

Travel-Related Infections Among Pregnant Travellers to the Tropics: An Overview

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Abstract

Infectious diseases acquired during travel pose a significant health risk to pregnant travellers, who are more susceptible to both acquiring certain infections and developing severe complications. A review of the literature focusing on recent evidence-based guidelines was conducted with attention to tropical infections in the pregnant patient. A summary meant to serve as a succinct reference for health care professionals caring for pregnant women is presented. Magnitude of risk, clinical features, management, and preventive strategies of major travel-acquired infections of pertinence to the pregnant traveller are summarized, including malaria, arboviral infections, foodborne infections, helminthic infections, and influenza. Tables with details on specific infections within each group and guidance for reducing travel-related health risks in the pregnant patient are presented.

Résumé

Les maladies infectieuses acquises en voyage représentent un risque important pour la santé des voyageuses enceintes, qui sont plus susceptibles que le reste de la population de contracter certaines infections et de développer des complications graves. Une revue de la littérature portant sur des lignes directrices récentes fondées sur des données probantes a été menée; l'accent a été mis sur les infections tropicales chez la femme enceinte. Nous présentons ici un résumé qui se veut une référence concise pour les professionnels de la santé qui suivent des femmes enceintes. Y sont abordées l'ampleur du risque, les manifestations cliniques, la prise en charge et les stratégies de prévention des principales infections qui peuvent être contractées en voyage et qui sont d'intérêt pour la femme enceinte : le paludisme, les infections à arbovirus, les infections d'origine alimentaire, les infections par des helminthes et l'influenza. Des tableaux détaillent les caractéristiques des infections individuelles dans chaque groupe et donnent des conseils pour réduire les risques pour la santé des femmes enceintes associés aux voyages.

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INTRODUCTION

Global travel and migration are occurring on an unprecedented scale. Recently, the number of Canadians travelling overseas exceeded 1 million per month and is continuing on an upward trend.¹ In this context of increasingly complex travel patterns, there is mounting concern about communicable diseases and their complications for the traveller. The recent Zika virus outbreak captured the attention of the medical and lay communities at large and has highlighted the need to understand health care issues surrounding the pregnant traveller. Pregnancy, through its mechanical and physiological alterations, affects both the susceptibility to infection and the risk of developing complications from many infectious agents.² In this review, we highlight key points related to selected tropical infectious diseases that may be acquired during travel and emphasize practical recommendations for prevention and management, particularly as they pertain to the traveller who is pregnant or contemplating pregnancy in the months following travel [Tables 1-4](#). Infectious diseases not typically associated with travel and important non-infectious travel-related illnesses, such as thromboembolic disease and altitude-related illness, are beyond the scope of this article.

METHODS

We conducted a review of recent, evidence-based travel-related guidelines produced by public health organizations (Public Health Agency of Canada, Committee to Advise on Tropical Medicine and Travel, National Advisory Committee on Immunization, Centers for Disease Control and Prevention, WHO), and recommendations specific to the pregnant population were identified and summarized. We conducted a PubMed search using the MeSH terms “pregnancy” combined with “tropical medicine” or “travel,” then reviewed abstracts to identify relevant articles. When required, terms for specific infections (e.g., “chikungunya,”

“typhoid”) were combined with “pregnancy” to identify articles more specific to one infection. A formal systematic review with data extraction tables for all relevant articles was not conducted.

TRAVEL-RELATED INFECTIONS

Health risks associated with international travel are significant and often preventable. Anywhere from 20% to 70% of returned travellers have experienced a travel-associated illness.³ Data from the GeoSentinel surveillance network, with its 60 surveillance sites throughout the world, provide an understanding of travel-related morbidity internationally, whereas Canada-specific data are available through the Canadian Travel Medicine Network. The most recent CanTravNet surveillance report on over 3000 non-immigrant travellers evaluated at surveillance sites in 2009 to 2011 indicated that serious infections such as malaria, dengue, and typhoid were commonly imported and that the most frequent definitive travel-related diagnoses included arthropod bite, giardiasis, and malaria.⁴ The reason for travel is an important risk factor for acquiring specific infections. Importantly, persons travelling for the purpose of visiting friends and relatives constitute a high-risk group for serious infections, such as malaria and typhoid fever.⁴

Malaria

Malaria infection is the most common, specific etiology of fever in the returned traveller among those attending travel clinics and affects hundreds of Canadian travelers per year.⁵ It is caused by the protozoan parasite *Plasmodium* and is transmitted by the *Anopheles* mosquito. Of the five species able to infect humans, *P. falciparum* is the most frequently imported species and is capable of causing severe end-organ damage and death. The majority of cases imported to Canada occur in the visiting friends and relatives population and are acquired in sub-Saharan Africa, followed by South Central Asia, South America, and North Africa.⁵ Business travellers also frequently acquire malaria compared with other

groups (such as those travelling for tourism, missionary, volunteer, research, or aid work).⁴ Data on imported malaria cases in pregnant women demonstrate similar areas of acquisition and reasons for travel as those of the general population of travellers.⁶ Approximately 6% of imported malaria cases in the United States occur in pregnant women.⁷

Non-immune hosts, such as children living in endemic areas and non-immune travellers, are at highest risk of developing severe complications of malaria. In contrast, immunocompetent adults residing in areas of stable transmission have acquired immunity to a broad range of malaria parasite antigens, rendering them partially protected against the development of severe infection and symptomatic episodes. However, pregnant women, even if living in areas of stable transmission, are more susceptible to malaria for at least two reasons. First, they are more prone to being bitten by mosquitoes, possibly due to higher body surface temperature, among other hypotheses.⁸ Second, they lack antibodies against parasites with antigenic variants having a predilection for placental infection, explaining the clinically observed heightened risk for severe infection in primigravida women that wanes with subsequent pregnancies.⁹ Pregnant women are three times more likely than non-pregnant women to develop severe complications, including preterm birth and maternal or fetal death.² In women residing in endemic countries, infection is often asymptomatic but still can lead to anemia and poor birth outcomes such as low birth weight.²

Prophylaxis, in the form of barrier prophylaxis and chemoprophylaxis, is crucial in preventing malaria in all travellers. A study examining imported malaria in pregnant women showed that in more than 80% of cases, women did not use chemoprophylaxis during travel.⁶ Current recommendations for the prevention of malaria in pregnant women suggest that they avoid travel to countries with significant transmission.⁸ If travel is unavoidable, strict adherence to barrier prophylaxis and chemoprophylaxis is recommended.⁸ Personal protective measures against arthropods are effective against a variety of vector-borne diseases (Table 2) and include physical barriers, such as use of insecticide-treated bed nets and wearing appropriate clothing, and use of chemical barriers such as N,N-diethyl-m-toluamide, which is safe in pregnancy.¹⁰ The choice of chemoprophylaxis depends on the destination. For regions without chloroquine resistance (several countries in the Caribbean and Central America), chloroquine is the preferred agent and is safe in pregnancy.⁸ For regions with high rates of chloroquine resistance (much of the developing world including sub-Saharan Africa), mefloquine is the preferred agent.⁸ Atovaquone-proguanil, which is commonly used for

ABBREVIATIONS

CanTravNet	Canadian Travel Medicine Network
CATMAT	Committee to Advise on Travel and Tropical Medicine
GBS	Guillain-Barré syndrome
HAV	hepatitis A virus
HEV	hepatitis E virus
PCR	polymerase chain reaction
TD	traveller's diarrhea
ZIKV	Zika virus

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