



# The return of swamp fever: malaria in Canadians

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Malaria is an old Canadian disease. It was an important cause of illness and death in the past century in Upper and Lower Canada and out into the Prairies.<sup>1,2</sup> During the period 1826–1832, malaria epidemics halted the construction of the Rideau Canal between Ottawa and Kingston, Ont., during several consecutive summers, with infection rates of up to 60% and death rates of 4% among the labourers.<sup>3</sup> Malaria also appears to have had an important effect on the health of the Northwest Mounted Police in the Prairies.<sup>1</sup> When the Montreal General Hospital opened, in 1823, 3% of the first 3665 patients admitted were ill with malaria, and 3% died in hospital as a consequence. Canada's own William Osler popularized the use of the microscope for the diagnosis of malaria in North America in the late 19th century.<sup>4</sup> The endemic malaria in North America was probably reinforced each spring by waves of infected immigrants from Europe. Several of our indigenous *Anopheles* mosquitoes were, and still are, capable vectors of human plasmodia.

Indigenous malaria gradually disappeared early this century for a variety of reasons, including decreasing malaria in Europe, destruction of *Anopheles* breeding sites, use of window screens and more rapid treatment of febrile cases before the malaria parasite reached the mosquito-infecting, gametocyte stage.

But malaria is returning. The 1036 cases reported in Canada in 1997 probably represent only half of the malaria occurring in Canadians; the other cases likely go unreported or occur abroad. Canadians are travelling more and to ever more exotic locations, including many regions where resistance to antimalarial drugs is increasing rapidly. The Canadian traveller is increasingly a naturalized Canadian returning to his or her original (and malarial) homeland for business or to visit family.

In this issue (page 195) Claudia dos Santos and colleagues,<sup>5</sup> from the active malaria research group at The Toronto Hospital, shed some light on this re-emerging problem. Their study begins with several solid premises: 1) there is good evidence that malaria chemoprophylaxis works, 2) insecticide-treated bed nets are effective in decreasing the incidence of malaria, 3) Canadians who contract malaria rarely have followed well-published malaria prevention guidelines, and 4) the sorry history of malaria

treatment in Canada suggests that prevention is better.<sup>6</sup>

The study describes the results of interviews with 307 “new Canadian” travellers departing from Pearson International Airport, Toronto, on flights bound for India. The goal was to determine whether antimalarial advice was sought before travelling and the effect that this advice had on intent to use antimalarial prophylaxis. The population studied had lived in Canada a mean of 12.8 years and were well educated (65% had a university degree).

Only 54% had obtained malaria prevention advice before the trip, 50% from a health care professional. The proportion who intended to use chemoprophylaxis was 53% among those who had sought advice and 4% among those who had not. The proportion intending to use chemoprophylaxis was greater among older travellers, those with a longer duration of residence in Canada and those with a family history of malaria.

What are the important lessons? First, the knowledge and practice of malaria prevention in this large subset of Canadian travellers is inadequate. It is an explanation for their increased malaria incidence on return to Canada. Although 69% recognized that malaria itself was a moderate to severe disease, 64% thought they were not at risk or were unaware of the risk. Of those who intended to use antimalarial drugs, only 24% had been prescribed a drug regimen recommended by Health Canada, the US Centers for Disease Control and Prevention or the World Health Organization,<sup>7–9</sup> despite the fact that 50% of all those interviewed had received advice from a Canadian health care professional. This study confirms the findings of several previous studies that have demonstrated a lack of knowledge of malaria and its prevention in Canada's health care community.<sup>6</sup>

It is clear that the malaria problem is not simply the result of noncompliance, so extensively studied in other areas of preventive medicine (e.g., use of antihypertensive drugs, seat belts and condoms).

- The duration of antimalarial use is finite, unlike the constancy of lifestyle change required for many other interventions.
- The health care provider usually has only one chance to educate the traveller and no chance to check on and encourage compliance.



- The traveller faces several other simultaneous travel-related health decisions, such as which of the increasing range of (and increasingly expensive) vaccinations are appropriate. These vaccines are typically paid for before antimalarials are purchased.
- Although the number of travel clinics in Canada has increased in the past decade, the governments of Quebec and Ontario no longer cover their (preventive) activities. This has raised the direct cost to the traveller, undoubtedly decreasing the universality of this public health activity.
- True and false side effects of antimalarial drugs have received prominent play in the Canadian media.
- Canada's health care providers clearly know less about malaria, despite its history in this country, than they do about hypertension, HIV infection and even hyperlipidemia.

## Where do the solutions lie?

The primary care physician must either give good advice, based on guidelines published by Health Canada, the US Centers for Disease Control and Prevention or the World Health Organization,<sup>7-9</sup> or refer the traveller to a travel centre that can. Readily available Web site sources of information on country-related requirements (such as [www.cdc.gov/travel/index.htm](http://www.cdc.gov/travel/index.htm)) are growing in number and quality. A better-informed primary care physician, supported by a more easily available malaria and travel vaccine information system, will be necessary for many travellers who do not have access to travel centre advice because of distance or price.

Government public health responsibilities involve public education. An excellent initiative has been the recent inclusion of information about malaria in the new vaccination booklets for travellers, "Travel Immunization Record." In contrast, the removal of pretravel health counselling from insured services in Quebec and Ontario is regressive.

The travel industry has not met its responsibility to alert customers to the health risks associated with its "product." Although travel agents and airlines are ideally situated to distribute health-related information, there is an inherent resistance to telling prospective customers about travel-related health risks. Legislation may eventually be required to enlist the travel industry's cooperation.

Academics (who complain that those in the front line aren't doing their jobs) also have a role. Several Canadian studies on malaria have been published in the past decade.<sup>6,10-12</sup> These studies have documented the growth of the malaria problem, risk factors for malaria-associated sickness and death, and determinants of compliance with

known preventive manoeuvres. It is now time to study the effect of new strategies to increase the proportion of travellers who seek advice, to increase compliance with advice given and to reduce the incidence of malaria in Canadian travellers. The high rates of malaria among Canadian travellers offer a fertile environment for such studies.

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