

# Is the knowledge of international travel health a legal obligation or a social and personal responsibility?

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## ABSTRACT

The preservation of health is a crucial aspect in the development of international travel. The aim of this literature review was to analyse the issues of travel-related health risks and the possibilities of prevention. As the destination changes, hazards differ. Health hazards depend on the cultural, infrastructural, technological, environmental aspects of tourists' locations. The process of health promotion helps travellers to gather necessary information about the destination and to accomplish a safe travel. By taking precautions and complying with safety requirements, travellers avoid the spread of diseases. The knowledge of international travel health is a legal obligation and an important responsibility for every traveller.

**Key words:** international travel, hazards, health promotion, travellers

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The objectives of the pre-travel consultation are to assess the traveler's trip plans and determine potential health hazards.

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## INTRODUCTION

Travel medicine is concerned with the prevention and treatment of travel-related disease [1]. The objectives of the pre-travel consultation are to assess the traveler's trip plans and determine potential health hazards [2]. The consultation includes information about the most important health risks, including traffic accidents [3]. This speciality is increasingly comprehensive and encompasses the epidemiology of travel-related infection, the pre-travel consultation with advice on prevention, vaccination, chemoprophylaxis and self-treatment during travel. In Europe, pre-travel preventive advice follows national guidelines or WHO recommendations [1].

The likelihood of disease and injury connected with the trip depends on traveller and itinerary specific factors [4]. The consultation should take place at least 4–8 weeks before the journey and preferably earlier if long-term travel or overseas work is envisaged. Travellers with underlying medical problems are strongly advised to consult a travel medicine clinic or medical practitioner to ensure that their potentially complex travel health needs are met [3].

## METHODS

Literature review and an analysis of the issue based on the current publications and agreed International Travel Health Controls to manage public health risks. Considering disease information, vaccination, travel health risks including: environmental risks, infectious disease & potential risks, accidental injury and speed of pan continental transmission including controls to minimise the global public health risks.

Systematic literature research including implications of international travel health and basic health hazard prevention. Evaluating the theory of correlation between legal obligations and the viewpoint on social and personal responsibility. The literature review includes articles with the publication year between 1994 and 2017. Articles are available at the online scientific service Web of Science.

## LITERARY ANALYSIS AND DISCUSSION

### Vaccination

Vaccinations are a principal measure of pre-travel preparation and they most probably constitute the most frequent reason for which an international traveller requests consultation prior to depart [5]. Travel vaccines include routine vaccines already incorporated in the national immunization program, required vaccines necessary for entry into certain countries and recommended vaccines whose recommendation depends on the risks of exposure at travel destination [3]. Risk assessment should be individualized on the basis of the epidemiological situation at destination, travel characteristics and traveller's characteristics. In addition, pre-travel consultation provides a timely opportunity for updating routine vaccinations [6]. The vaccines that may be recommended or considered for travellers are summarized in Table 1.

**Table 1:** Vaccines that may be recommended or considered for travellers [3]

CATEGORY	VACCINE
<b>1. Routine vaccination</b>	Diphtheria, tetanus, and pertussis Hepatitis B <i>Haemophilus influenzae</i> type b Human papillomavirus <sup>a</sup> Influenza <sup>b</sup> Measles, mumps and rubella Pneumococcal disease Poliomyelitis Rotavirus <sup>a</sup> Tuberculosis <sup>c</sup> Varicella
<b>2. Selective use for travellers to destinations of particular risks<sup>d</sup></b>	Cholera Hepatitis A <sup>e</sup> Japanese encephalitis <sup>e</sup> Meningococcal disease <sup>e</sup> Rabies Tick-borne encephalitis <sup>e</sup> Typhoid fever Yellow fever <sup>e</sup>
<b>3. Required vaccination</b>	Yellow fever Meningococcal disease against serogroups A, C, Y and W135 (Saudi Arabia demands proof of recent meningococcal vaccination (tetravalent vaccine) as a visa requirement for pilgrims and guest workers) and polio (required by Saudi Arabia for pilgrims)

a To date, introduced into the routine immunization programme of a limited number of countries.

b Routine vaccination for certain age groups and also for individuals belonging to certain high-risk groups.

c No longer routine in most industrialized countries.

d For diseases in this category a summary of vaccine recommendations and other precautions is provided.

e These vaccines are also included in the routine immunization programme in several high-risk countries.

## ENVIRONMENTAL RISKS

Travellers often experience abrupt and dramatic changes in environmental conditions, which may have detrimental effects on health and well-being. Travel may involve major changes in altitude, heat and humidity, and exposure to microbes, animals and insects. The negative impact of sudden changes in the environment can be minimized by taking simple precautions [3].

### Altitude

Altitude illness commonly affects unacclimatized individuals traveling to altitudes over 2500 m. The term refers to a number of diagnoses including acute mountain sickness, which is most common, as well as the more severe high altitude cerebral edema and high altitude pulmonary edema [7]. Acute mountain sickness symptoms are nonspecific, with the diagnosis being defined as the presence of headache plus one or more of the following: gastrointestinal upset (anorexia, nausea, or vomiting), sleep disturbance, dizziness, and fatigue in an individual recently arrived at altitude [8].

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Only a few conditions are contraindications for travel to altitude; they include unstable angina, pulmonary hypertension, severe chronic obstructive pulmonary disease and sickle-cell anaemia [3].

Travellers should avoid one-day travel to sleeping altitudes over 2750 m if possible and break the journey for at least one night at 2000–2500 m to help prevent acute mountain sickness. They must avoid overexertion and alcohol for the first 24 h at altitude and drink extra water. If direct travel to sleeping altitude over 2750 m is unavoidable, they should consider prophylaxis with acetazolamide. Travellers with pre-existing cardiovascular or pulmonary disease should seek medical advice before travelling to high altitudes [3].

### Heat and humidity

The mechanism by which heat impacts humans is complex, and although it is often treated as a sole product of temperature, in reality it is a result of the interactions between temperature, radiation, wind, and humidity. Despite its physiological importance, humidity is rarely the explicit focus in health impact studies [9]. Heat-related illnesses can manifest in occupations that demand a high amount of physical work in high ambient temperatures [10].

Consumption of salt-containing food and drink helps to replenish the electrolytes in case of heat exhaustion and after excessive sweating. Travellers should drink enough fluid to be able to maintain usual urine production. A daily shower using soap, wearing loose cotton clothing and applying talcum powder to sensitive skin areas help to reduce the development or spread of fungal skin infections. Travellers should avoid contact lenses in order to reduce the risk of eye problems [3].

### Foodborne diseases

The food chain has undergone considerable and rapid changes over the last 50 years, becoming highly sophisticated and international. Although the safety of food has dramatically improved overall, progress is uneven and food-borne outbreaks remain common in many countries [11].

Examples of diseases acquired through food and water consumption are travellers' diarrhoea, hepatitis A, typhoid fever and cholera [3]. Many infectious diseases, including a variety of gastrointestinal disorders, are contracted by individuals while travelling outside their country of residence [12]. As a result, someone can be exposed to a foodborne illness in one country and expose others to the infection in a location thousand of miles away from the original source of infection [12, 13].

In order to reduce the number of foodborne outbreaks, a regulatory international framework for food production and food safety has been developed over the last few years. European Union legislation on food hygiene focuses on the controls needed for public health protection and clarifies the responsibility of food business operators to produce food safely [14].

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Measures to prevent foodborne diseases include diet (foods and beverages to be avoided) and hygiene (boiling water or treating it with chlorine or iodine preparations, washing hands before eating) [15].

### **Waterborne diseases**

Waterborne diseases refer to any disease that can be transmitted through water, which is mainly via pathogen ingestion. However, many other potential transmission routes, such as eating food touched by an individual with soiled hands, drinking sewagecontaminated water, or contacting an infected individual during treatment in a hospital, may account for the spread of waterborne diseases [16].

Access to safe drinking water is essential to health, a basic human right and a component of effective policy for health protection. Travellers should avoid consumption or use of unsafe water, avoid unpasteurized juices, ice made from untreated water, salads or other uncooked meals. They should drink water that has been boiled, filtered or treated with chlorine or iodine and stored in clean containers, bottled water and beverages from sealed and tamper-proof containers, pasteurized juices and pasteurized milk [17].

### **Animals**

Animal bites have serious medical consequences including trauma, wound infection, exposure to rabies virus and social costs for the bitten individuals, and lead to thousands of deaths and injuries [18]. Taking care of animal bite-related injuries can provide useful information for planning and evaluation of public health interventions [19].

Rabies is the most important infectious health hazard from animal bites. In many developing countries, rabies is transmitted mainly by dogs, but many other mammalian species can be infected by the rabies virus [3].

Travellers should avoid direct contact with domestic animals in areas where rabies occurs, and with all wild and captive animals, behaviour that may startle, frighten or threaten an animal. A number of rabies-free countries have additional requirements. Before taking an animal abroad, the traveller should ascertain the regulatory requirements of the countries of destination and transit [3].

### **Snake bites**

Snake bite prevention suggests avoiding all contact with snakes, even if believed to be harmless or dead, wearing protective clothing (boots not open sandals, socks, long trousers) in undergrowth or deep sand, using a light at night. Travellers should sleep off the ground, under a well-tucked-in mosquito net or on a sewn-in groundsheet to prevent nocturnal bites [20].

### **Scorpion stings and spider bites**

Dangerously venomous scorpions inhabit deserts or hot dusty terrains. Dangerous spiders occur in the Americas, the Mediterranean, southern

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Africa and Australia. Travellers should use a permethrin-impregnated bed net, sleep off the ground, treat living quarters with insecticides and not walk bare-footed [21].

### **Aquatic bites and stings**

Many freshwater and marine venomous fish, including stingrays, catfish, weevers, scorpion fish and stonefish, have venomous stinging spines on their gills, fins or tail [20].

Prevention of aquatic bites and stings includes the observation of local advice and warning notices before entering the water. Wetsuits and footwear prevent sea snake bites and jellyfish stings.

### **Swimming pools**

The safety of swimming in pools is susceptible by a large variety of risks, including microbiological agents, chemical agents and technological and work related hazards [22]. The risk of illness or infection associated with swimming pools and similar recreational water environments is primarily associated with faecal contamination of the water. There are over 50 types of adenoviruses that have been linked to swimming pool outbreaks.

In some countries, it is common to shower before a swim. Showering will help to remove traces of sweat, urine, faecal matter, cosmetics, suntan oil and other potential water contaminants. Where pool users normally shower before swimming, pool water is cleaner, easier to disinfect with smaller amounts of chemicals and thus more pleasant to swim in [23].

### **Coastal and fresh waters**

In coastal waters, infection may result from ingestion or inhalation of, or contact with, pathogenic microorganisms, which may be naturally present, carried by people or animals using the water, or present as a result of faecal contamination [3].

Travellers should use life jackets where appropriate, pay attention to, and seek information from local residents regarding, tides and currents, and avoid outlets in spas and swimming pools. They should ensure constant adult supervision of children in or near recreational waters, including small volumes of water and avoid consumption of alcohol before any activity in or near water [3].

### **Parasites**

A parasite is an organism that lives on or in a host organism and gets its food from or at the expense of its host. There are three main classes of parasites that can cause disease in humans: protozoa, helminths, and ectoparasites.

Travellers should avoid walking barefoot, as parasites can enter intact or damaged skin [24].

## INFECTIOUS DISEASES AND POTENTIAL RISKS

Infectious diseases constitute one important aspect of travel associated risks. Despite possibilities of prevention by means of vaccinations and other preventive measures, vaccine preventable diseases remain an important contributor to morbidity in travellers [25].

Travellers as tourists or occupational travellers will encounter a range of infectious agents at the destination that differ greatly from those of home especially when visiting low income, tropical countries [1].

### Zoonotic diseases

Zoonotic diseases are described as those diseases transmitted from animals to humans. While the transmissive stages of zoonoses can be transmitted directly (e.g. by animal human contact or through contact with contaminated faeces, soil and herbage), they can also be transmitted through contaminated water and food [26].

The risk of infection can be reduced by avoiding close contact with any animals – including wild, captive and domestic animals in places where infection is likely to be present. Particular care should be taken to prevent children from approaching or touching animals [3].

### Sexually transmitted infections

Sexually Transmitted Diseases (STDs) are diseases that are passed on from one person to another through sexual contact, and sometimes by genital contact – the infection can be passed on via vaginal intercourse, oral sex, and anal sex [27].

The risk of infection can be reduced by avoiding casual and unprotected sexual intercourse and by use of condoms [3].

### Bloodborne diseases and diseases transmitted via soil

Bloodborne diseases are transmitted by direct contact with infected blood or other body fluids. The risk of infection can be reduced by avoiding direct contact with blood and body fluids. Soil-transmitted diseases include those caused by dormant forms (spores) of infectious agents, which can cause infection by contact with broken skin. The risk of infection can be reduced by protecting the skin from direct contact with soil in places where soil-transmitted infections are likely to be present [3]. The risk of contracting a soil-transmitted disease can be high when getting a tattoo abroad. Travellers should make sure that all tattoo equipment is fully sealed, within date, sterilised and opened in front of them.

### Airborne diseases

People encounter and have contacts with others in conducting activities or traveling; thus, they may become infected with air-borne viruses when epidemics are prevalent [28]. Airborne transmission occurs when droplet nuclei  $<5 \mu\text{m}$  in size are disseminated in the air and breathed in. Droplets are usually generated by the infected individual during coughing, sneezing or talking [3].

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The probability that a susceptible person becomes infected during a visit to a sublocation depends on: how many infectious persons co-occupy the room, how long each contact lasts, the type of activity, and the infectiousness category of the infectious person [28].

## ACCIDENTAL INJURY

Unintentional injury is a global public health problem. Reasons for the increasing public health importance of injury include the decline of infectious disease, the processes of urbanization, industrialization, motorization, and increased opportunities to travel [29].

Motor vehicle crashes, drownings, aircraft crashes, homicides, and burns can cause fatal injury deaths to travelers. Injuries to travelers are not random events. As with other health problems such as infectious diseases, injuries are preventable. Injury prevention and control is a science with fundamental principles and a growing knowledge base [30].

### Traffic injury

Road traffic injuries constitute a major public health and development crisis, and are predicted to increase if road safety is not addressed adequately [31].

Precautions in the countries to be visited include obtaining information on the regulations governing traffic and vehicle maintenance and on the state of the roads. Travellers should not drive after drinking alcohol, drive within the speed limit at all times, always wear a seat-belt. In addition, travelers driving vehicles abroad should make sure they carry their personal driving licence as well as an international driving permit and that they have full insurance cover for medical treatment of injuries [3].

### Drownings

Drowning is an important public health issue with major impacts on children and youth. Drowning is preventable. Lack of barriers controlling exposure to water bodies and lack of adequate, close supervision for infants and young children are a drowning risk, as are poor swim skills and low awareness of water dangers. In addition, high-risk behaviour, including consuming alcohol while engaging with water, is a risk among young people and adults. Other risk factors are transport on water and water crossings, lack of safe water supply, and flood disasters [32].

## SPEED OF PAN CONTINENTAL TRANSMISSION

Today's highly mobile, interdependent and interconnected world provides myriad opportunities for the rapid spread of diseases. A number of factors have underscored the fact that infectious disease events in one country may be of potential concern for the entire world. These factors include: increased population movements; growth in international trade in food; biological, social and environmental changes linked with urbanization; deforestation; alterations in climate; and changes in meth-



ods of food processing, distribution and consumer habits. Consequently, the need for international cooperation in order to safeguard global health has become increasingly important. It is critical that all countries have the capacity to detect, assess, and respond to public health events. They will then be able to contain the spread of diseases within their borders, thus minimizing the international spread of diseases [33].

Keeping healthy is not only a common personal priority and a moral issue, but it is also a legal obligation.

## CONCLUSION

Information, epidemiological data and surveillance are fundamental to obtain reliable information about the local health status and to prevent potential health problems. Vaccination entry requirements, road traffic safety requirements, food safety requirements and other specifications confirm the importance of public health. By taking simple precautions, that are described in this essay, travellers avoid plenty of risks and prevent the spread of diseases. Every traveller should travel safely and should be responsible for protecting the health of others and his own health. Keeping healthy is not only a common personal priority and a moral issue, but it is also a legal obligation.

## REFERENCES

- [1] Schlagenhauf P, Weld L, Goorhuis A, et al. Travel-associated infection presenting in Europe (2008–12): an analysis of EuroTravNet longitudinal, surveillance data, and evaluation of the effect of the pre-travel consultation. *The Lancet Infectious Diseases* 2015; 15 (1): 55-64.
- [2] CENTERS FOR DISEASE CONTROL AND PREVENTION, et al. *CDC health information for international travel 2014: The yellow book*. Oxford University Press, 2013.
- [3] WORLD HEALTH ORGANIZATION. *International travel and health: situation as on 1 January 2012*. World Health Organization, 2012.
- [4] Bazemore AW, Huntington M. *The pretravel consultation*. *Am Fam Physician* 2009; 80 (6): 15.
- [5] Lau S, Gherardin T. *Travel vaccination 2007*. *Aust Fam Physician* 2007; 36: 304e.
- [6] The Pretravel Consultation – Chapter 2. *Centers for Disease Control and Prevention*. [online]. 2017. [Accessed 24 March 2017]. Available from: <https://wwwnc.cdc.gov/travel/yellowbook/2016/the-pre-travel-consultation/the-pre-travel-consultation>.
- [7] Basnyat B, Murdoch DR. High-altitude illness. *The Lancet*, 2003, 361.9373: 1967-1974.
- [8] Hackett PH, Roach RC. High-altitude illness. *New England Journal of Medicine* 2001; 345 (2): 107-114.
- [9] Davis RE, McGregor GR, Enfield KB. Humidity: a review and primer on atmospheric moisture and human health. *Environmental research* 2016; 144: 106-116.
- [10] Bonauto D, Anderson R, Rauser E, et al. Occupational heat illness in Washington State, 1995–2005. *American journal of industrial medicine* 2007; 50 (12): 940-950.
- [11] WORLD HEALTH ORGANIZATION, et al. *The world health report 2007: a safer future: global public health security in the 21st century 2007*.
- [12] Ravel A, Nesbitt A, Marshall B, et al. Description and Burden of Travel-Related Cases Caused by Enteropathogens Reported in a Canadian Community. *Journal of travel medicine* 2010; 18 (1): 8-19.

- [13] Käferstein FK, Motarjemi Y, Bettcher DW. Foodborne disease control: a transnational challenge. *Emerging infectious diseases* 1997; 3 (4): 503.
- [14] Balzaretta CM, Marzano MA. Prevention of travel-related foodborne diseases: Microbiological risk assessment of food handlers and ready-to-eat foods in northern Italy airport restaurants. *Food control* 2013; 29 (1): 202-207.
- [15] Hill DR, Ryan ET. Management of travellers' diarrhoea. *Bmj* 2008; 337: a1746.
- [16] Wang Y, Cao J. Global stability of a multiple infected compartments model for waterborne diseases. *Communications in Nonlinear Science and Numerical Simulation* 2014; 19 (10): 3753-3765.
- [17] WORLD HEALTH ORGANIZATION. *Guidelines for drinking-water quality*. World Health Organization 2004.
- [18] Wunner WH, Briggs DJ. Rabies in the 21st century. *PLoS neglected tropical diseases* 2010; 4 (3): e591.
- [19] Emet M., et al. Animal-related injuries: epidemiological and meteorological features. *Annals of agricultural and environmental medicine* 2009; 16 (1): 87-92.
- [20] Warrell DA. Treatment of bites by adders and exotic venomous snakes. *Bmj* 2005; 331 (7527): 1244-1247.
- [21] Warrel DA. *Venomous animals*. *Medicine* 2007; 35(12): 659-662.
- [22] WORLD HEALTH ORGANIZATION, et al. *Guidelines for safe recreational water environments. Volume 1: coastal and fresh waters*. World Health Organization 2003.
- [23] WORLD HEALTH ORGANIZATION, et al. *Guidelines for safe recreational water environments. Volume 2: Swimming pools and similar environments*. World Health Organization 2006.
- [24] CDC – Parasites – About Parasites. *Centers for Disease Control and Prevention*. [online]. 2016. [Accessed 1 April 2017]. Available from: <https://www.cdc.gov/parasites/about.html>.
- [25] Boggild AK, Castelli F, Gautret P. Vaccine preventable diseases in returned international travelers: results from the GeoSentinel Surveillance Network. *Vaccine* 2010; 28 (46): 7389-7395.
- [26] Slifko TR, Smith HV, Rose JB. Emerging parasite zoonoses associated with water and food. *International journal for parasitology*. 2000; 30 (12): 1379-1393.
- [27] Nordqvist C. Medical News Today. *Sexually transmitted diseases (STDs): Types and symptoms*. [online]. 2015. [Accessed 1 April 2017]. Available from: <http://www.medicalnewstoday.com/articles/246491.php>.
- [28] Eubank S., et al. Modelling disease outbreaks in realistic urban social networks. *Nature* 2004; 429 (6988): 180-184.
- [29]McInnes RJ, Williamson LM, Morrison A. Unintentional injury during foreign travel: a review. *Journal of travel medicine* 2002; 9 (6): 297-307.
- [30] Hargarten SW. Injury prevention: a crucial aspect of travel medicine. *Journal of Travel Medicine* 1994; 1 (1): 48-50.
- [31] Peden, M. World report on road traffic injury prevention 2004.
- [32] WORLD HEALTH ORGANIZATION, et al. *Global report on drowning: preventing a leading killer*. World Health Organization, 2014.
- [33] WORLD HEALTH ORGANIZATION, et al. International Health Regulations (2005): Areas of work for implementation 2007.