

Updates in Travel Medicine

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for Family Medicine
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Disclosures

- No financial disclosures
- Stamaril: non-FDA approved Yellow Fever vaccine



OBJECTIVES: What you should take away

- Understand the 4 pillars of Travel Medicine
- Become familiar with the most recent outbreaks and their implications for patients traveling internationally
- Learn when to refer patients to a Travel Clinic



What is the most common cause of fatal injury to travelers?

-
- A
 - B
 - C
 - D
 - E



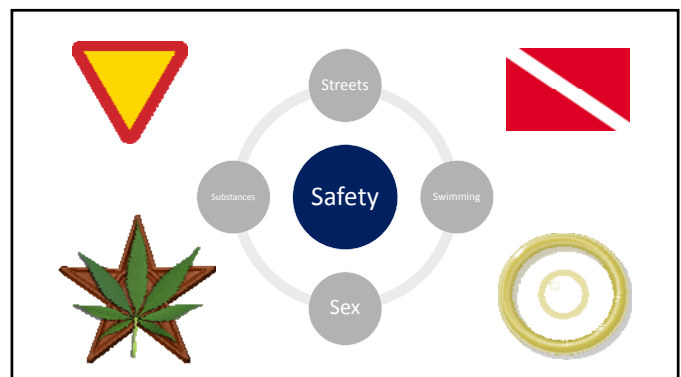
Pillars of Travel Medicine

Safety

Malaria

Diarrhea

Vaccination



Helicopter Transport in London

Emerg Med J 25:843, 2008

121 foreigner transports
61% for pedestrians struck
by a vehicle (16% of locals)
47% of these hit by a bus
16% mortality



Look both ways!



SAFETY: Streets

- Look both ways
- Seatbelts
- Helmets
- Car seats

Emerg Med J 25:843, 2008
Int J Inj Contr Saf Promot 17:161,
2010
J Travel Med 15:95, 2008
Travel Med Infect Dis 12:385, 2014



Motivation predicts risk

Fun/Social >> more risk

Physical/Behavioral >> less risk

Parker et al. *Addict Beav* 38:1980, 2013

Home risk changes during spring break

Peer influences matter

Apostolopoulos et al. *Int J STD AIDS* 13:733, 2002

Perceived difference from peers increased risk

Lewis et al. *Prev Sci* 15:408, 2014



Stephen Hargarten, MD, MPH

What is the deadliest animal to humans in the world – that is, causes the greatest number of human deaths?

A

Snakes



C

Sharks



B

Mosquitos



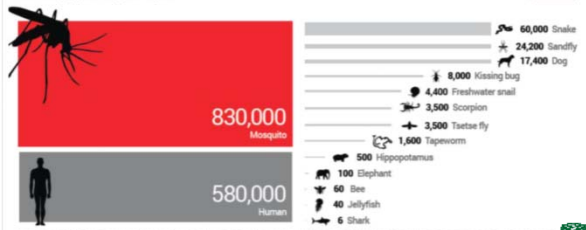
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Humans



The World's Deadliest Animals

Number of people killed by animals, 2015



Mosquito-Borne Illnesses – The ABCs

- Awareness of the risk
- Bite prevention
- Chemoprophylaxis



Awareness of Risk

Risk depends on:

- Specific location
- Season of travel
- Length of stay
- Activities
- Type of accommodation



Insect Repellants



- DEET: 20 to 50% concentration
 - 8 hours
 - Mosquitoes, ticks, flies, chiggers, fleas, gnats
- Picaridin: at least 20%
 - only ½ as protective
 - 8 hours
 - Mosquitoes and ticks
- Lemon eucalyptus oil, paramenthane-diol, 2-undecanone



Insect Repellants

Product	Duration of Protection
DEET 24%	302 minutes
DEET 20%	234 minutes
DEET 7%	112 minutes
Citronella, 10%	20 minutes
Citronella, 0.05%	3 minutes
Picaridin	~ same as DEET



Insect Repellants



Permethrin



Two healthy surgeons (42 and 69 years of age) will be spending 2 weeks in Bomet, Kenya performing cardiac surgery at a medical mission hospital. The latter also plans to go on Safari for 2 days in the Serengeti.

Is malaria chemoprophylaxis advisable?

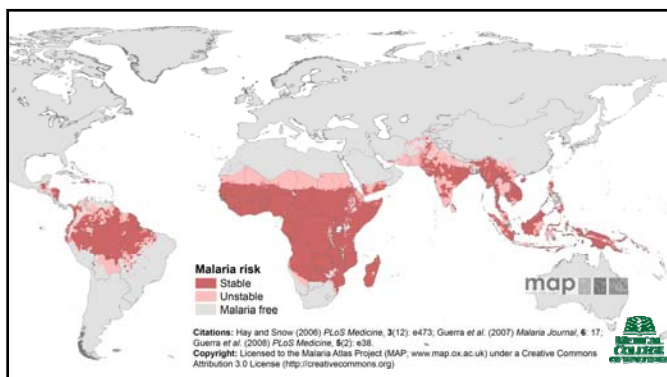
- A. Yes, for both
- B. Yes, but only for the one going on safari
- C. Neither need chemoprophylaxis for this trip
- D. No idea



Lyle Joyce, MD, PhD



David Joyce, MD



Malaria Risk by Destination

one month stay, no chemoprophylaxis

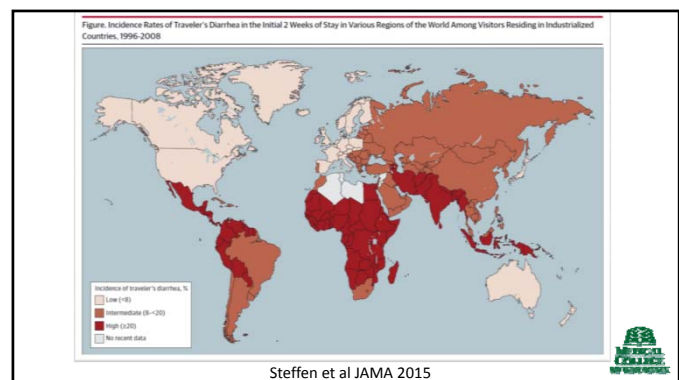
1:30	Oceania
1:50	Africa
1:250	South Asia
1:2,500	Southeast Asia
1:5,000	South America
1:10,000	Central America, Mexico



	Atovaquone-proguanil	Doxycycline	Mefloquine	Chloroquine
Dosing	1 dose daily	1 tablet daily	1 dose weekly	1 tablet weekly
Schedule	2 days before, daily, 1 wk after return	2 days before, daily, 4 wks after return	2 wks before, daily, 4 wks after return	1-2 wks before, daily, 4 wks after return
Pros	Minimal side effects	Antibiotic, diarrhea	Weekly	Weekly
Cons	Diarrhea, sleep trouble, Cannot miss	Gastric acid, sun sens, yeast inf, Cannot miss Not < 8 yrs old	Neuropsych Seizure threshold Dreams	Bitter taste, early side effects, problem with chronic use
Cost	\$215/mo	\$100/mo	\$40/mo	\$40/mo

A 30 year old woman develops copious diarrhea while hiking the Annapurna range in Nepal. She is 13 weeks pregnant. What is the preferred treatment for this patient?

- A. Azithromycin 1000 mg once
 B. Ciprofloxacin 500mg BID x 3 days
 C. Rifaximin 200 mg TID x 3 days
 D. Oral fluids only



Etiology of Traveler's Diarrhea

Organism	Latin America and Caribbean	Africa	South Asia	Southeast Asia
Enterotoxigenic Escherichia coli	≥35	25-35	15-25	5-15
Enterobacteriaceae E coli	25-35	<5	15-25	No data
Campylobacter	<5	<5	15-25	25-35
Salmonella	<5	5-15	<5	5-15
Shigella	5-15	5-15	5-15	<5
Norovirus	15-25	15-25	5-15	<5
Rotavirus	15-25	5-15	5-15	<5
Giardia	<5	<5	5-15	5-15

Steffen et al. JAMA 313:71, 2015

Traveler's Diarrhea: Treatment

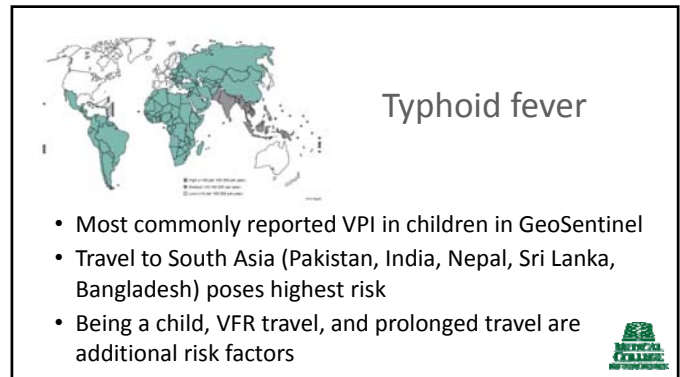
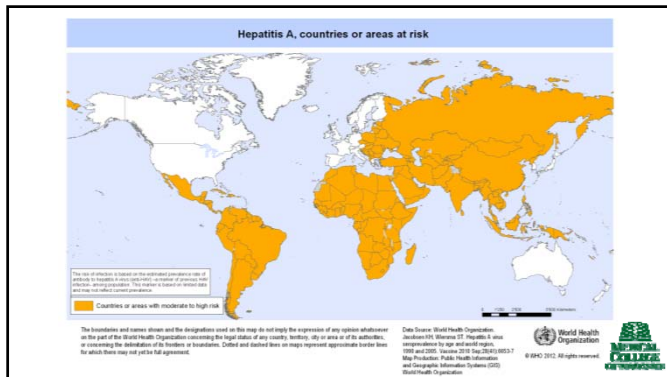
- Moderate-severe diarrhea (≥ 5 stools/day)
- Persistent diarrhea >48 hours
- Azithromycin favored over quinolones
 - Black box warning for quinolones
 - Safe in children and in pregnancy
 - Quinolone-resistant Campylobacter
- Bloody stools or fever – SEEK MEDICAL ATTENTION!



A 40 year old man is traveling to Iquitos, Peru, (Amazon jungle) for 2 weeks in June with his daughter's middle school science class. He has no medical problems. He is up to date on routine immunizations for his age group. What vaccines would you recommend?

- A. Typhoid
- B. Hepatitis A
- C. Yellow fever
- D. All of the above





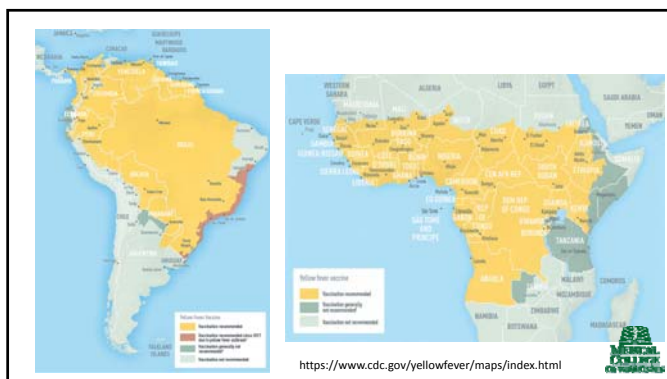
Typhoid fever

	Oral, live attenuated	Injectable, inactivated
Route	Oral	IM
Dosage	QOD, 4 doses over 1 week	once
Duration	5 years	2 years
Pros	Duration Children ≥ 3 y (liquid) ≥ 6 yr (capsule)	- Immunosuppressed - Children > 2 years - Last-minute trips
Cons	- Refrigeration - Inactivated by antibiotics	Duration

Yellow Fever

- Mosquito transmitted
- Often requires hospitalization
- Fever
- Flu-like symptoms
- Jaundice
- Bleeding from multiple body sites: liver, kidney, lungs
- Death (20% - 50% of serious cases)

Headache
Nausea
Yellow eyes and skin (jaundice)
spread by mosquitoes



Yellow Fever Vaccine

- May be required for entry into certain countries
- Given at certified clinics and pharmacies
- Patients given a stamped "yellow card"

Yellow Fever Vaccine

Contraindications	Precautions
Allergy to vaccine component	Age 6–8 months
Age <6 months	Age ≥60 years
Symptomatic HIV infection CD4 <200/mm ³	Asymptomatic HIV infection CD4 200–499/mm ³
Thymus disorder associated with abnormal immune-cell function	Pregnancy
Primary immunodeficiencies	Breastfeeding
Malignant neoplasms	
Immunosuppressive drugs	



Yellow Fever Vaccine Recommendations

- Infant and child ≥9 mo of age: vaccinate
- Infant <6 mo of age
 - Never give the vaccine
 - "Can trip be deferred?"
- Infants 6-8 mo of age
 - Acceptable immune responses without significant adverse events¹
 - May give vaccine during outbreaks and travel to high risk areas
 - Need to have a good understanding of current yellow fever epidemiology at destination²

¹Osei-Kwasi M et al. *Bull WHO* 2001.
²Lown BA et al. *Clin Infect Dis* 2012.



Yellow Fever Vaccine - Risks

- Yellow fever associated neurotropic disease (YEL-AND)
 - Encephalitis, Guillian-Barre, Bell's Palsy
 - Rarely fatal
- Yellow fever associated viscerotropic disease (YEL-AVD)
 - Mimics severe yellow fever infection
 - **50% or greater fatality rate**



Yellow Fever Vaccine - Risks

- Incidence of YEL-AND is 0.8:100,000 doses
 - ≥60 years, 2.2:100,000 doses
- Incidence of YEL-AVD is 0.4:100,000 doses
 - 60–69 years, 1:100,000 doses
 - ≥70 years, 2.3:100,000 doses



Yellow Fever Vaccine - Update

- National shortage projected through January 2019
- Stamaril available in Milwaukee and Madison
- Patients in need of vaccine should be referred to a travel clinic

<https://wwwnc.cdc.gov/travel/page/search-for-stamaril-clinics>



Yellow Fever – Bottom line

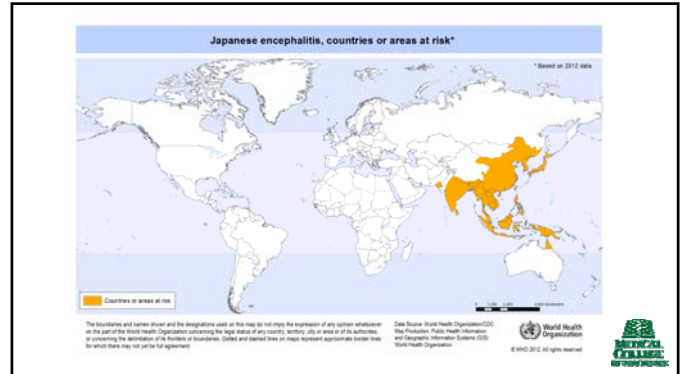


Refer to a travel clinic
for discussion of risks
and benefits



A healthy 22 year young man plans to backpack across rural areas of northern India and Nepal in June and July. He has no medical problems. He is up to date on routine immunizations for his age group. What vaccinations would you recommend?

- A. Typhoid
- B. Hepatitis A
- C. Japanese encephalitis
- D. A and B
- E. All of the above



Name an illness for which this person is putting himself at risk.



Rabies



95% of reported rabies cases: Africa, Asia
~50,000 - 55,000 rabies death annually (India)



Figure 2. Recommended immunization schedule for adults aged 18 years or older by medical condition and other indications, United States, 2017

**Updating
Routine Vaccinations
is an important aspect of the
Pre-Travel Consult!**

The New York Times

Measles in Europe, Recently at Record Low, Jumps to Highest Level Since '90s

A boy waited in Rome, Ukraine, earlier this year to be vaccinated against measles. Inset: Timothy L. Bortone / Reuters / Corbis

Aug. 20, 2018

**Half (46%) of all Pediatric Travelers Received At Least One
*Routine Vaccine***

Hagmann et al. *J Ped Infect Dis Soc* 2013;2(4):327-334.

Minimum Age for Initiation of Vaccination

Table 13.4 Accelerating Routine Pediatric Vaccinations

	Age	Minimum Interval
DTaP	6 weeks	4 weeks
Hepatitis B	Birth	4 weeks
Hib	6 weeks	4 weeks
IPV	6 weeks	4 weeks
MMR	6-11 months, followed by MMR at 12 months old	4 weeks
OPV	Birth	4 weeks
PCV13	6 weeks	4 weeks
Rotavirus	6 weeks	4 weeks

Mackell S and Starr M in Keystone J (Ed) *Travel Medicine* 3rd ed.

Chikungunya 2013-2017

- > 2 million in the Americas
- Argentina, > 1000 in 2016
- Brazil, 385,000 cases
- Case fatality rate close to seasonal flu

Zika Virus

<https://wwwnc.cdc.gov/travel/page/world-map-areas-with-zika>

Zika: Updated Guidance, August 8, 2018

- Men with possible exposure: wait 3 months before engaging in unprotected sex
- Women with exposure: wait 2 months



Source: CDC
 Mead PS, et al. Zika virus shedding in semen of symptomatic infected men. *N Engl J Med*. 2018.
 Feldmann H. Virus in semen and the risk of sexual transmission. *N Engl J Med*. 2018;379(13):1440-1441. doi: 10.1056/NEJMe1803212.

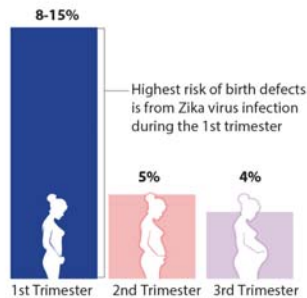


Proportion of Babies with Birth Defects



Reynolds MR, et al. Vital Signs: Update on Zika Virus-Associated Birth Defects and Evaluation of All U.S. Infants with Congenital Zika Virus Exposure — U.S. Zika Pregnancy Registry, 2016. *MMWR*. 2017.
 Shapiro-Mendoza CK, et al. Pregnancy Outcomes After Maternal Zika Virus Infection During Pregnancy — U.S. Territories, January 1, 2016–April 25, 2017. *MMWR*. 2017.

Zika in Early Pregnancy Increases Risk of Birth Defects



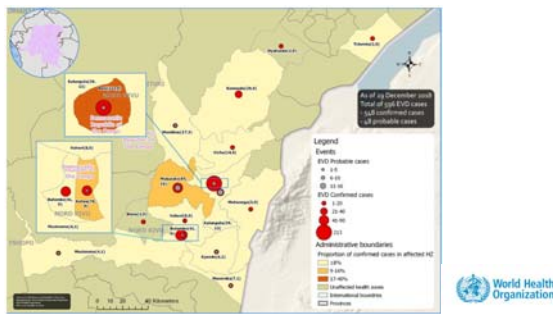
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Supporting Healthcare Providers

- Guidance and recommendations
 - Travel, testing and other recommendations for pregnant women
 - Published updates to clinical guidance and algorithms for healthcare providers caring for pregnant women
- 24/7 Clinical hotline
 - Call 770-488-7100 and ask for the Zika Pregnancy Hotline
 - or email ZIKAMCH@cdc.gov
- Providers and the general public can also ask questions through CDC INFO
 - Call 1-800-CDC-INFO (1-800-232-4636) or visit www.cdc.gov/cdc-info



Ebola Virus as of December 29, 2018



STAT

Ebola outbreak shaping up as most dangerous test of world's ability to respond since global crisis

By [Helen Branswell](#) @helenbranswell
 August 16, 2018



Medical workers double a coffin made as Ebola treatment center in Beni, ASHBY PETERSON/AP Photo Images

Scientists Discover New Ebolavirus in Bats in Sierra Leone Currently No Evidence of Human Infection or Spillover

By Kat Kerlin on July 27, 2018 in [Human & Animal Health](#)



Things to Cover

- Injury prevention
- Safety and security
- Insect precautions
- Sex and travel
- Food/water precautions
- Local outbreaks – Zika, Ebola, etc.
- Travel insurance
- Animal bites
- Needle sticks exposures
- DVT and PE prevention
- Jet lag
- Motion sickness
- Altitude sickness



In summary (Keystone's Travel Medicine Pearls)

- Don't get HIT
- Don't get LIT
- Don't do IT
- Don't get BIT
- Don't eat s**t



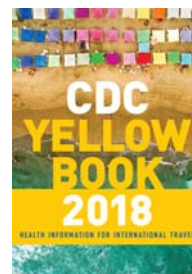
Travel Health Clinic

- Patients planning travel with:
 - Complex medical comorbidities
 - Immunocompromising conditions
 - Destinations to yellow fever, malaria, Japanese encephalitis or rabies endemic areas
 - Medical care delivery or invasive procedures
 - Duration of travel > 2 weeks
 - Uncertain travel itinerary
- Symptomatic patients returning from international travel



<https://www.froedtert.com/travel-medicine>

References

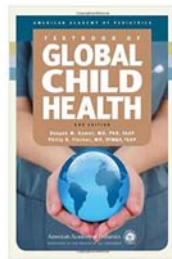
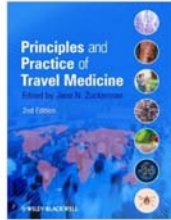


CDC Yellow Book
<http://www.cdc.gov/travel/yellowbook/2014/table-of-contents.aspx>



Shoreland Travax
<http://www.shoreland.com/services/travax>

References



Questions
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