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TRAVEL HEALTH: DISEASES, VACCINES & PROPHYLAXIS

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LEARNING OBJECTIVES

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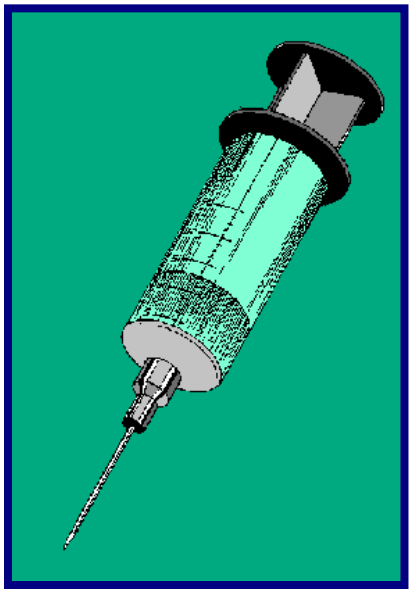
1. Understand the epidemiology of the most frequent travel vaccines given: Hepatitis, Typhoid, Yellow Fever and Japanese Encephalitis

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

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OVER 1.1 BILLION TOURISTS TRAVELED ABROAD

FATALITIES AMONG FRENCH ABROAD 2000-2004

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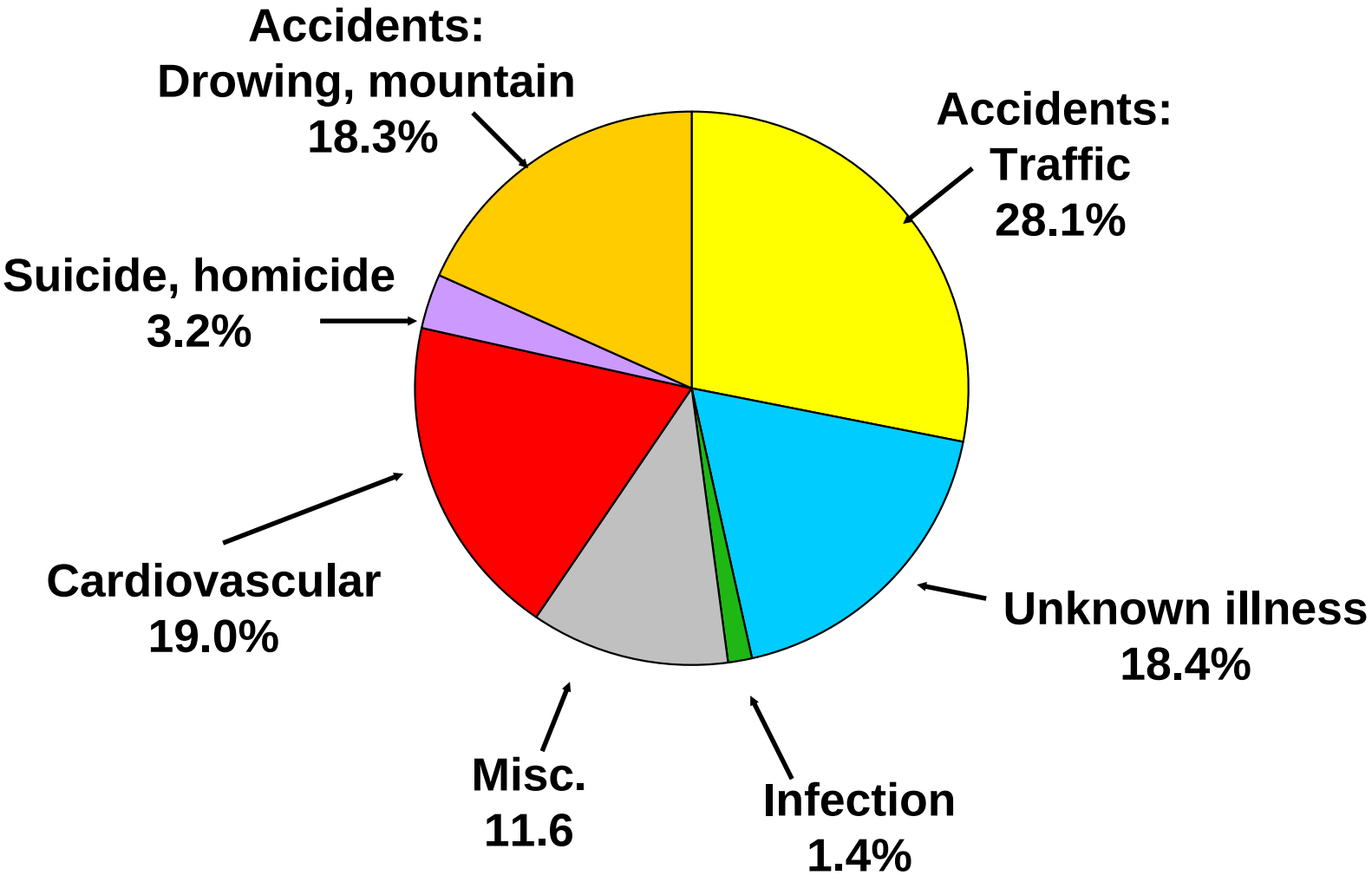

Jeannel D et al. BEH 2006/no 23-24/p166-8

MEDICAL CARE ABROAD

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- 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

IMMUNIZATIONS

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- **MANY TRAVELERS ARE NOT ADEQUATELY IMMUNIZED**
  - Travel vaccines: required, recommended and routine
  - Travel: a good reason to update routine immunizations.

CASE

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- 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

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- **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

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

Photo from www.cdc.gov. Image in public domain. Photo by James Gathany.

YELLOW FEVER

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- 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

- **YELLOW FEVER ZONES**
- CDC MAP best reference

YELLOW FEVER

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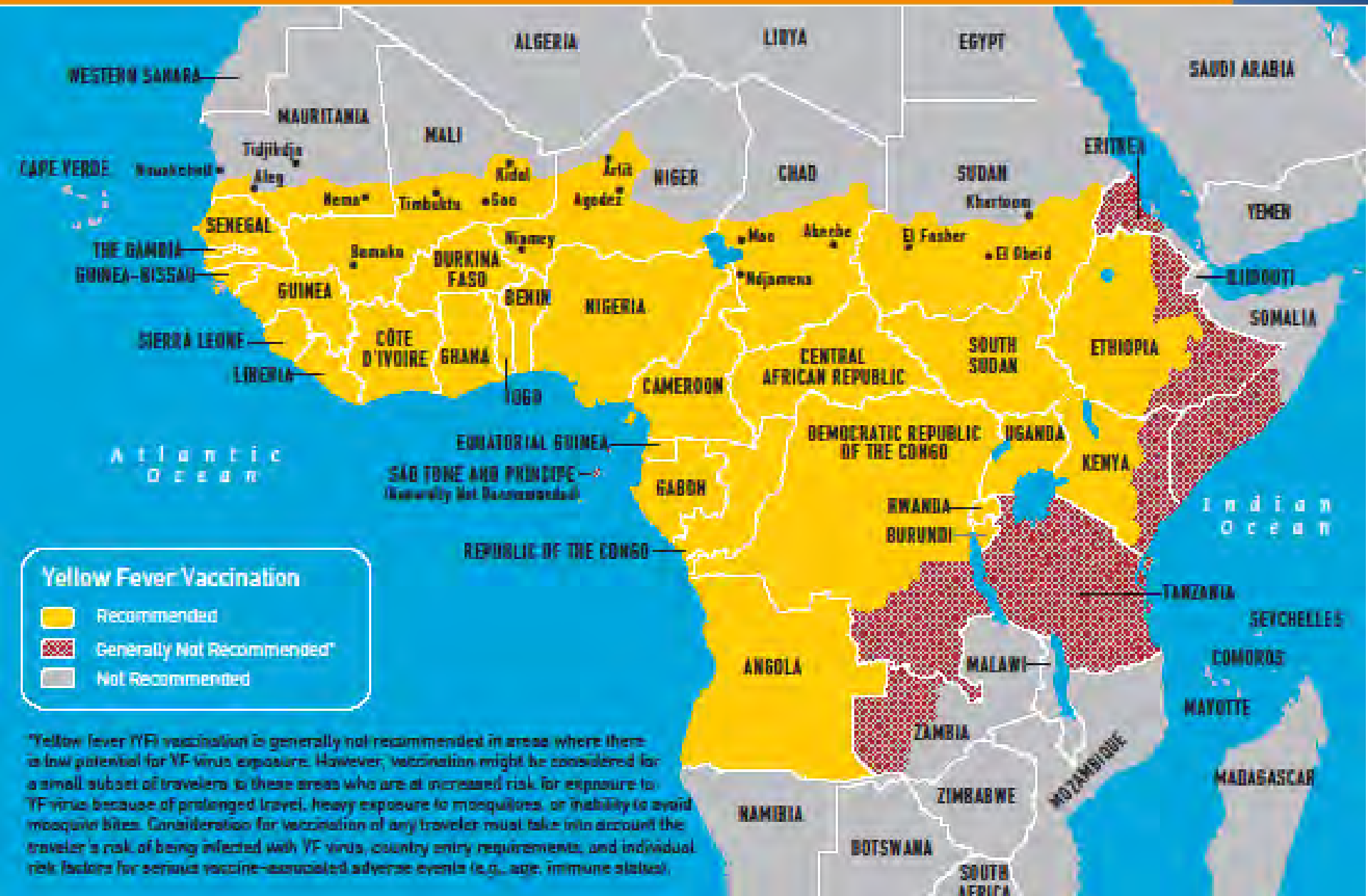

YELLOW FEVER

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- **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

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- 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

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- Adverse Reactions (10-30%)
  - Local soreness
  - Mild fever
  - Headache
  - Myalgias

YELLOW FEVER VACCINE
RARE SEVERE REACTIONS

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- 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

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- Yellow fever associated viscerotropic 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

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- 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

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- 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

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- 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
  wwwnc.cdc.gov/travel/yellowfever.aspx

YELLOW FEVER VACCINATION PROOF REQUIRED FOR ENTRY

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- 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

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- 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

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- "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

http://wwwnc.cdc.gov/travel/images/380.ashx

MENINGOCOCCAL DISEASE

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- 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

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- 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.stmproof

MENINGOCOCCAL DISEASE

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- 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

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

TETANUS

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- 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

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- 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

HEPATITIS A

- 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

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- 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

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- 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

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- 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

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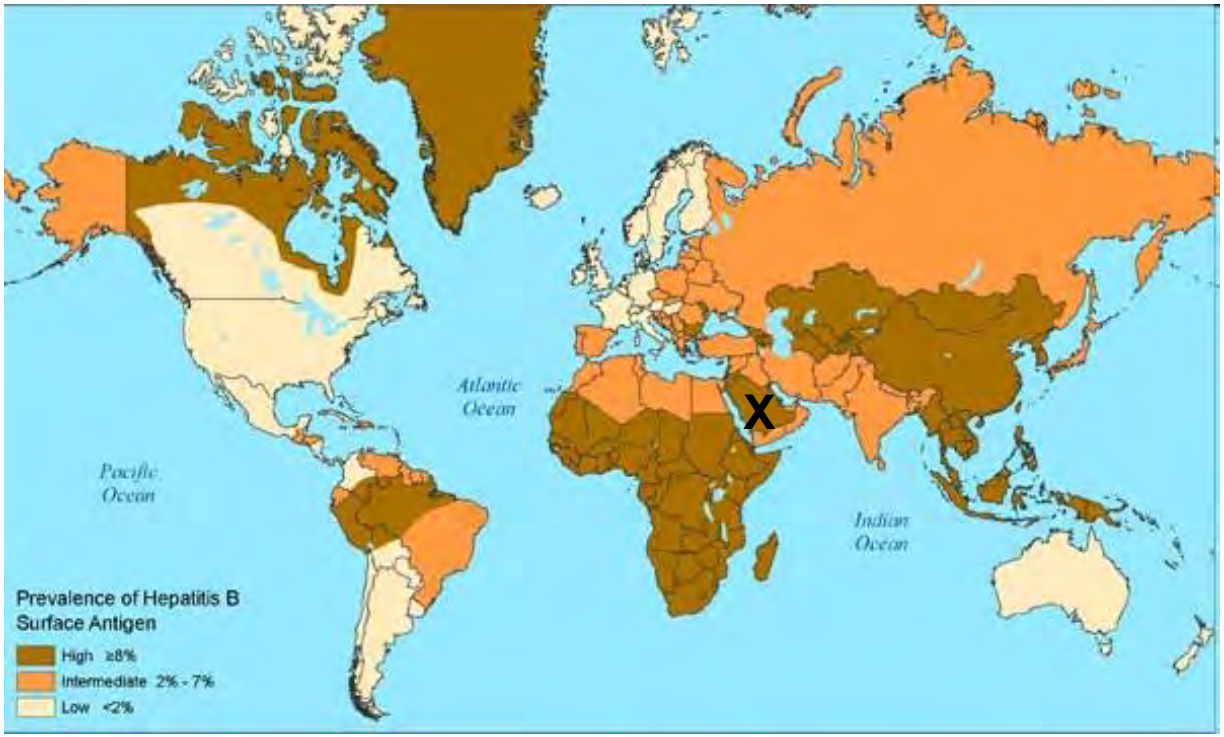
- International travel to endemic areas



http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter-2/hepatitis-b.aspx

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

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- 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

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- 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

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- 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

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- Prevention
  - Avoid contaminated food and water
  - Hygiene
  - Local cuisine
- Vaccine(s)
  - 2 available

Photo from www.cdc.gov. Image in public domain.

TYPHOID VACCINES

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- 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)

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- 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

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- 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

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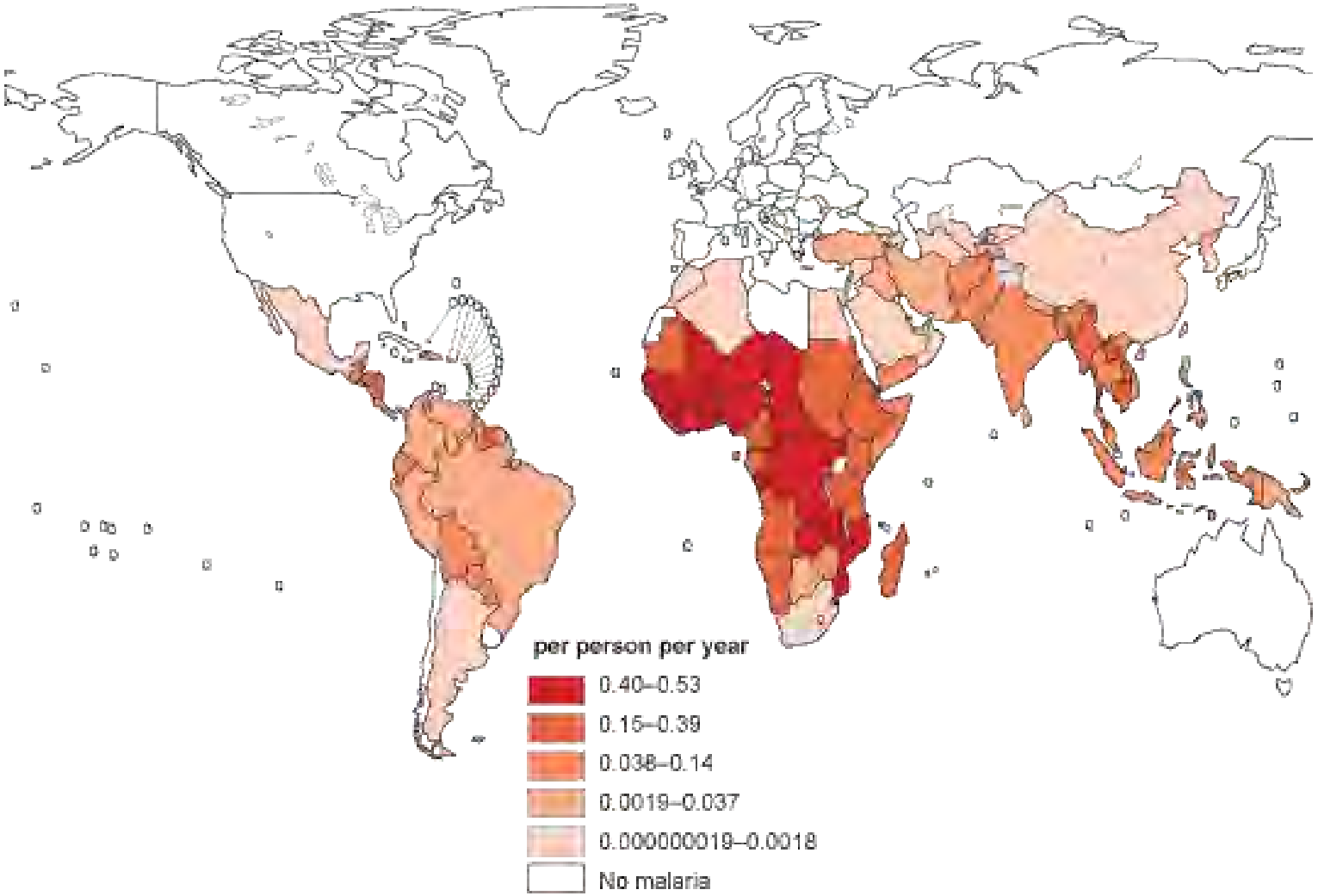
- 350,000,000 - 500,000,000 cases/year
- 1,000,000 - 3,000,000 deaths/year
- Mostly sub-Saharan Africa

x

MALARIA


per person per year
0.40–0.53
0.15–0.39
0.038–0.14
0.0019–0.037
0.000000019–0.0018
No malaria

MALARIA

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- ~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

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NO VACCINE,

yet

Have to treat with chemoprophylaxis

MALARIA

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- Prevention
  - Clothing
  - Insect repellant
  - Mosquito netting
- Chemoprophylaxis
  - Atovaquone/proguanil (Malarone®)
  - Primaquine
  - Chloroquine
  - Mefloquine
  - Doxycycline

MALARIA

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- Multiple regimens, multiple meds
  - Start before, end after
- Important to plan ahead with your doctor or travel clinic
- Recommendations at CDC yellowbook
  - http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter-2/malaria.aspx
- Pregnancy
  - Chloroquine/mefloquine only

TRAVELER'S RESPONSIBILITIES

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- 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 http://wwwnc.cdc.gov/travel/notices.aspx

TRAVELER'S RESPONSIBILITIES

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- Travel health kit
  - Prescription medications and over-the-counter medications
  - Advice available at: http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter-2/travel-health-kits.aspx
  - 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

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- International Association for Medical Assistance to Travelers www.iamat.org
- Travax EnCompass www.shoreland.com
- International Society of Travel Medicine www.istm.org
- American Society of Tropical Medicine & Hygiene www.astmh.org/clinics.cfm

HEALTHCARE RESPONSIBILITIES

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- 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