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Risk factors and pre-travel healthcare of international travellers attending a Dutch travel clinic: A cross-sectional analysis

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Summary *Background:* The number of international travellers is currently estimated to exceed one billion annually. To address travel related health risks and facilitate risk reduction strategies, detailed knowledge of travellers' characteristics is important.
Method: In this cross-sectional study, data of a 20% sample of travellers visiting the Academic Medical Center (AMC) travel clinic Amsterdam from July 2011 to July 2012 was collected. Itineraries and protection versus exposure rates of preventable infectious diseases were mapped and reported according to STROBE guidelines.
Results: 1749 travellers were included. South-Eastern Asia, South-America and West-Africa were most frequently visited. 26.2% of the population had pre-existing medical conditions (often cardiovascular). Young and VFR travellers had a longer median travel time (28 and 30 days) compared to the overall population (21 days). Young adult travellers were relatively often vaccinated against hepatitis B (43.9% vs. 20.5%, $p < .001$) and rabies (16.6% vs. 4.3%, $p < .001$). VFRs were less often vaccinated against hepatitis B (11.6% vs. 30.6%, $p < .001$) and rabies (1.3% vs. 9.0%, p .012) compared to non-VFR travellers.
Conclusions: Pre-travel guidelines were well adhered to. Young adult travellers had high-risk itineraries but were adequately protected. Improvement of hepatitis B and rabies protection would be desirable, specifically for VFRs.
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Background

Travel medicine clinics are important for prevention of travel-related diseases by providing pre-travel advice, vaccines, prophylactics and other preventive measures to travellers.

With the advent of air travel, which improved ease and speed of longer-distance journeys, the risk of transmission and acquisition of travel-related diseases has increased annually. International departures from Dutch airports increased from 16.5 million to 18.4 million between 2002 and 2010 [1]. Globally, the World Tourism Organization estimates the number of annual international travellers to exceed one billion [2] and this number continues to increase. Infectious diseases constitute one important aspect of these 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 [3].

The Academic Medical Center's Center of Tropical and Travel Medicine houses one of the largest travel clinics in the Netherlands. Travel related health risks differ for each individual depending on person, travel style, destination and duration. Although extensive guidelines tailored to needs of various groups exist [4], it remains essential to monitor clinical practice and to continuously improve pre-travel health care.

Objective

The aim of this study is to describe travellers' characteristics and to identify potential travel related risks with regard to itinerary and travel preparations for travellers visiting AMC travel clinic.

Methods

We report according to STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) guidelines, which is an international initiative to improve quality of reporting of medical literature [5].

Study design and setting

In this cross-sectional study, we collected pre-travel data at the travel clinic (Center of Tropical Medicine and Travel Medicine) of the Academic Medical Center, (Amsterdam, The Netherlands).

From July 2011 to July 2012, 8.745 travellers visited the clinic. Every fifth traveller was included according to chronology of visits, resulting in a total sample of 1.749 travellers (See Appendix 1 for group size calculation). Inclusion criteria were a visit to the travel clinic and planned travel. Travellers with repeated visits were only included once. Unspecified travel destinations (of i.e. airline personnel) were documented as 'unknown'.

Data collection

A pre-travel questionnaire was filled in by travellers prior to consultation, elaborating on demographic details (sex, age, nationality); medical history (chronic diseases, treatments, allergies, obstetric conditions). and travel itinerary details (date of clinic visit, date of departure, destination(s), duration, purpose(s)). Details on vaccination and chemoprophylaxis prescriptions were collected from Orion Globe 7.6.0, an electronic database (WKM Business Software BV, Assen, the Netherlands).

Primary and secondary outcomes

Our primary outcome measure was protection to exposure ratio (P/E) for each vaccination and for malaria chemoprophylaxis. Our secondary outcome measures were duration between clinic visit to departure and travel duration.

Definitions and measurements

P/E was defined as number of protected travellers (P), divided by total number of travellers to countries where the disease is endemic (E) according to Dutch national guidelines on travel advice [4]. Malaria and yellow fever-endemic countries were classified into (1) countries where protection is invariably recommended and required, respectively; and (2) countries where protection is recommended under specific (seasonal or other) conditions.

Vaccinations against low incidence/high impact diseases (rabies, meningo-encephalitis, Japanese encephalitis, tick-borne encephalitis and hepatitis B) are not indicated for all travellers but rather for those with specific high risk itineraries or those with risk—prone activities. Often, information about these risks is lacking. In order to provide a complete overview of all vaccinations, we included these diseases in our analyses irrespective of risk itineraries or activities.

Protection was defined as having immunity (pre-existing antibodies, a valid immunization or prescribed chemoprophylaxis) on date of departure.

We documented vaccinations that, according to manufacturers' Summary of Product Characteristics (Appendix 2) were still valid on date of departure and defined this as pre-existing immunity. Immunizations given during pre-travel consultation were defined as 'provided immunity' [6].

Geographic destinations were classified into regions according to grouping of member states of the World Health Organization. Different from this grouping, three distinct regions (South America, Central America, and the Caribbean) were (geographically incorrect) clustered under "South America", i.e. the Americas located south of the USA. Mexico was included in the Central America region.

We defined several groups for which travel related risks might differ from the general population: young adult travellers, older travellers, travellers with a pre-existing medical condition, immune compromised travellers and VFR travellers. Young adult travellers (travellers between 18 and 30 years old) may be at risk due to risk seeking behaviour such as backpacking, consuming open drinks and street food and lower compliance with antimalarial chemoprophylaxis [7]. Also, there may be fewer financial

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