

## "TOC" to your patients

*Risk assessment tool for patients with fever or acute respiratory illness in your primary care office*

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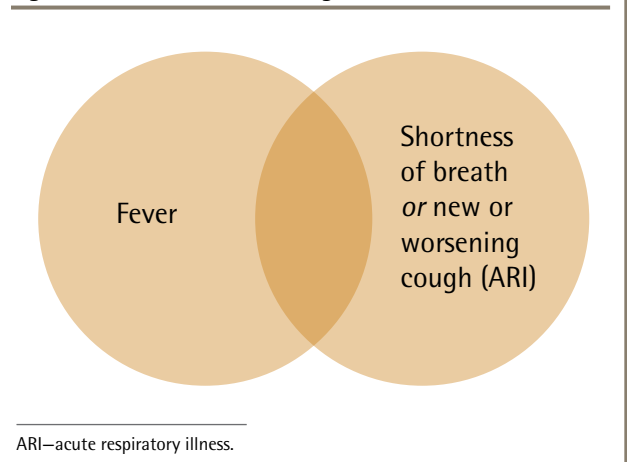
Some 8 million people travel by air each day.<sup>1</sup> Annually, more than 1 billion trips cross international borders—a figure expected to double by 2030.<sup>2</sup> As travel increases worldwide, so too does the number of opportunities for pathogens to be carried into new populations. Recent outbreaks of Zika virus across the Americas and the Caribbean, Middle East respiratory syndrome (MERS) in South Korea, Ebola virus disease (EVD) in West Africa, and measles in the United States and in Canada, as well as other contemporary outbreaks such as H1N1 and severe acute respiratory syndrome (SARS), illustrate the speed at which familiar and emerging microbes can traverse our interconnected world.

Physicians in urgent or emergency and primary care settings are our health care system's first line of defence against communicable illness and serve as the eyes and ears of public health. Because many Canadian patients will at some point travel from home or come into contact with someone else who has been abroad, family physicians can no longer presume that their patients have been exposed only to endemic sources of infection; best practice is to assume that all patients are potentially contagious, and that the origin of infection might not be local.

Because it is impossible for any clinician to be familiar with all diseases that exist worldwide or predict when, where, or in what form a novel infectious disease will first present, it is crucial that family physicians screen patients who visit their clinics with the most common signs of communicable illness: fever alone, or shortness of breath or a new or worsening cough with or without fever (acute respiratory illness [ARI]) (Figure 1).<sup>3</sup>

Numerous flowcharts, point-of-care tools, and algorithms have been developed to assist physicians in identifying and managing specific communicable disease threats (eg, EVD), often pertaining to defined populations (eg, returning travelers).<sup>4</sup> Few of these strategies for assessing patients' risk of exposure or infection have been validated for effectiveness in clinical practice. Practically, such tools might be invaluable

Figure 1. The most common signs of communicable illness



when physicians are on high alert for a particular disease, such as Zika virus, EVD, or MERS. They are less useful, however, in assessing which of the many patients who present with fever or ARI warrant further investigation, modification of personal protective equipment (PPE), or immediate implementation of additional precautions and public health follow-up. For this, clinicians require a comprehensive algorithm to help differentiate those patients for whom their index of suspicion for an emerging, uncommon, or nonlocal source of infection should be increased.

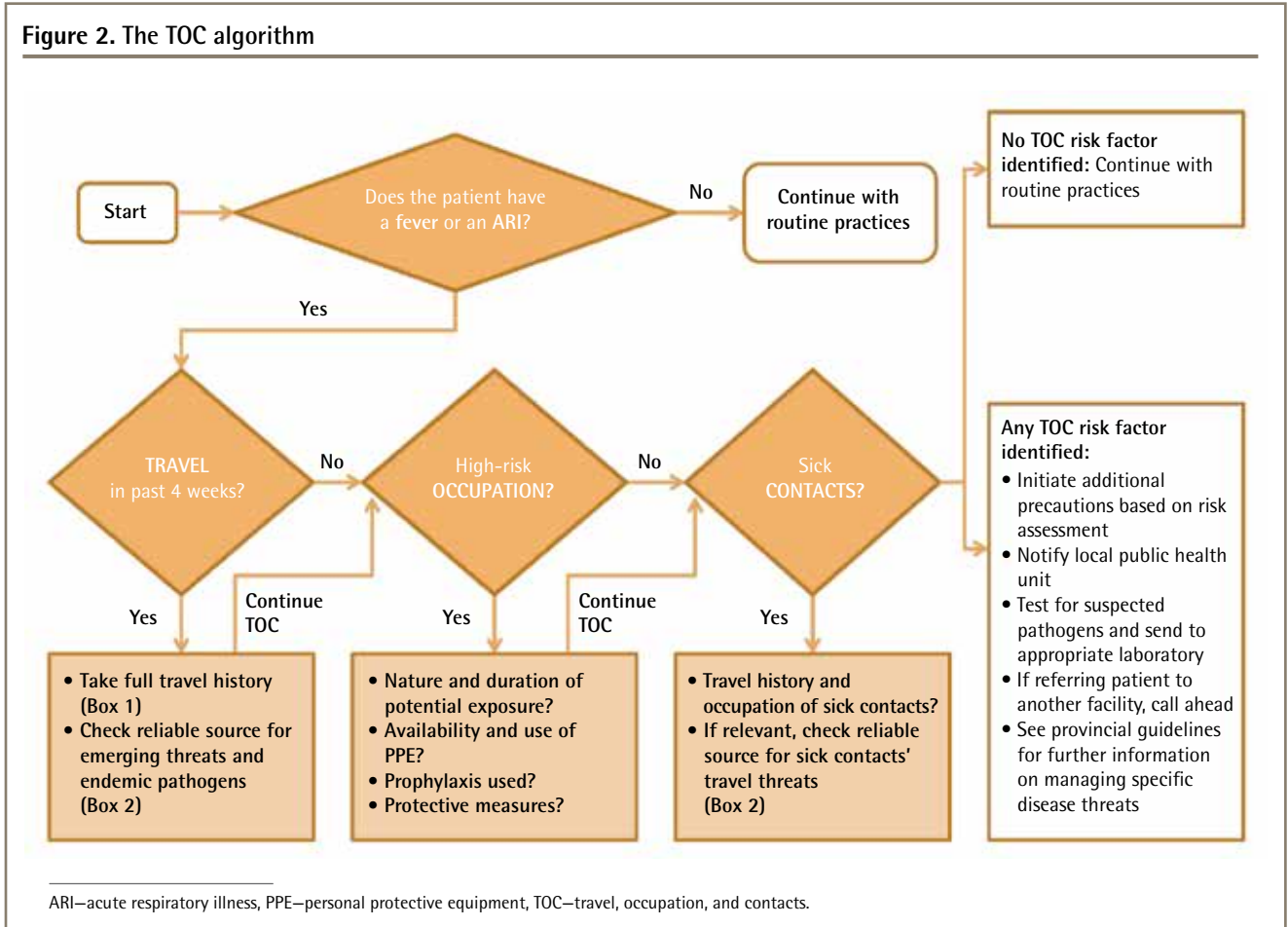
For this purpose, we propose a simple, practical universal risk assessment tool called *TOC* (travel, occupation, and contacts), which is firmly rooted in the basic principles of history taking. We recommend that you "TOC" (ie, talk) to patients by asking those with fever or ARI about the 3 key risk factors—travel, occupation, and sick contacts—at the time of booking and again when they present to the clinic for care (Figure 2). An easy-to-print sign for your clinic is available from **CFPlus**.<sup>\*</sup> By facilitating risk assessment of potentially infectious patients, the *TOC* tool can assist in timely diagnosis, proper management, and reduction of onward spread of infection.

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La traduction en français de cet article se trouve à [www.cfp.ca](http://www.cfp.ca) dans la table des matières du numéro de février 2017 à la page e74.

\*An easy-to-print sign for clinics that presents patients with questions about travel, occupation, and contacts is available in English at [www.cfp.ca](http://www.cfp.ca). Go to the full text of the article online and click on **CFPlus** in the menu at the top right-hand side of the page.

Figure 2. The TOC algorithm



### TOC risk factors

Patients who present with fever or ARI should be asked questions regarding 3 key risk factors.

**Has the patient traveled anywhere in the past month?** Assessment of fever or ARI should always include an evaluation of relevant travel history, taking into account both domestic and international travel. International travel is more likely to be associated with uncommon or emerging febrile illness, as well as childhood vaccine-preventable diseases mostly eradicated in Canada but still common in regions where vaccination coverage is low.<sup>2</sup> However, even travel within Canada might expose a patient to pathogens not native to their home region, such as vector-borne infections endemic to specific areas of Canada and the United States (eg, Lyme disease, West Nile virus). Any positive identification of a patient with fever or ARI who has traveled within the past month should prompt a more focused history (**Box 1**).<sup>2</sup>

It is worth noting that only 10% of Canadians seek pretravel medical advice, and that those traveling to visit friends and family are especially likely to forego pretravel consultations, vaccinations, and

chemoprophylaxis, and might not accurately perceive or protect themselves against environmental risks.<sup>5,6</sup>

For guidance on how best to prepare patients for travel, we recommend that you review the article by Aw and colleagues on travel medicine published in *Canadian Family Physician* in 2014.<sup>7</sup>

To assess a patient's risk of travel-related infection, family physicians should check for travel health advisories issued for destinations on the patient's itinerary. Family physicians should also establish what diseases are endemic to areas the patient visited (eg, malaria, dengue, or chikungunya) and assess what measures the patient took to reduce his or her risk of exposure and infection. **Box 2** presents a few publicly accessible online resources where family physicians can find more information.

Malaria (20% to 30%), gastroenteritis (10% to 20%), and respiratory tract infections (10% to 15%) are the most common causes of febrile illnesses in returning international travelers.<sup>8</sup> However, family physicians must be wary of "premature closure bias" when evaluating illness after international travel and avoid settling on one of these diagnoses before thoroughly investigating all potential infectious causes.

**Box 1. Important factors to consider when evaluating a patient with a probable travel-related illness**

Factors to consider include the following:

- Severity of illness
- Travel itinerary and duration of travel
- Timing of onset of illness in relation to international travel
- Past medical history and medications
- History of a pretravel consultation
- Travel immunizations
- Adherence to malaria chemoprophylaxis
- Individual exposures
- Type of accommodations
- Insect precautions taken (such as repellent, bed nets)
- Source of drinking water
- Ingestion of raw meat or seafood or unpasteurized dairy products
- Insect or arthropod bites
- Freshwater exposure (such as swimming, rafting)
- Animal bites and scratches
- Body fluid exposure (such as tattoos, sexual activity)
- Medical care while overseas (such as injections, transfusions)

Data from Centers for Disease Control and Prevention.<sup>2</sup>

**Box 2. Online resources for assessing travel health risks**

Government of Canada travel health notices: <https://travel.gc.ca/travelling/health-safety/travel-health-notice>

Centers for Disease Control and Prevention travel health notices: [wwwnc.cdc.gov/travel/notices](http://wwwnc.cdc.gov/travel/notices)

HealthMap (provides an interactive map for searches on various infectious diseases): [www.healthmap.org](http://www.healthmap.org)

**What is the patient's occupation?** An individual's occupation can provide clues about risk exposures and potential causes of fever or ARI. Health care workers; laboratory personnel; international humanitarian workers; individuals involved in construction, demolition, or natural resource extraction; and agricultural workers who present with fever or ARI all warrant further assessment.

Health care workers and laboratory personnel might be exposed to common pathogens as a routine part of their jobs, or to rare or emerging virulent agents during an outbreak. Health care workers accounted for more than 40% of SARS infections during the Toronto outbreak<sup>9</sup>; and in the EVD epidemic, both health care and funeral workers were at increased risk of infection.<sup>4</sup> International humanitarian workers might contract infections rarely seen in Canada, such as malaria, dengue, or tuberculosis. Chemical or uncommon environmental exposures, for example to spores of *Histoplasma*

*capsulatum*, might be more likely in occupations that involve construction, demolition, or extraction of natural resources.<sup>10</sup> Finally, agricultural environments can be reservoirs for zoonoses, including avian influenza, Q fever, histoplasmosis, psittacosis, and hantavirus pulmonary syndrome.<sup>10,11</sup>

If an ill patient reports a higher-risk occupation, his or her family physician should explore the nature of potential exposures and whether appropriate PPE or chemoprophylaxis (where applicable) were available and properly used.

**Has the patient recently come into contact with anyone else who has been sick?** Contact tracing is a critical component of global health security. A *contact* is defined as anyone who has had physical contact with or spent time at the same place as a confirmed case, presumptive confirmed case, or probable case while the case patient was capable of transmitting disease. In South Korea, one man became a MERS "super spreader" in part because the health care workers at the hospital where he presented failed to recognize that he had come into contact with the country's first case of MERS a month before during hospitalization at a different health care facility.<sup>12</sup> The "super spreader" patient was diagnosed with pneumonia and spent 3 days in the hospital's crowded emergency department owing to a shortage of beds; by the time he was finally isolated, hundreds of health care workers, patients, and hospital visitors had been exposed.

If a sick contact is identified, it is important to follow up by soliciting information about the sick contact's travel history and occupation. The Toronto SARS outbreak began when a patient whose grandmother had sickened and died following a trip to Hong Kong presented to an emergency department in Scarborough, Ont, and waited nearly 20 hours to be assessed.<sup>9</sup> At the time of intake, no one asked whether the patient had come into contact with anyone else who was sick. The cause of the patient's illness came into focus only after health officials connected his grandmother's travel history with a recent outbreak of a mysterious respiratory illness in mainland China.


**Conclusion**

Febrile patients and patients presenting with signs of ARI should be treated as potentially infectious until proven otherwise. The TOC algorithm (**Figure 2**) is a practical risk assessment tool appropriate for use both at the time of booking (to identify probable infectious cases that warrant additional precautions) and again when patients present to the clinic.<sup>13</sup>

If any TOC risk factors are identified, the family physician should treat the patient as a probable case. The patient should be isolated immediately, and staff

involved should appropriately modify their use of PPE in accordance with routine practices and adopt additional precautions as required.<sup>14</sup> Health care settings should implement surveillance and infection prevention and control practices to protect against respiratory infections (eg, signs, screening, masks, isolation areas) and practise them as routinely as other health and safety measures in the workplace.<sup>3</sup> For any probable case referred to another health care provider or facility, family physicians should follow best practice: call ahead to alert staff and provide the patient with a mask for travel.

If family physicians suspect or have confirmation that a patient has a reportable disease, they must notify the local public health unit in accordance with the regulations of the province or territory of their practice. They are also encouraged to contact public health as early as possible if they have questions or concerns about a particular case or cluster of cases.

The benefits of the TOC universal risk assessment tool are 3-fold: better care for patients, better protection for family physicians and other health care workers, and earlier identification of potential threats to public health. Many outbreaks might be attenuated or prevented altogether if patients with clear travel, occupation, or contact risk factors are identified when they first seek care. By simply talking about the TOC risk factors to patients who present with fever or ARI, you might well prevent the spread of the next emerging infection. 

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**Competing interests**

None declared

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The opinions expressed in commentaries are those of the authors. Publication does not imply endorsement by the College of Family Physicians of Canada.

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