Profile of Travelers With Preexisting Medical Conditions Attending a Specialist Travel Medicine Clinic in Ireland

Calvin Teo Jia Han,∗† and Gerard Flaherty, MD∗†

∗Department of Medicine, School of Medicine, National University of Ireland, Galway, Ireland; †School of Medicine, International Medical University, Kuala Lumpur, Malaysia

DOI: 10.1111/jtm.12221

Background. Patients with complex medical comorbidities travel for protracted periods to remote destinations, often with limited access to medical care. Few descriptions are available of their preexisting health burden. This study aimed to characterize preexisting medical conditions and medications of travelers seeking pre-travel health advice at a specialized travel medicine clinic.

Methods. Records of travelers attending the Galway Tropical Medical Bureau clinic between 2008 and 2014 were examined and information relating to past medical history was entered into a database. Data were recorded only where the traveler had a documented medical history and/or was taking medications.

Results. Of the 4,817 records available, 56% had a documented medical history and 24% listed medications. The majority of travelers with preexisting conditions were female. The mean age of the cohort was 31.68 years. The mean period remaining before the planned trip was 40 days. Southeast Asia was the most popular single destination, and 17% of travelers with medical conditions were traveling alone. The most frequently reported conditions were allergies (20%), insect bite sensitivity (15%), asthma (11%), psychiatric conditions (4%), and hypertension (3%). Of the 30 diabetic travelers, 14 required insulin; 4.5% of travelers were taking immunosuppressant drugs, including corticosteroids. Half of the female travelers were taking the oral contraceptive pill while 11 travelers were pregnant at the time of their pre-travel consultation.

Conclusions. This study provides an insight into the medical profile of travelers attending a travel health clinic. The diverse range of diseases reported highlights the importance of educating physicians and nurses about the specific travel health risks associated with particular conditions. Knowledge of the effects of travel on underlying medical conditions will inform the pre-travel health consultation.

There has been a dramatic increase in the number of individuals embarking on international travel in recent years, with over a billion people traveling beyond their country’s borders in 2012 alone.1 With the ease and convenience of modern international transportation, chronic medical conditions no longer present significant barriers to international travel. Patients with complex medical comorbidities may travel for protracted periods to remote destinations, often with limited access to high quality medical care. The risk of travel-related infectious diseases is 2.3 times greater in travelers with underlying immunosuppressing medical conditions when compared with healthy travelers.2 Travelers taking immunosuppressive drugs report more travel-related skin infections than do their unaffected traveling companions.3 In many cases, travelers do not protect themselves by obtaining appropriate medical travel insurance.

It is essential that travelers with chronic illnesses are well controlled and that their illness management has been optimized prior to travel.4 In the case of some conditions, patient education with respect to self-care during travel may need to be emphasized, a health plan devised, and a comprehensive travel health kit assembled. The timing of the pre-travel consultation is even more critical for the traveler with an underlying chronic medical condition, to ensure that there is adequate time to respond to vaccinations as some immune-compromising conditions and agents, and even immune-senescence brought on by advancing age, may impair the antibody response to vaccinations.5

Some chronic medical conditions, such as chronic obstructive pulmonary disease and coronary heart disease, may decompensate during commercial air travel and fitness to fly issues may arise, necessitating advance
Travel With Preexisting Medical Conditions

Patients taking prescribed medications need to be advised to transport their medications safely and legally and to pack double the normal amount in case of lost baggage. In the case of some medications, such as insulin, time zone differences will prompt an alteration in the timing and doses of medication administered.

The difficulties faced by travelers in accessing medical care with or without medical insurance are significant, and organizations including the International Association for Medical Assistance to Travelers provide reassuring guidance to travelers and their physicians in such circumstances. Travelers being managed for potentially fatal medical conditions or with severe anaphylaxis to foods, drugs, or venom should be advised to wear medical alert bracelets. Many medical conditions and recent surgery increase the risk for traveler's thrombosis and long-haul travelers will need to be carefully counseled regarding the recognition of deep vein thrombosis and pulmonary embolism, and the importance of hydration, wearing loose-fitting clothing, and mobilizing at frequent intervals during prolonged travel.

In its published recommendations for the practice of travel medicine, the Faculty of Travel Medicine stipulates that it is a standard of good practice that the travel medicine practitioner “determines the relevance of preexisting health problems to the traveler’s itinerary/destination and tailors risk assessment and risk management advice accordingly.” To achieve this standard of care, the travel health provider must have a reasonable working knowledge of the travel health-related issues, which may result from specific chronic medical conditions.

However, the published research literature on this subject is limited, and few descriptions are available of the actual chronic illness burden of international travelers. The present study aimed to characterize the profile of preexisting medical conditions and current medications among a cohort of travelers seeking pre-travel health advice and medical preparation in a specialized travel medicine clinical setting.

Methods

The pre-travel medical registration cards of travelers attending the Tropical Medical Bureau (TMB) between 2008 and 2014 were examined. TMB is a specialized travel medicine clinic in Galway city, which currently receives approximately 120 traveling clients per month. Information in a panel relating to the past medical and surgical history of subjects was extracted and entered into an IBM SPSS Statistics v21.0 database (IBM, Armonk, NY, USA) database. This panel lists options to select a range of common medical conditions, including items of particular relevance to travel vaccination, including immunocompromised state and egg allergies. A separate section of the registration card provides space for travelers to expand on any conditions selected and list additional comorbidities, either intermittent or in their past medical history. Data were recorded only where the traveler had a documented medical history and/or was taking prescribed medications for chronic or intermittent illnesses. Data pertaining to the travel itinerary, including the intended destinations (countries or regions), and patient demographic information were also documented. No comparison was made between “healthy” travelers and travelers with preexisting medical conditions as it was beyond the scope of the research question. Ethics committee approval was obtained for this retrospective study from the local clinical research ethics committee.

Results

Of the 4,817 records available, 56% (n = 2,702) of travelers had a documented past medical history, and 32% (n = 1,525) were taking prescribed medication at the time of travel. Almost a third of eligible subjects (n = 863) reported more than one personal medical condition. The majority of travelers with preexisting conditions were female (67%, n = 1,820). The mean age of the cohort was 31.68 (±12.2) years. The mean period remaining before the planned departure date was 40 (±32) days. The most frequent duration of travel was 2 to 4 weeks (30%, n = 803), with travelers planning travel of widely varying durations, from <2 weeks (28%, n = 754) to 4 years (0.1%, n = 2). Hotel accommodation was the most popular single accommodation type in this group, but 35% of travelers expressed an intention to stay in more than one accommodation setting, including hostel, camping, and cruise ship travel (Figure 1). More than a third of travelers with preexisting conditions were traveling to multiple international regions (Figure 2), with Southeast Asia being the most popular single regional destination (18%, n = 477). The most frequently cited purpose of travel (Figure 3) was a holiday (58%, n = 1,561). More than 400 travelers with medical conditions were traveling alone (17%, n = 404).

A total of 200 distinct medical conditions were declared on their medical registration cards by the travelers in this study. The most frequently reported medical conditions in this cohort (Table 1) were allergies (20%, n = 541), insect bite sensitivity (15%, n = 415), asthma (11%, n = 300), photosensitivity (5%, n = 135), psychiatric conditions (4%, n = 110), and hypertension (3%, n = 78). Of the 30 diabetic travelers, nearly half required insulin (n = 14). Seventeen travelers reported being immunocompromised, while 125 subjects (4.5%) were currently taking immunosuppressant drugs, including corticosteroids (Figure 4). Half of the female travelers were taking the oral contraceptive pill (OCP) at the time of their pre-travel consultation. Other frequently used medications included inhalers (7%, n = 186) and blood-thinning medications (1.3%, n = 34). Eleven travelers were pregnant at the time of their travel health consultation.

J Travel Med 2015; 22: 312–317
Discussion

This study is the first of its kind in Ireland to examine the medical burden of international travelers in an effort to better prepare travel health advisers for their responsibility of providing specific preventive information to these vulnerable travelers. A majority of travelers who attended the travel medicine clinic during the 6-year period of the study reported at least one preexisting medical condition on their traveler medical registration card upon arrival at the clinic. The travel medicine physician corroborates this information in the context of a comprehensive travel health consultation and records additional information, if any, on both the registration card and in a specially designed electronic medical record. Access to the computerized records was beyond the scope of the current study but in the experience of the researchers, most medical information relating to the traveler was captured on the registration cards.

Profile of Preexisting Illness

In the present study, 56% of travelers had a documented medical condition, compared to 18%,11 12.4%,12 and 17.9%,13 as reported in previous studies. This may partly be explained by the detailed nature of the proforma pre-travel medical registration card that lists a wide range of medical conditions. More than a third of eligible travelers had more than one medical condition, and more than half of the travelers were taking prescribed medications at the time of their pre-travel consultation. Hochberg and colleagues13 found that 17.9% of travelers attending clinics in the greater Boston area were high risk, 23.3% were immunocompromised, 74.3% had comorbid medical conditions, and 2.5% were pregnant women. The authors concluded that travelers presenting with complex medical histories would benefit from assessment by a travel medicine specialist. Van De Winkel and colleagues, in a prospective study of 2,227 travelers presenting to a travel clinic in Belgium, reported that travelers with risk factors, immunosuppression, medication usage, pregnancy, or advanced age comprised 12.4% of their cohort. The authors analyze the extent to which pre-travel health advice was modified in response to these factors. They concluded that it is important for travel health providers to be appropriately informed about such risk groups so that they can adapt their advice accordingly.12

Our findings are particularly noteworthy given that the mean age of travelers in this study was 32 years. The median age of travelers with preexisting conditions in the earlier studies by Hochberg and colleagues13 and Van De Winkel and colleagues12 was higher than that in our study at 47 and 39 years, respectively. Whether older travelers in Ireland have a preference for attending their family doctors for travel health advice because of their familiarity with the patient’s medical history and medication list cannot be determined from the findings of this study, but if this were a factor, then the true medical illness burden of international travelers is likely to be underestimated by this study.

It is reassuring that the mean length of time remaining before departure was 40 days in this study, which allows the traveler’s medical condition to be optimized before travel. Stienlauf and colleagues11 concluded from a retrospective analysis of travelers to developing countries that the presence of chronic medical illnesses in
Table 1 Principal intercurrent and chronic medical conditions among cohort of travelers

<table>
<thead>
<tr>
<th>Disease category</th>
<th>Frequency, n (%)</th>
<th>Specific conditions, if reported by patient</th>
<th>Frequency, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hay fever</td>
<td>637 (23.6)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Allergies</td>
<td>541 (20)</td>
<td>Penicillin</td>
<td>161 (6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other drugs</td>
<td>121 (4.5)</td>
</tr>
<tr>
<td>Respiratory conditions</td>
<td>525 (19.4)</td>
<td>Asthma</td>
<td>486 (18)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pneumonia</td>
<td>11 (0.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previous tuberculosis</td>
<td>7 (0.3)</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>345 (12.8)</td>
<td>Varicose veins</td>
<td>170 (6.3)</td>
</tr>
<tr>
<td>Insect bite sensitivity</td>
<td>415 (15.4)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Photosensitivity</td>
<td>135 (5)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Psychiatric disorders</td>
<td>110 (4.1)</td>
<td>Depression</td>
<td>74 (2.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anxiety</td>
<td>22 (0.8)</td>
</tr>
<tr>
<td>Previous surgery</td>
<td>73 (2.7)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>59 (2.2)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Infectious jaundice</td>
<td>58 (2.1)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Musculoskeletal disorders</td>
<td>58 (2.1)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Neurological disease</td>
<td>58 (2.1)</td>
<td>Migraine</td>
<td>24 (0.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Epilepsy</td>
<td>22 (0.8)</td>
</tr>
<tr>
<td>Skin conditions</td>
<td>51 (1.9)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Gastrointestinal disease</td>
<td>48 (1.7)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Previous tropical infections</td>
<td>48 (1.7)</td>
<td>Malaria</td>
<td>4 (0.1)</td>
</tr>
<tr>
<td>Reproductive issues</td>
<td>34 (1.3)</td>
<td>PCOS</td>
<td>11 (0.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pregnancy</td>
<td>11 (0.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endometriosis</td>
<td>6 (0.2)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>30 (1.1)</td>
<td>Type 1</td>
<td>10 (0.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type 2</td>
<td>5 (0.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not specified</td>
<td>15 (0.6)</td>
</tr>
<tr>
<td>Ear, nose, and throat problems</td>
<td>26 (1.0)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A = not applicable, ie, supplemental information was not provided by travelers.
PCOS = polycystic ovary syndrome.

Travelers had little impact on travel itinerary, but a shorter travel duration was observed in travelers who were taking long-term medications. Their retrospective cohort study of travelers with chronic illnesses visiting developing countries identified endocrine/metabolic, cardiovascular, and respiratory illnesses as the major preexisting medical conditions while the present study reveals a higher proportion of allergies and psychiatric disorders and a lower relative occurrence of endocrine/metabolic conditions.11

In our study, more than a third of travelers with preexisting medical conditions intended to visit multiple global regions on their upcoming trip, which increases their exposures to various communicable diseases and other health and safety threats. Southeast Asia was the most popular single destination in this group and is a region with numerous travel health risks, including vector-borne diseases such as dengue and malaria, rabies, travelers’ diarrhea, envenomations, personal safety and security risks, drowning risks, and heat injury. Of particular interest was the finding that nearly one in five of all travelers with chronic medical illnesses did not have a traveling companion, which may expose them to isolation from prompt medical attention in the event of an emergent illness. Our observation that more than a third of travelers intended to use multiple accommodation options that included camping, and the finding that 17% of our travelers with preexisting medical conditions were traveling without a partner, underscores the vulnerability of this patient group and the possibility that they may be isolated from medical care in the event of incapacity due to decompensation of their illness.

A wide range of medical conditions, of varying severity, was revealed in this retrospective analysis. Allergies were commonly represented with more than 1 in 10 of the travelers being allergic to a drug. Insect bite sensitivity was also frequently reported. This can lead to severe local skin reactions and secondary soft tissue infections but may conceivably promote greater insect bite avoidance behavior in travelers. It was not surprising to find that 1 in 20 of the travelers were photosensitive given that the majority of clients attending the clinic were Irish Caucasian. Asthma was particularly common in this cohort but less than one in every two asthmatics reported use of an inhaler. Asthma symptoms in patients with severe refractory disease may paradoxically improve at altitude,14 but the high levels of environmental air pollution in many developing countries and the...
A recent study of the travel-related diseases reported by young adults with type 1 diabetes mellitus revealed satisfactory glycemic control during their travels.\textsuperscript{18}

**Travelers’ Medication Usage**

The risk of interactions between travelers’ medications and drugs used for malaria chemoprophylaxis and prevention of travelers’ diarrhea must be considered by travel health practitioners. There may also be unanticipated local dietary effects on oral anticoagulants such as warfarin,\textsuperscript{19} which will need to be factored into the traveler’s preparations.

Patients on immunosuppressant drugs such as corticosteroids were well represented in this study. The travel medicine practitioner must provide accurate specialized advice with regard to the likely immunogenicity of inactivated vaccines, the potential risks of unchecked viral replication from inadvertent administration of live vaccines, and the potential for acquiring opportunistic infections in this patient population.\textsuperscript{20} One in every two female travelers was taking the OCP in this cohort, a finding that should focus travel medicine physicians’ attention on the need to provide appropriate advice regarding prevention of venous thromboembolism, as well as counseling regarding the disputed interactions between doxycycline for malaria chemoprophylaxis and the OCP.\textsuperscript{21} A small number of pregnant travelers presented for pre-travel counseling during this 6-year period. Most travel vaccines and all live vaccines are relatively contraindicated in pregnant women and the risks of venous thromboembolism, of developing severe malaria, and of antenatal complications resulting from malaria infection make this a particularly vulnerable group of travelers who sometimes should be advised to defer their travel plans until they have delivered.\textsuperscript{22}

**Limitations of Study**

This study, though it provides a valuable cross-sectional view of the medical burden of international travelers, is limited by the fixed structure of the medical registration card, which was developed many years previously by the medical director of the travel medicine clinic. The format of the registration card had not been modified during the period under study. Since the traveler completes the card without prompting or guidance, it is possible that inaccurate information may sometimes be recorded owing to recall bias, but this is generally corrected during the consultation by the travel medicine physician, who pays particular attention to any listed medical condition or medication that may impact on travel. The section that allows the traveler to expand the medical history, or provide supplemental clinical information, is helpful in ensuring that no relevant medical data have been omitted. Given that only the declared or elicited medical history was recorded on the patient registration card, it is possible that the travelers in this cohort may have a higher true burden of undocumented medical problems.
Conclusion

This study provides a detailed insight into the medical profile and medication usage of travelers attending a travel health clinic. A diverse range of diseases was reported, which highlights the importance of educating travel medicine physicians about the specific health risks associated with particular conditions. The importance of providing relevant preventive advice to travelers is supported by the study findings. This is particularly critical in the case of individuals who travel alone or whose conditions and medications present particular challenges during travel.

Acknowledgments

The authors are grateful to Dr Graham Fry, Mr Andrew Lewis, and Ms Laura Nolan of the TMB travel medicine clinic in Galway, Ireland. The authors also acknowledge the statistical advice provided by Ms Gloria Avalos of the School of Medicine, National University of Ireland, Galway. One of the authors (C. T. J. H.) was supported by an unrestricted educational grant received from the Travel Medicine Society of Ireland.

Declaration of Interests

Both authors state that they have no conflicts of interest to declare.

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