Traveling is fun. Travel to countries outside the United States is increasing. An estimated 50 million people travel between industrialized countries and developing countries each year. An estimated 1.9 million children travel overseas each year. Health issues related to pediatric international travel are complex, reflecting varied activities, exposures, and age-specific health risks. While some travel health concerns are similar for children and adults, international pediatric travelers have unique problems because of variable immunity and different age-based behavior; for example, a newly mobile toddler will have different health risks than a sexually active adolescent.

Although data about the incidence of pediatric illnesses associated with international travel are limited, studies of pediatric travelers have reported serious morbidity and mortality. The most common reported health problems are diarrheal illnesses (bugs), malaria (bites), and motor vehicle-and water-related accidents (bruises). Many parents who travel overseas are returning home. Travelers who visit friends and relatives (also called VFRs) in developing countries are at particularly high risk of travel-related illnesses and seldom seek pre-travel medical care.

Young children have less reserve than older children and adults. They tolerate heat, dehydration, and decreased food intake poorly, and they may not understand the need for behavioral restraint to prevent exposures to unsafe food, contaminated water, or dangerous animals. When traveling with children, parents should actively prepare to meet their children’s health needs, plan to observe their children more slowly, and be especially equipped to deal quickly with common health problems that arise while the family is away from home.

Ideally, medical preparation for travel should begin two months before departure, to allow enough time for vaccinations that may require several doses and for initiation of necessary prophylaxis. Infants are at higher risk of becoming ill during travel because of their immature system and incomplete immunization status.

Pre-Departure Safety

Children require safe entertainment and distraction during travel, beginning with the journey to the destination. Children should have sufficient quiet entertainment for the length of the journey. For overnight air travel with a child who is older than 2 years, parents may choose to use diphenhydramine to help the child sleep. They should give the child a test dose of the medication before the trip, however, because some children have a paradoxical response and become more active and restless.

Sedation is usually unnecessary, however. Most children who get plenty of activity before boarding the plane and take along one or two familiar items – a pillow, a stuff toy – can make themselves comfortable in an airplane seat and fall asleep. During air travel, changes in altitude increase pressure and the vacuum effect in the middle ear can cause pain on descent. Awakening a sleeping infant does not alter the adjustment of the tympanic membrane (eardrum) and only leads to increased crying. The act of swallowing, such as drinking from a bottle, may hasten equalization of ear pressure for infants who are uncomfortable, and chewing gum may help older children.

Dry air on airplanes increases insensible fluid loss, so all airplane travelers should consume liquids regularly during flight. Infants should not be fed more than usual because higher altitude causes gases to expand, and infants may experience abdominal distension during air travel.

Bugs: Diarrhea and Dehydration

Boil it, Cook it, Peel it, or Forget it

Most common causes of gastrointestinal infection in travelers are transmitted by the fecal-oral route. This may lead to diarrhea, eventually to dehydration. Although the former is mostly an inconvenience, the latter is a significant concern because this can lead to catastrophic mortality. Young children and infants are at high risk for diarrhea and other food-and waterborne illnesses because of limited pre-existing immunity. Infants and children with diarrhea can become dehydrated more quickly than adults.

For young infants, breastfeeding is the best way to prevent foodborne and waterborne illness. Travelers should use only purified water for drinking, preparing ice cubes, brushing teeth, and mixing infant formula and foods. Scrupulous attention should be paid to handwashing and cleaning pacifiers, teething rings, and toys that fall to the floor or are handled by others. When proper handwashing facilities are not available,
an alcohol-based hand sanitizer can be used as a disinfecting agent. Travelers should never consume tap water, juice mixed with tap water, or ice cubes made from tap water. Safe water can be bought in sealed bottles. Because local vendors sometimes “recycle” old water bottles and fill them up with tap water, travelers should check that the seal is not broken or should buy carbonated water only to be sure that tap water has not been substituted. Water that has come to a rapid boil for at least one minute is considered safe. Some foods can be spotted and avoided easily: uncooked fruits and vegetables from which the outer skin has not been removed, undercooked meat and cooked fruits and vegetables from which the outer skin has not been removed, undercooked meat and cooked fruits and vegetables from which the outer skin has not been removed, undercooked meat and cooked fruits and vegetables from which the outer skin has not been removed.

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Adults traveling with children should be counseled about the signs and symptoms of dehydration and the proper use of World Health Organization (WHO) oral rehydration solutions (ORS). Oral rehydration therapy is the mainstay of managing mild and moderate dehydration. ORT packets are available in most pharmacies and should be mixed with clean water. If the child is not dehydrated, feeding should continue, and ORT can be used to replace losses if the parent thinks that normal intake is inadequate. Immediate medical attention is required for an infant or young adult with diarrhea who has signs of moderate to severe dehydration (withdrawn, somnolent, rapid and weak pulse, sunken fontanelles and eyes, dry mucous membranes, no urine for several hours with more than 10% weight loss), bloody diarrhea, fever of greater than 38.5 C (>101.5 F), or persistent vomiting.

Unlike diarrhea in the US or other industrialized countries, traveler’s diarrhea is often bacterial in origin. Although the infectious organism is usually never identified, pathogens most commonly associated with traveler’s diarrhea are enterotoxigenic Escherichia coli, Shigella, and Campylobacter. Empirically, fluoroquinolones (Ciprofloxacin 20 to 30 mg/kg/day divided bid for three days) are the medications most often prescribed to treat traveler’s diarrhea in adults, but these medications are not licensed for children younger than 18 years. Trimethoprim-sulfamethoxazole (TMP/SMX) was previously used for empiric treatment for traveler’s diarrhea in children; however its effectiveness has been reduced by widespread drug resistance and it is no longer routinely recommended. Azithromycin, given at a dosage of 10 mg/kg/day for three days is an option for treating children with traveler’s diarrhea. Although there is evidence that a single dose may be sufficient. The American Academy of Pediatrics recommends against giving antimotility agents (e.g. loperamide, lomotil) to children less than 2 years of age because of conflicting data regarding the efficacy of these agents and concerns about their neurologic effects.

Bites
They are for real

Insects in the developing countries can be more than a nuisance. They can carry life threatening diseases, such as malaria, dengue hemorrhagic fever, filariasis, Japanese encephalitis and Chagas disease. Barriers – including clothing, protective nets, and personal insecticides – are essential for preventing exposure to insects that can lead to infection. When possible, parents should dress children in light-colored clothing that covers their arms and legs and treat clothing with permethrin to increase protection.

In tropical climate, wearing long sleeves and long pants at all times may not be feasible. Parents should find out at what time of day potentially infectious exposures occur in the region they are visiting, and focus protective measures on those times. Anophelines mosquitoes that carry malaria often bite at dusk, for example, whereas Aedes aegypti, the mosquito that carries the dengue virus, feeds during the day.

Malaria is one of the most serious, life-threatening diseases affecting pediatric international travelers. In the United States, 5794 cases of malaria in US civilians were reported to CDC from 1992 to 2000. Of these, 17% occurred in children less than 18 years of age. The largest percentage of cases occurred in persons who were visiting family and friends.

Children with malaria can rapidly develop a high level of parasitemia. They are at increased risk of severe complications of malaria, including shock, seizures, coma, and death. Initial symptoms of malaria in children may mimic other common causes of pediatric febrile illnesses and therefore may result in delayed diagnosis and treatment. Chloroquine was the first medication used for malaria prophylaxis. Because of widespread resistance to the drugs, its efficacy is now limited to areas north of Panama Canal in Central America. Mefloquine is generally recommended for children of any age, who are traveling to areas with chloroquine-resistant malaria. Both chloroquine and mefloquine should be administered with a sweet food to hide the bitter taste. Options include mixing the medication with chocolate syrup, condensed milk, or fruit jam or placing it in a sandwich cookie. Doxycycline is effective against multidrug resistant malaria but can only be given to children who are older than 8 years and can cause skin photosensitivity and lead to fungal infections of the mucosa.

Diethyl methylbenzamide (DEET) is the most effective personal insecticide available. It is active against many biting insects, including mosquitoes, flies, fleas, and ticks. DEET is available in many concentrations, 20% or 30% and higher concentrations provide longer duration of protection, but concentrations greater than 50% offer only a marginal increase in protection time. DEET should be applied to all ex-
posed areas of the skin. Because it is an eye irritant, can cause mild dermatitis, and should not be orally ingested. DEET should not be applied to the hands and face of young children. Parents should be instructed to use 20% or 30% DEET and reapply it every six hours for the standard formulation. It should be washed off with soap and water when the child is in an area away from mosquitoes, such as under a bed net.

Remind parents who are reluctant to use DEET that the risks of mosquito bites and other insect bites are real and significant: Insects transmit diseases, and secondary skin infections can develop at the site of a bite.

Bed nets provide an effective barrier to insect bites, especially because they protect children during sleep, when biting insects go unnoticed and the child does not move much. To avoid accidental ingestion, repellents should not be applied to children’s faces or hands. It can be used sparingly around the ears. Children should not be allowed to apply their own repellent.

Bruises

Injury, not infectious disease, is the leading cause of death among travelers. Vehicle-related accidents are the leading cause of death in children who travel. While traveling in automobiles and other vehicles, children weighing less than 40 pounds should be restrained in age-appropriate car seats or booster seats. These seats often must be carried from home, since availability of well-maintained and approved seats may be limited abroad. In case of a collision, the rear seat of car is safer than the front seat. The physical environment in developing countries is often unpredictable in terms of safety. Any area the child is likely to explore must be inspected for potential dangers, including exposed electrical wires and outlets, broken glass, dangerous small animals such as scorpions, inadequate guardrails, and incomplete or decaying construction.

Beyond

Traveling is fun. But safety comes first. Advising families who are planning to travel to less developed countries is a large undertaking. Physician who specialize in travel medicine have access to up-to-date and detailed information about health risks at specific destinations and are familiar with the advantages, disadvantages, and side effects of malaria prophylaxis and other pre-travel interventions. They have the expertise in giving advice, instructions, and recommendations to travelers and usually offer extensive written material to reinforce their discussions with clients.

Children benefit immensely from travel to new and different places. They are ideal travelers because of their natural curiosity and open mind. As health care provider, you can enhance the family travel experience by providing sound, practical advice to keep children happy and healthy during their adventures.

Online resources for foreign travel:

1. American Academy of Pediatrics. Summer safety tips
   http://www.aap.org/advocacy/releases/summertips.htm

2. International Society of Travel Medicine
   www.is stm.org

3. Travel clinic directory
   www.astmh.org/scripts/clinindex.asp

4. Health Information for the International traveler
   www.cdc.gov/travel/yb/index.htm

5. CDC information on foreign destinations
   www.cdc.gov/travel/

6. World Health Organization information about foreign countries
   www.who.int/ith/countries/en/

7. US State Department overseas travel advisory
   http://travel.state.gov

References


5. Ryan ET, Kalin KC. Primary care: Health advice and immunizations for travelers.


Questions for STEP Participants

Answer questions only on the official STEP answer sheet. If you do not have the official STEP answer sheet, a year’s supply can be obtained (at no cost), simply by writing to: STEP Program Answer Sheets. American Medical Technologists, 10700 W. Higgins Rd., Rosemont, IL 60018.

In addition to marking your answers, be sure to include all the required information on the answer sheet and a processing fee of $3.00 per article. In the following, choose the one best answer for each question.

1. Ideally, medical preparation for travel should begin two months before departure to initiate the necessary prophylaxis and also to allow ample time for vaccinations. (True or False)

2. Airplane travelers
   A. should consume more liquids than usual during flight
   B. especially infants be fed more than usual due to increased insensible water losses
   C. particularly infants should not be fed more than usual because infants may experience abdominal distension because higher altitude causes gas to expand
   D. None of the above is correct

3. Outside the United States and other industrialized countries, the common etiologic agent for traveler’s diarrhea is in origin.
   A. viral
   B. protozoal
   C. bacterial
   D. fungal
   E. parasitic

4. Children younger than 18 years old are empiracicially treated for traveler’s diarrhea with
   A. quinolones
   B. azithromycin
   C. trimethoprim-sulfamethoxazole
   D. penicillin
   E. cephalosporins

5. The following are fecal-borne agents except
   A. Aedes aegypti
   B. Escherichia coli, enterotoxigenic strain
   C. Campylobacter jejuni
   D. Shigella sonnei
   E. Rotavirus

6. The following are insect bite-borne illnesses except
   A. malaria
   B. dengue hemorrhagic fever
   C. filariasis
   D. amoebiasis
   E. Chagas disease

7. Initial symptoms of malaria in children may mimic other common causes of pediatric febrile illnesses and therefore may result in delayed diagnosis and treatment. (True or False)

8. Generally recommended for children at any age as treatment of choice for malaria is
   A. doxycycline
   B. mefloquine
   C. chloroquine
   D. diethyl methylbenzamide
   E. doxycycline and mefloquine

9. Vehicle-related accidents are the leading cause of death in children who travel. (True or False)

10. Physical areas that children are likely to explore that require immediate inspection for potential dangers are
    A. broken glass
    B. electrical outlets
    C. exposed electrical wires
    D. guardrails
    E. all of the above