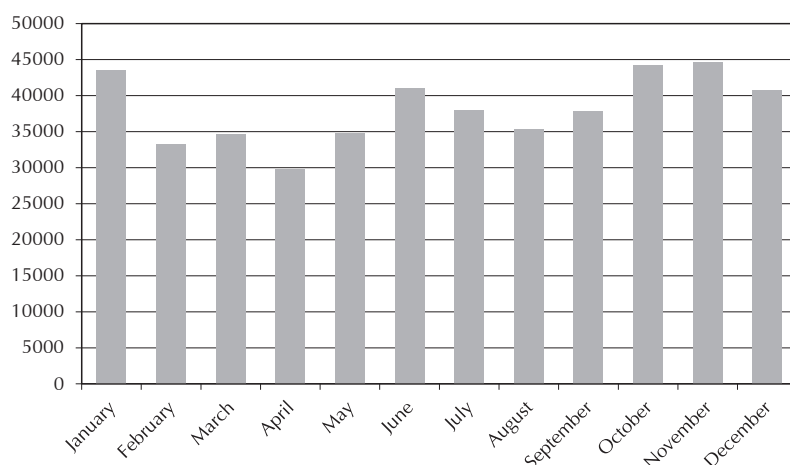
Webpage accessed	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
Thailand vaccinations	328	102	46	43	46	70	212	264	269	309	407	415	2213
Tanzania/Zanzibar vaccinations	162	47	49	26	36	41	132	170	176	289	250	297	1675
India vaccinations	82	41	19	14	38	50	35	40	59	139	130	121	768
Kenya vaccinations	39	22	18	9	11	–	17	27	72	83	141	148	587
Dominican Republic vaccinations	35	6	–	–	–	47	54	51	19	56	71	179	518
Yellow fever	118	67	48	80	42	44	128	126	108	315	494	329	1899
HIV/AIDS	165	98	96	68	61	51	107	73	114	207	212	298	1550
Typhoid fever	71	27	40	40	83	148	19	73	72	100	179	107	959
Rabies	36	60	47	32	80	84	119	103	49	109	106	92	917
Chancroid	83	30	22	28	27	14	61	55	35	85	51	96	587
<b>Total</b>	<b>1119</b>	<b>500</b>	<b>385</b>	<b>343</b>	<b>424</b>	<b>549</b>	<b>884</b>	<b>982</b>	<b>973</b>	<b>1692</b>	<b>2041</b>	<b>2082</b>	<b>11 974</b>

In 2015, the website was most often visited in January, June and in the October–December period (Fig. 2). The difference in the distribution of the number of visits to the website between individual months was statistically significant ( $\chi^2 = 3556.12$ ;  $p = 0.0001$ ).

The most frequently accessed page on the website in January, February, the July–October period, December was ‘Thailand vaccinations’; in March, ‘HIV/AIDS’ was most popular; in April and November, ‘Yellow fever’; while in

May and June, the page on ‘Typhoid fever’ was most frequently accessed. The correlation between the most frequently accessed pages and the month was not statistically significant (Tab. 2).

Correlation analysis showed that, towards the end of 2015, the following pages were accessed statistically more frequently: ‘Thailand vaccinations’, ‘Tanzania/Zanzibar vaccinations’, ‘Kenya vaccinations’, ‘Dominican Republic vaccinations’, ‘Yellow fever’, ‘Typhoid fever’, and ‘Rabies’ (Tab. 3).

**Figure 2.** Number of visits to www.medycynatropikalna.pl in the individual months of 2015

**Table 3. Correlation analysis of the most frequently accessed pages on [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) in the individual months of 2015 (R-correlation coefficient)**

Webpage accesses	R	p-value
Thailand vaccinations	0.60	0.0382
Tanzania/Zanzibar vaccinations	0.74	0.0058
India vaccinations	0.56	0.0586
Kenya vaccinations	0.61	0.0358
Dominican Republic vaccinations	0.77	0.0031
Yellow fever	0.69	0.0126
HIV/AIDS	0.52	0.0800
Typhoid fever	0.64	0.0247
Rabies	0.69	0.0139
Chancroid	0.48	0.1182

**Table 4. Profile of most frequently accessed pages on [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) in the individual months of 2015**

Thailand vaccinations	
mean (SD)	209.3 (142.7)
range	43.0–415.0
median	238.0
95% CI	[118.6; 299.9]
Tanzania/Zanzibar vaccinations	
mean (SD)	139.6 (101.0)
range	26.0–297.0
median	147.0
95% CI	[75.4; 203.8]
India vaccinations	
mean (SD)	64.0 (43.6)
range	14.0–139.0
median	45.5
95% CI	[36.3; 91.7]
Kenya vaccinations	
mean (SD)	48.9 (51.1)
range	0.0–148.0
median	24.5
95% CI	[16.5; 81.4]
Dominican Republic vaccinations	
mean (SD)	43.2 (49.7)
range	0.0–179.0
median	41.0
95% CI	[11.6; 74.8]
Yellow fever	
mean (SD)	158.3 (143.3)
range	42.0–494.0
median	113.0
95% CI	[67.2; 249.3]
HIV/AIDS	
mean (SD)	129.2 (75.8)
range	51.0–298.0
median	102.5
95%CI	[81.0; 177.3]

Typhoid fever	
mean (SD)	79.9 (48.1)
range	19.0–179.0
median	72.5
95%CI	[49.3; 110.5]
Rabies	
mean (SD)	76.4 (30.5)
range	32.0–119.0
median	82.0
95%CI	[57.0; 95.8]
Chancroid	
mean (SD)	48.9 (27.4)
range	14.0–96.0
median	43.0
95% CI	[31.5; 66.3]

The mean number of visits per month for the most commonly accessed pages was 209.3 (range 43.0–415.0) for ‘Thailand-vaccinations’; 158.3 (range 42.0–494.0) for ‘Yellow fever’; 139.6 (range 26.0–297.0) for ‘Tanzania/Zanzibar-vaccinations’; and 129.2 (range 51.0–298.0) for ‘HIV/AIDS’. The ‘Thailand vaccinations’ page was statistically more frequently visited than the pages on ‘Kenya vaccinations’ ( $p = 0.0125$ ), ‘Dominican Republic vaccinations’ ( $p = 0.0082$ ), and ‘Chancroid’ ( $p = 0.0472$ ). Moreover, the ‘Dominican Republic vaccinations’ page was statistically less frequently visited than the ‘HIV/AIDS’ page. More detailed information is presented in Table 4.

## Discussion

It is estimated that 15–70% of American citizens traveling to Asia, Africa, South America, and Central America – all countries with hot climate and poor standards of sanitation – return home with a health problem. Most travel-related illnesses are mild, but 1–5% of travelers become ill enough to seek medical care while traveling [11]. Research conducted by travel medicine specialists in Europe has demonstrated that, of 100,000 tourists from highly developed countries traveling to the Third World countries for one month, 50,000 will develop some kind of a health problem, typically of moderate intensity, 1,100 travelers will be unfit for work after their return, 300 travelers will be hospitalized while abroad or immediately after they return home, 50 travelers will require medical evacuation to their home country, and 1 person will die of an illness or an injury [12].

The most common health problems affecting travelers include chronic gastrointestinal disorders (10%), dermatoses (8%), respiratory tract infections (5–13%), and fevers of unknown origin (3%). The analysis carried out by the GeoSentinel Surveillance Network demonstrates that the prevalence of certain health problems varies between different geographical regions. As an example, dermatoses are most often found in travelers to Central and South America, diarrhea commonly affects travelers returned from South and Southeast Asia, while malaria is most often diagnosed in tourists visiting Sub-Saharan Africa [13]. When staying in areas characterized by harsh environmental conditions, travelers may suffer from acute diarrhea – mainly of bacterial (enterotoxigenic *Escherichia coli*) origin, but less commonly of viral or parasitic etiology – that persists for several days and is commonly known as travelers’ diarrhea. Chronic diarrhea, on the other hand, is frequent among travelers who seek medical care upon returning home. Chronic diar-

rhea typically lasts longer than 2 weeks and is caused by parasites, usually protozoa (*Giardia intestinalis*, *Cryptosporidium parvum*, *Entamoeba histolytica*) [14, 15]. The most common dermatoses seen in travelers include reactions to insect bites, allergic rash, superficial skin lesions (abrasion, animal bites, sunburns, and lesions from contact with marine animals, such as from jellyfish stings), pyodermas (purulent folliculitis, furuncles, and abscesses), and mycoses. Dermatoses are often divided into those not accompanied by fever (which are more common) and those that manifest with fever (skin rash characteristic of some viral infections, secondary bacterial pyodermas). The most commonly seen tropical dermatoses include cutaneous larva migrans, leishmaniasis, myiasis, and skin rash presenting in the course of a viral illnesses (dengue, chikungunya) [16–18]. Respiratory tract infections are often seen on group tours, in hotels, and on board planes and passenger ships. They usually take the form of upper respiratory tract infections (common cold, pharyngitis, tonsillitis, and sinusitis) with the clinical image resembling the infections commonly diagnosed in moderate climate zones. In the case of lower respiratory tract illnesses, such as pneumonia, the clinical signs are much more serious (fever, chest pain, cough, and dyspnea) and patients usually require hospitalization. The most common etiological factors responsible for the development of respiratory tract infections are viral (influenza and parainfluenza viruses, rhinoviruses, adenoviruses, and coronaviruses) and bacterial pathogens (*Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, *Haemophilus influenzae*). Tropical pathogens are rarely detected in patients with lower respiratory tract illnesses [19, 20]. Fevers of unknown origin (FUOs) are typically a sign of various parasitic or contagious diseases. In one out of three cases, the cause of a fever in travelers who have returned from tropical or subtropical destinations is malaria, and for this reason it should always be ruled out first. Other commonly seen tropical diseases that manifest

with persisting fever include dengue, hepatitis A, typhoid fever, bacterial diarrhea, acute schistosomiasis, and rickettsiosis. Fever may also be caused by conditions not associated with a hot climate, including pneumonia or pyelonephritis. Fever may also be associated with some dermatoses or skin injuries (skin rash in the course of a secondary bacterial infection, burns) [21, 22]. The majority of diseases manifest within several weeks after returning from a journey. However, there are certain illnesses whose incubation period is 6 weeks or longer; it is thus crucial that the physician takes a comprehensive medical history. In the case of febrile illnesses starting three weeks after returning from a journey, it is usually possible to rule out viral hemorrhagic fevers, dengue, and rickettsioses. A long incubation period may indicate cutaneous, mucocutaneous or visceral leishmaniasis, chronic forms of Chagas disease, chronic brucellosis, malaria, or schistosomiasis. Correct diagnosis depends greatly on the patient, who should inform the physician of conditions which could have led to the development of the disease, such as nonuse from antimalarial chemoprophylaxis (which should be taken for 7 to 28 days after returning from an endemic area), consumption of local food, casual sexual activities, injections or intravenous medications, animal bites, insect bites, and injuries. The omission or withholding of any such information, even if embarrassing, can make it difficult to find effective therapy, which, after all, is a priority for both the patient and the doctor [5].

## Conclusions

The considerable increase in the number of visits to [www.medycynatropikalna.pl](http://www.medycynatropikalna.pl) in recent years provides evidence of a growing interest in travel medicine and greater health awareness among travelers. The majority of website searches were for Asia, Africa, and Central America, which may suggest a growing interest in travel to tropical countries.

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Conflict of interest: The author declares no conflict of interests.

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