CANADA COMMUNICABLE DISEASE REPORT

CCDR

May 7, 2015 • Volume 41•5
ISSN 1481-8531 / Cat. HP3-1E-PDF / Pub. 150005

Inside this issue: Visiting friends and relatives

Travel is a national pastime in Canada. Yet many do not know that those who travel internationally to visit friends and relatives are at increased risk of travel-related morbidity. In this issue, read two new statements and a list of useful travel medicine resources by the Committee to Advise on Tropical Medicine and Travel (CATMAT). We are also pleased to announce that CCDR is about to turn 40! Its first issue was published May 10, 2015.

Advisory committee statements

Resources

ID News

Conference

May 24-28, 2015: The 14th Conference of the International Society of Travel Medicine, Québec, Quebec.
http://www.istm.org/

Upcoming education

The Canadian Field Epidemiology Program (CFEP) is now accepting applications for its annual **Epidemiology in Action course** in Ottawa, Ontario. Applicants can select one or both modules:

Module One: Outbreak investigations and special topics in applied epidemiology (Sep 14-25, 2015)
Module Two: Effective data management: Tools and techniques for field investigations (Sep 28-Oct 1, 2015)

The deadline for applications is Friday May 29, 2015. For further information and an application package, please contact CFEP at: cfep@phac-aspc.gc.ca.

Upcoming webinar

June 25, 2015: Statement on international travellers who intend to visit friends and relatives.
CATMAT webinar
Link to registration:
https://gts-ee.webex.com/gtsee/j.php?RGID=r33c35450b376fd06a91d62371d80563e

https://doi.org/10.14745/ccdr.v41i05a01

Summary of the Statement on International Travellers Who Intend to Visit Friends and Relatives

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Abstract

Background: Travellers intending to visit friends and relatives (VFRs) are a specific group of travellers who have been identified as having an increased risk of travel-related morbidity.

Objective: To provide recommendations for risk reduction in international VFRs.

Methods: Recommendations regarding VFRs were developed based on available travel medicine literature and CATMAT expert opinion. Specific travel-related risks, including infectious disease epidemiology and burden in this population, were reviewed and recommendations were provided to attempt to mitigate these risks. Previous CATMAT statements related to VFRs were referred to and reiterated.

Recommendations: Rates of travel-related illness in VFRs tend to be higher for many conditions. Disease-specific risk factors and recommendations are discussed throughout this Statement. CATMAT recommends that VFRs' vaccinations be up-to-date and they be counselled on the importance of various risk reduction activities such as the use of malaria prophylaxis, safe sex practices and injury prevention. Pre- and/or post-travel tuberculosis testing is indicated in certain situations.

Conclusion: The pre-travel health assessment is an important opportunity to address with VFRs issues regarding health beliefs, health behaviours, current health status and the possibility of pre-existing conditions. Discussions addressing the importance of adherence to health advice and potential challenges to achieving adherence may be necessary.

Preamble

The Committee to Advise on Tropical Medicine and Travel (CATMAT) provides the Public Health Agency of Canada with ongoing and timely medical, scientific, and public health advice relating to tropical infectious disease and health risks associated with international travel. The Agency acknowledges that the advice and recommendations set out in this statement are based upon the best current available scientific knowledge and medical practices and is disseminating this document for information purposes to both travellers and the medical community caring for travellers.

Persons administering or using drugs, vaccines or other products should also be aware of the contents of the product monograph(s) or other similarly approved standards or instructions for use. Recommendations for use and other information set out herein may differ from that set out in the product monograph(s) or other similarly approved standards or instructions for use by the licensed manufacturer(s). Manufacturers have sought approval and provided evidence as to the safety and efficacy of their products only when used in accordance with the product monographs or other similarly approved standards or instructions for use.

Introduction

In 2012, visiting friends and relatives was the second most common reason for international travel among Canadian travellers and accounted for approximately two million overnight visits to overseas countries (1). Travellers intending to visit friends and relatives (VFRs) are a specific group identified as having an increased risk of travel-related morbidity. The United States Centers for Disease Control and Prevention define a VFR as "an immigrant, ethnically and racially distinct from the majority population of the country of residence (a higher-income country), who returns to his or her home country (lower-income country) to visit friends or relatives. Included in the VFR category are family members, such as the spouse or children who were born in the country of residence" (2).

This is a summary of the CATMAT Statement on International Travellers Who Intend to Visit Friends and Relatives, in which a full description of the evidence and recommendations is available (3). The Statement focuses on the abovementioned definition of VFRs and outlines the increased risks faced by VFRs while providing recommendations based on the available literature. Given the current global patterns of population mobility, this definition of VFR may be rather strict. It is reasonable to extend these recommendations to all travellers to any country with an epidemiological gradient of risk compared to the country of residence, whose intent is to visit friends and relatives, regardless of migrant status or ethnicity (4, 5).

Methods

A literature search was conducted for both published studies and grey literature. MEDLINE, EMBASE, Global Health, Scopus, Google Scholar and Access MEDLINE databases were used as well as reports and publications from Statistics Canada, the Public Health Agency of Canada (PHAC) and Citizenship and Immigration Canada.

Based on this initial overview, section topics were selected and additional focused literature searches were performed. Literature and evidence from Canada regarding the epidemiology and burden of specific diseases in the VFR population was used when available. The Statement does not contain a comprehensive overview of all travel-related risks, as content was prioritized based on increased risk specifically for VFRs. Therefore, it is important to be familiar with and address all travel-related risks at destination with a special emphasis on the topics discussed below.

The Statement represents a narrative review of the travel medicine literature on VFRs as well as CATMAT expert opinion. The recommendations do not include a description of the strength of the recommendation or grade of the quality of evidence as in previous CATMAT statements. Previous CATMAT statements were referred to and reiterated where they related to VFRs and a comprehensive list of current CATMAT statements can be found on the PHAC travel health website (6).

Results and recommendations

Risk factors

Rates of travel-related illness in VFRs tend to be higher for many conditions due to several factors. VFRs have an increased potential for last-minute travel plans, often have longer stays, may be reluctant to eat differently than hosts, may stay in places without door or window screens and without bed nets, are often in close proximity to the local population and have an increased likelihood of drinking untreated water (7,8).

VFRs and foreign-born travellers are less likely to seek pre-travel health consultation (9, 10, 11, 12), are more likely to seek advice closer to departure (13) and are more likely to decline a recommended vaccine (13). These differences have been associated with VFRs' low perception of personal disease risk (8), but may also reflect language, cultural and/or financial barriers preventing uptake (14, 15). VFRs often believe that they are immune to diseases (such as malaria) in their home country (7, 14, 16). They may seek advice from health care providers with a similar ethnic background who may not recommend preventive strategies such as chemoprophylaxis due to similar beliefs (17, 18).

Malaria

Studies have found that among travellers with malaria, 59 to 99% did not use malaria chemoprophylaxis or took it inadequately (inappropriate drug or adherence) (19). In a Canadian case series of malaria diagnoses, the majority of cases were among travellers who did not seek pre-travel advice and/or did not take appropriate malaria prophylaxis (20, 21).

VFRs account for a significant proportion of imported malaria cases in non-endemic countries (19). Studies have found foreign-born VFRs to have up to a 4.5-fold higher risk of contracting malaria than tourist travellers (22). Based on data from the Canadian Malaria Network from 2001 to 2013, 45% of severe malaria cases in Canada, for which information was available, reported visiting friends and relatives as the purpose for travel (23).

Given the characteristics mentioned above that may increase the risk of malaria (such as personal perception of disease risk and immunity) VFRs should be counselled about the importance of malaria prevention when travelling to malaria-endemic countries. Recommendations should include use of personal protective measures to prevent mosquito bites and potential use of chemoprophylaxis, depending upon destination. VFRs should be advised to seek health care if they develop fever during travel or once they return to Canada.

Specific recommendations on malaria chemoprophylaxis are available in CATMAT's Canadian Recommendations for the Prevention and Treatment of Malaria (24).

Vaccine-preventable diseases

Due to variation in vaccination schedules or lack of access to vaccines in different countries, Canadian immigrants may be more susceptible to vaccine-preventable disease.

Routine immunization

Studies have found substantial rates of non-immunity to measles, mumps, rubella and varicella among Canadian immigrants from developing countries (25, 26, 27). Foreign-born VFRs should be evaluated for immunization status and immunity to vaccine-preventable disease and routine vaccinations should be provided as needed. For pediatric VFRs, there may be an opportunity to accelerate the routine schedule in order to provide maximal protection during travel.

Appendix 2 in the full VFR Statement (3) and CATMAT's Statement on Pediatric Travellers (28) contain information on accelerated vaccination schedules for children.

Typhoid

The majority of cases of typhoid fever in North America are associated with travel, particularly travel to South Asia (Afghanistan, Pakistan, India, Nepal, Bangladesh, Maldives, Sri Lanka and Bhutan) (15). Studies have found VFR travel to be a major risk factor for travel-related typhoid fever infection, with VFRs accounting for 66% of cases in the United States (29) and more than 90% of cases in Quebec (30). A study by the global GeoSentinel network found VFRs to have a 7-fold greater risk of receiving a diagnosis of typhoid fever compared with tourist travellers (22).

Age-appropriate typhoid vaccination is recommended for VFRs travelling to South Asia (31). Typhoid vaccine is not routinely recommended for travellers to destinations outside of South Asia; however, it may be considered for VFRs in specific high-risk situations (31). Safe food and water precautions should be discussed and the importance of frequent hand washing should be emphasized.

Refer to CATMAT's Statement on International Travellers and Typhoid (31) for further information on prevention of typhoid fever and use of typhoid vaccine.

Hepatitis A and B

VFRs, especially children, are a major contributor to hepatitis A cases in Europe and North America. Studies from Europe and Quebec have found that VFRs account for 28%-78% of travel-related HA cases (30, 32, 33, 34, 35).

Research has shown that over half of immigrants and refugees are non-immune to hepatitis B (36). Several behavioural characteristics of VFR travel (longer periods in country, close contact with local population, greater

risk of injury and/or contact with the medical system) and high levels of non-immunity would be considered specific risk factors for hepatitis B acquisition.

Those travelling to countries with poor sanitation and hygiene conditions should be advised to follow safe food and water precautions and to wash their hands frequently (37). VFRs travelling to HB-endemic countries or who may engage in behaviours increasing their risk for blood/body fluid contact should be counselled regarding safe practices (condom use, use of sterile medical equipment) (38). Travellers who are non-immune to HA and/or HB should be vaccinated prior to travel (37). Age-appropriate immunization is advised for children.

Further recommendations on prevention of HA and HB in travellers can be found in CATMAT's Summary of Recommendations for the Prevention of Viral Hepatitis During Travel (37).

Tuberculosis

Travellers to countries with higher tuberculosis (TB) incidence are at risk of acquiring infection during travel. Foreign-born individuals accounted for 64% of all reported cases in Canada in 2012, with the highest incidence rates among those originating from Africa, South-East Asia, Western Pacific and Eastern Mediterranean (39). These cases include TB disease acquired in the country of origin before immigration as well as during return VFR trips. Studies have found that significant proportions of TB in immigrant populations can be attributed to VFR travel (40, 41). Additionally, foreign travel, especially VFR travel, has been found to be a risk factor for latent TB infection (LTBI) (42, 43).

VFRs travelling to high TB incidence countries should avoid consumption of unpasteurized dairy products to reduce the risk of M. bovis acquisition (44). VFRs should be cautioned to avoid individuals with unexplained chronic cough or known pulmonary TB until the individual is deemed non-infectious. Bacillus Calmette-Guérin (BCG) vaccine may be considered in certain circumstances for individual long-term travellers to high-prevalence countries (45).

Pre- and/or post-travel TB skin tests may be indicated depending on risk at destination, duration of travel and personal health factors. The full VFR Statement contains a decision making model to guide TB skin testing in travellers (3).

Refer to CATMAT's Risk Assessment and Prevention of Tuberculosis Among Travellers (44) for detailed guidance on pre-travel advice for TB infection risk avoidance and post-travel TB screening and to the Canadian Tuberculosis Standards (45) for up-to-date information on TB risk conditions and country-level risk stratification.

Parasitic infections

Certain parasitic infections, such as schistosomiasis, strongyloidiasis, echinococcosis and cysticercosis can be chronic and may cause significant morbidity and even death, while others are self-limiting and have a low impact on health. A Canadian GeoSentinel study found VFRs to be more likely to present with these and other parasitic infections (46).

VFRs should be advised to avoid freshwater activities (such as swimming) in regions where schistosomiasis is endemic (Africa, South-East Asia and parts of South America). Avoidance of skin-to-soil contact (such as walking barefoot) is recommended to prevent strongyloidiasis in tropical countries. Food and water precautions are recommended to prevent other parasitic infections spread via the fecal-oral route. The pre-travel assessment can provide an opportunity to identify risk and recommend screening for these treatable chronic parasitic infections among immigrants.

Sexually transmitted infections and Human Immunodeficiency Virus

New sexual partners and unprotected sexual encounters are common among travellers generally (47), including VFRs (48,49). A recent global GeoSentinel review found that VFR travel was associated with an increased risk of sexually transmitted infections (STI) compared with other travel (50) which adds to existing literature reports that STIs were more likely among VFRs than other travellers (22,51).

Sexual health counselling should be a routine part of the pre-travel consultation and risk of exposure to STIs and Human Immunodeficiency Virus (HIV) should be discussed. The importance of safer sex practices should be emphasized and travellers should be encouraged to bring condoms from Canada to assure their quality (52). HPV vaccine can be considered for adolescent and adult travellers not previously vaccinated. HB vaccination is recommended as above.

Refer to CATMAT's Statement on Travellers and Sexually Transmitted Infections (52) for additional recommendations related to STI risk reduction.

Injury

Injury is a significant cause of morbidity and mortality in travellers and accounts for 18%-25% of traveller mortality abroad (53, 54, 55). Numerous characteristics of VFRs (longer trip duration, greater likelihood to use local modes of travel) are assumed to increase injury risk, though there is not specific literature on travel-related injury among VFRs.

Road safety precautions such as seatbelts, infant/child car seats and helmets should be recommended (56). VFRs should avoid riding motorcycles or bicycles and should be encouraged to use helmets where this cannot be avoided (56). For more information on injury risk and recommendations for prevention, refer to CATMAT's Statement on Risk of Injury and Travel (56).

Special populations

Pediatric VFRs

Compared to pediatric tourist travellers, pediatric VFRs are more likely to be younger, travel for longer periods, travel more often to rural areas, present for pre-travel advice closer to the departure date and travel to destinations with higher risk for tropical diseases (57, 58).

Pediatric VFRs have an increased risk of travel-related illness and are at particular risk for febrile illness (especially caused by malaria) (59), TB, typhoid and meningococcal meningitis (60). A recent surveillance study of pediatric VFRs from Canada found that enteric fever, malaria, diarrheal diseases and HA accounted for 75% of travel-related illnesses in this group (61). Only 26% of these travellers had received pre-travel advice.

These results emphasize the importance of pre-travel assessment and adherence to recommended interventions for children. Opportunities to accelerate the routine schedule should be evaluated in order to provide maximal protection during travel (refer to Appendix 2 of the full VFR Statement (3) for accelerated vaccination schedules) Parents should be advised that the rates of illness requiring hospitalization are higher among VFR children and that illness during and after travel requires urgent assessment. Also, parents of Canadian-born VFR children should be informed that their children do not have any innate immunity against travel-related illnesses due to genetics alone. For more information on pediatric travellers and recommendations, refer to CATMAT's Statement on Pediatric Travellers (28).

Immunocompromised and older VFRs

There is little research focusing on immunocompromised or older VFRs. Specific characteristics of these populations (comorbid conditions, poorer immune responses, contraindications to vaccines or frailty) which lead to increased health risks while travelling may lead to synergistic risks for VFRs.

Infectious disease risk should be reviewed with the traveller according to the degree of their immune compromise along with risks specific to the destination and appropriateness of travel.

For travel health information on immunocompromised travellers and detailed recommendations on specific conditions, refer to CATMAT's Statement on The Immunocompromised Traveller (62). For information on and recommendations for older travellers, refer to CATMAT's Statement on Older Travellers (63).

Targeting VFRs for pre-travel advice

Health care providers should discuss potential upcoming VFR travel with their patients at routine health visits. Consultation with a travel health specialist should be recommended for all VFRs and particularly for those with risk factors for severe disease. Because some patients may be unwilling or unable to afford the cost of seeking travel medicine consultation, primary care providers should equip themselves with travel health knowledge and clinical resources so they are able to provide appropriate essential recommendations.

Conclusion

The pre-travel consultation for VFRs provides an important opportunity for health promotion, identification of pre-existing conditions and risk reduction. VFRs should be made aware of their increased risk for travel-related illnesses and how to prevent them. Higher levels of non-immunity to vaccine-preventable disease and increased prevalence of chronic diseases among VFRs should also be addressed. In addition, health care providers should stress the importance of adherence and address potential challenges to achieving it.

Table 1 summarizes the disease-specific recommendations for VFRs and additional resources. Additional research is required to determine the facilitators and barriers for VFRs in accessing and adhering to pre-travel advice. Engaging ethnic communities and health care personnel that provide their care is necessary to assess knowledge, attitudes and behaviour regarding travel health and to determine optimal ways of providing information to VFRs.

Table 1: Disease-specific recommendations for visiting friends and relatives (VFR) and additional resources

Disease	Strategies to decrease travel-associated risk to VFRs	Resources for further information
Malaria	• Targeted counselling including correction of personal risk misconceptions (e.g., traveller believes they are immune). • Advise personal protective measures against mosquito bites, chemoprophylaxis may be indicated. • Where antimalarial chemoprophylaxis is indicated, VFRs should be encouraged to purchase it within Canada rather than abroad. • VFRs travelling to malaria-endemic regions should be advised to seek health care if they develop fever during or after travel.	• CATMAT's Canadian Recommendations for the Prevention and Treatment of Malaria (24) • CATMAT's Statement on Personal Protective Measures to Prevent Arthropod Bites (64) • Children: CATMAT's Statement on Pediatric Travellers (28)
Routine vaccine-preventable disease	• Evaluate immunization status of foreign-born individuals and update routine vaccinations as necessary. • Children: Possible acceleration of primary immunization series should be evaluated to provide maximal protection during travel.	• Appendix 2 of the full VFR Statement, pediatric accelerated immunization schedules table (3) • CATMAT's Statement on Pediatric Travellers (28) • Canadian Immunization Guide Part 3, Immunization of Travellers (65)
Typhoid	• Those travelling to countries with poor sanitation and hygiene conditions should be advised to follow safe food and water precautions and to wash their hands frequently. • Typhoid vaccine is recommended for adult and children (where age-appropriate)	• CATMAT's Statement on International Travellers and Typhoid (31)

	travelling to South Asia[1] (31). • Typhoid vaccine is not routinely recommended for travellers to destinations other than South Asia[1]; however, it may be considered for VFRs in situations posing significant risk (e.g., children, extended periods of stay, inability to avoid high-risk food/water exposures) (31).	
Hepatitis A (HA)	• Travellers should be advised to follow safe food and water precautions and to wash their hands frequently. • Non-immune VFRs going to developing countries should be vaccinated. • **Children**: Age-appropriate immunization against HA is advised for children.	• CATMAT's Statement on Hepatitis Vaccines for Travellers (38) • CATMAT's Summary of Recommendations for the Prevention of Viral Hepatitis During Travel (37)
Hepatitis B (HB)	• All VFRs going to countries endemic for HB (i.e., with HB surface antigen prevalence ≥ 2%) or who may engage in behaviours increasing their risk for blood/body fluid contact should be counselled regarding safe practices (condom use, use of sterile medical equipment). • Non-immune VFRs should be vaccinated. • **Children**: Age-appropriate immunization against HB is advised for children.	• CATMAT's Statement on Hepatitis Vaccines for Travellers (38) • CATMAT's Summary of Recommendations for the Prevention of Viral Hepatitis During Travel (37) • World Health Organization map of endemic countries (66)
Tuberculosis (TB)	• VFRs should avoid contact with individuals who have known pulmonary TB (while they remain infectious) or people with unexplained chronic cough. • Pre- and/or post-travel TB skin tests may be indicated depending on risk at destination, duration of travel and personal health factors. The full VFR Statement contains a decision model to guide TB skin testing in travellers (3). • In some exceptional circumstances BCG may be considered for individual long-term travellers to high-prevalence countries. • VFRs travelling to high TB incidence countries should avoid consumption of unpasteurized dairy products to avoid the risk of M. bovis acquisition.	• Appendices 3, 4 and 5, criteria for TB skin testing post-travel, risk factors for development of active TB and decision making model to guide TB skin testing (3) • CATMAT's Risk Assessment and Prevention of Tuberculosis Among Travellers (44) • The Canadian Tuberculosis Standards (Chapters 6 & 13) (45) • Children: CATMAT's Statement on Pediatric Travellers (28)
Parasitic infections	• Travellers should be advised to avoid freshwater activities, such as swimming, in Africa, South-East Asia and parts of South America to prevent schistosomiasis • Avoid walking barefoot or other skin-to-soil contacts in tropical countries to prevent strongyloidiasis. • Follow safe food and water precautions for prevention of various intestinal parasitic infections.	
Sexually transmitted	• Discuss sexual activity during travel and the rates of STIs and HIV in the general and	• CATMAT's Statement on Travellers and Sexually

infections (STIs) and Human Immunodeficiency Virus (HIV)	sex worker populations at destination. • Stress the importance of safer sex practices and preparation for travel by bringing condoms from Canada (to ensure quality). • HB vaccination should be recommended as above. • HPV vaccine can be considered for adolescent and adult travellers not previously vaccinated.	Transmitted Infections (52)
Injury	• VFRs should avoid the use of bicycles and motorcycles and use helmets if these activities cannot be avoided. • Encourage standard road safety precautions such as seat belts and infant/child car seats.	• CATMAT's Statement on Risk of Injury and Travel (56)
Pediatric travellers	• Counsel parents that rates of illness requiring hospitalization are higher among VFR children and that illness during and after travel requires urgent assessment. • Address misconceptions around prior immunity (e.g., child is not protected because parent was born in destination country). • Accelerated vaccination may be possible. • Post-travel TB skin testing and BCG vaccination may be indicated in specific situations, see additional resources for recommendations.	• Child-specific recommendations in previous sections, including in CATMAT's Canadian Recommendations for the Prevention and Treatment of Malaria (24) • Appendix 2 for accelerated vaccination schedule (3) • CATMAT's Statement on Pediatric Travellers (28) • CATMAT's Risk Assessment and Prevention of Tuberculosis Among Travellers (44) • The Canadian Tuberculosis Standards (Chapters 6 & 13) (45)
Older travellers	• Review of comorbidities and vaccine recommendations according to age should be conducted. • Pre- and/or post-travel TB skin testing may be indicated.	• CATMAT's Statement on Older Travellers (63) • CATMAT's Risk Assessment and Prevention of Tuberculosis Among Travellers (44) • The Canadian Tuberculosis Standards (Chapters 6 & 13) (45)
Immunocompromised travellers	• Review infection risk for travellers according to personal immune compromise and risk at destination and discuss appropriateness of travel. • Post-travel TB skin testing may be indicated.	• CATMAT's Statement on The Immunocompromised Traveller (62) • CATMAT's Risk Assessment and Prevention of Tuberculosis Among Travellers (44) • The Canadian Tuberculosis Standards (Chapters 6 & 13) (45)

[1]South Asia is defined as per the World Bank classification (67) and includes Afghanistan, Pakistan, India, Nepal, Bangladesh, Maldives, Sri Lanka and Bhutan.

Acknowledgements

This summary was developed by the VFR Working Group: Brophy J (Chair), Bui Y, Crockett M, Greenaway C, McCarthy A, Jagt K, Geduld J and Bryson M.

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Conflict of interest

None.

Funding

This work was supported by the Public Health Agency of Canada.

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https://doi.org/10.14745/ccdr.v41i05a02

Statement on Meningococcal Disease and the International Traveller

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Abstract

Background: Meningococcal meningitis occurs globally and the predominant serogroups vary by geographic region. Vaccines against serogroups A, B, C, Y and W-135 are available in Canada.

Objective: To provide guidance to health care professionals for the prevention of invasive meningococcal disease in international travellers from Canada.

Methods: This Statement was developed by the Committee to Advise on Tropical Medicine and Travel (CATMAT) to compliment the *Canadian Immunization Guide*. It considers the need for protection and the potential for adverse effects of vaccination.

Results: Meningococcal vaccine recommendations vary by traveller characteristics and travel destination. Meningococcal meningitis occurs globally and the predominant serogroup varies by geographic region. Areas of particular risk are the "meningitis belt" in Sub-Saharan Africa, Saudi Arabia during the Hajj and Umrah pilgrimages and places with current epidemics or heightened disease activity. For healthy travellers see the *Canadian Immunization Guide*. Quadrivalent vaccine should be given to individuals at increased risk for invasive meningococcal disease due to medical conditions with booster doses every five years. Meningococcal B vaccine should be considered.

Conclusion: Vaccination is the most effective measure for preventing invasive meningococcal disease. The Government of Canada's travel health notices identify areas of new and recent meningococcal activity and are updated regularly.

Preamble

The Committee to Advise on Tropical Medicine and Travel (CATMAT) provides the Public Health Agency of Canada with ongoing and timely medical, scientific, and public health advice relating to tropical infectious disease and health risks associated with international travel. The Agency acknowledges that the advice and recommendations set out in this statement are based upon the best current available scientific knowledge and medical practices and is disseminating this document for information purposes to both travellers and the medical community caring for travellers.

Persons administering or using drugs, vaccines, or other products should also be aware of the contents of the product monograph(s) or other similarly approved standards or instructions for use. Recommendations for use and other information set out herein may differ from that set out in the product monograph(s) or other similarly approved standards or instructions for use by the licensed manufacturer(s). Manufacturers have sought approval and provided evidence as to the safety and efficacy of their products only when used in accordance with the product monographs or other similarly approved standards or instructions for use.

Introduction

The goal of this Statement is to provide guidance to health care professionals for the prevention of meningococcal disease in international travellers from Canada.

Methods

This Statement was developed by a working group of the Committee to Advise on Tropical Medicine and Travel (CATMAT). It was developed to compliment a thorough literature review and analysis which was conducted as part of the development of the National Advisory Committee on Immunization's (NACI) recommendations in the Canadian Immunization Guide (1). CATMAT has considered the need for protection and the potential for adverse effects of vaccination. The Statement represents a narrative review of the travel medicine literature on meningococcal vaccines and CATMAT's expert opinion. The recommendations do not include a description of the strength of the recommendation or grade of the quality of evidence as has been done in previous CATMAT statements. Each member of CATMAT is a volunteer and none declared a relevant conflict of interest.

Background

Meningococcal disease is caused by a Gram negative bacterium, *Neisseria meningitidis*. Neisseria are divided into 12 serogroups according to the immunological reactivity of their capsular polysaccharide (2). The five major serogroups most commonly associated with invasive disease are A, B, C, Y and W-135 (2, 3, 4).

Person-to-person transmission occurs by close contact with respiratory secretions or saliva of infected persons (1, 4). Humans are the only reservoir (5). Asymptomatic carriage occurs, and at any time, 5%–10% of the population may be carriers of *N. meningitidis* (1, 3, 4). Invasive disease is an infrequent consequence of nasopharyngeal colonization (6).

Invasive meningococcal disease generally occurs one to fourteen days after exposure and usually presents as an acute febrile illness with rapid onset and features of meningitis or septicemia (meningococcemia), or both and a characteristic non-blanching petechial or purpuric rash. Symptoms of meningococcal meningitis include intense headache, fever, nausea, vomiting, photophobia and stiff neck. Meningococcemia often involves hypotension, acute renal failure, hemorrhage and multi organ failure (1, 4). Fatality rates are approximately five to ten percent even with prompt antimicrobial treatment in healthcare facilities (5). Up to one-third of survivors may have long-term sequelae including hearing loss, neurologic disabilities and digit or limb amputations (1, 2, 4).

Epidemiology

N. meningitidis is found worldwide. In most countries, *N. meningitidis* is recognized as a leading cause of meningitis and fulminant septicemia and is a significant public health problem. However, population-based surveillance with laboratory confirmation and strain characterization is still not attainable in many countries throughout the world (7). Surveillance data from many countries are incomplete or lacking and there is currently no reliable global burden estimate (8).

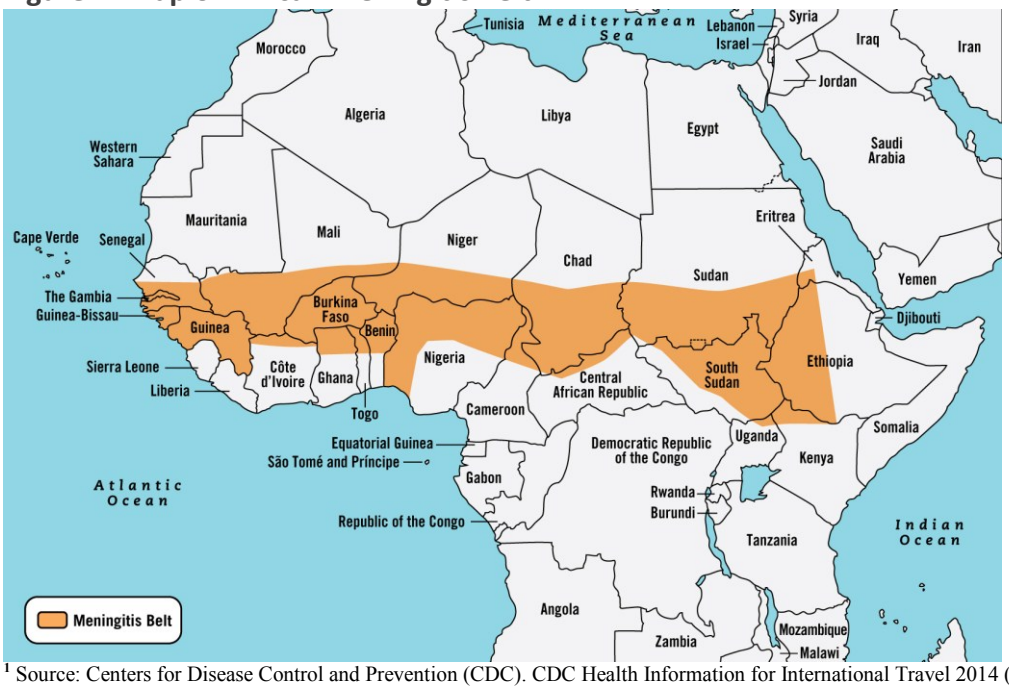
Meningococcal meningitis occurs globally and the predominant serogroup varies by geographic region. In Australia, New Zealand and Europe, serogroup B predominates, followed by serogroup C (7, 9). Serogroups B and C predominate in the United States and Canada, followed by serogroup Y (7, 9). The serogroup distribution across Latin America, South America and the Caribbean varies, with serogroups B and C predominating in some countries and W-135 and Y in others (9). Little is known about the epidemiology of meningococcal disease in Asia and neighbouring areas (7, 9).

Different patterns of invasive meningococcal disease are seen across Africa (7). This is the case in the African meningitis belt, a region in sub-Saharan Africa extending from Senegal in the west to Ethiopia in the East (**Figure 1**), with a population of approximately 400 million (10). During the dry season (approximately December through June), the incidence rate of meningococcal disease can reach as high as 1,000 cases per 100,000 population. In non-epidemic periods, the rate of meningococcal disease in this region is roughly five to ten cases per 100,000 population (4, 8). Risk is highest in travellers to the meningitis belt who have prolonged contact with local populations during an epidemic.

Because of the crowded conditions of the Hajj and Umrah pilgrimage to Saudi Arabia and high carrier rates of *N. meningitidis* among pilgrims, outbreaks of meningococcal disease have historically been a problem (4, 11). The Hajj pilgrimages in 2000 and 2001, for example, were associated with large outbreaks of serogroup W-135 in returning pilgrims and their contacts.

Although people of any age can develop disease, endemic disease occurs most often in children and adolescents, whereas in meningococcal epidemics, rates may rise in older children and young adults (1, 8).

Figure 1: Map of African Meningitis Belt[1]



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Prevention

Vaccination is the most effective measure for preventing invasive meningococcal disease. Vaccines for serogroups A, B, C, Y and W-135 are available in Canada. A comprehensive description of vaccines for serogroups A, C, Y and W-135 and associated recommendations is available in the most recent version of the *Canadian Immunization Guide* (1). A comprehensive description of the vaccine for serogroup B can be found in the NACI Statement on the Advice for the use of 4CMenB Vaccine (9).

Vaccine recommendations for Canadian travellers

Meningococcal vaccine recommendations vary by characteristics of the traveller (e.g., age, medical conditions, etc.) and the travel destination. Specific recommendations for travellers from Canada are outlined below. For healthy travellers to a destination where risk of meningococcal transmission is high, please see **Table 1** in Part 4 Active Vaccines: Meningococcal Vaccine: Meningococcal Vaccine of the *Canadian Immunization Guide* for the vaccination schedules (1).

Routine vaccination programs with conjugate serogroup C vaccine have been implemented in every Canadian province and territory (1). Independent of travel plans, the traveller should be up-to-date for age in accordance with their provincial/territorial immunization schedule (12).

Travellers with underlying medical conditions

Vaccination is recommended for children and adults at increased risk of invasive meningococcal disease regardless of destination (**Table 1**). Refer to the *Canadian Immunization Guide* for detailed information on recommended products, scheduling and dosage (1).

Table 1: Meningococcal vaccine recommendations for travellers at increased risk for invasive meningococcal disease (IMD) due to medical conditions (1, 2, 9)

Individuals at increased risk for IMD due to medical conditions	Vaccine recommendations	
	Serogroups A, C, Y, W-135	**Serogroup B**
Persons with: • functional or anatomic asplenia (including sickle cell disease); • congenital complement, properdin, factor D or primary antibody deficiencies; and • acquired complement deficiencies(e.g., those receiving eculizumab). In addition, immunization should be considered for persons with HIV infection, especially if congenitally acquired and for cochlear implant recipients.	**Individuals between two months to less than two years of age[1]** Men-C-ACYW-CRM (Menveo™) should be preferentially used. For infants two months to less than one year of age, a schedule using two or three doses with each dose given eight weeks apart with another dose at 12 to 23 months of age is recommended (and at least eight weeks from the previous dose). For children one to less than two years of age, a two-dose series is recommended with each dose given at least eight weeks apart.	**Individuals between two months and 17 years of age** Multicomponent meningococcal serogroup B (4CMenB) vaccine should be considered. For infants two to five months, three doses given with an interval of at least one month between doses is recommended. A fourth dose (a booster) is recommended between 12 and 23 months of age. For infants six to 11 months, the first two doses should be separated by an interval of two months and a third dose is recommended between 12 and 23 months of age, no less than two months after the second dose. For children one to ten years, two doses separated by a two month interval is recommended. For individuals 11 to 17 years, two doses given at least one month apart is recommended.
	Individuals two years of age and older[2] Any of the quadrivalent conjugate vaccines (Men-C-ACYW-135-CRM, Menveo™; Men-C-ACYW-135-D, Menactra®; or Men-C-ACYW-135-TT, Nimenrix™) can be given as a two-dose series at least eight weeks apart.	**Individuals 18 to 55 years of age[3]** Although the manufacturer of the vaccine approved for use in Canada currently does not provide an adult schedule, in clinical trials of individuals from 18 to 55 years of age, two doses given at least one month apart have shown to be immunogenic and safe.

	The use of polysaccharide meningococcal vaccine is not routinely recommended in Canada. Conjugate vaccines possess significant advantages over polysaccharide vaccines including better immune memory, longer duration of efficacy, lack of hyporesponsiveness with booster doses and possible reduction of bacterial carriage rates (4, 5).	
	Booster doses[4]: Booster doses should be given every five years after the last dose.	**Booster doses:** Because of unknown duration of protection after immunization, the need for a booster dose is yet to be determined.

[1]Based on available published data in this age group, Menveo™ should be used because it has been found to be safe and immunogenic. Routine meningococcal C conjugate vaccine does not need to be administered in addition to Menveo™.
[2]Men-C-ACYW-135 vaccines are not authorized for use in those 56 years of age and older; however, based on limited evidence and expert opinion their use is considered appropriate (2).
[3]In Canada, 4CMenB has been authorized for use in individuals from two months through 17 years of age.
[4]The manufacturer of Nimenrix™ has not yet determined the need for a booster dose; however NACI recommends periodic booster for individuals at high-risk for IMD or who have ongoing risk of exposure (2).

Travellers to the Hajj and Umrah pilgrimages

In the aftermath of two large invasive meningococcal disease (IMD) outbreaks during the 2000 and 2001 pilgrimages, the Kingdom of Saudi Arabia Ministry of Health implemented a requirement for all pilgrims to receive meningococcal vaccine. A certificate of vaccination against meningococcal meningitis is required for all visitors arriving for the purpose of Hajj or Umrah. Hajj or Umrah visas cannot be issued without a valid proof of vaccination.

- Adults and children aged two years and older must be vaccinated with quadrivalent meningococcal vaccine (serogroups A, C, Y and W-135) (13).
- Children between three months and two years of age must be vaccinated with two doses of meningococcal A vaccine, with a three-month interval between the two doses (13).
- The vaccination must have been received not more than three years and not less than ten days before arrival in Saudi Arabia (13).

In general, travellers to this region do not need to receive 4CMenB vaccine unless there is evidence of a hyperendemic strain or an outbreak that is known to be caused by serogroup B that can be prevented by the vaccine.

Refer to the recommendations in the Government of Canada's travel health notices for pilgrims to the Hajj and Umrah posted each year in late summer to early fall for the most up-to-date information to ensure that individual travellers have appropriate vaccine documentation (14).

Travellers to sub-Saharan Africa

Quadrivalent meningococcal vaccine (serogroups A, C, Y, W-135) is recommended for travellers to the African meningitis belt (**Figure 1**) or countries outside the usual boundaries where epidemics have occurred, especially those who will be living or working there, or may be in close contact with the local population through school, accommodation, etc.

Immunization against serogroup C alone is not considered adequate for individuals travelling to this region. A single dose of any of the available quadrivalent conjugate meningococcal vaccines may be used for the immunization of individuals two years of age and older (2). Men-C-ACYW-135-CRM (Menveo™) is recommended for immunization of individuals two months to less than two years of age. Refer to the *Canadian Immunization Guide* for detailed information and schedules (1).

In general, travellers to this region do not need to receive 4CMenB vaccine unless there is evidence of a hyperendemic strain or an outbreak that is known to be caused by serogroup B that can be prevented by the vaccine.

Other considerations for travellers

- Travellers to areas with current epidemics or heightened disease activity should be vaccinated, regardless of duration of exposure. The Government of Canada's travel health notices for recognized areas of new and recent meningococcal activity are released and updated regularly on travel.gc.ca (14).
- IMD has historically occurred in schools, colleges and other places where large numbers of adolescents and young adults congregate. Individuals travelling to these settings may consider receipt of vaccine for serogroups B and A,C,Y, W-135 at least two weeks prior to arrival (5).
- Individuals travelling to engage in research, industrial and/or clinical laboratory settings with the potential for routine exposure to *N. meningitidis* should be vaccinated with Men-C-ACYW-135 vaccine and 4CMenB vaccine. Re-vaccination of laboratory staff at ongoing risk of exposure should be done at routine five-year intervals (1). Laboratory staff at ongoing risk of exposure should be re-vaccinated at routine five-year intervals with Men-C-ACYW-135 vaccine (1). Because of unknown duration of protection after immunization, the need for a booster dose of 4CMenB vaccine is yet to be determined (9).
- There is no evidence to recommend routine meningococcal immunization of individuals travelling to work as health care providers; nosocomial transmission of IMD is very uncommon (1).
- Travellers to developed countries should follow the meningococcal immunization recommendations of the destination country (15).

Additional vaccine characteristics and usage

Table 2 identifies additional vaccine information, such as common adverse reactions, contraindications, precautions and use in special populations. For complete and detailed information, refer to the *Canadian Immunization Guide* (1).

Table 2: Additional vaccine characteristics and usage recommendations for meningococcal vaccines

Vaccine feature	Serogroup A, C, Y, W-135 vaccine	Serogroup B vaccine
Adverse reactions	Mild injection site (e.g., redness, tenderness and swelling) and systemic reactions (e.g., headache, malaise) have been reported. Serious adverse events are rare.	Among infants and children up to 12 months of age, the most commonly reported adverse reactions included erythema, induration, fever and sleepiness or irritability. A review of the evidence can be found in the NACI Statement on the Advice for the use of 4CMenB Vaccine (9).
Contraindications and precautions	Contraindicated for individuals with a history of anaphylaxis after a previous dose of the vaccine or individuals with a proven anaphylactic reaction to any component of the vaccine or its container (1). Administration of meningococcal vaccine should be postponed in	Contraindicated for individuals with a serious allergy to any vaccine component or previous dose (2).

	individuals with moderate or severe acute illness; individuals with minor acute illnesses (with or without fever) may be vaccinated (1).	
Pregnancy and breastfeeding	Conjugate meningococcal vaccines have not been studied in pregnancy; however, the use of the vaccine may be considered, if indicated (1, 3). Inactivated vaccines, such as meningococcal vaccines, may be administered to women who are breastfeeding (1).	There are no studies of 4CMenB vaccine in pregnant or lactating women.
Immunocompromised travellers	Meningococcal vaccine is recommended for certain high-risk individuals as outlined above. When considering immunization of an immunocompromised person, consultation with the individual's attending physician may be of assistance. For complex cases, referral to a physician with expertise in immunization and/or immunodeficiency is advised.	
Concurrent administration with other vaccines	Quadrivalent conjugate vaccines may be administered concomitantly with adolescent and adult age-appropriate vaccines at different injection sites using separate needles and syringes (1).	A review of the concomitant use of 4CMenB with other vaccines can be found in the NACI Statement on the Advice for the use of 4CMenB Vaccine (9).
Interchangeability of vaccines	Any of the quadrivalent conjugate vaccines may be used for re-vaccination, regardless of which meningococcal vaccine was used for initial vaccination (1). When possible, the infant series should be completed with the same vaccine.	Not applicable.

General precautions

Travellers should be advised to practice good hand hygiene interventions and avoid activities that promote the exchange of respiratory secretions, such as sharing drinks, cigarettes, lipstick, etc. Avoid overcrowding in confined spaces. Following close contact with an individual infected with meningococcal disease, medical advice should be sought regarding possible chemoprophylaxis and vaccination (5).

Conclusion

Meningococcal vaccination is the most effective measure for preventing IMD. The Government of Canada's travel health notices identify areas of new and recent meningococcal activity and are updated regularly (14).

Acknowledgements

This Statement was developed by the Meningococcal Working Group: McCarthy A (Chair), Bryson M, Bui Y, Cutler J, and Geduld J.

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Conflict of interest

None

Funding

This work was supported by the Public Health Agency of Canada.

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https://doi.org/10.14745/ccdr.v41i05a03

Travel medicine resources for Canadian practitioners

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Abstract

Objective: To provide travel medicine practitioners with a comprehensive (though not exhaustive) list of resources. Resources that appear to be most frequently used by health professionals currently practising this specialty have been included.

Methods: Select members of TravelMed, an international e-mail discussion forum for travel medicine practitioners were informally canvassed and presented with a question regarding which travel medicine resources they find to be most useful. Their responses informed the development of this Statement. In addition, the opinions of experts in travel medicine were solicited to identify resources. The scope was international; however, particular attention was given to Canadian sources of information.

Results: Travel medicine resources are listed and organized into the following categories: Courses, conferences and local travel medicine groups; Books; Canadian recommendations; Handbooks; periodicals and reports; Journals; Internet medicine forums; Online subscription services; Outbreak reports and travel advisories; Sources of malaria recommendations; More useful websites; Travel medicine clinics in Canada and abroad; and Certification.

Conclusion: There are many Canadian and international resources available to inform Canadian travel medicine practitioners.

Preamble

The Committee to Advise on Tropical Medicine and Travel (CATMAT) provides the Public Health Agency of Canada with ongoing and timely medical, scientific and public health advice relating to tropical infectious disease and health risks associated with international travel. The Agency acknowledges that the advice and recommendations set out in this statement are based upon the best current available scientific knowledge and medical practices and is disseminating this document for information purposes to both travellers and the medical community caring for travellers.

Persons administering or using drugs, vaccines, or other products should also be aware of the contents of the product monograph(s) or other similarly approved standards or instructions for use. Recommendations for use and other information set out herein may differ from that set out in the product monograph(s) or other similarly approved standards or instructions for use by the licensed manufacturer(s). Manufacturers have sought approval and provided evidence as to the safety and efficacy of their products only when used in accordance with the product monographs or other similarly approved standards or instructions for use.

Introduction

The goal of this document is to provide both the novice and the experienced travel medicine practitioner with a comprehensive (though not exhaustive) list of resources. Resources that appear to be most used by health professionals currently practising this specialty have been included. Select members of TravelMed, an international e-mail discussion forum for travel medicine practitioners, were informally canvassed and presented

with a question regarding which travel medicine resources they find to be the most useful. Their responses informed the development of this Statement. In addition, the opinions of experts in travel medicine were solicited to identify resources.

The scope was international; however, particular attention was paid to Canadian sources of information. These are often more accessible to Canadian practitioners and reflect practice in this country.

Travel and tropical medicine frequently overlap. The intent of this document is to focus on travel medicine. Tropical medicine resources are cited mainly when they regularly include travel medicine material.

Categories of resource

1. Courses, conferences and local travel medicine groups

Canada

- Alberta Association of Travel Health Professionals Symposium and General Meeting
  - Annually in early summer in Canmore, Alberta
- Blue Travel Health Conference (Colloque Bleu) (in French)
  - Annually in spring in Montréal, Quebec
- Comité consultatif québécois en santé des voyageurs, INSPQ online module (in French)
- Fondation du CHUM travel health conference (in French)
  - Annually in early fall in Montréal, Quebec
- Manitoba Travel Health Network Annual Conference
  - Annually in April in Winnipeg, Manitoba
- McGill University Tropical Medicine course
  - Biennially in spring in Montréal, Quebec
- NOVA Travel Medicine Conference
  - Annually in November in Victoria, British Columbia

International

- American Society of Tropical Medicine and Hygiene Annual Meeting
  - Annually in November in different cities in the United States
- Asia Pacific Travel Health Society Congress
  - Biennially on even years
- Conference of the International Society of Travel Medicine
  - Biennially on odd years in spring in different host cities
- International Society of Travel Medicine (ISTM) travel medicine review and update course
  - An update and review of the body of knowledge for the practice of travel medicine and assistance in the preparation for the Certificate in Travel Health exam.
- List of additional international travel medicine conferences can be found at the International Society of Travel Medicine's website.

2. Books

Travel medicine

- Keystone JS, Freedman DO, Kozarsky PE, Connor BA, Northdruft HD. Travel medicine, 3rd ed. Philadelphia (PA): Saunders Elsevier Inc.; 2013.
- Weiss EA. Wilderness and travel medicine: A comprehensive guide, 4th ed. Seattle, (WA): The Mountaineers Books; 2012.
- Zuckerman JN. Principles and practice of travel medicine, 2nd ed. Chichester, West Sussex: Wiley-Blackwell; 2013.

Vaccines

- Plotkin SA, Orenstein WA, Offit PA. Vaccines, 6th ed. China: Saunders, Elsevier Inc.; 2013.

- Zuckerman JN, Jong EC. Travelers' Vaccines, 2nd ed. Shelton (CT): People's Medical Publishing House – USA; 2010.

Travellers' diarrhea

- Ericsson C, DuPont H, Steffen R. Travelers' diarrhea, 2nd ed. Hamilton (ON): BC Decker Inc.; 2008.

Tropical disease

- Farrar J, Hotez PJ, Junghanss T, Kang G, Lalloo D, White N. Manson's tropical diseases, 23rd ed. China: Saunders Elsevier Inc.; 2014.
- Guerrant RL, Walker DH, Weller PF. Tropical infectious diseases: Principles, pathogens and practice, 3rd ed. Philadelphia (PA): Saunders Elsevier Inc.; 2011.
- Magill AJ, Ryan ET, Hill D, Solomon T. Hunter's tropical medicine and emerging infectious diseases, 9th ed. China: Saunders Elsevier Inc.; 2013.
- Schwartz E. Tropical diseases in travelers. Singapore: Blackwell Publishing; 2009.

Other

- Auerbach PS. Wilderness medicine, 6th ed. Philadelphia (PA): Mosby Elsevier Inc.; 2012.
- Heymann DL. Control of communicable diseases manual, 20th ed. Washington (DC): American Public Health Association; 2014.
- All travel health professionals should have access to a good atlas. Ideally, an atlas will show the states/provinces in most countries, since many malaria recommendations name these specifically. Topography should also be shown so that altitude information is obtainable.

3. Canadian recommendations

- Committee to Advise on Tropical Medicine and Travel (CATMAT): The external advisory committee of the Public Health Agency of Canada develops recommendation statements on a wide array of travel medicine topics.
- Canadian Immunization Guide: Developed by the Public Health Agency of Canada, using National Advisory Committee on Immunization (NACI) and Committee to Advise on Tropical Medicine and Travel (CATMAT) recommendations and guidelines for all vaccines licensed for use in Canada. It deals comprehensively with problematic situations such as immunizing immunosuppressed travellers.

4. Handbooks, periodicals and reports

- Canada Communicable Disease Report (CCDR): Travel medicine articles, including CATMAT recommendations appear fairly often in this publication.
- CDC Health Information for International Travel (commonly called the "Yellow book"): Published by the Centers for Disease Control and Prevention (CDC) in the United States.
- International Travel and Health: Published by the World Health Organization (WHO).

5. Journals

Journals devoted to travel medicine

- Journal of Travel Medicine
- Travel Medicine and Infectious Disease

Journals that sometimes include travel medicine content

- The American Journal of Tropical Medicine and Hygiene
- British Medical Journal
- Clinical Infectious Diseases
- Emerging Infectious Diseases
- Infectious Disease Clinics of North America
- Journal of Infection
- The Journal of Infectious Diseases

- The Lancet
- The Lancet Infectious Diseases
- Malaria Journal
- Morbidity and Mortality Weekly Report
- Vaccine

Other major medical journals will occasionally include travel medicine content (e.g., NEJM, JAMA, etc.).

6. Internet travel medicine forums

- TravelMed: International travel medicine e-mail discussion forum, open to members of the International Society of Travel Medicine.

7. Online subscription services

These programs/services provide detailed assistance for any itinerary. The user inputs itinerary and traveller information. The program displays its recommendations regarding immunizations, malaria prophylaxis and advice. Generally, these resources can be very helpful for less-experienced practitioners.

- Gideon: Primarily a tropical and infectious disease diagnostic program but includes detailed epidemiologic information on travel-related diseases. US $995* per year for individual subscription.
- Sitata: An online service for travellers and travel medicine clinics, US $540* per year.
- TravaxShoreland: A popular source of travel medicine information, US $895*per year for single clinic license.
- TRAVAX (United Kingdom): Price available on request of application to TRAVAX.
- Tropimed: US $219 per year (at time of publication).

8. Outbreak reports and travel advisories

It is highly recommended that practitioners stay current regarding disease outbreaks of importance to travellers. The following sources provide up-to-date information that can be used in this regard.

- Disease Outbreak News: WHO, Global Alert and Response.
- GeoSentinel: A worldwide data collection and communication network associated with the International Society of Travel Medicine and the US Centers for Disease Control and Prevention.
- Government of Canada Travel News and Advisories - highlights the latest updates on threats and conditions considered unsafe for Canadians around the world.
- Government of Canada Travel health Advisories - outlines potential risks to Canadian travellers and to the Canadian public, and recommends measures that can be taken to reduce these risks.
- Global Polio Eradication Initiative: Polio updates, WHO, UNICEF, Rotary International and CDC.
- Healthmap: A map-based reporting system for outbreaks.
- Meningitis Vaccine Project: Meningococcal meningitis updates, WHO.
- ProMED: At this time perhaps the most frequently used disease outbreak e-mail service. Past outbreak reports are available on the ProMED website. These reports are timely, though may not always be confirmed.
- Weekly Epidemiological Record: WHO, outbreak reports.
- Several of the online subscription services listed above provide regular disease outbreak and security reports.

9. Sources of malaria recommendations

Links to Canadian guidelines are presented here. Included as well are those of several other jurisdictions. Recommendations regarding the need for chemoprophylaxis can vary widely. Familiarity with a broad set of national guidelines can provide practitioners with a wider perspective for developing recommendations and advice, in particular for itineraries associated with a "low" risk of malaria.

Canadian

- Canada, 2014: Travellers, Committee to Advise on Tropical Medicine and Travel.
- Québec, 2013: Guide d'intervention en santé-voyage, published by the Institut national de santé publique du Québec.

European

- France, 2014: Recommandations sanitaires pour les voyageurs, 2014 *(available in French only)*
- Germany, 2015: Deutsche Gesellschaft für Tropenmedizin und Internationale Gesundheit (DTG). Empfehlungen zur Malariavorbeugung *(available in German only)*
- Italy, 2014: New Italian Guidelines for malaria prophylaxis in travellers to endemic areas and Indicazioni per La Profilassi Antimalarica nei viaggiatori in area endemic *(available in Italian only)*
- Sweden, 2013: Rekommendationer för malariaprofylax *(available in Swedish only)*
- Switzerland, 2014: Comité d'experts en médecine des voyages (Suisse)
    - Conseils médicaux aux voyageurs *(available in French and German only)* and Confédération suisse. Office fédéral de la santé publique OFSP.
    - Paludisme (Malaria) *(available in French and German only)*
- United Kingdom, 2014: Malaria Prevention Guidelines for travellers from the UK

International

- IAMAT 2014 - World Malaria Risk Chart, International Association for Medical Assistance to Travellers (IAMAT).
- World Health Organization: International Travel and Health (ITH).

United States

- Centers for Disease Control and Prevention: Malaria and Travelers

10. More useful websites

- Bulletin épidemiologique hebdomaire, French Institute for Public Health Surveillance (France).
- Canadian Malaria Network: Timely medical access to artesunate or quinine for the treatment of malaria.
- CanTravNet: Canadian travel medicine clinic surveillance network.
- Health Canada's ship inspection program: Provides inspection scores for cruise ships.
- Malaria atlas project: Disseminates free, accurate and up-to-date information on malaria and associated topics, organized on a geographical basis.
- National Reference Centre for Parasitology: Reference diagnostic service in serology for parasitic diseases.
- National Travel Health Network and Centre (United Kingdom).
- Storage and Handling of Immunizing Agents, *Canadian Immunization Guide*.
- The BCG World Atlas - www.bcgatlas.org: A Database of Global BCG Vaccination Policies and Practices.
- TST/IGRA interpreter: This tool estimates the risk of active tuberculosis for an adult with a tuberculin skin test reaction of ≥5mm, based on his/her clinical profile.
- US cruise ship inspection ratings: provides inspection scores for cruise ships.

11. Travel medicine clinics in Canada and abroad

- International Association for Medical Assistance to Travel.
- Online Clinic Directory, International Society of Travel Medicine.
- Tropical and Travel Medicine Consultant Directory, American Society of Tropical Medicine and Hygiene.
- Yellow Fever Vaccination Centres in Canada.

12. Certification

- The International Society of Travel Medicine holds at least one Certificate of Knowledge examination each year. It is held in conjunction with the biannual conference and regional meetings of the ISTM. Successful candidates are awarded a certificate attesting to proficiency in travel medicine.
- American Society of Tropical Medicine and Hygiene holds an examination for the Certificate of Knowledge in Clinical Tropical Medicine and Traveler's Health.
- Royal College of Physicians and Surgeons of Glasgow offers a diploma in travel medicine.

Conclusion

There are many Canadian and international resources available to inform Canadian travel medicine practitioners.

Acknowledgements

This Statement was prepared by Dr. P. Teitelbaum and approved by CATMAT. CATMAT acknowledges and appreciates the contribution of Kelsie Jagt, Jennifer Cutler and Maggie Bryson.

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Conflict of interest

None

Funding

This work was support by the Public Health Agency of Canada.

ID News

Travel Medicine

Aw B, Boraston S, Botten D, Cherniwchan D, Fazal H, Kelton T, et al. **Travel medicine: What's involved? When to refer?** Can Fam Physician. 2014; 60:1091-103.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4264804/

Objective: To define the practice of travel medicine, provide the basics of a comprehensive pre-travel consultation for international travellers and assist in identifying patients who might require referral to travel medicine professionals.

Sources of information: Guidelines and recommendations on travel medicine and travel-related illnesses by national and international travel health authorities were reviewed. MEDLINE and EMBASE searches for related literature were also performed.

Main message: Travel medicine is a highly dynamic specialty that focuses on pre-travel preventive care. A comprehensive risk assessment for each individual traveller is essential in order to accurately evaluate traveller-, itinerary- and destination-specific risks and to advise on the most appropriate risk management interventions to promote health and prevent adverse health outcomes during travel. Vaccinations might also be required and should be personalized according to the individual traveller's immunization history, travel itinerary and the amount of time available before departure.

Conclusion: A traveller's health and safety depends on a practitioner's level of expertise in providing pre-travel counselling and vaccinations, if required. Those who advise travellers are encouraged to be aware of the extent of this responsibility and to refer all high-risk travellers to travel medicine professionals whenever possible.

Medlock JM, Leach SA. **Effect of climate change on vector-borne disease risk in the UK**. Lancet Infect Dis. 2015 Mar 20. pii: S1473-3099(15)70091-5. doi: 10.1016/S1473-3099(15)70091-5.
http://www.ncbi.nlm.nih.gov/pubmed/25808458

During the early part of the 21st century, an unprecedented change in the status of vector-borne disease in Europe has occurred. Invasive mosquitoes have become widely established across Europe, with subsequent transmission and outbreaks of dengue and chikungunya virus. Malaria has re-emerged in Greece, and West Nile virus has emerged throughout parts of Eastern Europe. Tick-borne diseases, such as Lyme disease, continue to increase, or, in the case of tick-borne encephalitis and Crimean-Congo haemorrhagic fever viruses, have changed their geographical distribution. From a veterinary perspective, the emergence of Bluetongue and Schmallenberg viruses show that northern Europe is equally susceptible to transmission of vector-borne disease. These changes are in part due to increased globalisation, with intercontinental air travel and global shipping transport creating new opportunities for invasive vectors and pathogens. However, changes in vector distributions are being driven by climatic changes and changes in land use, infrastructure, and the environment. In this Review, we summarise the risks posed by vector-borne diseases in the present and the future from a UK perspective, and assess the likely effects of climate change and, where appropriate, climate-change adaptation strategies on vector-borne disease risk in the UK. Lessons from the outbreaks of West Nile virus in North America and chikungunya in the Caribbean emphasise the need to assess future vector-borne disease risks and prepare contingencies for future outbreaks. Ensuring that adaptation strategies for climate change do not inadvertently exacerbate risks should be a primary focus for decision makers.