#### Malaria, Parasites and Diarrhea

# A Different View on International Travel

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#### Learner Outcomes

- Identify individuals in need of travel counseling
- Describe infectious disease issues related to international travelers and resources needed to plan for patients traveling abroad



#### What is Travel Medicine

- Travel medicine is a burgeoning international field requiring up-to-date information on the epidemiology, diagnosis, management, and prevention of disease and injury among travelers. It is an academic discipline that requires a reference textbook that keeps pace with constantly changing trends in disease and injury.
- Manual of Travel Medicine
- Allen Yung, Karin Leder, Joseph Torresi, Tilman Ruff, Daniel O'Brien, Mike Starr, Jim Black DOI: http://dx.doi.ora/10.1111/j.1708-8305.2012.00648.x 397 First published online: 1 October 2012



# Why is it Important

 International travel poses a risk of destinationspecific illness and may contribute to the global spread of infectious diseases.







Global TravEpiNet CID 2012:54 (4): 455-62





# Top 10 Tourist Destinations for 2014

1. France

6. Turkey

2. United States

7. Germany

3. Spain

8. United Kingdom

4. China

9. Russian Federation

5. Italy

10. Mexico

Most tourists visit destinations within their own region.

UNWTO Tourism Highlights 2015 Edition



# Top Destinations for US Travelers

Mexico
 Canada
 United Kingdom
 Dominican Republic
 France

6. Italy 7. German 8. Jamaica

Republic 9. Spain 10. China

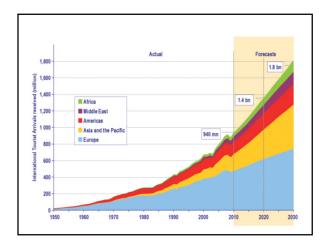
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Reasons For Travel		
Main Purpose of Trip	2014	
	(Percent	
	)	
Vacation/Holiday	50.9	
Visit Friends/Relatives	27.0	
Business	10.8	
Education	4.5	
Convention/Conference/Trade	3.4	
Show		
Religion/Pilgrimage	2.0	
Health Treatment	0.4	
Other	1.1	







# Special Populations of Travelers

- Immunocompromised
- Visiting friends and relatives (VFR)
- Seeking medical care (dental, cosmetic surgery)
- Adventure/extreme travel
- Age of traveler
- Students
- Long-stay traveler
- Last-minute traveler
- Relief worker
- Military
- Corporate traveler



#### Travel Health Risk Assessment

- Medical history
- Travel destination
- Purpose
- Duration of stay
- Existing medical conditions



# So Let's Take a Trip.... IRAVEL AROUND THE WORLD THE WO

# Case Study

- Parents will travel with their 3 year old to adopt and bring home their 2 year old daughter from Kenya
- 3 year old is "up-to-date" on immunizations
- leaving next week
- plan to stay for two weeks
- will stay in recommended hotel in the capital
- may visit child's birth city in rural Kenya

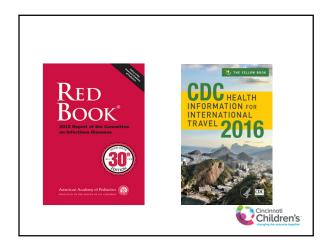




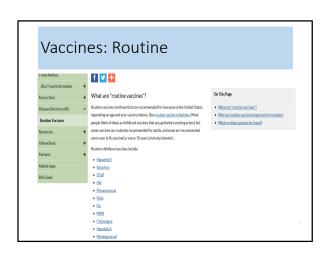
#### Pre-travel assessment

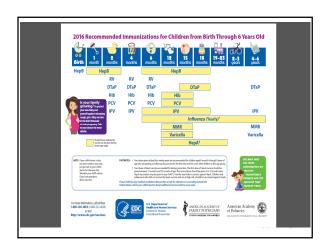
- Medical history
  - Chronic conditions
  - Pregnancy
  - immunocompromised
- Medications
  - ADHD meds
  - Insulin
- Immunizations
  - Routine?
  - Up-to-date
- Destination specific risks
  - Yellow Fever
  - Malaria
- Itinerary specific risks
  - Transportation/lodging
  - Seasonality
  - Urban vs rural
  - Purpose

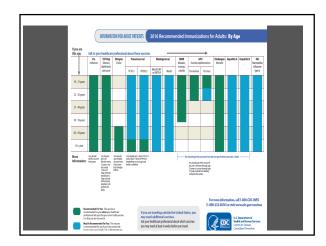












# Routine vaccine considerations



- Administer all routine vaccines appropriate for age
- When there is an age range for administration, err on the side of giving earlier in range (ex: polio, DTaP, varicella)







#### Routine vaccine considerations

- MMR recommended (in the US) beginning at 6 months of age for ALL international destinations
- MMR given before 12 months-of-age should not be included as part of the childhood series; repeat 1<sup>st</sup> dose after 12 months-of-age
- Give 2<sup>nd</sup> dose of MMR 28 days after initial dose



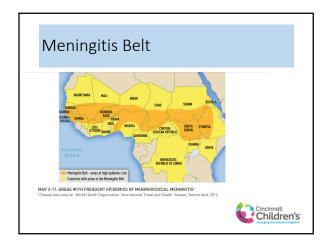




#### Routine vaccines to be given

- Hepatitis A
- Meningococcal
- MMRVVaricella
- \*Menveo can be given as early as 2 months-of-age
- Influenza
- \*Menactra can be given as early as 9 months-of-age
- Pneumococcal
- \*These vaccines cover serogroups: Groups A / C / Y and W-135









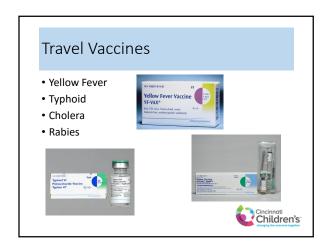
# Vaccine Dosing Schedule

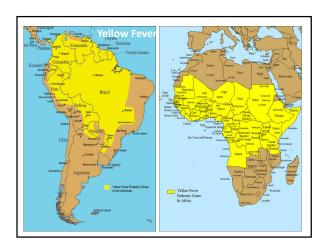


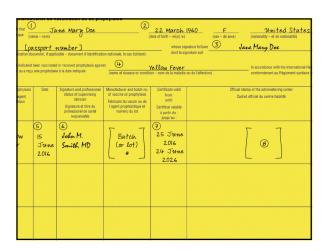
#### Spacing of vaccines:

- All vaccines can be given on the same day
- If not given on the same day, injected live virus vaccine should be separated by 28 days
- Better late than never; no need to repeat a series
- Do not give earlier than the minimum scheduled interval





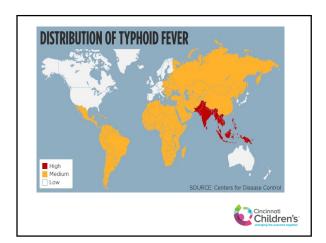




#### Precautions and Contraindications

- infants and elderly at increased risk for adverse events
- contraindicated in children < 6 months of age
- precautions in children 6-9 months of age
- absolute contraindications:
  - o primary immunodeficiencies
  - $\circ\, transplantation$
  - $\circ \, \text{immunomodulating drugs}$
  - o thymus disorders
  - o Allergy to egg or gelatin
- advise not to travel if there is true risk for yellow fever and can not receive vaccine





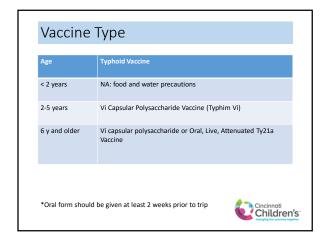
#### Enteric Fevers (Typhoid and Paratyphoid Fevers)

- Fever, headache, malaise, anorexia, lethargy, dry cough
- Diarrhea or constipation
- · Diagnosed by blood culture
- Treated with antimicrobials
- Prevented with vaccines (oral or parenteral) with limited effectiveness



Updated typhoid vaccine recommendations, ACIP, 2015: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6411a4.htm?s\_cid=mm6411a4\_e









#### **Rabies Prevention**

- Education about risks and the need to avoid bites: dog, bat, monkey
- A bite/scratch should be taken seriously
- Seek post-exposure prophylaxis which may require urgent international travel to where PEP is available
- Speak to children about avoiding animals



# Dog Bite

# More about rabies vaccine

VACCINE	DOSE (mL)	NUMBER OF DOSES	SCHEDULE (DAYS)	ROUTE
HDCV, Imovax (Sanofi)	1.0	3	0, 7, and 21 or 28	IM
PCEC, RabAvert (Novartis)	1.0	3	0, 7, and 21 or 28	IM



Cincinnati Children's

#### **Last Minute Travel Vaccines**

- Yes for Single Dose Vaccines
  - hepatitis A
  - typhoid (parenteral)
- meningococcal vaccine
- yellow fever
- Influenza
- No for Vaccine Series
  - rabies





#### Malaria Prophylaxis

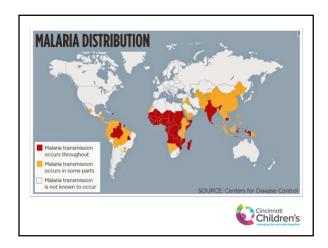




# Case Study

- A 21 year old man is traveling to Haiti for a week long mission trip with his church.
- He will be outdoors helping to build a school.
- While he is there he and his church group plan to work at an orphanage holding vacation bible school.







# Malaria Epidemiology • Protozoan parasite of the genus Plasmodium • falciparum • vivax • ovale • malariae • knowlesi

#### Transmission

- All species are transmitted by the bite of an infective female *Anopheles* mosquito.
- Occasionally through blood transfusion
- Needle sharing
- Congenitally from infected mother to fetus





# Insect Repellent Matters:







# Malaria Chemoprophylaxis

- Drugs used to prevent malaria
  - Atovaquone-proguanil (Malarone®)
  - Mefloquine
  - Primaquine
  - Chloroquine
  - Doxycycline



#### Malaria Chemoprophylaxis

- Chloroquine-susceptible P. falciparum:
  - · Chloroquine (weekly) Medications listed below for resistant falciparum
- Chloroquine-resistant P. falciparum:
  - Atovaquone-proguanil (daily)
  - Mefloquine (weekly)
     Doxycycline (daily)





# Back to our mission trip to Haiti

#### Atovaquone/proguanil

- Relatively few side effects
- Take daily
- Daily for 7 days after returning home

#### <u>Mefloquine</u>

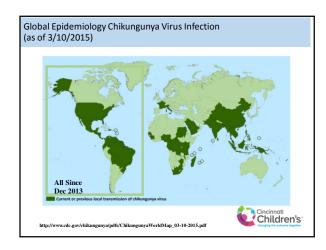
Adverse side effects



#### **Clinical Presentation**

- Fever
- Influenza like symptoms
- Headache
- Myalgia
- Malaise
- Symptoms can occur in intervals
- Uncomplicated disease may be associated in anemia and jaundice





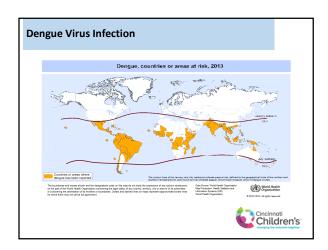
# Examples of Chikungunya Rash Note swelling around ankle joint Cincinnati Cincindate System Cincindate Sys

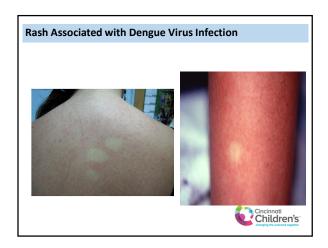
#### **Chikungunya Virus Infection**

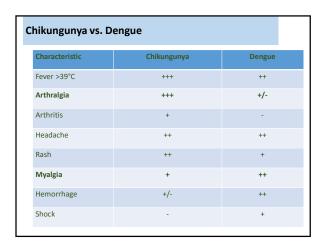
- polyarthralgia is common and may persist months to years or may recur
- no specific treatment; acetaminophen, ibuprofen, NSAIDs for arthralgia
- diagnosis by culture or PCR early (before day 2-5); serology (IgM from day 2-7, IgG from day 5-6 of illness)
- prevention by avoiding mosquito bites

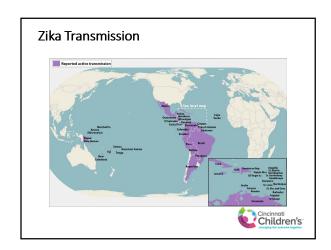
Burt et al, Lancet 2012















#### Traveler's Diarrhea

- Very common illness in travelers
- Children < 3 years of age
  - highest rates
  - longest durationgreatest severity
- Most common cause is bacterial (ETEC)
- · Generally self-limited
- · Preventive measures
  - good handwashing
  - good choices with food and beverages
  - continue breastfeeding infants
  - consider antibiotic prophylaxis in children with chronic conditions





#### Management of Travelers' Diarrhea

- Oral rehydration solutions
  - often the best option
  - major component of treatment of diarrhea for children
- Bismuth subsalicylate preparation
  - not recommended for children because of salicylate component
- Anti-motility agents (loperamide)
  - do not use for children < 2 years of age
  - · when high fever or bloody stool
  - discontinue if symptoms persist beyond 48 hours
- No need to change diet or restrict foods



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#### **Fever after International Travel**

- Potentially a medical emergency
- Travel history critical for determining differential diagnosis
- Immunization history important (measles)
- Medication history helpful
  - did the patient take anti-malarials for instance
  - Malaria is the  $1^{\rm st}$  consideration in a returning traveler who has traveled to a malaria endemic area.



#### **Returns Home with Diarrhea**

- 15 year old returns home after a 10 day eco-trip to Costa Rica with school
- Received recommended vaccines including typhoid and hepatitis A vaccines
- Got diarrhea in Costa Rica
  - three days after arrival
  - self-treated with azithromycin
  - improvement
- Since coming home is having frequent, loose, foul-smelling stools



#### Protozoal Parasites

<u>Pathogens</u>

Non-Pathogens

Giardia intestinalis

Endolimax nana Entamoeba coli

Cryptosporidium parvum Blastocystis hominis\*

Dientamoeba fragilis\*

Entamoeba gingivitis

Entamoeba histolytica

Entamoeba hartmanni

Balantidium coli

Entamoeba polecki

Isospora belli

Iodamoeba butschlii

Chilomastix mesnili

Cyclospora cayentensis\*\*

Enteromonas hominis

Microsporidia species\*\*

Retortamonas intestinalis

Trichomonas hominis

Trichomonas tenax \*controversy about pathogenicity; \*\*not identified with routine testing Kim J, Staat MA; Clin Ped Emerg Med; 2004; 5:130-142



#### Safe travel includes:

- Transportation safety
- Mosquito and other insect precautions
- Smart food choices
- Getting vaccines
- Respecting the culture
- Being prepared for the "what-ifs"

Carrie Farrell





#### Our CCHMC Travel Team:

Director: **Nursing Team:** 

Dr. Mary Staat Cara Kohlrieser, RN

Krista Doerflein, LPN

**Intake Coordinators**: Brittney Cassell, LPN

Kelly Branscome, MA

Robin Gordon Erica Harrison, MA



Have a safe trip!!	
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