TRAVEL HEALTH: DISEASES, VACCINES & PROPHYLAXIS

LAILA WOC-COLBURN, MD, DTM&H, FACP
DIRECTOR OF MEDICAL EDUCATION
NATIONAL SCHOOL OF TROPICAL MEDICINE
ASSISTANT PROFESSOR-INFECTION DISEASES
DEPARTMENT OF MEDICINE
BAYLOR COLLEGE OF MEDICINE

WOCOLBU@BCM.EDU  TWITTER: DOCWOC71
LEARNING OBJECTIVES

1. Understand the epidemiology of the most frequent travel vaccines given: Hepatitis, Typhoid, Yellow Fever and Japanese Encephalitis

2. Describe the side effects of the chemoprophylaxis and vaccines

3. Discuss the components needed to give the correct vaccine and chemoprophylaxis advice to the traveler
DISCLOSURES
NONE
EPIDEMIOLOGY OF TRAVELING

OVER 1.1 BILLION TOURISTS TRAVELED ABROAD

2015 International Tourist Arrivals

AMERICAS
ITA: 191 million (16%)

MIDDLE EAST
ITA: 54 million (5%)

EUROPE
ITA: 609 million (51%)

ASIA PACIFIC
ITA: 277 million (23%)

AFRICA
ITA: 53 million (5%)

WORLD: 1,184 MILLION

SOURCE: UNWTO World Tourism Barometer
FATALITIES AMONG FRENCH ABROAD
2000-2004

Accidents:
- Drowning, mountain: 18.3%
- Traffic: 28.1%
- Suicide, homicide: 3.2%
- Cardiovascular: 19.0%
- Misc.: 11.6%
- Infection: 1.4%
- Unknown illness: 18.4%
- Misc.: 11.6%

Jeannel D et al. BEH 2006/no 23-24/p166-8
MEDICAL CARE ABROAD

• Travelers, especially those with special needs, should plan ahead to facilitate access to quality health care if necessary during their travel

• Supplemental health and travel insurance should be purchased, covering emergency evacuation with 24 hr telephone access, as well as local care in destination sites
• MANY TRAVELERS ARE NOT ADEQUATELY IMMUNIZED
  • Travel vaccines: required, recommended and routine
  • Travel: a good reason to update routine immunizations.
• This a 40-year-old woman, visits your office in March.

• She was born in Houston, Texas and attended public school here. She is going on pilgrimage to Mecca with her father in November and then going to the Serengati. She thinks she needs some vaccines before she goes.

• What vaccines does she need?
TRAVEL IMMUNIZATIONS

- **Required**
  - Yellow Fever
  - Meningococcal
  - ?Cholera

- **Recommended**
  - Polio
  - Tetanus/Diphtheria/Pertussis
  - Influenza
  - Measles
  - Hepatitis A/B
  - Typhoid
  - Rabies
  - Japanese Encephalitis
  - Tick-borne Encephalitis
YELLOW FEVER

- Mosquito-borne hemorrhagic fever
- ~200,000 cases per year, 90% in Africa
- Indigenous case fatality rates vary – @20-60%
- Rare fatalities in travelers since vaccine introduction
YELLOW FEVER

- Disease Transmission
  - From primates or humans
  - Mosquito vector
- Disease Prevention
  - Avoid mosquito bites
    - DEET
    - Clothing
    - Mosquito nets
    - Eliminate standing water
  - Vaccination

YELLOW FEVER

- 3 stages
  - Infection (3-4 days)
    - Fever, malaise, leukopenia
  - Remission (48 hours)
    - Abatement of symptoms
    - 15% progress
  - Intoxication
    - Return of symptoms,
    - Organ dysfunction, hemorrhage
YELLOW FEVER ZONES

CDC MAP best reference
YELLOW FEVER

Yellow Fever Vaccination

- **Recommended**
- **Generally Not Recommended**
- **Not Recommended**

*Yellow fever (YF) vaccination is generally not recommended in areas where there is low potential for YF virus exposure. However, vaccination might be considered for a small subset of travelers to these areas who are at increased risk for exposure to YF virus because of prolonged travel, heavy exposure to mosquitoes, or inability to avoid mosquito bites. Consideration for vaccination of any traveler must take into account the traveler’s risk of being infected with YF virus, country entry requirements, and individual risk factors for serious vaccine-associated adverse events (e.g., age, immune status).*
YELLOW FEVER

• LEGALLY “REQUIRED”
  • Yellow fever
    – Assess risk
    – Rare multi-organ failure syndrome and death
    – Waiver if only legally required

WHO RECOMMENDATION
As of June 2016 official recommendation will be: A single dose of vaccine provides life long protection.
YELLOW FEVER VACCINE

• Live-attenuated vaccine
• Developed in 1936
• Seroconversion >95%
• Single 0.5ml subcutaneously
• Revaccination at 10-year intervals required by World Health Organization
  – Protection from one vaccine, however, may last 30 or more years
YELLOW FEVER VACCINE SIDE EFFECTS

• Adverse Reactions (10-30%)
  – Local soreness
  – Mild fever
  – Headache
  – Myalgias
YELLOW FEVER VACCINE
RARE SEVERE REACTIONS

• Anaphylaxis
  – Risk 1/131,000

• Yellow fever associated neurotropic disease (YEL-AND)
  – Risk 1:150,000 - 200,000
  – Multiple neurologic conditions
    • Encephalitis (esp. infants <9 months), Guillian-Barre, Bell’s Palsy
  – Onset 2-28 days after vaccination
  – Rarely fatal
Yellow Fever Vaccine
Rare Severe Reactions

- Yellow fever associated viscerotrophic disease (YEL-AVD)
  - Mimics severe yellow fever infection
  - Major organ system failure occurs
    - Hepatic, renal, circulatory failure
    - 50% or greater fatality rate
  - Occurs 1-8 days (average 3 days) after initial vaccination
  - Risk 1:200,000 - 300,000
    - Greater risk if over age 60
YELLOW FEVER VACCINE CONTRAINDICATIONS

• Age <9 months old*
  * Can consider at 6-9 months old during outbreaks

• Pregnant women*
  * Yellow fever can cross placenta

• Severe egg allergies

• Severe immunocompromise
  – CD4 >350 Vload <20

• Immunomodulatory drugs
YELLOW FEVER VACCINE

• Certification of vaccination required
  – International Certificate of Vaccination or Prophylaxis for Yellow Fever form (ICVP)
  – Must be signed by licensed physician or designee

• Waiver form for medical contraindication to vaccine, such as pregnancy
YELLOW FEVER VACCINE

• Vaccine given at a certified center
• “Uniform Stamp”
  – Issued by state health departments
  – Stamp needed to validate the International Certificate of Vaccination or Prophylaxis against Yellow Fever form (ICVP)
• Location of vaccination centers
  [Website Link](http://wwwnc.cdc.gov/travel/yellowfever.aspx)
YELLOW FEVER VACCINATION PROOF REQUIRED FOR ENTRY

- Angola
- Benin
- Bolivia (or signed affidavit at point of entry)
- Burkina Faso
- Burundi
- Cameroon
- Central African Republic
- Congo, Republic of the
- Côte d’Ivoire
- Democratic Republic of Congo
- French Guiana
- Gabon
- Ghana
- Liberia
- Mali
- Niger
- Rwanda
- São Tomé and Príncipe
- Sierra Leone
- Togo
- Always check up to date list at www.cdc.gov/travel
MENINGOCOCCAL DISEASE

- Neisseria Meningitidis
  - Gram negative diplococci
- Youngest children = highest risk
- 0.5-10/100,000 in non-epidemic areas
- Up to 1,000/100,000 in epidemic areas
MENINGOCOCCAL DISEASE

• “Meningitis Belt”
  – Sub-Saharan Africa
• Greatest risk: dry season (Dec. - June)
• Risk of travelers
  – 0.4/100,000
• Hajj pilgrimage to Saudia Arabia associated with outbreaks

MENINGOCOCCAL DISEASE

• 1-14 days post-exposure
• Presents as meningitis in 50%
• Sepsis in up to 20%
• Less dramatic symptoms in < 2 year olds
• Treatment
  – During epidemics
    • Ceftriaxone
    • Chloramphenicol
MENINGOCOCCAL DISEASE

- Vaccine required to attend the Hajj (annual pilgrimage to Mecca)
  - If under age 15, polio vaccination needed also

http://news.bbc.co.uk/cbbcnews/hi/pictures/galleries/newsid_1832000/1832100.stm
MENINGOCOCCAL DISEASE

• Available vaccines
  – MCV4 (Menactra™)
    • 2-55 years old
    • Preferred in <11 year olds
  – MPVS4 (Menomune®)
    • 2 years and older
    • Use for >55 years old
  – MenACWY-CRM (Menveo®)
    • 11-55 years old
    • Licensed for use in 2010
MENINGOCOCCAL DISEASE

• Revaccination
  – If high-risk (epidemic area or travel)
    • If vaccine given at 2-6 years old
      – Repeat after 3 years, then every 5 years
    • If vaccine given >6 years old
      – Repeat every 5 years
RECOMMENDED VACCINES FOR TRAVEL

- Tetanus/Diphtheria/Pertussis
- Influenza
- Polio
- Measles
- Hepatitis A
- Hepatitis B
- Typhoid
- Rabies
- Japanese Encephalitis
- Tick-borne Encephalitis
TETANUS

- Omnipresent in the environment worldwide
- Agricultural areas – exposure to animal excrement
- Approximately 290,000 people died from tetanus in 2006
  - Most in Asia, Africa and South America
- Vaccination provides 10 years of protection
- Booster
  - >10 years since last dose or if wound occurs and vaccination is greater than 5 years old
**POLIO**

- Fecal-oral or oral transmission
- **Global Polio Eradication Initiative (GPEI)**
  - Goal to eradicate polio
  - **Wild polio virus: India, Nigeria, Pakistan, Afghanistan**
  - Most cases of polio from these countries
- **2 vaccines worldwide: IPV and OPV**
  - Only IPV in U.S.
  - Still OPV in other parts of the world
    - Rare cases of vaccine associated paralytic poliomyelitis
  - Vaccine recommended if traveling to endemic area and incomplete series
MEASLES

• 20,000,000 cases globally each year
• Almost every country
• Travel guidelines closely match general immunization guidelines
  – Immunity for travel:
    • 6-11 months old – 1 dose required (does not count in U.S.)
    • >12 months old – 2 doses required
    • Laboratory evidence of immunity
    • Born before 1957
    • Physician-diagnosed case of measles
HEPATITIS A

• Worldwide prevalence
• Fecal/oral transmission
  – Associated poor hygiene or sanitation
• Symptoms include
  – Jaundice
  – Fatigue
  – Abdominal pain
  – Anorexia
  – Nausea
• Adults often contract from asymptomatic children
• Incubation 28 days (range 15-50 days)
• Viral shedding 2 weeks before to 1 week after symptoms
• Usually self-limited disease
HEPATITIS A VACCINE

• Inactivated Hep A virus (Havrix® or Vaqta®)
• Combined with Hepatitis B (Twinrix®)
• Travel vaccine indications
  – Anyone >1 year old traveling anywhere outside of
    • U.S. and Canada
    • Western Europe
    • Scandinavia
    • Japan
    • Australia and New Zealand
HEPATITIS A

- For healthy patients <40 years old, one dose before travel confers adequate protection
- Consider immunoglobulin treatment for patients
  - Leaving in less than two weeks
  - Older
  - Immuno-compromised
  - Chronic medical conditions
  - Under 12 months of age
HEPATITIS B

• Transmitted by blood and body fluids
• Travelers generally low risk except:
  – Injuries that occur while traveling
  – Sexual contact
  – Drug injection
  – Piercings or tattoos
• Recommended for travel to intermediate/high risk areas
HEPATITIS B VACCINE INDICATIONS

- International travel to endemic areas

Twinrix®

- Inactivated Hepatitis A with Recombinant Hepatitis B
- Indicated for 18 years old and older
- 3-dose series
- 0, 1, 6 months
- Better choice if both vaccines are indicated
INFLUENZA

• Risk depends on timing and destination
  – Tropics: year round risk
  – Temperate climates: risk generally April-September

• Avian subtype risks
  – Visiting poultry farms
  – Visiting open markets where live poultry are present
  – Eating undercooked poultry products (eggs, meat, etc.)

• Preventative measures include
  – Hygiene: washing hands
  – Annual vaccination
Typhoid Fever

- Typhoid fever – acute life-threatening illness
- Caused by *Salmonella typhi*
- Humans – only source
- Acquired through fecal contamination of food and water
- 22,000,000 cases worldwide/year
  - 200,000 deaths
TYPHOID

• Southeast Asia
  – 6-30 times more common
  – Highest risk of drug resistance

• Africa, Caribbean, Central and South America

• Length of stay = increased risk

http://www.marioncountyhealthdept.org/images/Map_Typhoid.gif
TYPHOID

• Prevention
  – Avoid contaminated food and water
  – Hygiene
  – Local cuisine

• Vaccine(s)
  – 2 available
• **Vivotif®**
  – Oral, live-attenuated
  – Ages 6 and older
  – 50-80% protection
  – 4 pills – one every other day
  – Completed 1 week before potential exposure
  – Revaccination every 5 years

• **Typhim Vi®**
  – Capsular polysaccharide (IM)
  – Ages 2 and older
  – 50-80% protection
  – Single 0.5ml injection
  – 2 weeks before exposure
  – Booster every 2 years
JAPANESE ENCEPHALITIS VIRUS (JEV)

- Most common cause of encephalitis in Southeast Asia
- Carried by mosquitoes
- Risk
  - Little risk in urban areas
  - Mostly rural areas
    - Not recommended for short-term travel to urban area

Geographic distribution in Southeast Asia.

Map from www.cdc.gov
JAPANESE ENCEPHALITIS

• Incubation 5-15 days
• Most infections asymptomatic
  – <1% develop clinical disease
• Headache, fever, vomiting, diarrhea
  – Most recover in 1 week
  – 1:300 severe symptoms with 30% fatality
    • Mental status changes
    • Focal neurological deficits
    • Parkinsonian syndrome
    • Seizures (especially children)
JAPANESE ENCEPHALITIS

• 2 vaccines in U.S. (Multiple vaccines available in Southeast Asian countries)
  – Inactivated Vero cell culture (JE-VC)
    • For people over 17 years old
    • Duration of protection unknown
    • Need for boosters undetermined
    • Pregnancy Category B
  – Inactivated mouse brain cell culture (JE-MB)
    • Production stopped 2006
    • Stockpile only for children <17 years old
    • Booster 2 years after primary series if needed
MALARIA

- 350,000,000 - 500,000,000 cases/year
- 1,000,000 - 3,000,000 deaths/year
- Mostly sub-Saharan Africa
MALARIA

Map showing malaria prevalence around the world, with color-coding indicating different per person per year rates.
MALARIA

• ~1500 imported cases to US/year
  – Probably under-reported
• 6 deaths/year
• Risk assessment
  – Location, season, elevation, duration
  – Military
  – Travelers visiting friends or relatives
  – Pregnancy
MALARIA

NO VACCINE,
yet

Have to treat with chemoprophylaxis
MALARIA

- Prevention
  - Clothing
  - Insect repellant
  - Mosquito netting

- Chemoprophylaxis
  - Atovaquone/proguanil (Malarone®)
  - Primaquine
  - Chloroquine
  - Mefloquine
  - Doxycycline
MALARIA

• Multiple regimens, multiple meds
  – Start before, end after
• Important to plan ahead with your doctor or travel clinic
• Recommendations at CDC yellowbook
• Pregnancy
  – Chloroquine/mefloquine only
TRAVELER’S RESPONSIBILITIES

• 4-6 weeks before travel see provider
• Get necessary immunizations
  – Check CDC for up to date
    recommendations
    (www.cdc.gov.travel)
• Check travel notices for outbreak
  information
TRAVELER’S RESPONSIBILITIES

• Travel health kit
  – Prescription medications and over-the-counter medications
  – Advice available at:
  – Commercial pre-assembled health kits
    • American Red Cross: www.redcrossstore.org
    • Adventure Medical Kits: www.adventuremedicalkits.com
    • Chinook Medical Gear: www.chinookmed.com
    • Travel Medicine, Inc.: www.travmed.com
    • Wilderness Medicine Outfitters: www.wildernessmedicine.com
MEDICAL SERVICES ABROAD

- International Association for Medical Assistance to Travelers [www.iamat.org](http://www.iamat.org)
- Travax EnCompass [www.shoreland.com](http://www.shoreland.com)
- International Society of Travel Medicine [www.istm.org](http://www.istm.org)
- American Society of Tropical Medicine & Hygiene [www.astmh.org/clinics.cfm](http://www.astmh.org/clinics.cfm)
HEALTHCARE RESPONSIBILITIES

• Know some basic travel medicine advice
  – Hepatitis A and B for trips to Mexico/Caribbean
  – Prevention techniques
    • Clean water
    • Mosquito prevention

• How to access the CDC website for travel advice (www.cdc.gov/travel)

• International Society of Travel Medicine (www.istm.org) for those more interested