

# Pre- and Post-Travel Medical Consultations



Deborah J. Mills , Lani Ramsey , and Luis Furuya-Kanamori 

**Abstract** This chapter reviews the main topics that should be covered in a pre-travel medical consultation, noting that what the traveller might think is important may not necessarily correspond to what is needed for the best protection of their health and wellbeing during the journey. Pre-departure travel medicine excellence is not just knowing which vaccine is required, but also planning how best they can be administered and recorded, how to encourage safer health behaviours, advising on medical supplies, and gathering the evidence for constant improvement in outcomes for all types of travellers. We also describe the main travel-related illnesses that a health provider may encounter during a post-travel consultation. The cessation of most international travel, resulting from worldwide measures to contain the COVID-19 pandemic, presents particular challenges to travel medicine providers, especially those more specialised. In this chapter, we also discuss how the requirements of the *new normal* may impact pre- and post-travel medical consultations.

**Keywords** Travel medicine · Pre-travel consultation · Vaccinations · Health advice · COVID-19

---

D. J. Mills (✉)  
Dr Deb The Travel Doctor, Brisbane, QLD, Australia  
e-mail: [email@drdeb.com.au](mailto:email@drdeb.com.au)

L. Ramsey  
Travel-Bug Vaccination Clinic, Adelaide, SA, Australia

L. Furuya-Kanamori  
Australian National University, Canberra, Australia

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2021

J. Wilks et al. (eds.), *Tourist Health, Safety and Wellbeing in the New Normal*,  
[https://doi.org/10.1007/978-981-16-5415-2\\_3](https://doi.org/10.1007/978-981-16-5415-2_3)

## Introduction

A pre-travel health consultation is a visit to a medical provider with the goal of the traveller accessing the advice and services necessary to protect their health during overseas or international travel. In the early 1980s, travel medicine education of doctors was limited, perhaps delivered as one lecture in a six-year medical program. Consumer demand inspired travel providers British Airways and Trailfinders to operate specialised travel medicine services for their passengers in London. Since that time, a great deal of development and fine-tuning of the pre-travel health consultation has occurred. The International Society of Travel Medicine (ISTM) was formed in 1991, and the tireless efforts of ISTM founders and members have catalysed this progress. Knowledge was shared at specialist conferences and research was inspired, which led to steady advances in understanding the type of health problems befalling travellers, and as a consequence, what could be done to decrease those risks. Gradually these conferences spawned textbooks. Now up-to-date research findings are published in well-respected journals including the ISTM's own *Journal of Travel Medicine*.

The health of all manner of different travellers has been investigated and consultations consequently fine-tuned; business travellers, student travellers, holidaymakers, and travellers visiting friends and relatives (VFR) all have unique risk profiles and challenges (see also *Part I Health: Vulnerable Groups and Travel Health Considerations*). The pre- and post-travel medicine consultations have evolved over the ensuing decades, with the development of improved vaccines for diseases such as polio, typhoid and hepatitis A, and more effective medications for the prevention of malaria, along with better diagnostic tools, for example, polymerase chain reaction (PCR) tests to rapidly reveal the aetiology of diarrhoea. Providers have also developed a better understanding of how to efficiently deliver these services to travellers. The spread of diseases such as HIV, dengue, Chikungunya, and Zika, and now the appearance of COVID-19, have reshaped the pre- and post-travel consultations, further emphasising the importance of tailoring each consultation to fit the travel itinerary and health profile of the traveller.

## The Pre-travel Health Consultation

According to Chen and Hochberg (2020), the pre-travel consultation offers dedicated time to prepare travellers to avoid those health concerns that might arise during their trips. The objectives of the pre-travel consultation are to:

1. Perform an individual risk assessment,
2. Communicate these anticipated health risks to the traveller,
3. Provide risk management measures, including immunisations, malaria prophylaxis, medical kits, and education as indicated, and,

4. Provide an understanding of the interaction between pre-existing medical conditions and the conditions in the destination.

Pre-travel consultations can be undertaken by providers with various backgrounds including doctors, nurse practitioners, registered nurses, and pharmacists. Each will bring their unique background and responsibilities to the task.

Pre-travel care is unique and different from a typical general practice consultation. In general practice, the doctor is required to make a diagnosis and then formulate a management plan. In travel medicine the “diagnosis”, is clear, the challenge is the management plan. Therefore, much of pre-travel health care focuses on disease prevention—travellers are mostly healthy and wish to stay that way, both while overseas and on return (Flaherty et al., 2017). Just as many different instruments come together in an orchestra to play music—whether a symphony or an opera—in travel medicine delivery many different systems must come together: checklists; staff training; traveller educational materials; stock management procedures, and; optimal equipment such as purpose-built vaccine fridges. These are some of the essential instruments required for excellence in service delivery regardless of the country being visited or the health risks the traveller will face.

## **Promotion and Benefits of Travellers Having a Pre-travel Consultation**

A pre-travel health consultation is generally recommended by most governments around the world as part of their official travel advisory service for citizens (see *Part V Government and Industry Activity: Government Travel Advisories*). These advisory services also provide health warnings and precautions about destinations. Many travel agencies and tour operators recommend that their clients seek health advice before departure. There is considerable evidence that obtaining medical advice leads to better outcomes, with pre-travel consultations found to be associated with lower morbidity and severity of malaria (Schlagenhauf et al., 2015). Other studies have shown a strong association between receiving advice before travelling and risk-avoiding behaviour (Packham, 1995), with a lower incidence of diarrhoea and gastrointestinal symptoms (Tafari et al., 2014).

Despite the benefits of pre-travel consultations, only a minority of travellers seek health advice prior to travel. Around a third of travellers departing from Bangkok and Sydney airports sought pre-travel advice from a health professional (mainly through a general practice), and less than 5% attended a more specialised travel medicine provider or travel clinic (Heywood et al., 2012). Similar results were observed by Stoney et al. (2016b) in the USA, where only 30% of people who travelled internationally sought pre-travel healthcare.

The main factor associated with not seeking pre-travel health advice was traveller perceptions of low disease risk while overseas. Additional factors for not seeking

pre-travel advice included being foreign-born (relative to the country of departure), visiting friends and relatives, travelling frequently, being male, travelling for a shorter duration, and time limitation before departure (Kain et al., 2019). Interestingly, cost was rarely mentioned as a barrier to attending pre-travel consultations.

## **Elements of Medical History Needed for a Pre-travel Consultation**

A pre-travel consultation begins with collecting information on the traveller's past medical history, their vaccine history, and trip details to aid an appropriate individual risk assessment. Even before vaccines or chemoprophylaxis are considered, ensuring that travellers pre-existing medical conditions are stable for travel is the most important part of the process. Pre-existing medical conditions are not uncommon in travellers. Wieten et al. (2014) found that 26% of all travellers suffered a pre-existing medical problem—becoming more common in those over 60 years of age, where 50% of travellers had a pre-existing medical condition.

Pre-existing medical conditions require consideration as to what (if anything) may cause these conditions to worsen or become unstable while overseas, for example, will asthma symptoms be precipitated by poor air quality at the destination, or will exertion worsen cardiac insufficiency in remote areas? Also, pre-existing conditions may influence the vaccine recommendations, for example, those with inflammatory bowel disease may be recommended cholera vaccination. Table 1, modified from the 2020 CDC Yellow Book, summarises items to be considered during the pre-travel consultation (Centers for Disease Control and Prevention, 2020).

## **Business Travel—Duty of Care**

People who travel overseas for some form of work, whether this is for-profit or humanitarian reasons, deserve special consideration. *High stakes* business travellers with packed itineraries who become ill, may incur not just inconvenience, but significant financial loss. Failure to provide appropriate pre-travel care might trigger expensive litigation targeting the sender organisation, should significant preventable medical problems develop. Thus Occupational Health and Safety (OH&S) concerns must impinge upon some pre-travel recommendations.

“Workers and other persons should be given the highest level of protection against harm to their health, safety and welfare from hazards and risks arising from work as is reasonably practicable” (Australian Work Health and Safety Act, 2011 s 3). This encompasses both “physical and psychological health” (s 4).

**Table 1** Topics which inform the pre-travel risk assessment

<b>Health background</b>	
Medical history	Age and sex Underlying conditions and current medications Allergies (food, vaccines, medication)
Special conditions	Pregnancy (including trimester) or breastfeeding Disability or handicap Immunocompromising conditions or medications Older age Recent surgery
Immunisation history	Routine vaccines Travel vaccines
Prior travel experience	Experience with malaria chemoprophylaxis Experience with altitude Illnesses related to prior travel
<b>Trip details</b>	
Itinerary	Countries and specific regions Rural or urban Reason for travel (e.g., tourism, business, seeking health care)
Timing	Trip duration Season of travel Time to departure
Travel style	Independent travel or tour Propensity for “adventurous” eating Traveller risk tolerance General hygiene standards at destination Modes of transportation Type of accommodations
Special activities	Disaster relief Medical care (providing or receiving) High altitude High risk/extreme sports Cruise ship Anticipated interactions with animals Anticipated sexual encounters

Source: Adapted from 2020 CDC Yellow Book (CDC, 2020)

In countries with extensive local OH&S legislation, the employer’s responsibility may not cease at the country’s border. The duty of care should provide, to the extent reasonably possible, a safe work environment for all personnel, whether in the head office or on assignment overseas. This means that workers need to receive “best practice” pre-travel health care prior to departure, as well as documentation of this completion.

Although business travellers may be regarded by some as “low-risk” travellers, they do experience a high prevalence of travel-related health problems. Chen et al. (2018) found that among 12,203 business travellers across 29 countries in the

GeoSentinel network, the most frequent diagnoses were malaria (9%), acute unspecified diarrhoea (8%), viral syndrome (6%), acute bacterial diarrhoea (5%), and chronic diarrhoea (4%). Diarrhoeal illness and malaria caused the largest morbidity in this group of travellers, which is concerning given that morbidity can be reduced by better adherence to malaria chemoprophylaxis and targeted vaccination. Furthermore, the researchers reported that pre-travel advice was under-utilised among this group of travellers, as less than half of them reported attending a pre-travel consultation.

## Which Vaccines for This Traveller?

It is beyond the scope of this chapter to provide a comprehensive list of which vaccines are recommended or required for each particular country, as the recommendations change as diseases ebb and flow. However, it is worth understanding that vaccines for travel can be broadly categorised into three groups: routine, recommended, and required. Vaccines to consider during pre-travel consultation are listed in Table 2.

### *Routine Vaccines*

These are also known as standard childhood vaccines. No travellers should depart without these standard vaccines; however, what is considered a standard childhood vaccine may vary depending on the birth year of the traveller or their country of origin, for example, recommendations change over time where some countries give varicella or hepatitis A vaccine and some do not, or not all countries include Bacille Calmette-Guérin (BCG) vaccination for tuberculosis as part of their national immunisation program schedule. Meningococcal vaccines may be included in a routine schedule, but the type and timing of these vaccines may vary depending on the country of origin.

**Table 2** Vaccines to update or consider during a pre-travel consultation

Recommendation	Vaccines
Routine vaccines	Polio, tetanus, diphtheria, pertussis, measles, mumps, rubella, varicella, influenza (flu), pneumonia, hepatitis B, tuberculosis
Recommended vaccines	Typhoid, hepatitis A, cholera, Japanese encephalitis, tick encephalitis, rabies, Q fever
Required vaccines	Yellow fever, meningitis, COVID-19

## ***Recommended Vaccines***

Recommended travel vaccines will vary depending on the risk-benefit analysis as outlined earlier. Certain vaccines may be recommended for travellers visiting anywhere in a country where health systems are under-resourced (e.g., hepatitis A vaccine), whereas other vaccines may only be recommended for particular parts of a country (e.g., Japanese encephalitis predominantly for rural areas of Asia). Some vaccines may be based on planned activities. For example, Q fever vaccination may be recommended for persons who will be working with animals or wildlife in certain regions.

## ***Required Vaccines***

Compulsory vaccines are those where the vaccine record will be checked upon entry to a country, such as the yellow fever vaccine for parts of Africa and South America, meningitis vaccine for Hajj, and now COVID-19 vaccination.

Once vaccines are recommended, however, not all travellers will accept the vaccine. Lammert et al. (2016) found that more than one-quarter of travellers who sought pre-travel health advice refused at least one vaccine during the pre-travel health encounter. The most common reason for travellers to decline vaccinations was lack of perceived risk (i.e., not concerned with illness). A similar finding by Wang et al. (2019) also identified both threat and coping appraisals affect travellers' protection motivations (see also *Part IV Contexts: Understanding how Tourists Perceive and Respond to Risk: A Focus on Health Risk*).

In addition to the perception of low risk, vaccine cost was also another barrier for some traveller's vaccine uptake (Lammert et al., 2016). Leder et al. (2012) promoted the concept that vaccination recommendations may change if one looks through the lens of not just this trip, but future trips as well. Expensive vaccines may be perceived as better value when the risk is potentially more prolonged. Travel medicine providers themselves may also play a role in the uptake of a particular vaccine. Kain et al. (2019) found that travellers who consulted more experienced travel medicine providers were more likely to accept vaccination recommendations. Possibly experienced providers are more skilled at assessing and communicating information about disease threats and vaccine benefits.

Furthermore, once the vaccines are agreed to with the traveller, vaccination timing is an important part of the pre-travel service, as there are considerations regarding interactions of vaccines (particularly live vaccines) and vaccines that require multiple doses to complete the schedule. This vaccination timing issue leads to another challenge faced by travel medicine providers, that is, *when* a traveller presents in relation to their departure date. Some travellers present with insufficient time to complete the recommended vaccinations or pre-travel preparation (Yates et al., 2019). Late presentation may necessitate incomplete or condensed vaccination

schedules, often with limited data to guide best practice as to their effectiveness. Although it is seldom too late to get pre-travel health advice, the human immune system takes time to process vaccines and generate appropriate protection. Vaccination of “last-minute travellers” may still lessen the impact of some diseases, especially those with long incubation periods. It will also prime the immune system as many of these travellers undertake repeated last-minute trips. Encouraging travellers to seek medical advice early (at least 4 to 6 weeks prior to departure) might help mitigate the problem of late presentation. It behoves travel consultants or websites which organise travel arrangements to encourage travellers to plan for pre-travel health advice early in the booking cycle.

## Needle Phobia

People who suffer from needle phobia will likely avoid healthcare settings, but the presence of required vaccines funnels some of these needle-phobic travellers toward travel medicine providers. Despite immunisation being one of the key components of a pre-travel consultation, needle phobia has been largely neglected in the context of travel medicine.

The very nature of needle phobia makes it hard to determine its prevalence and consequent impact on vaccine uptake. McLenon and Rogers (2019) found that the prevalence of needle fear ranges from 20–50% in adolescents and 20–30% in young adults, and the prevalence tends to decrease with increasing age. They found that, even among health care workers, the prevalence of needle fear leading to avoidance of influenza vaccine was as high as 27% in hospital employees and 18% in workers at long-term care facilities.

Children are a particular concern regarding vaccination pain, as the experience of pre-travel medical care could have lasting effects on their tolerance of immunisations in adulthood. Pain management strategies have the potential to reduce distress during vaccination and improve satisfaction leading to positive experiences for children and their families (Taddio et al., 2009). Simple activities such as swaddling, combined with breastfeeding within 45 minutes of immunisation can decrease injection pain in neonates (Hashemi et al., 2016). Tools to minimise injection pain may be useful in some settings, for example, a CoolSense device or anaesthetic patches. Other techniques individualised to the travellers, such as using applied tension to maintain blood pressure in those predisposed to fainting, cognitive behaviour therapy along with a systematic desensitisation programme (Jenkins, 2014) or the use of geographical visualisation as a distraction technique (Andrews & Shaw, 2010), could improve a traveller’s experience and satisfaction during pre-travel immunisation. Syncope (fainting or passing out) is a very real and important issue that can easily be prevented by lying down. It is also important to consider the order of administration when giving multiple vaccines, as this could make a difference to the pain experience (Kumar et al., 2016; Ravikiran et al., 2011).



## Mindfulness and Immunisation

Mindfulness, as an immunisation coping strategy, is becoming popular with some health professionals. Mindfully re-framing the words about procedures starts before the traveller enters the consulting room—from the website wording (e.g., changing words like *needles* and *painful*), to how we talk about *vaccines* or immune memory on the phone, or in written instructions. Even calling clients *travellers*, instead of *patients*, can make it better for some people. Encouraging travellers to be well-fed before their visit and to feel comfortable revealing their fears or history of feeling faint is important. Listening to the traveller's concerns during a consultation in a non-judgemental, empathetic and caring healthcare environment makes a big difference. Being alert to utilising the client's learning style (by observing how they talk "I see, I hear, I feel") allows a suitably trained professional to assist in reframing the experience and their concerns.

Young babies can be distracted with bubbles or sounds. Young children, especially those who have been taught mindfulness techniques in school, can be assisted to use imagination. For example, when dressed in a superhero t-shirt, that focus on the child can be utilised (they are being given superpowers) or they can be guided to imagine their favourite activity. Adolescents and adults are the ones that quite often need the most attention and time. Strategies which allow them to feel more comfortable, such as preparing vaccines away from eye-sight (removing vaccines from noisy packaging and placing syringes under sterile drapes), and slowing down to allow time to mentally create a favourite scene are beneficial. Facilitating engagement of all the senses such as having pleasant music or fragrances in the waiting room may be ways to help disengage the amygdala—the part of the brain that reacts quickly and adversely to stress.

Some travellers may need reassurance of what seems obvious to providers—that staff in travel medicine clinics have worked tirelessly to ensure they are getting the right choice of products, for the right style of trip, and within their budget, their pain threshold, and their values. For some travellers, it is enough to remind them that medical staff members are highly trained professionals whose goal it is to keep them safe. Experienced practitioners develop a personal spiel or system to put travellers at ease—from using their own brand of humour, letting travellers see, or not see what is going on depending on the traveller's preference, getting it over quickly, engaging in *verbal anaesthesia* by talking or asking the traveller questions. The describing language that is used by the medical staff is extremely important to ensure "just a light feathery touch" to let them know they are safe. Positive reinforcement for their success, once achieved, is imperative.

Some individuals have serious reservations (phobias) about invasive procedures and simple techniques can help them find their courage, and make all the difference between a calm experience and a downright terrible one, which will also assist them with their future health care needs.

## Vaccine Records and Safety

Recording of vaccines is important to minimise unnecessary future vaccination. Records must include a provider system to store vaccine batch numbers for later retrieval in the event of a vaccine batch recall. Travellers may need to be re-called and re-vaccinated if there is a recognised failure of some aspect of the complicated journey of vaccines from manufacture into the traveller. For example, the rabies vaccine recall of four lots of IMOVAX in 2004 by Aventis Pasteur would not have been possible without these records (Centers for Disease Control and Prevention, 2004).

Vaccine records must also be provided to the traveller. Sometimes this will be in the form of an International Certificate (e.g., Yellow Fever, polio). Some countries have national immunisation registers to solve the problem of lost vaccination records, such as the Australian Immunisation Register (AIR) which is a national register that records all vaccines given to all people in Australia (Australian Government, 2019).

Vaccine administration entails even further responsibilities. Despite newer vaccines having been developed in the last decades which are more effective (i.e., immunogenic) and have better safety profiles, education about potential side effects of vaccines is required. Needed too are systems for follow-up in the event of problems or queries, even if problems develop after hours. There are now excellent technological solutions to the problem of revealing safety signals for vaccines using real-time tracking of vaccine side effects, such as SmartVax.

### **SmartVax: An Active Text Message-Based Surveillance System Following Immunisation**

As of November 2020, the SmartVax vaccine-safety monitoring network consisted of 356 sites made up of 320 general practices 22 pharmacies, three hospitals, four local government councils, two Aboriginal Medical Services, three university clinics and two community clinics—located across every state and territory in Australia. SmartVax is an active adverse event following immunisation (AEFI) platform which monitors all vaccinations at all ages.

The platform works by sending an automated text message to patients 3 to 5 days after receiving a vaccination. The text asks if the patient experienced a reaction to the vaccinations and invites them to respond with a *Yes* or *No*. *Yes* responses are followed by a second automated text message enquiring if the reaction was medically attended, as well as another message containing a link to a brief survey enquiring about the nature, severity and duration of the reaction. The response rate to the first text is 72.9% with reactions reported in 6.7% of encounters and medically attended reactions reported in 0.4% of encounters (based on data from the 12 months to 31 October 2020).

(continued)

Since its inception in 2011, SmartVax has monitored over 2.5 million vaccination encounters (including 426,604 for influenza vaccinations in 2020). The database contains over three million vaccine profiles and over four million SMS messages have been sent. The network spans approximately 6.5% of the Australian population. Travel vaccines comprise 13% of vaccination encounters in the SmartVax database.

SmartVax partners with AusVaxSafety, a world's first national system, funded by the Australian Government Department of Health, analysing and monitoring adverse events following immunisation and facilitates the early detection of potential vaccine safety issues.

More information is available at [www.smartvax.com.au](http://www.smartvax.com.au) or [www.ausvax-safety.org.au/safety-data](http://www.ausvax-safety.org.au/safety-data) for specific vaccination safety data gathered by SmartVax.

## Health Education in a Pre-travel Setting

Vaccines may be the catalyst for travellers to seek health care, but the interaction affords a useful opportunity to inform and educate travellers on key health messages. Protective health behaviours may be more effective at ensuring better health outcomes than the vaccinations.

Many topics must be covered in a pre-travel setting to achieve the goal of the traveller protecting their health while overseas. Every destination and set of activities will impose a consequent set of risks. Similar to other individuals, rational tourists tend to be risk-averse and avoid dangerous situations. The travel medicine provider must assist the traveller to understand the personally relevant risks and adopt relevant risk reduction strategies. It is impractical to discuss every risk, so priorities must be established. The burden of the proposed health-protective behaviour, along with the likelihood and severity of the negative outcome must be weighed. Health care providers must be sensitive to the information needs of the travellers in order to have any chance of encouraging adaptive behaviour change.

Some risks are well-known in Australia, but may not be expected in destination countries. For example, travellers may be aware of jellyfish envenomation in Australia but unaware this is a risk to tourists visiting other countries. Fatal envenomation from jellyfish has been reported from Thailand, the Philippines, Borneo, Japan, and Malaysia (Thaikruea et al., 2015). Some risks have entered the public consciousness such as deep vein thrombosis (DVT), but they may be carried with a wave of misinformation such as the expectation that DVT does not occur in Business Class travellers. Some risks are not well-known as they are seldom in the news, like ciguatera poisoning. Also, not all counselling is effective. Svensson et al. (2018) found that the impact of routine safe sex counselling during pre-travel consultation was limited. Burdensome preventative health behaviours are easier to encourage

when risks are well-publicised. Those who have never heard of methanol poisoning may be disinclined to give up drinking spirits if they see this alcohol as an integral part of their travel experience. No amount of pre-travel care is likely to predict all possible risk activities of tourists. An example being the need to tell travellers to avoid walking into an active volcano despite the tour operators stating they have had no problems so far. In such matters, the Domain-Specific Risk-Taking (DOSPERT) scale can be used to assess risk-taking and perception of health/safety among travellers (Farnham et al., 2018).

The principle health concerns of travellers may not accord with those of their travel health providers and it behoves the providers to be sensitive to the information requirements of their travellers. Travel health providers are recommended by Flaherty et al. (2017) to invite travellers to nominate their principal travel health priorities prior to the pre-travel consultation, lest the priorities of the traveller are not addressed. Travellers also have different levels of information need, some need (and are eager) to know details, while other travellers do not—“Don’t tell me what the vaccines are for Doc, just give them to me and let me get out of here”—this attitude may make informed consent problematic. Stories are an important technique to share health information and travel medicine providers, both doctors and nurses, must adapt their stories to the information needs of the patients (Haigh & Hardy, 2011).

Likewise, with vaccine recommendations, there is evidence that recommendations to minimise health risks are not always followed by travellers (e.g., there may be poor compliance with malaria chemoprophylaxis risk reduction recommendations). Travellers may remember little of what was discussed during the pre-travel medical consultation, thus providing written information is important—whether it is in the form of books, sheets of paper, electronic documents, or apps for carrying on a smartphone. Checklists for travel medicine providers can aid in documenting what has been discussed, especially if the traveller may be seen over multiple visits by different staff members. An example of items that can form part of a health education checklist is presented in the following box.

#### **Checklist of Potential Educational Needs of Travellers**

- During the flight: sanitation, hydration, thrombosis prevention
- Jetlag and adjusting to new time zones
- Gastroenteritis prevention, food and water precautions
- Acquisition of antibiotic-resistant bacteria and implications for surgery on return
- Respiratory disease prevention, hand hygiene, social distancing, masks
- Animals: avoiding risk exposure and what to do if bitten; dogs, rodents, monkeys
- Mosquito diseases: repellents, bednets, permethrin
- Insect bites: prevention and management especially ticks

(continued)

- Worms and parasites: especially schistosomiasis, strongyloides, ascaris
  - Motion sickness
  - Accident prevention especially motor vehicles and pedestrian
  - Personal security
  - Mind-altering drugs/herbs, alcohol, methanol, ayahuasca
  - Sexually transmitted diseases, HIV
  - Extremes of hot or cold climates
  - High altitude travellers
  - Sports such as snow sports, trekking, scuba diving, surfing, climbing
  - Marine environment—water safety, marine envenomation, ciguatera, fresh and seawater infections
  - Cruise ship risks
  - Culture shock
  - Travelling with medications
  - What to do if you get sick
  - Travel insurance
- Special recommendations related to travellers' individual medical history

Enhanced pre-travel education/preparation including country-specific briefing sessions, reading material, access to an electronic version of the book *Travelling Well: The “Must Have” Guide to a Safe and Healthy Journey* (Mills, 2019), and the smartphone app Travel Health Guide (Dr Deb The Travel Doctor, 2017) have been shown to improve gap year travellers' wellbeing (Furuya-Kanamori et al., 2020a).

## Malaria and Mosquito Diseases

The subject of which (if any) malaria pill should be recommended for a particular traveller and journey, is a topic that generates a lot of “airtime” in travel medicine training and at conferences. The actual risk of malaria (and other arboviral diseases) in travellers is extremely difficult to estimate—a veritable quixotic pursuit (Davlan et al., 2017) and has been discussed previously in this book (see *Part I Health: Travel Medicine and Tourist Health*).

In Australia, the most recent available annual report of the National Arbovirus and Malaria Advisory Committee (NAMAC) reported 260 notifications of malaria during 2014–15 (Knape et al., 2019). Papua New Guinea was the most frequently reported country of acquisition (17%) followed by India (13%). Malaria was most frequently reported among young travellers aged 20 to 29 years, with 25% of notified cases in this age group. Even when it comes to malaria deaths, the risk among travellers is still relatively low compared to other causes of death such as road traffic accidents (Prociv, 1995). This does not take away from the need to advise travellers

how to stay safe from malaria, but informs the need to assist travellers avoid other threats to life and limb, for example, precautions about road safety.

Personal protective measures (PPM) are those activities undertaken by travellers to decrease the risk of arthropod-borne disease (Alpern et al., 2016). PPM includes such things as the use of insect repellents containing approved chemicals (e.g., DEET and picaridin as these have been shown to offer sufficient protection against arthropod bites). It also includes protective measures, such as bite avoidance, protective clothing, insecticide-treated bed nets, and insecticide-treated clothing.

The main problem faced by travellers (and thus health care providers) which impinges on the effectiveness of PPM is the traveller's poor adherence to the recommendations. Adam et al. (2018) found that compliance with recommended anti-vectorial prevention measures was low among both chikungunya and malaria-infected travellers. Likewise, Ropers et al. (2008) identified that the correct intake of malaria chemoprophylaxis was approximately 50% among German travellers to tropical destinations. Poor compliance and failure to take chemoprophylaxis is linked with an elevated risk of severe malaria and malaria-associated deaths (Gryseels et al., 2015). Therefore the goal during the pre-travel consultation must be to improve compliance with malaria chemoprophylaxis. Several studies have found that forgetting to take medications was a common problem (Bocci et al., 2016; Stoney et al., 2016a), so compliance could potentially be improved by utilising simpler drug dosages, such as shorter duration, fewer doses, or schedules that can be completed before travel (Lau et al., 2019; Stoney et al., 2016a).

## Medical Kits

What to take in a medical kit for travellers is an educated guess at best and one size does not fit all. Experienced travel medicine practitioners will endeavour to recommend the contents based on the destination, activities, likely medical problems and the traveller's medical history and preference. There are many variables to factor into the likelihood of illness and consequent utilisation of kit supplies. Looke et al. (1992) and Goodyer and Gibbs (2006) found that analgesics and anti-diarrhoeal/rehydration solutions were the most commonly used items in travellers' medical kits. Other items that were often used and should be considered were dressings and antiseptic, insect repellent, throat lozenges, and antihistamines (Fig. 1).

Antibiotics were once considered a mainstay for the self-treatment of travellers' diarrhoea. The rising spectre of multidrug-resistant bacteria is, however, of worldwide concern (Holubar 2019). We found that acquiring traveller's diarrhoea overseas increased the risk of contracting multidrug-resistant bacteria and taking antibiotics led to higher risk (Furuya-Kanamori et al., 2020b). This has led to difficulties for providers and travellers in deciding whether to carry antibiotics—trying to balance the potential benefits of immediate recovery from traveller's diarrhoea, with potential disadvantages from dangerous multidrug-resistant bacteria carriage later.



**Fig. 1** Specialist travel medicine clinics supply comprehensive travel medical kits. (Image courtesy of Laura Mills)

Specialised travellers' tools such as a self-test kit for malaria may be useful for a select group of travellers who will be visiting malaria areas remote from medical care (Berthod et al., 2017). Extensive research is still needed to guide medical kit recommendations to ensure better clinical outcomes for sick travellers and reduce potentially avoidable visits to health care services overseas, or problems on return.

## Post-Travel Health

Like the pre-travel consultation, post-travel health care can be delivered by a wide range of providers, such as travel medicine specialist doctors, general practitioners, nurse practitioners, registered nurses, or medical specialists in other areas, depending on the needs and symptoms of the returned traveller.

The most common travel-related illnesses, identified in a large study with over 42,000 returned travellers by the GeoSentinel Surveillance Network, varied by region of travel, but overall were gastrointestinal diagnoses (34%), febrile illness (23%), dermatologic problems (20%), and respiratory illness (11%) (Leder et al., 2013). This finding reinforces the need for protective health behaviours in travellers as most of the conditions are potentially preventable.

The most common gastrointestinal diagnosis was acute diarrhoea; *Campylobacter*, *Salmonella*, and *Shigella* species were the most common cause of bacterial infections; while *Giardia* was the most commonly found parasite. It is worth reinforcing

that there is a high risk of returned travellers, especially those from South Asia and Northern Africa, becoming asymptomatic carriers of antibiotic-resistant *Enterobacteriales* (Furuya-Kanamori et al., 2020b). Despite being asymptomatic, these travellers are at higher risk of infections on return. Extended-spectrum beta-lactamase-producing *Escherichia coli* bacteraemia has been reported in recently returned international travellers after prostate biopsies (Williamson et al., 2012). Evidence is building that these multidrug-resistant organisms can spread to family members on return home (Arcilla et al., 2017). Therefore, the potential role of screening and contact precautions for some returned travellers needs to be further examined.

The GeoSentinel surveillance study found that the main cause of febrile illness in returned travellers were vector-borne diseases, malaria (29%) and dengue (15%); these infections were mainly found in returned travellers from Africa, Southeast Asia, Latin America, and the Caribbean. Dermatological problems were reported by one-fifth of the travellers and the most common causes were animal bites or scratches, insect bites or stings, skin or soft-tissue infections, and rashes (Leder et al., 2013).

## **Pre- and Post-travel Consultations in the New Normal**

The degree to which telemedicine has been necessitated by the pandemic in many countries has meant that many of the perceived barriers to telehealth have disappeared. As a result, telemedicine for pre, during and post-travel consultations will have a larger role to play in the future of travel medicine. As travel medicine providers, we are particularly aware of the problem of travellers being stuck in areas without access to best-practice medical care. Telehealth may be part of a solution for this problem. New and innovative vaccines such as COVID-19 vaccines and perhaps variant boosters will have pride of place in our fridges.

## **Pivot**

The pandemic has meant that most providers who work in the field of travel medicine have suffered a catastrophic drop in demand for their services. Providers whose travel medicine practice is combined with other services (e.g., general practice), may have less difficulty pivoting to spending more time on other aspects of their work. The ISTM recently carried out a pilot survey of travel medicine practitioners to examine the impact of COVID-19 on Travel Health/Medicine Providers (International Society of Travel Medicine—COVID-19 Task Force, 2020), the unpublished results are presented in the box below.



### **Initial Impact of COVID-19 on Travel Health/Medicine Providers— Pilot Survey Report**

The respondents included 58% physicians, 27% nurses or nurse practitioners, and 10% pharmacists. Respondents included 64% North America, 12% Europe and 12% Oceania. As a result of the pandemic, 40% stopped practising travel medicine altogether. Whilst a few retired, many respondents reported pivoting to other areas of their normal general practice or hospital work, increasing their writing, advisory or telehealth work, or assisting the COVID-19 response. Of those respondents whose travel medicine work was impacted by the pandemic downturn, 80% said it was *very likely* or *somewhat likely* that they would return to travel medicine. Only about 1.8% planned to leave the specialty.

Shlim et al. (2020) recommend that travel medicine practices should think about the ways they can be involved in immunisation, testing, and protection of people in their own countries. Finding other useful work to maintain the financial viability of travel medicine practices will ensure that personnel are not lost to the field of travel medicine. Experienced staff members are an essential resource for the provision of any medical service, and will be needed when international travel returns—as it surely will. Experienced immunisers will likely play a vital role in the delivery of the COVID-19 vaccines.

Pivoting to undertaking research by partnering with universities may be an avenue to find useful employment and also advance the field of travel medicine. Vaccines are one of the most cost-effective medical interventions, but they are still underutilised. Research into ways to enhance traveller engagement, minimise injection discomfort, or provide vaccinations at less cost would be useful.

## **Adapt**

Travel medicine practitioners more than most perhaps, can place infectious diseases in their historical context—just like the Spanish flu, this too will pass. However, we must “never let a good crisis go to waste” as Sir Winston Churchill is credited with first saying. Adaption has always been a feature of travel medicine practice. The ever-changing medical (and legal) landscapes have always meant that providers of travellers’ medical services must constantly strive to ensure their knowledge and systems are thoroughly up to date and best practice.

In addition to knowledge of the diseases present in different regions of the planet, travel health care providers must be familiar with the conditions that travellers will experience in the microclimate of environments such as hotels, airports, or cruise ships. These microclimates have certainly changed as a result of the pandemic,

mostly for the better, with improved cleaning, ventilation, and fewer buffet meals. A set of agreed standards for these microclimates, such as those which are now being developed for cruises (Healthy Sail Panel, 2020) will facilitate safer cruising of all travellers. Better *COVID-Safe* facilities and systems will decrease the risk of other infectious diseases including influenza. Whilst education of travellers in safer behaviours will always be important, improved systems in commonly visited travel destinations will serve to enhance safety and wellbeing for travellers without having to rely on individual travellers' behaviour. Development of these COVID-safe standards in conjunction with other authorities may be a new role for the ISTM.

As well as the usual provision of yellow fever certificates, familiarity with the paperwork required by airlines and tour companies with respect to health, and particularly COVID-19 status, has become a normal expectation of travel medicine providers. Along with the usual considerations of mental health, an understanding of the mental health demands of quarantine will need to be researched, and suggestions to mitigate the potential negative effects may become a necessary part of a pre-travel consultation.

Standards for travel insurance policies may be another area where provider input may be useful. The extensive financial losses that accompany the pandemic may necessitate insurance companies limiting travellers' cover for preventable medical problems until they return home. The increasing emphasis on occupational health and safety may necessitate a more extensive pre-departure medical assessment of business travellers, possibly even with investigations to uncover hidden problems, so they do not surface in areas with poor medical care. There will need to be a better evidence base to determine the most cost-effective screening and pre-travel assessment.

## Recalibrate

Many low-income countries, which are popular destinations for travellers, have suffered extra challenges due to the pandemic. Aside from copious morbidity and mortality from COVID-19, there will have been a deterioration of medical facilities brought on by the deluge of pandemic patients, leading to a consequent decrease in capacity to maintain normal public health measures and tropical disease mitigation. Even if travellers have the much-awaited protection of a safe and effective vaccine against COVID-19, visitors to these areas may be exposed to more unrelated health risks than previously, as other diseases spiral out of usual control due to deterioration of basic public health measures. The usual range of human injuries becomes more problematic to treat when the local medical services are under strain. All this increases the importance and utility of good pre-travel health care.

Some persons, especially those who live in countries with excellent public health infrastructure such as Australia, New Zealand, Europe, and the USA, have never

given much thought to infectious disease. As a result of the pandemic, a virtual tidal wave of stories about infection, illness, and death have appeared in the media for most of 2020, along with a rising number of “saviour vaccine” stories. This prolonged news coverage just might cause a recalibration of the understanding of health and infections in the wider population, and lead some previously unconcerned travellers to pay more attention to their health in future. Certainly, many travellers report postponed trips which were planned for 2020 and 2021. Persons who have never availed themselves of the option to travel overseas may suddenly find the embargo on overseas travel has enhanced their wish to do so. For all these reasons, demand for travel medicine services may surge.

In future, it may be interesting to see if there is a shift in the demographic of those travelling, with consequent changing pre-travel requirements. For example, there may be fewer immunosuppressed travellers. Travellers who see themselves are more vulnerable may opt to avoid cruises, change their preferred destinations or even stay home. Eligibility for travel insurance may become a deciding factor.

We would like to believe that in future, as a result of the pandemic news, more travellers will decide that it is worthwhile to “get their shots just in case”. As a result of the pandemic, those booking travel may have a better appreciation of the impact of infectious disease and hence the importance of encouraging travellers to get proper pre-travel health care, well in advance. Employers may embrace their duty of care to their staff and so organise better pre-travel care and even post-travel care for those who return home with medical issues. As travel medicine providers, when travellers present for their care, in addition to organising their vaccines, we must keep educating travellers that optimal pre-travel care is not just vaccines, but knowing which health behaviours will keep them safer, and which useful tools they should carry such as medical kits, and even self-test kits for some diseases.

## References

- Adam, D. C., Bui, C. M., Heywood, A. E., Kunasekaran, M., Sheikh, M., Narasimhan, P., & MacIntyre, C. R. (2018). Adherence to anti-vectorial prevention measures among travellers with chikungunya and malaria returning to Australia: Comparative epidemiology. *BMC Research Notes*, *11*(1), 590. <https://doi.org/10.1186/s13104-018-3695-9>
- Alpern, J. D., Dunlop, S. J., Dolan, B. J., Stauffer, W. M., & Boulware, D. R. (2016). Personal protection measures against mosquitoes, ticks, and other arthropods. *Medical Clinics of North America*, *100*(2), 303–316. <https://doi.org/10.1016/j.mcna.2015.08.019>
- Andrews, G. J., & Shaw, D. (2010). “So we started talking about a beach in Barbados”: Visualization practices and needle phobia. *Social Science & Medicine*, *71*(10), 1804–1810. <https://doi.org/10.1016/j.socscimed.2010.08.010>
- Arcilla, M. S., van Hattem, J. M., Haverkate, M. R., Bootsma, M. C. J., van Genderen, P. J. J., Goorhuis, A., Grobusch, M. P., Lashof, A. M. O., Molhoek, N., Schultz, C., Stobberingh, E. E., Verbrugh, H. A., de Jong, M. D., Melles, D. C., & Penders, J. (2017). Import and spread of extended-spectrum  $\beta$ -lactamase-producing Enterobacteriaceae by international travellers

- (COMBAT study): A prospective, multicentre cohort study. *Lancet Infectious Diseases*, 17(1), 78–85. [https://doi.org/10.1016/S1473-3099\(16\)30319-X](https://doi.org/10.1016/S1473-3099(16)30319-X)
- Australian Government. (2019). *Australian immunisation register*: <https://www.servicesaustralia.gov.au/individuals/services/medicare/australian-immunisation-register>
- Berthod, D., Rochat, J., Voumard, R., Rochat, L., Genton, B., & D’Acremont, V. (2017). Self-diagnosis of malaria by travellers: A cohort study on the use of malaria rapid diagnostic tests provided by a Swiss travel clinic. *Malaria Journal*, 16(1), 436. <https://doi.org/10.1186/s12936-017-2079-2>
- Bocci, G., Troiano, G., Golinelli, D., Verzuri, A., Rossi, S., & Nante, N. (2016). Compliance with malaria chemoprophylaxis in travelers: A systematic review. *European Journal of Public Health*, 26(suppl\_1), ckw174.229. <https://doi.org/10.1093/eurpub/ckw174.229>
- Centers for Disease Control and Prevention. (2004). Notice to readers: Manufacturer’s recall of human rabies vaccine—April 2, 2004. *Morbidity and Mortality Weekly Report*, 53(13), 287–289. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5313a3.htm>
- Centers for Disease Control and Prevention. (2020). *CDC Yellow Book 2020: Health information for international travel*. Oxford University Press. <https://wwwnc.cdc.gov/travel/page/yellowbook-home>
- Chen, L. H., & Hochberg, N. S. (2020). The pretravel consultation. In CDC (Ed.), *CDC Yellow Book 2020: Health information for international travel*. Oxford University Press. <https://wwwnc.cdc.gov/travel/yellowbook/2020/preparing-international-travelers/the-pretravel-consultation>
- Chen, L. H., Leder, K., Barbre, K. A., Schlagenhaut, P., Libman, M., Keystone, J., Mendelson, M., Gautret, P., Schwartz, E., Shaw, M., MacDonald, S., McCarthy, A., Connor, B. A., Esposito, D. H., Hamer, D., & Wilson, M. (2018). Business travel-associated illness: A GeoSentinel analysis. *Journal of Travel Medicine*, 25(1), tax097. <https://doi.org/10.1093/jtm/tax097>
- Davlatnes, E. A., Tan, K. R., & Arguin, P. M. (2017). Quantifying malaria risk in travellers: A quixotic pursuit. *Journal of Travel Medicine*, 24(6), tax066. <https://doi.org/10.1093/jtm/tax066>
- Dr Deb The Travel Doctor. (2017). *Travel Health Guide app*. Dr Deb The Travel Doctor Pty Ltd. <https://apps.apple.com/au/app/travel-health-english/id355832434> or <https://play.google.com/store/apps/details?id=com.thg.app.travelhealth>
- Farnham, A., Ziegler, S., Blanke, U., Stone, E., Hatz, C., & Puhan, M. A. (2018). Does the DOSPERT scale predict risk-taking behaviour during travel? A study using smartphones. *Journal of Travel Medicine*, 25(1), tay064. <https://doi.org/10.1093/jtm/tay064>
- Flaherty, G. T., Chen, B., & Avalos, G. (2017). Individual traveller health priorities and the pre-travel health consultation. *Journal of Travel Medicine*, 24(6), tax059. <https://doi.org/10.1093/jtm/tax059>
- Furuya-Kanamori, L., Lau, C. L., Banks, S., & Mills, D. J. (2020a). Impact of pre-departure preparation on the health and wellbeing of Australian gap year travellers. *Travel Medicine and Infectious Disease*, 37, 101682. <https://doi.org/10.1016/j.tmaid.2020.101682>
- Furuya-Kanamori, L., Stone, J., Yakob, L., Kirk, M., Collignon, P., Mills, D. J., & Lau, C. L. (2020b). Risk factors for acquisition of multidrug-resistant Enterobacterales among international travellers: A synthesis of cumulative evidence. *Journal of Travel Medicine*, 27(1), taz083. <https://doi.org/10.1093/jtm/taz083>
- Goodyer, L., & Gibbs, J. (2006). Medical supplies for travelers to developing countries. *Journal of Travel Medicine*, 11(4), 208–212.
- Gryseels, C., Uk, S., Sluydts, V., Durmez, L., Phoeuk, P., Suon, S., Set, S., Heng, S., Siv, S., Gerrets, R., Tho, S., Coosemans, M., & Peeters Grietens, K. (2015). Factors influencing the use of topical repellents: Implications for the effectiveness of malaria elimination strategies. *Scientific Reports*, 5, 16847. <https://doi.org/10.2310/7060.2004.19003>
- Haigh, C., & Hardy, P. (2011). Tell me a story—A conceptual exploration of storytelling in healthcare education. *Nurse Education Today*, 31(4), 408–411. <https://doi.org/10.1016/j.nedt.2010.08.001>
- Hashemi, F., Taheri, L., Ghodsbini, F., Pishva, N., & Vossoughi, M. (2016). Comparing the effect of swaddling and breastfeeding and their combined effect on the pain induced by BCG vaccina-

- tion in infants referring to Motahari Hospital, Jahrom, 2010–2011. *Applied Nursing Research*, 29, 217–221. <https://doi.org/10.1016/j.apnr.2015.05.013>
- Healthy Sail Panel. (2020). *Recommendations from the Healthy Sail Panel*. <https://nclhltdcorp.gcs-web.com/static-files/5492d5db-6745-4b21-b952-49d3639f6e79>
- Heywood, A. E., Watkins, R. E., Iamsrithaworn, S., Nilvarangkul, K., & MacIntyre, C. R. (2012). A cross-sectional study of pre-travel health-seeking practices among travelers departing Sydney and Bangkok airports. *BMC Public Health*, 12, 321. <https://doi.org/10.1186/1471-2458-12-321>
- Holubar, M. (2019). Antimicrobial resistance: A global public health emergency further exacerbated by international travel. *Journal of Travel Medicine*, 27(1), taz095. <https://doi.org/10.1093/jtm/taz095>
- International Society of Travel Medicine—COVID-19 Task Force. (2020). *Initial impact of COVID-19 on travel health/medicine providers—Pilot survey report* (Executive summary, version 2).
- Jenkins, K. (2014). II. Needle phobia: A psychological perspective. *British Journal of Anaesthesia*, 113(1), 4–6. <https://doi.org/10.1093/bja/aeu013>
- Kain, D., Findlater, A., Lightfoot, D., Maxim, T., Kraemer, M. U. G., Brady, O. J., Watts, A., Khan, K., & Bogoch, I. I. (2019). Factors affecting pre-travel health seeking behaviour and adherence to pre-travel health advice: A systematic review. *Journal of Travel Medicine*, 26(6), taz059. <https://doi.org/10.1093/jtm/taz059>
- Knope, K., Doggett, S. L., Jansen, C. C., Johansen, C. A., Kurucz, N., Feldman, R., Lynch, S. E., Hobby, M. P., Sly, A., Jardine, A., Bennett, S., Currie, B. J., & the National Arbovirus and Malaria Advisory Committee. (2019). Arboviral diseases and malaria in Australia, 2014–15: Annual report of the National Arbovirus and Malaria Advisory Committee. *Communicable Diseases Intelligence* 43, 1–69. <https://doi.org/10.33321/cdi.2019.43.14>
- Kumar, M., Upadhyay, A., Singh, J., Chhabra, M., Singh, A., Gupta, N. K., Bhat, A., & Yadav, C. P. (2016). Effect of change in sequence of administration of DTWp and Hepatitis B vaccines on perception of pain in infants: A randomized control trial. *Vaccine*, 34(15), 1816–1822. <https://doi.org/10.1016/j.vaccine.2016.02.031>
- Lammert, S. M., Rao, S. R., Jentes, E. S., Fairley, J. K., Erskine, S., Walker, A. T., Hagmann, S. H., Sotir, M. J., Ryan, E. T., & LaRocque, R. C. (2016). Refusal of recommended travel-related vaccines among U.S. international travellers in Global TravEpiNet. *Journal of Travel Medicine*, 24(1), taz075. <https://doi.org/10.1093/jtm/taw075>
- Lau, C. L., Ramsey, L., Mills, L. C., Furuya-Kanamori, L., & Mills, D. J. (2019). Drug-free holidays: Compliance, tolerability, and acceptability of a 3-Day Atovaquone/Proguanil schedule for pretravel malaria chemoprophylaxis in Australian travelers. *Clinical Infectious Diseases*, 69(1), 137–143. <https://doi.org/10.1093/cid/ciy854>
- Leder, K., Chen, L. H., & Wilson, M. E. (2012). Aggregate travel vs. single trip assessment: Arguments for cumulative risk analysis. *Vaccine*, 30(15), 2600–2604. <https://doi.org/10.1016/j.vaccine.2011.12.133>
- Leder, K., Torresi, J., Libman, M. D., Cramer, J. P., Castelli, F., Schlagenhaut, P., Wilder-Smith, A., Wilson, M. E., Keystone, J. S., Schwartz, E., Barnett, E. D., von Sonnenburg, F., Brownstein, J. S., Cheng, A. C., Sotir, M. J., Esposito, D. H., Freedman, D. O., & GeoSentinel Surveillance Network. (2013). GeoSentinel surveillance of illness in returned travelers, 2007–2011. *Annals of Internal Medicine*, 158(6), 456–468. <https://doi.org/10.7326/0003-4819-158-6-201303190-00005>
- Looke, D., Mills, D., Kass, R., & Grove, D. (1992). The “welcome home” letter and questionnaire as a valuable quality assurance tool for an Australian traveller’s medical clinic. In H. Lobel, R. Steffen, & E. Kozarsky (Eds.), *Travel medicine 2: Proceedings of the 2nd conference on international travel medicine* (pp. 287–289). International Society of Travel Medicine.
- McLenon, J., & Rogers, M. A. M. (2019). The fear of needles: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 75(1), 30–42. <https://doi.org/10.1111/jan.13818>
- Mills, D. (2019). *Travelling well: The ‘must have’ guide to a safe and healthy journey* (21st ed.). <https://www.travellingwell.com.au/>

- Packham, C. J. (1995). A survey of notified travel-associated infections: Implications for travel health advice. *Journal of Public Health*, 17(2), 217–222. <https://doi.org/10.1093/oxfordjournals.pubmed.a043096>
- Prociw, P. (1995). Deaths of Australian travellers overseas. *Medical Journal of Australia*, 163(1), 27–30. <https://doi.org/10.5694/j.1326-5377.1995.tb126084.x>
- Ravikiran, S. R., Kumar, P. M., & Meundi, A. D. (2011). Pain response in newborns to the order of injecting BCG and Hepatitis-B vaccines: A randomized trial. *Indian Journal of Pediatrics*, 78(6), 693–697. <https://doi.org/10.1007/s12098-010-0327-3>
- Ropers, G., Du Ry van Beest Holle, M., Wichmann, O., Kappelmayer, L., Stüben, U., Schönfeld, C., & Stark, K. (2008). Determinants of malaria prophylaxis among German travelers to Kenya, Senegal, and Thailand. *Journal of Travel Medicine*, 15(3), 162–171. <https://doi.org/10.1111/j.1708-8305.2008.00188.x>
- Schlagenhauf, P., Weld, L., Goorhuis, A., Gautret, P., Weber, R., von Sonnenburg, F., Lopez-Vélez, R., Jensenius, M., Cramer, J. P., Field, V. K., Odolini, S., Gkrania-Klotsas, E., Chappuis, F., Malvy, D., van Genderen, P. J., Mockenhaupt, F., Jauréguiberry, S., Smith, C., Beeching, N. J., et al. (2015). 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. *Lancet Infectious Diseases*, 15(1), 55–64. [https://doi.org/10.1016/S1473-3099\(14\)71000-X](https://doi.org/10.1016/S1473-3099(14)71000-X)
- Shlim, D. R., Connor, B. A., & Taylor, D. N. (2020). What will travel medicine look like in the COVID-19 pandemic era? *Journal of Travel Medicine*, 28(2), taaa148. <https://doi.org/10.1093/jtm/taaa148>
- Stoney, R. J., Chen, L. H., Jentes, E. S., Wilson, M. E., Han, P. V., Benoit, C. M., MacLeod, W. B., Hamer, D. H., Barnett, E. D., & Boston Area Travel Medicine Network. (2016a). Malaria prevention strategies: Adherence among Boston area travelers visiting malaria-endemic countries. *The American Journal of Tropical Medicine and Hygiene*, 94(1), 136–142. <https://doi.org/10.4269/ajtmh.15-0565>
- Stoney, R. J., Kozarsky, P., Bostick, R. M., & Sotir, M. J. (2016b). International travellers from New Jersey: Piloting a travel health module in the 2011 Behavioral Risk Factor Surveillance System survey. *Journal of Travel Medicine*, 23(1), tav015. <https://doi.org/10.1093/jtm/tav015>
- Svensson, P., Sundbeck, M., Persson, K. I., Stafström, M., Östergren, P. O., Mannheimer, L., & Agardh, A. (2018). A meta-analysis and systematic literature review of factors associated with sexual risk-taking during international travel. *Travel Medicine and Infectious Disease*, 24, 65–88. <https://doi.org/10.1016/j.tmaid.2018.03.002>
- Taddio, A., Chambers, C. T., Halperin, S. A., Ipp, M., Lockett, D., Rieder, M. J., & Shah, V. (2009). Inadequate pain management during routine childhood immunizations: The nerve of it. *Clinical Therapeutics*, 31(Suppl 2), S152–S167. <https://doi.org/10.1016/j.clinthera.2009.07.022>
- Tafari, S., Guerra, R., Gallone, M. S., Cappelli, M. G., Lanotte, S., Quarto, M., & Germinario, C. (2014). Effectiveness of pre-travel consultation in the prevention of travel-related diseases: A retrospective cohort study. *Travel Medicine and Infectious Diseases*, 12(6 Pt B), 745–749. <https://doi.org/10.1016/j.tmaid.2014.10.012>
- Thaikruea, L., Siriariyaporn, P., Wutthanarungsan, R., & Smithsuwan, P. (2015). Review of fatal and severe cases of box jellyfish envenomation in Thailand. *Asia-Pacific Journal of Public Health*, 27(2), 1639–1651. <https://doi.org/10.1177/1010539512448210>
- Wang, J., Liu-Lastres, B., Ritchie, B. W., & Mills, D. J. (2019). Travellers' self-protections against health risks: An application of the full Protection Motivation Theory. *Annals of Tourism Research*, 78, 102743. <https://doi.org/10.1016/j.annals.2019.102743>
- Wieten, R. W., van der Schalie, M., Visser, B. J., Grobusch, M. P., & van Vugt, M. (2014). Risk factors and pre-travel healthcare of international travellers attending a Dutch travel clinic: A cross-sectional analysis. *Travel Medicine and Infectious Diseases*, 12(5), 511–524. <https://doi.org/10.1016/j.tmaid.2014.05.004>
- Williamson, D. A., Masters, J., Freeman, J., & Roberts, S. (2012). Travel-associated extended-spectrum beta-lactamase-producing *Escherichia coli* bloodstream infection following tran-

rectal ultrasound-guided prostate biopsy. *BJU International*, 109(7), E21–E22. <https://doi.org/10.1111/j.1464-410X.2012.11001.x>

*Work Health and Safety Act*. (2011). (Cth). Australian Government. <https://www.legislation.gov.au/Details/C2018C00293>

Yates, J. A., Rao, S. R., Walker, A. T., Esposito, D. H., Sotir, M., LaRocque, R. C., & Ryan, E. T. (2019). Characteristics and preparation of the last-minute traveler: Analysis of vaccine usage in the Global TravEpiNet Consortium. *Journal of Travel Medicine*, 26(6), taz031. <https://doi.org/10.1093/jtm/taz031>

**Dr. Deborah J. Mills** is the Medical Director of a specialised Travel Medicine clinic in Brisbane, Australia and visiting fellow at the Australian National University. Her current research interests are intradermal vaccines, vaccine side effects, smartphone apps, and encouraging safer travel. Her book *Travelling Well* is in its 21st edition. ORCID: <https://orcid.org/0000-0003-0282-0136>

**Lani Ramsey** is an endorsed Nurse Practitioner in South Australia. She works in a private clinic with a focus on Travel Health. She uses hypnosis, mindfulness and meditation in her practice. She has worked on the development of Travel Medicine programs for health professionals and is a mentor for nurses. ORCID: <https://orcid.org/0000-0003-2934-9524>

**Dr. Luis Furuya-Kanamori** is an NHMRC fellow in the Research School of Population Health at the Australian National University. His research aims to identify more efficient use of current drugs and vaccines in travellers, and to improve meta-analytical methods for research synthesis. ORCID: <https://orcid.org/0000-0002-4337-9757>