Fever in the Returning Traveler

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KEYWORDS

• Fever • Child • International travel • Tropical infections • Returning traveler

KEY POINTS

- The initial workup of a febrile child without a clear source will be based on the history, physical examination, and potential risk factors but commonly includes laboratory testing.
- Malaria, enteric fever, and dengue fever are some of the most common and serious tropical infections in pediatric travelers.
- Clinicians need to remain up-to-date on potential etiologic factors for febrile illnesses to develop a focused plan best suited to the patient's clinical picture.

INTRODUCTION

Millions of children travel annually, whether they are refugees, international adoptees, visitors, or vacationers.[1–4] In 2015, the International Tourism Organization reported 1.2 billion overseas trips.[5,6] Although most young travelers do well, many develop febrile illnesses during or shortly after their journeys.[7] In a study of European children, 53% of all pediatric patients with travel-related infections were visiting friends and relatives (VFRs), 43.4% were tourists, and 2.4% were immigrants.[8] Most illnesses are self-limited childhood infections that do not require subspecialist consultation. However, 28% of 24,920 ill American travelers sought care at travel clinics after returning home.[9] Additionally, young children with fevers can present a diagnostic dilemma because they may not report symptoms and can be at risk for severe disease, such as malaria. As awareness of tropical illnesses rise in parents, such as the increase in multidrug-resistant bacteria worldwide or the emergence of epidemics with Zika virus in South America, families may be more anxious about serious infections as an etiologic factor of fevers.

Approaching fevers in the returning traveler requires an appropriate index of suspicion to diagnose and treat the child in a timely manner. This article offers a framework

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on how to address these issues by discussing diseases based on geography, incubation period, and affected organ systems, as well as risk factors, diagnostic techniques, and resources.

GENERAL APPROACH

A thorough history is an important initial step when evaluating a pediatric traveler with a fever (**Table 1**). Discussing a detailed travel itinerary develops a timeline of exposures that can be unique to an urban or rural setting (**Table 2**).

Many children receive vaccinations and/or antimicrobial prophylaxis, but reported adherence does not preclude an illness with a particular pathogen. Up to 75% of travelers do not adhere to the recommended malaria prophylaxis.[10] Many travel vaccines, including typhoid vaccine, provide only partial protection despite proper administration of these immunizations.[11]

A medically complex individual may have sought care outside of the United States due to necessity or medical tourism, which can increase the risk of infection through body fluid exposures. Multidrug-resistant pathogens can also be associated with health care exposure. Up to half of hospitalized children in Zimbabwe are colonized with extended spectrum beta lactamase producing *Enterobacteriaceae* on admission to the hospital,[12] a problem that is increasingly seen worldwide. Underlying medical conditions, such as asplenia or immunosuppression from chemotherapy, may predispose children to overwhelming infections and sepsis. Refugee children from countries such as Syria are susceptible to vaccine-preventable diseases such as polio due to infrastructure breakdown.[13]

CLINICAL FINDINGS, DIAGNOSIS, AND MANAGEMENT

Fever is a common and anxiety-provoking sign for parents that can be exacerbated by overseas travel. Up to 34% of patients with recent travel history are diagnosed with routine infections.[3] Of the 82,825 cases of infection in travelers from 1996 to 2011 reported to GeoSentinel, a worldwide data collection network on travel-related diseases, 4% of cases were considered to be life-threatening.[14] A study in Swiss children showed that 0.45% of emergency room visits were due to travel-related morbidities with fever and gastrointestinal symptoms being the most common complaints in 63% and 50% of patients, respectively.[8] The temporality of travel to the onset of fever can offer important clues to the etiologic factors of fevers (**Table 3**). Because the causes and clinical outcomes associated with fevers in pediatric travelers vary from self-limited to deadly, a systems-based approach can lead to prompt diagnosis and treatment that evaluates for the most likely and serious diseases early in the illness course.

Fever

According to GeoSentinel, 91% of patients with an acute, life-threatening illness will present with fever.[14] There are a broad range of potential tropical infections, including malaria, dengue fever, and enteric fever. The incidence of emerging infections such as Zika virus and chikungunya are not yet known. In both adults and children, pneumonia, sepsis, meningococcemia, and urinary tract infections that were acquired at home or overseas should be on the differential diagnosis.

The initial workup of a febrile child without a clear source will be based on the history, physical examination, and risk factors but commonly includes a complete blood count, liver function tests, creatinine, urinalysis, and blood cultures.[1,3] Malaria smears are also frequently helpful. Other tests to consider include serologies for dengue fever