What Pediatric Primary Care Providers Need to Know to About Travel Medicine

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Jen Burns

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Objectives

01
Understand worldwide risks of disease in the pediatric traveler

02
Be familiar with general principles of travel clinic

03
Review immunizations and precautions to be addressed at the visit

04
Update group regarding Yellow Fever Vaccine shortage
Pediatric Travel

• 800 million people traveled internationally in 2014
• An estimated 4% of these people are children
• Approximately 8% of these travelers need to seek medical attention while traveling
General Principles of Travel Clinic

• Most insurances do not offer or have limited coverage for travel vaccines
• The most common thing not covered is the professional fee for counseling
• Travel clinic is a fee for service. Payment is required at the end of the visit
General Principles of Travel Clinic

• Ideally the travel visit should be the second reservation after the flight arrangements

• Review Itinerary
  • Destinations: purpose, time, duration and accommodations
  • Potential exposure to insects and animals
  • Immunization Records
  • Vaccines
    • Recommended VS Required
General Principles of Travel Clinic

• Routine Immunizations
• Malaria Prophylaxis
• Protective Measures
• Traveler’s Diarrhea
  • Preventive measures
• Pediatric Travel Kit
• Other important documents and items
Which Vaccine preventable disease will the traveler most encounter?

- HEPATITIS A
- MENINGOCOCCAL DISEASE
- VARICELLA
- INFLUENZA
Influenza

Estimated Annual Cases of Influenza Are Between 15 and 63 Million\(^1,2\)

In 2011, ~35,000 Cases Of Other Infectious Diseases Included:\(^3\):

- Mumps
- Meningococcal Disease
- Hepatitis A
- Hepatitis B
- Haemophilus Influenzae
- Varicella
- Pertussis

*Estimated value based on US Census of 313,000,000.\(^2\)

Routine Immunizations

• Polio
  • Global eradication targeted for 2005
  • Between 2002 to 2005 21 countries previously polio free documented polio infections
  • www.polioeradication.org

• MMR
  • More than ½ million children die of measles annually
  • Children less than 1 year of age have the highest risk of severe disease
  • Children 6 to 12 months of age traveling to endemic countries should receive a dose of MMR
World Hepatitis A Prevalence


Prevalence of hepatitis A
Routine Immunizations

• Varicella
  • As of 2008, 2 doses are recommended
  • For children with unknown varicella status, sero testing is recommended before immunization for children 5 years and older

• Hepatitis A
  • The majority of Hep A is imported to the US from Mexico and Central America
  • In children Hep A causes asymptomatic or mild infection, but virus may be shed for prolonged period
  • Immunoglobulin recommended for a child under 1 year of age
Routine Immunizations

• Hepatitis B
  • Children who are traveling to endemic areas should complete Hep B prior to travel
  • Can use an accelerated schedule of 0,1, 2 & 12 months
  • Make sure adolescents and adults have completed the series since this group has a higher incidence of engaging in high-risk behavior while traveling

• Influenza
  • Recommended for all children 6 months to 18 years of age
  • Southern Hemisphere flu season April to September and year-round in the tropics
Routine Immunizations

- **Menactra**
  - Part of the routine immunization schedule for 11 to 12 y.o. adolescents.
  - Hib-Men CY is available, but only covers 2 serotypes.
  - MCV4 (Menactra ™) now licensed for children 9 months to 10 years of age.
  - Meningococcal vaccinations required to Hadj in Saudi Arabia.

Sub Sahara Meningococcemia Belt
Vaccines Specific for Travel

- Typhoid
- Yellow Fever
- Japanese Encephalitis
- Rabies
- BCG (Not in USA)
- Cholera (Not in USA)
Vaccines Specific for Travel

• Typhoid
  • Enteric fever caused by salmonella (S. typhi & S. paratyphi)
• Children are at risk of getting disease and becoming chronic carriers
• Areas of Risk
  • Asia, Africa and Latin America
  • Risk to travelers estimated to 1 in 3000 (India, northern & western Africa and Peru)
• Types of Vaccine (70% to 80%)
  • Vivotiff or Ty21a (live attenuated)
    • Oral
  • Typhim (Capsular polysaccharide)
Typhoid Risk Worldwide

Estimated incidence of typhoid and paratyphoid fevers by country per 100,000 population, 2015.
Citation: The American Journal of Tropical Medicine and Hygiene 99, 3_Suppl; 10.4269/ajtmh.18-0032
Yellow Fever Vaccine

• YF-Vax is the only FDA approved vaccine in the USA
  • Annually, USA gives ~ 500,000 YF VAX
  • 2/3’s of the YF VAX is distributed to 4000 clinical sites

• 2015-2016
  • Sanofi announced that they would be relocating to another manufacturing facility
  • In 2015 YF-VAX depletion began

• About 1 million stock pile doses were loss
  • Related to a vaccine handling and storage error
Yellow Fever Vaccine

• **2016**
  - Possible complete depletion of stock by end of the year
  - YF outbreaks in Angola and Brazil
  - DOD/Sanofi applied for EAP to Stameril
    - Allowed only 250 sites to apply for EAP

• **2017**
  - YF-Vax exhausted
  - UCMC was not selected for EAP
Yellow Fever Vaccine

• 2018- August
  • YF-Vax was not being manufactured for USA
  • IND enrollment for Stameril

• April 2021
  • YF-VAX available for purchase
  • Limits 50 doses per site

• Stameril
  • Would be discontinued May 2021
Yellow Fever Vaccine

• Caused by an arbovirus of the Flavus virus group
• Human disease occurs through bites from infected mosquitoes, Aedes aegypti.
• Some countries require this for entry
<table>
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<th>Countries</th>
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<tbody>
<tr>
<td>Angola</td>
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<td>Benin</td>
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<td>Burkina Faso</td>
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<td>Burundi</td>
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<td>Cameroon</td>
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<td>Central African Republic</td>
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<td>Congo, Republic of the</td>
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<td>Côte d'Ivoire</td>
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<td>Democratic Republic of Congo</td>
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<td>French Guiana</td>
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<td>Gabon</td>
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<td>Ghana</td>
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<td>Guinea-Bissau</td>
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<td>Mali</td>
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<td>Niger</td>
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<td>Sierra Leone</td>
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<td>South Sudan</td>
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<td>Sudan</td>
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<tr>
<td>Togo</td>
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<td>Uganda</td>
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1 Country requirements for YF vaccination are subject to change at any time; therefore, CDC encourages travelers to check with the destination country's embassy or consulate before departure.
Table 4-26. Contraindications and precautions to yellow fever vaccine administration

<table>
<thead>
<tr>
<th>CONTRAINDICATIONS</th>
<th>PRECAUTIONS</th>
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<tbody>
<tr>
<td>• Allergy to vaccine component¹</td>
<td>• Age 6-8 months</td>
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<tr>
<td>• Age &lt;6 months</td>
<td>• Age ≥60 years</td>
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<td>• Symptomatic HIV infection or CD4 T-lymphocytes &lt;200/mm³ (or &lt;15% of total in children aged &lt;6 years)²</td>
<td>• Asymptomatic HIV infection and CD4 T-lymphocytes 200–499/mm³ (or 15%–24% of total in children aged &lt;6 years)²</td>
</tr>
<tr>
<td>• Thymus disorder associated with abnormal immune-cell function</td>
<td>• Pregnancy</td>
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<tr>
<td>• Primary immunodeficiencies</td>
<td>• Breastfeeding</td>
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<tr>
<td>• Malignant neoplasms</td>
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<tr>
<td>• Transplantation</td>
<td></td>
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<tr>
<td>• Immunosuppressive and immunomodulatory therapies</td>
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¹ If vaccination is considered, desensitization can be performed under direct supervision of a physician experienced in the management of anaphylaxis.

Contraindications

• Hypersensitivity to items listed below
  • Anaphylaxis egg proteins or egg products
  • Anaphylaxis to previous yellow fever dose
  • Latex (stopper
Precautions

• Breast feeding
• Pregnancy
• HIV CD4 200-500
Adverse Reactions

- **Yellow Fever Vaccine–Associated Neurologic Disease (YEL-AND)**
  - Conglomeration of clinical syndromes including:
    - Meningoencephalitis
    - Guillain-Barré syndrome
    - Acute disseminated encephalomyelitis
    - Cranial nerve palsies.
  - YEL-AND is rarely fatal.
Adverse Reactions

• **Yellow Fever Vaccine–Associated Viscerotropic Disease (YEL-AVD)**
  - Severe illness similar to wild-type YF disease
  - Vaccine virus proliferating in multiple organs leading to multiorgan dysfunction or failure and death
  - The incidence is higher for people aged ≥60 years,
  - YEL-AVD occurs only after the first dose of YF vaccine
Japanese Encephalitis Virus Vaccine

• JE
  • An arboviral infection is transmitted by the Culex mosquito

• Risk
  • Endemic in rural areas of Asia
  • Temperate regions April to November
  • All year round in tropical and subtropical areas
  • Transmission to travelers is low
  • Vaccine recommended for traveler’s who will be in rural areas for a month or longer

• Vaccine
  • Ixiaro®- licensed for persons 17 years and older
  • Associated with hypersensitivity reaction should be observe for at least 30 minutes and complete vaccine 10 days prior to travel
JE Endemic Areas

Distribution of Japanese encephalitis risk
Rabies

• Pre-exposure vaccination
  • Not recommended for your average traveler related to manufacturer shortage

• Risk
  • Endemic in Africa, Asia (India) and Latin America
  • Risk to traveler is low
  • Children have been recommended to receive pre-exposure b/c they interact with animals and do not report bites

• Vaccine
  • 3 shots: 0, 7 and 21 or 28 days
Rabies Map
Rabies

Human Rabies Deaths - 2004

Legend
- Human Rabies Deaths
  - 0
  - 1 - 100
  - 101 - 1,000
  - 1,001 - 10,000
  - > 10,000

* Including Imported Cases in Humans and Animals

Note: This data depicts some regions where rabies transmission is occurring. The map is indicative and should be used for informational purposes only.
BCG Vaccine

• Not available in the USA
• It is part of routine vaccination schedule in many countries
• BCG prevents CNS TB infection
• You need to instruct parent that they may need this vaccine while living in the country
• Recommend young infants and children who will be traveling/living in TB endemic countries
Malaria

• Leading cause of death among children under 5 years of age
• Causing more than $\frac{1}{2}$ billion infections a year and 1 million deaths a year
• Cause
  • Infection is caused by Plasmodium species through the bite of an infected female Anopheles mosquito
• Risk
  • Young children
  • Pregnant women
• Vaccine
  • Not available
Risk for Malaria in the Americas
Risk for Malaria in Africa and Asia
Mefloquine-Resistant Malaria
Malaria Medications

• May not be covered by insurance
• Not all malaria medications are appropriate for all regions
• Medications have side-effects
• Need to know where patients are traveling and prescribe based the CDC recommendations
• http://wwwnc.cdc.gov/travel/yellowbook/2012/
Dengue Fever

Distribution of Dengue Fever risk

Citation: CDC Yellow Book, 2019, https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases
Dengue Fever

Distribution of Dengue Fever risk

Citation: CDC Yellow Book, 2019, https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases
Protective measures

• DEET
  • Use at least 30% concentration
  • Can be use on infants older than 2 months of age

• PERMETHRIN
  • Insecticide that may be used to treat bed nets and clothing

• Clothing
  • Light colored clothing with long sleeves and pants
Precautions for Use of Diethyltoluamide (DEET)

- Use repellents containing > 30% DEET only
- Apply sparingly to exposed skin
- Apply only to intact skin
- Apply to face by wiping, avoid eyes and mouth
- Do not spray directly on face
- Wash off with soap and water when coming indoors
- Do not inhale or ingest repellent
- Do not apply on hands or other areas that are likely to come in contact with the eyes or mouth
- Do not allow children under 10 years to apply DEET themselves
- Apply to your own hands then apply to the child
- Do not use on children less than 2 months of age
Traveler’s Diarrhea

• Risks
  • Most common illness among traveler’s
  • 9 to 40% of pediatric traveler’s

• Etiology
  • E. Coli
  • Salmonella
  • Campylobacter
  • Shigella
Traveler’s Diarrhea

Epidemiology of Traveler’s Diarrhea, 2019
https://doi.org/10.1016/B978-0-323-54696-6.00018-5
Traveler’s Diarrhea

- Oral Rehydration
- Antibiotics
  - Azithromycin
    - if prescribing as a liquid make sure to have the med dispensed as a powder b/c once mixed only good for 2 weeks
- Zinc
  - Found to decrease duration
  - Dose
- If traveler’s diarrhea does not respond to a course of antimicrobial therapy, medical attention should be sought
**Prevention of Traveler’s Diarrhea**

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>DO NOT</strong></th>
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</table>
| • Eat only thoroughly cooked food served hot  
  • Peel fruit  
  • Drink only bottled, carbonated, boiled, chemically treated, or filtered water  
  • Prepare all beverages and ice cubes with boiled or bottled water  
  • Wash hands before eating or preparing foods  
  • Continue breastfeeding throughout travel period | • Eat raw vegetables or unpeeled fruit  
  • Eat raw seafood or shellfish or undercooked meat  
  • Eat food from street vendors  
  • Drink tap water  
  • Consume milk or dairy products unless labeled as pasteurized or irradiated |
Prevention of Traveler’s Diarrhea

• If you cannot
  • BOIL IT
  • PEEL IT
  • OR COOK IT

DO NOT EAT IT
Medications

- Personal prescription medications in their original containers (copies of all prescriptions should be carried, including the generic names for medications, and a note from the prescribing physician on letterhead stationery for controlled substances and injectable medications)
- Antimalarial medications, if applicable
- Over-the-counter antidiarrheal medication (e.g., bismuth subsalicylate, loperamide)
- Antibiotic for self-treatment of moderate to severe diarrhea
- Antihistamine
- Decongestant, alone or in combination with antihistamine
- Anti-motion sickness medication
- Acetaminophen, aspirin, ibuprofen, or other medication for pain or fever
- Mild laxative
- Cough suppressant/expectorant
- Throat lozenges
- Antacid
- Antifungal and antibacterial ointments or creams
- 1% hydrocortisone cream
- Epinephrine auto-injector (e.g., EpiPen), especially if history of severe allergic reaction. Also available in smaller-dose package for children.
Other items

- Insect repellent containing DEET (up to 50%)
- Sunscreen (preferably SPF 15 or greater)
- Aloe gel for sunburns
- Digital thermometer
- Oral rehydration solution packets
- Basic first-aid items (adhesive bandages, gauze, ace wrap, antiseptic, tweezers, scissors, cotton-tipped applicators)
- Antibacterial hand wipes or alcohol-based hand sanitizer containing at least 60% alcohol (1)
- Moleskin for blisters
- Lubricating eye drops
- First aid quick reference card
- Other items that may be useful in certain circumstances
  - Mild sedative (e.g., zolpidem) or other sleep aid
  - Anti-anxiety medication
  - High-altitude preventive medication
  - Water purification tablets
  - Commercial suture/syringe kits (to be used by local health-care provider. These items will also require a letter from the prescribing physician on letterhead stationery.)
  - Latex condoms
  - Address and phone numbers of area hospitals or clinics
Smart Traveler Enrollment Program (STEP)

- Smart Traveler Enrollment Program (STEP) - free service provided by the U.S. Government to U.S. citizens who are traveling to, or living in, a foreign country.

- STEP allows you to enter information about your upcoming trip abroad so that the Department of State can better assist you in an emergency.

- STEP also allows Americans residing abroad to get routine information from the nearest U.S. embassy or consulate.
Smart Traveler Enrollment Program (STEP)

• Security/Safety
  • Smart Traveler – http://travel.state.gov/
  • To Enroll: https://step.state.gov/step/
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THANKS!