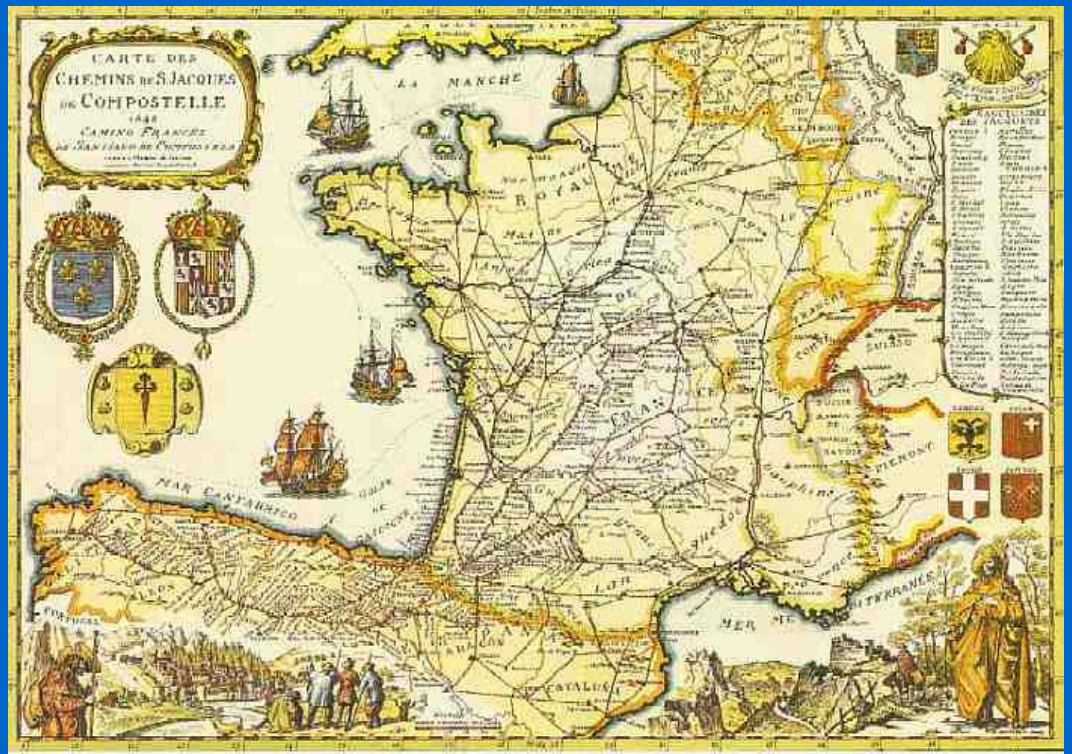
Good afternoon!

TRAVEL MEDICINE



PLANO DE LOS "CAMINOS" DE SANTIAGO EN EL AREA OCCIDENTAL DE EUROPA

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Disclosures: Brant Viner, M.D.

I have no conflicts of interest to declare.

- Consultant: Only to my wife and children
- Grant Research/Support: Sadly, …no
- Speaker's Bureau: No
- Major Stockholder: Fuffle Farm Apiary

Recommendations for "off label" use:

- Antibiotics for traveler's diarrhea

Assessment

- Departure date
- Itinerary
- Length of stay
- Purpose of travel
- Form of travel
- Vaccination history
- Travel history
- Medical problems
- PPD status
- Pregnancy risk
- Medications
- Allergies
- Family history?

Preparation

- Examinations
  - medical
  - dental
  - gynecologic
  - ophthalmologic
  - psychiatric

Preparation

- Medications
  - routine, prn, travel
  - controlled Rx: carry pharmacy bottles/letter from MD
- Contraception
- Glasses or contacts
- Essential medical data
- Medical referral?
- Medical & evacuation insurance?

Education

- Food & water
- Diarrhea
- Local customs
- Travel issues
- Fauna & flora (esp., arthropods)
- Environmental issues

Fatalities, US travelers (1975-1984)

- Cardiovascular disease 50%
- Injury (1/3 in MVA) 22%
- Infection 1%

Peace Corps Fatalities (1984-2003)

- Injuries (total) 57 (86%)
  - Unintentional (~ 1/2 MVA) 45
  - Homicide 11
  - Suicide 1
- Illness (total) 9 (14%)
  - Heart disease 5
  - Cancer 2
  - Infection 2

Infections in Travelers

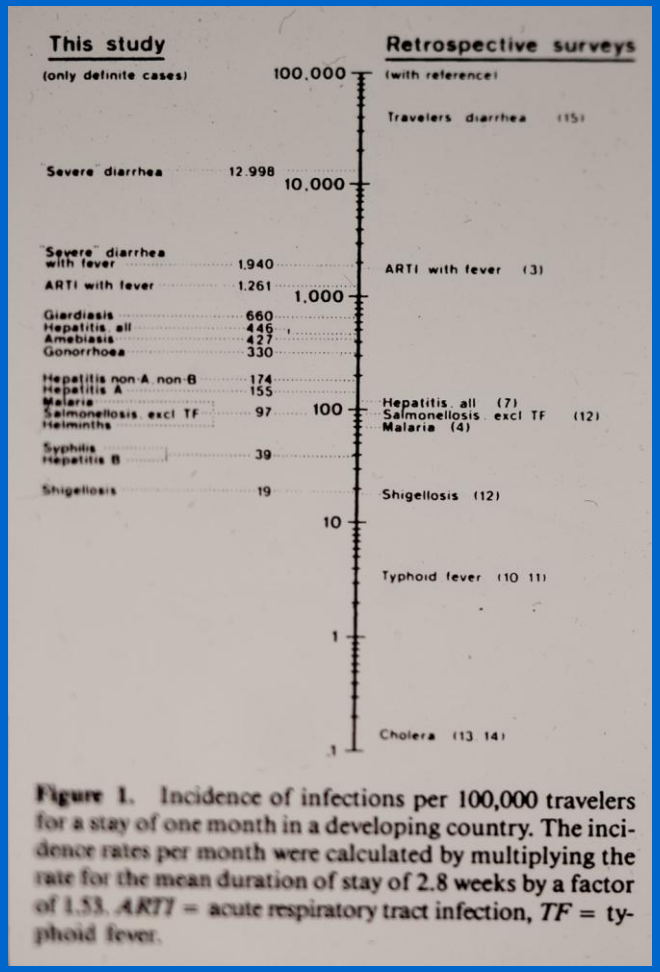


Figure 1. Incidence of infections per 100,000 travelers for a stay of one month in a developing country. The incidence rates per month were calculated by multiplying the rate for the mean duration of stay of 2.8 weeks by a factor of 1.53. *ARTI* = acute respiratory tract infection, *TF* = typhoid fever.

Infections in Travelers

Table 5. Relevant infections in 7,886 short-term visitors to developing countries.

Illness	Diagnosis of illness in travelers to developing countries	
	Definite	Possible
Malaria	5	7
Hepatitis (all)	23	4
Hepatitis A	8	–
Hepatitis B	2*	–
Hepatitis, non-A, non-B	9	–
Hepatitis, unclassified	4	4
Giardiasis	34	4
Amebiasis	22	8
Helminthsiasis	5	2
Paratyphoid B	1	–
Salmonellosis, other	5	1
Shigellosis	1	–
Gonorrhea	17†	6†
Syphilis	2	–

Food & Water

“If it isn’t boiled, peeled, or cooked, forget it!”

Water

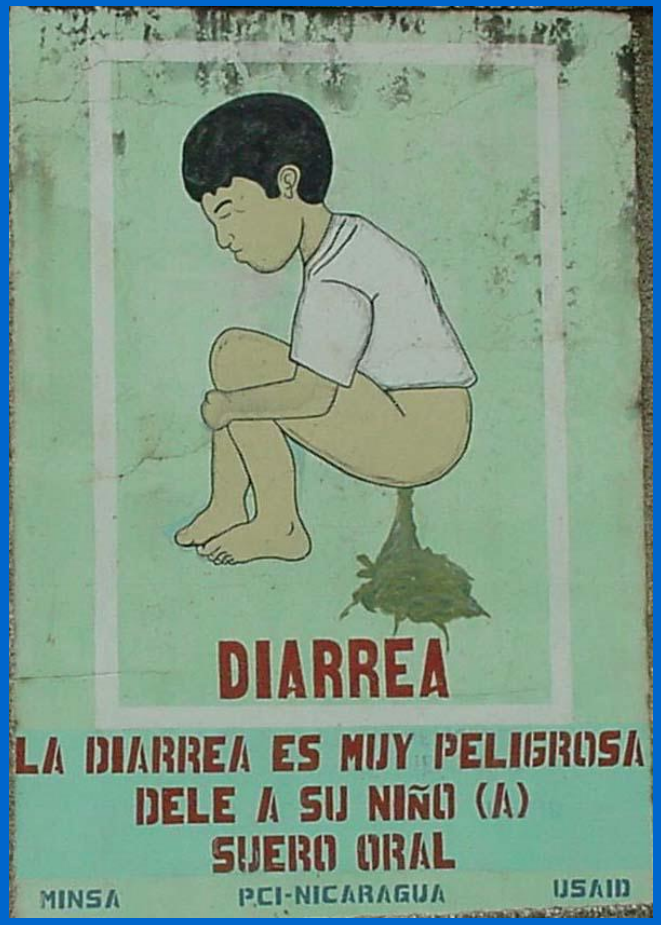
- Drink only:
  - Bottled water
  - Carbonated beverages
  - Tea/coffee
  - Wine/beer
- Purification systems
  - chemical treatment
  - filtration

Beware the ice cube!

Food

- All food should be cooked thoroughly and hot when served.
- Beware salads, fruit, and milk products.
- ***Do not confuse price with safety!***

Diarrhea


DIARREA
LA DIARREA ES MUY PELIGROSA
DELE A SU NIÑO (A)
SUERO ORAL
MINSA
P.C.I-NICARAGUA
USAID

Diarrhea

- Loose stool is not diarrhea.
- It may be inevitable.
- Food/water precautions are the best defense.
- Prophylaxis vs. treatment:
  - Oral rehydration formula
  - Antibiotics
- *MD for high fever, blood or mucus in stool*

Traveler's Diarrhea: pathogens

- *E. coli* (ETEC, et al.)
- Shigella spp.
- Campylobacter
- Salmonella spp.
- Vibrio spp.
- *S. aureus*
- *B. cereus*
- *C. perfringens*
- *E. histolytica*
- *G. lamblia*
- *C. cayetanensis*
- Cryptosporidium
- Rotavirus
- Tropical sprue

Oral Rehydration Formula

WHO “recipe”: Prepare two separate glasses:

Glass #1:	fruit juice (rich in K+)	8 oz.
	honey or corn syrup (glucose)	½ tsp.
	table salt	1 pinch
Glass #2:	clean water	8 oz.
	baking soda (bicarbonate)	¼ tsp.

Drink alternately from each glass until thirst is quenched.
Supplement as needed with additional clean water.

Agents for Traveler's Diarrhea

	Prophylaxis	**Treatment**
BSS	524 mg qid	524 mg every 30 *minutes* x 5 doses
levofloxacin	500 mg qd	500 mg qd x 1-3d
azithromycin		1000 mg x 1 dose 500 mg qd x 3d
rifaximin	200 mg qd?	200 mg tid x 3d 400 mg bid x 3d

Insects

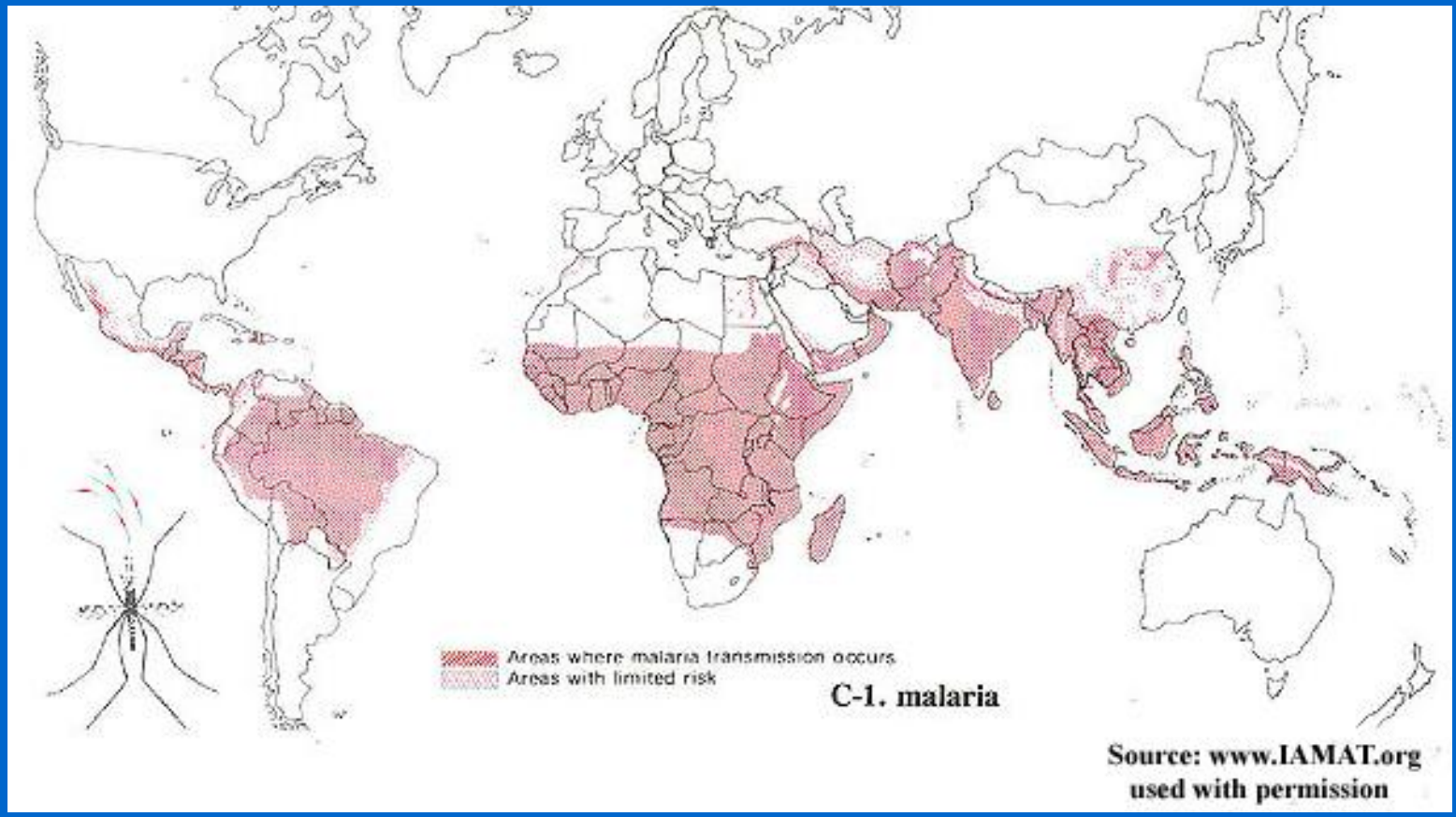
Insects

- It is better not to be bitten!
  - Barriers: clothing, netting, & screens
  - Repellants: DEET & permethrin
  - Insecticides
  - Air conditioning

Repellents: Duration of Activity

Product	Active Ingredient	Protection Time (minutes)
OFF! Deep Woods	DEET 23.8%	301.5 +/- 37.6
OFF! Skintastic	DEET 6.65%	112.4 +/- 20.3
OFF! Skintastic for Kids	DEET 4.75%	88.4 +/- 21.4
Natrapel	Citronella 10%	19.7 +/- 10.6
Skin-So-Soft Bug Guard	Citronella 0.1%	10.3 +/- 7.9
Repella Wrist Band	DEET 9.5%	0.3 +/- 0.2
Modified from: Fradin and Day, NEJM 2002;347:13-18		

Malaria


Areas where malaria transmission occurs
Areas with limited risk
C-1. malaria
Source: www.IAMAT.org
used with permission

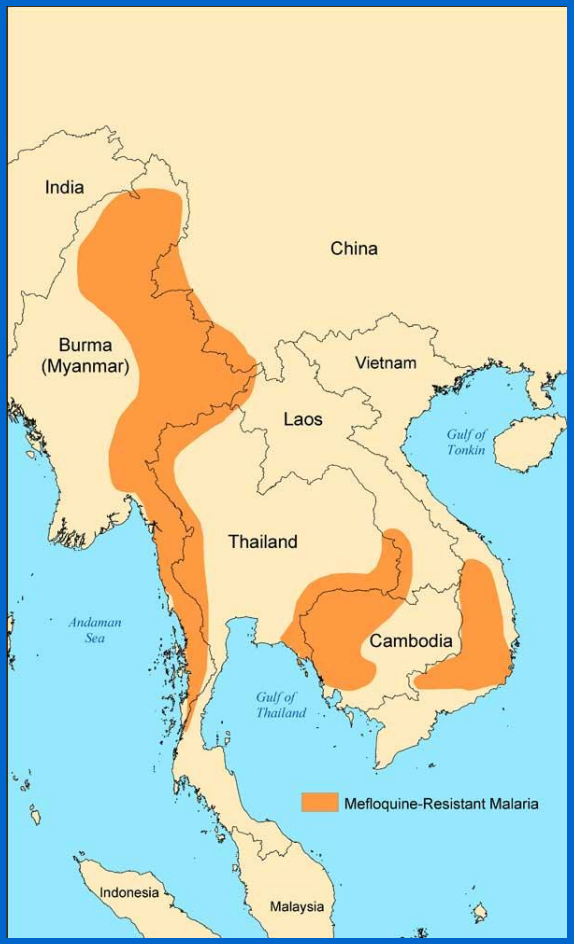
Chloroquine-sensitive Malaria

- Hispaniola
- Middle East
- Central America (north of Panama Canal)
- Córdoba province (Argentina)

Malaria Prophylaxis

- **Chloroquine-resistant *P. falciparum* (or *vivax*?)**
  - mefloquine 250 mg po q week
  - doxycycline 100 mg po qd
  - atovaquone/proguanil (250 mg/100 mg) one tab po qd
  - primaquine 0.5 mg/kg base po qd
- **Other areas**
  - chloroquine 500 mg po q week
- *Consider primaquine on return*

Mefloquine-resistant *P. falciparum*



Environmental Issues

Not all travelers are aware of the risks:

- Sun: protective clothing & creams
- Heat: self-restraint & fluids
- Cold: protective clothing
- Air pollution: self-restraint & medication
- Altitude: acclimatization +/- treatment

  (acetazolamide or dexamethasone)

Local Customs

- Diet
- Dress code
- Religious beliefs
- Politics
- Sex
- Drugs & alcohol
- Medical care

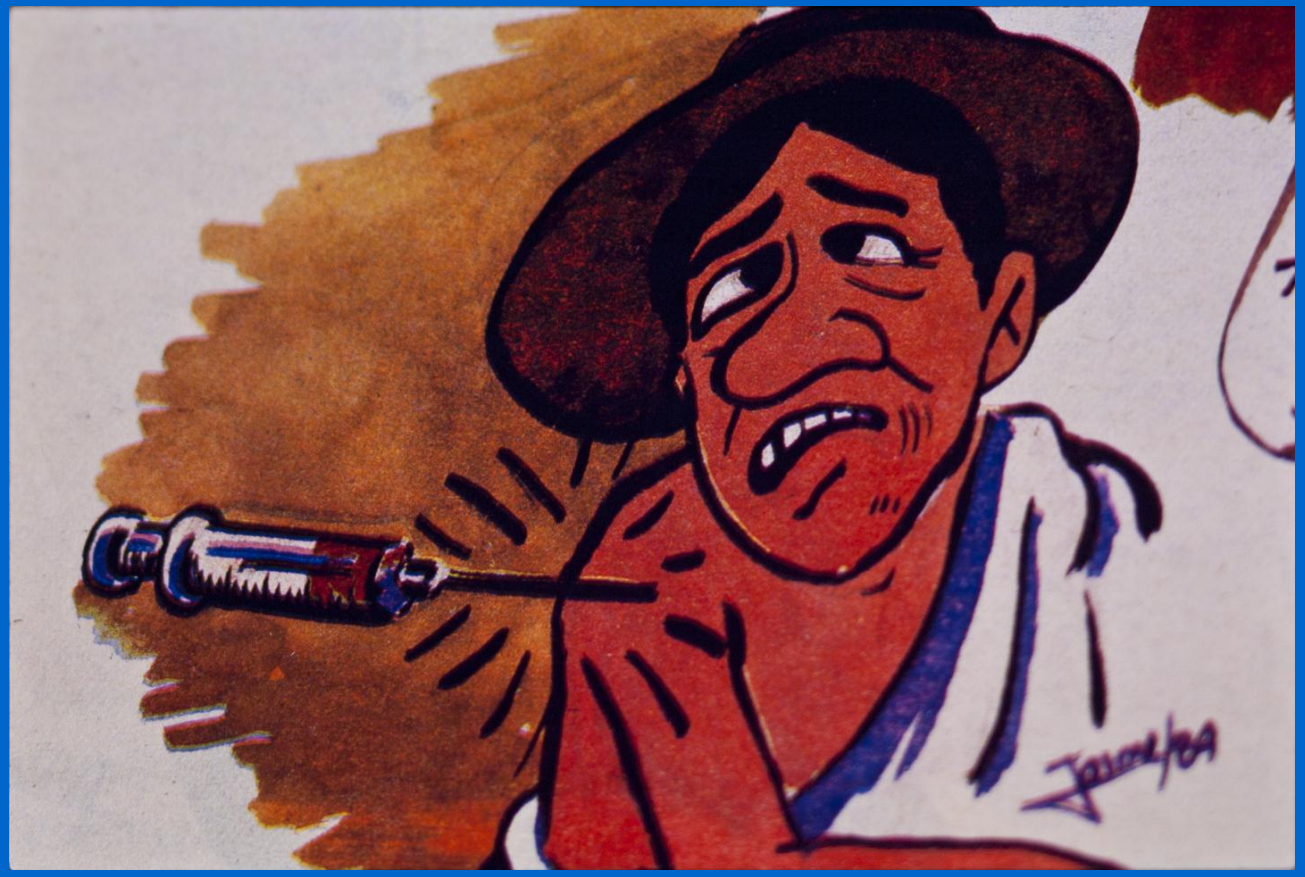
Local Fauna

- Bites
  - pets and feral
- Envenomations
  - Hymenoptera
  - snakes and scorpions
- Invasive parasites
  - *Strongyloides*, hookworm, and CLM
  - *Schistosoma*

Travel Issues

- Jet lag
  - fluids
  - avoid alcohol/caffeine
  - melatonin?
- Deep Venous Thrombosis
- Adjustment of medications

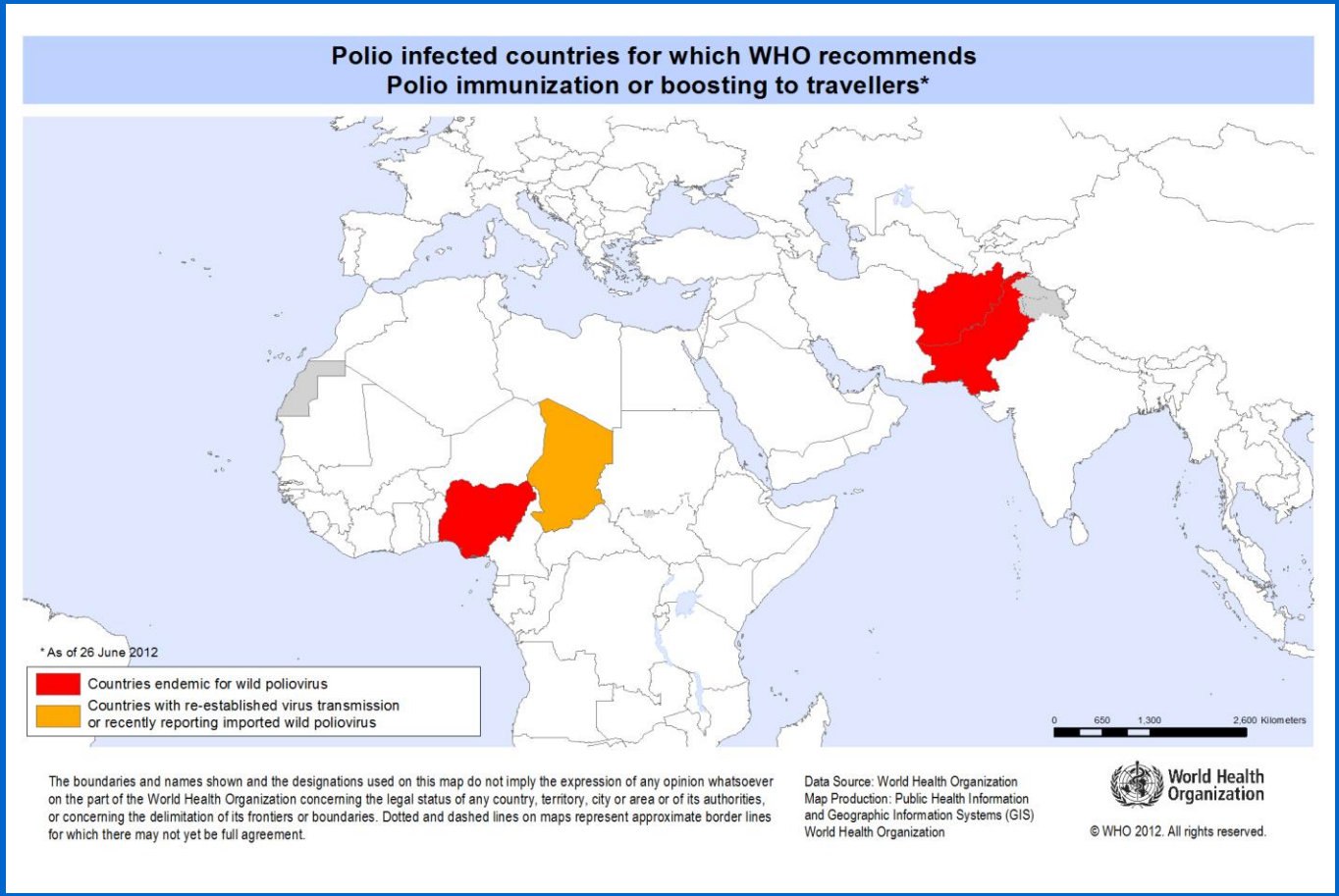
Immunization



Immunization: all patients

- Tetanus & diphtheria (Td, Tdap)
  - primary series?
  - booster every 10 years
    - Tdap once, age 19-64 (≥ 2 yrs after last Td)
    - otherwise, Td
- Poliomyelitis (TOPV, IPV)
  - Africa, South Asia, Indonesia?, Arabian peninsula?
  - primary series?
  - one time booster

Polio


Polio infected countries for which WHO recommends
Polio immunization or boosting to travellers*
* As of 26 June 2012
Countries endemic for wild poliovirus
Countries with re-established virus transmission
or recently reporting imported wild poliovirus
0 650 1,300 2,600 Kilometers
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization
World Health Organization
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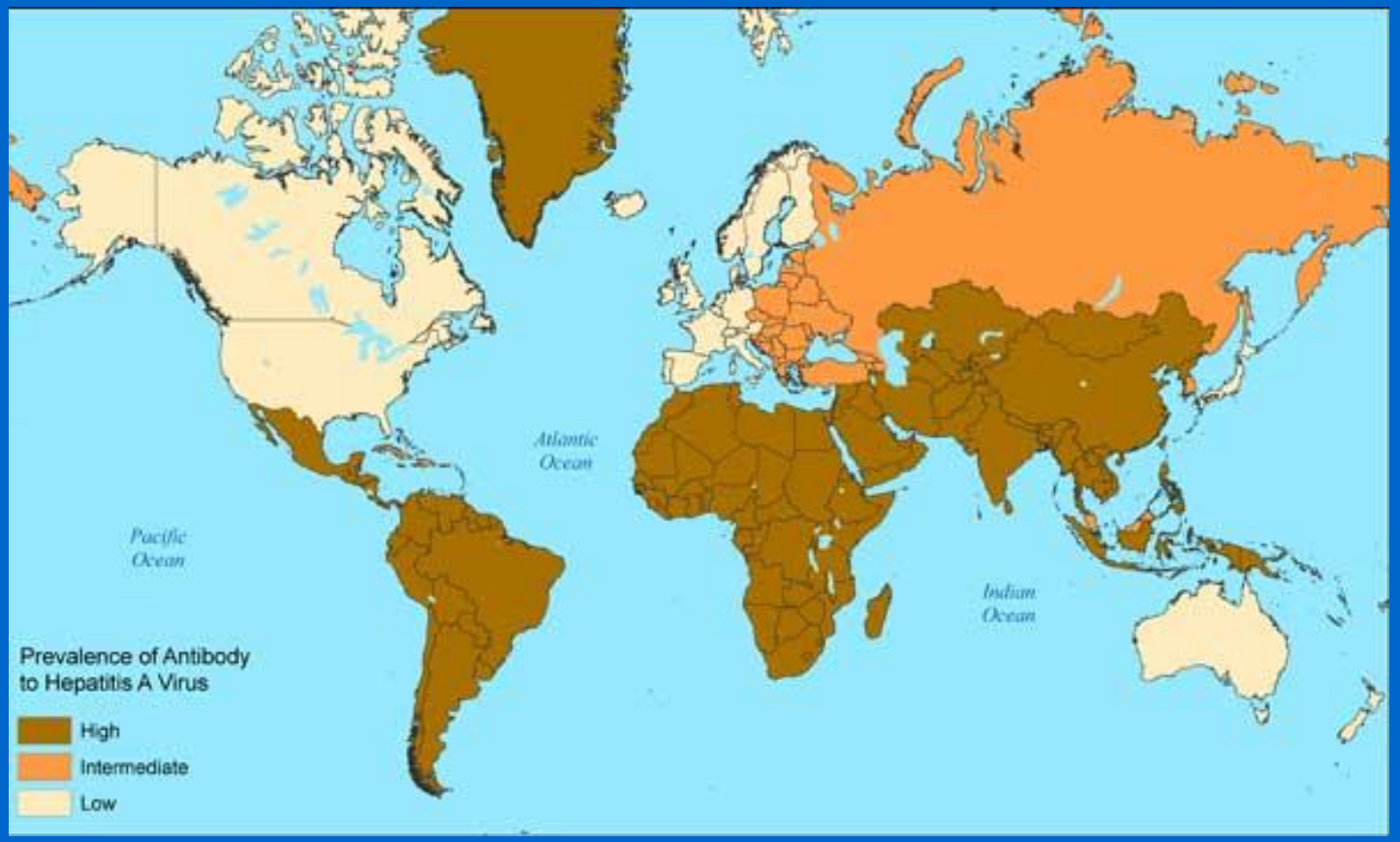
Immunization: all patients

- Measles, mumps, rubella (MMR)
  - natural immunity?
    - born before 1957 (*not HCWs*)
    - positive serology
    - history of physician-diagnosed measles (*not HCWs*)
  - primary vaccination?
    - 2 doses after 12 months of age, > 28 days apart
  - booster
    - killed measles vaccine (USA 1963-1967)
    - live vaccine (Edmonston B strain, USA 1963-1975)
    - primary vaccination 6-11 months of age
    - travel or risk of exposure (outbreak, HCWs)

Immunization: some patients

- Pneumococcus:
  - High-risk patients (heart, lung, liver, kidneys, DM, smokers…)
    - PPSV23 once at age < 65 yrs.
  - Highest risk patients (immunocompromise, asplenia, CSF leak, cochlear implant):
    - Naïve: PCV13; then PPSV23 > 8 wks. Later; then booster in 5 yrs.
    - Prior PPSV23: PCV13 > 1 yr. after last PPSV23; 5 yr booster as above
  - PPSV23 for all at age 65; ≥ 5 yr interval if prior PPSV23
- Influenza: season, destination
- Hepatitis B: destination, occupation, behavior
  - primary?
  - booster: 1-3 doses per titer
- *H. influenzae* (Hib)?

Hepatitis A

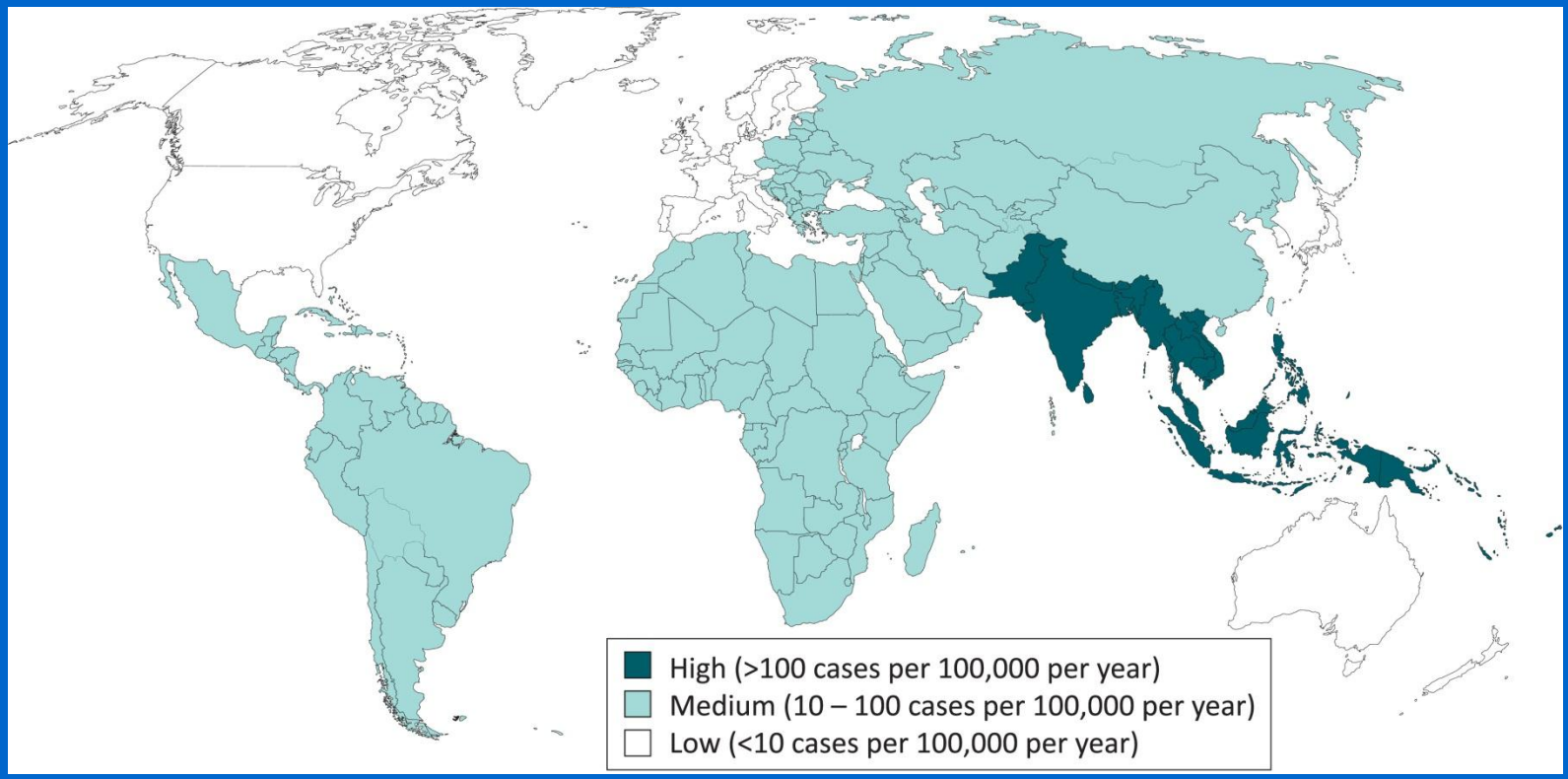

Atlantic Ocean
Pacific Ocean
Indian Ocean
Prevalence of Antibody to Hepatitis A Virus
High
Intermediate
Low

Immunization: some destinations

Hepatitis A

- Immune globulin
  - immediate protection
  - protects up to 5 months
- Vaccines (Havrix®, VAQTA®, …plus Twinrix®)
  - inactivated virus
  - 1st dose: at least 2 weeks before departure
  - 2nd dose: 6-12 months after first dose
  - Twinrix®: requires 3 doses (0, 1, 6 months)
  - duration of immunity?

Typhoid


High (>100 cases per 100,000 per year)
Medium (10 – 100 cases per 100,000 per year)
Low (<10 cases per 100,000 per year)

Immunization: some destinations

Typhoid

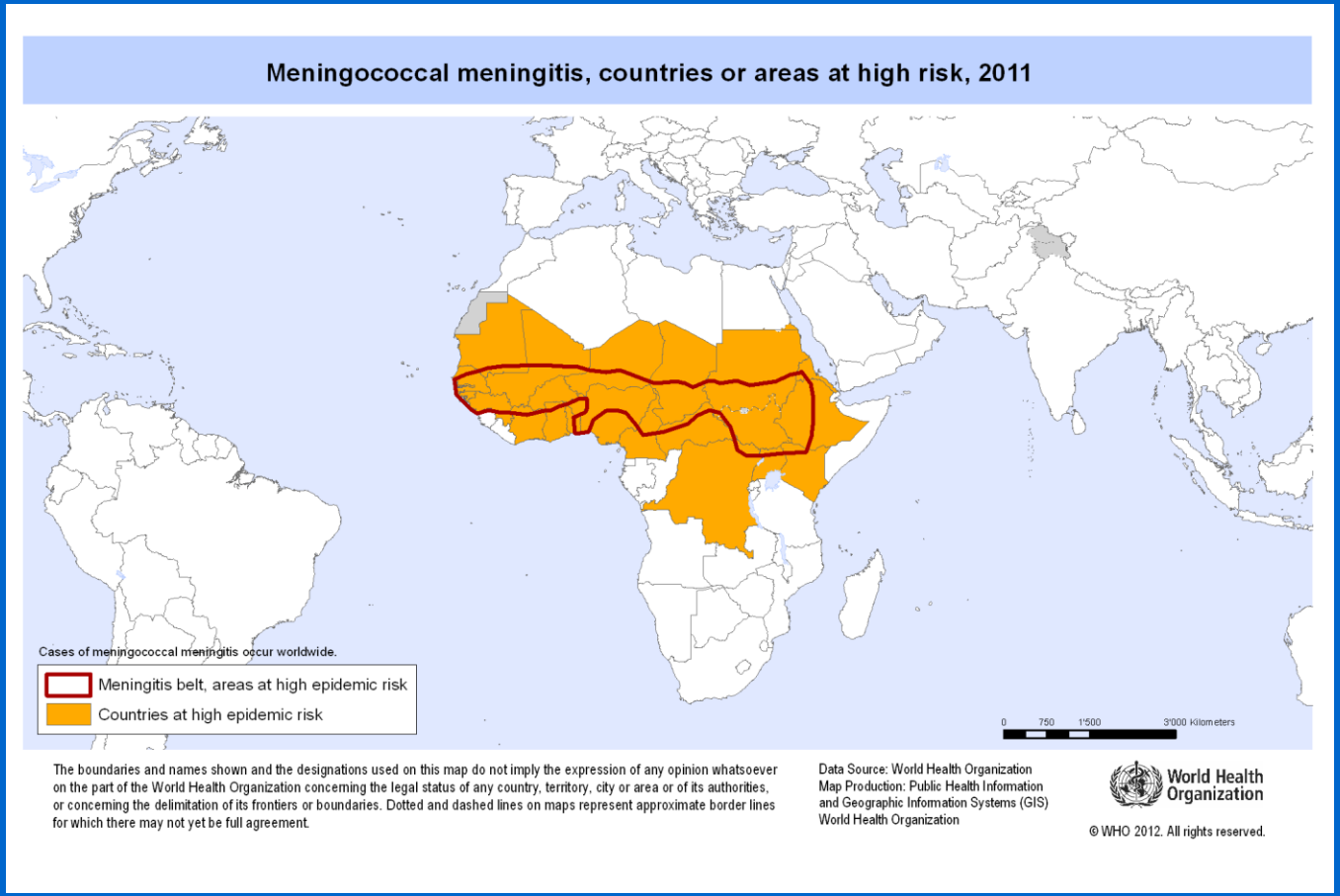
- Indications for vaccination:
  - travel over 3 weeks in an endemic area
  - “adventuresome eaters”
  - unusual itineraries

Caution is better than immunization!

Immunization: some destinations

- Oral typhoid vaccine: Ty21a
  - live-attenuated bacteria
  - not for children < 6 yrs., immunocompromised
  - 50-80% efficacy in endemic areas
  - no concurrent antibiotics or proguanil; Malarone?, mefloquine?
  - booster every 5 yrs.
- Parenteral typhoid vaccines: Typhim Vi
  - killed vaccine
  - Typhim Vi efficacy 55-74% in endemic areas
  - Typhim Vi not for children < 2 years of age
  - booster every 2 yrs. (US), 2-3 yrs. (WHO)

“Meningitis belt”



Immunization: some destinations

Meningococcal vaccination

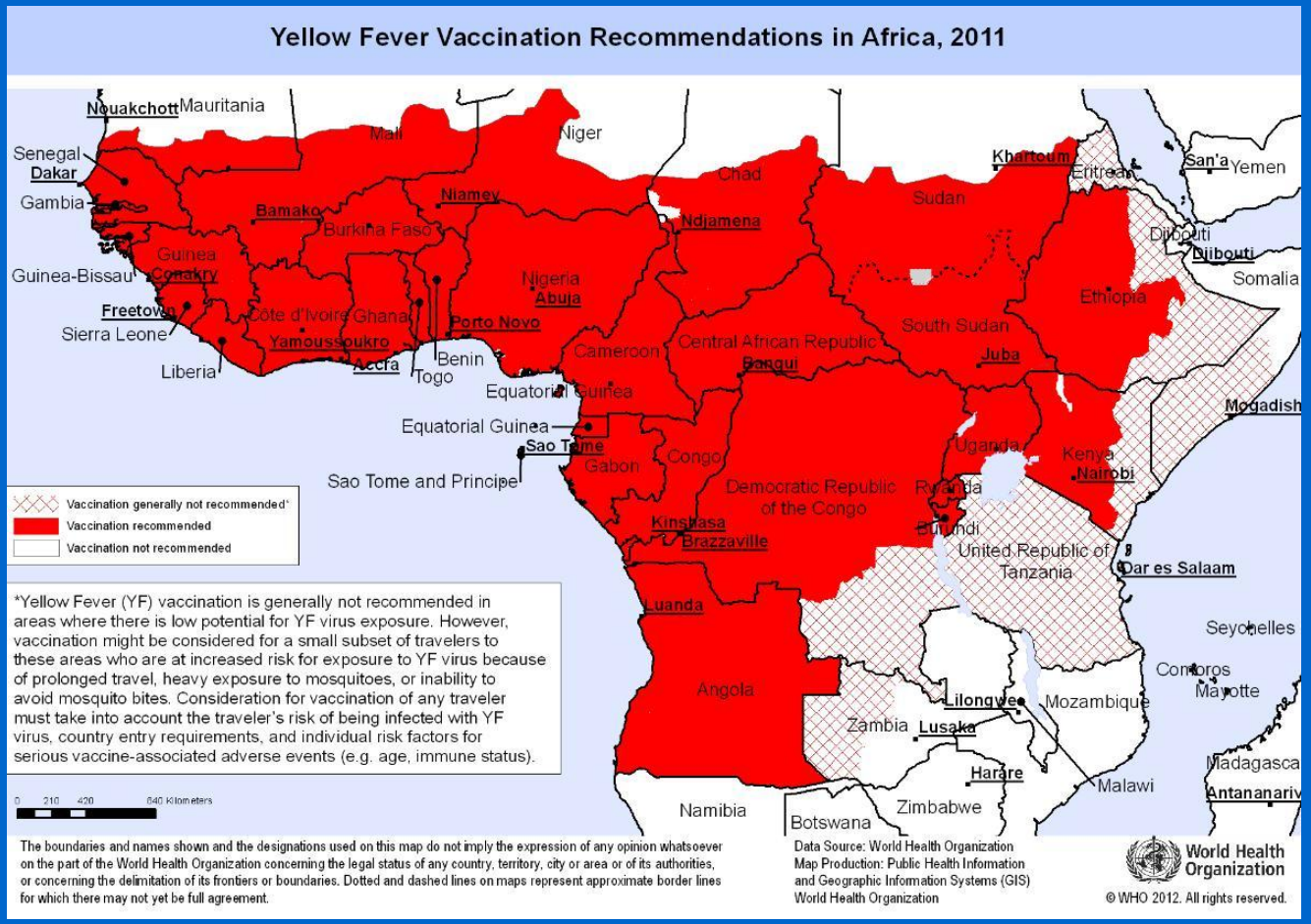
- Only for serogroups A, C, W-135, and Y in USA
- inactivated-bacteria vaccines
  - MCV
    - Hib-MenCY-TT: age 2-18 months; 4 dose series
    - MenACWY: age 9 months-55 yrs.; 1-2 dose series per indication
  - MPSV4
    - Approved for age ≥ 2 yrs.
    - Only vaccine licensed for age ≥ 56 yrs.

Immunization: some destinations

Meningococcal vaccination

- Target populations
  - Adolescents: 11-12 yrs.; booster at 16 yrs.
  - High risk:
    - complement deficiency: 2 doses; boost every 5 yrs.
    - Asplenia: 2 doses; boost every 5 yrs.
    - Micro lab: 1 dose; boost every 5 yrs.
  - Travel:
    - Recommended for Sahel, dry season (December-June): 1 dose; boost every 5 yrs.
    - Required by Saudi Arabia for pilgrims (Hajj); dose within 3 yrs.
    - Children who received Hib-MenCY-TT should be given MCV4
  - Outbreaks

Yellow fever



Yellow fever

Immunization: some destinations

Yellow fever

- attenuated, live-virus vaccine, efficacy ≈ 100%
- available only from licensed centers
- single dose ≥ 10 days before departure
- booster every 10 years
- side effects generally mild

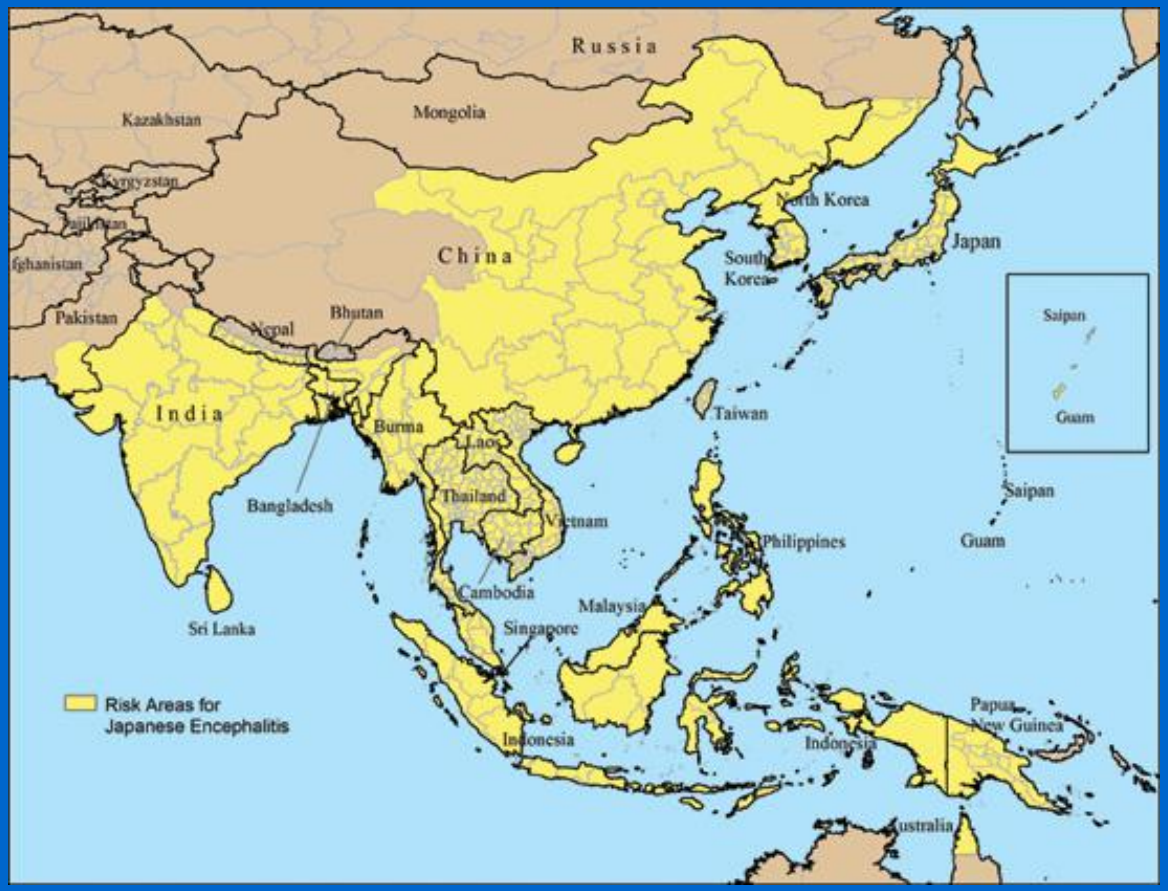
Immunization: some destinations

- Precautions, yellow fever vaccine
  - age ≥ 60
  - pregnancy or breastfeeding
  - HIV with moderate immunosuppression
- Contraindications, yellow fever vaccine
  - severe egg allergy
  - severe immunocompromise
    - primary immunodeficiencies
    - transplantation
    - advanced HIV/AIDS
    - thymus disorders with abnormal immunity
    - medications (high dose steroids, TNF-α, IL-1, etc…)

Immunization: some destinations

- Yellow fever vaccine
  - *the only internationally regulated immunization*
  - CDC-recommended for countries with active transmission and for countries with endemic risk
  - may be required for travel from one country with risk into another country with risk (includes transit)
  - Medical waivers can be given, …but may not be honored

Japanese encephalitis



Immunization: some destinations

Japanese encephalitis: vaccine indications

- ongoing outbreak
- prolonged stay or frequent short stays in rural, agricultural areas of countries at risk
- extensive outdoor exposure in countries at risk
- seasonal risk (“wet season”)
- long-term expatriates

Risk extremely low for stays < 30 days, urban only

Japanese encephalitis: vaccines

JE-MB: inactivated vaccine

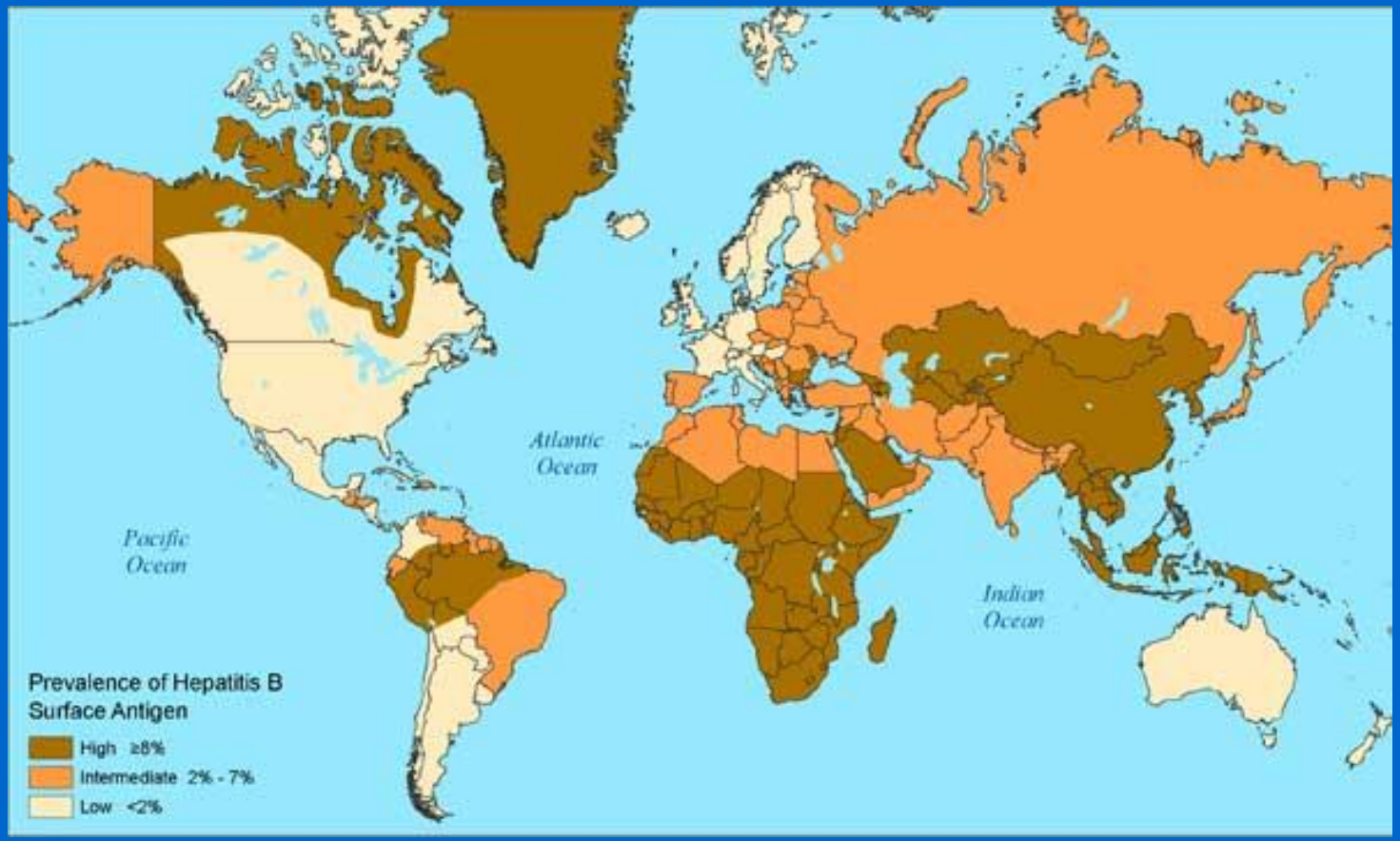
- Age ≥ 1 year
- Primary: 1.0 ml SC days 0, 7, & 30 (> 10 days before travel)
- Booster: every 2 years?
- Two doses → immunity in ~ 80%
- Frequent side effects, some severe
  - systemic side effects in 10%
  - Urticaria/angioedema in 1/260
- Pregnancy category C
- Limited availability since 2006: call Sanofi

Observe 30 minutes after dose.
Defer travel to remote areas for ≥ 10 days.

JE-VC: inactivated vaccine

- Age ≥ 17 years
- Primary: 0.5 ml IM days 0 & 28
- Booster: every 2 yrs???
- Fewer severe local side effects, systemic adverse events generally mild
- Pregnancy category B

Hepatitis B


Atlantic Ocean
Pacific Ocean
Indian Ocean
Prevalence of Hepatitis B Surface Antigen
High ≥8%
Intermediate 2% - 7%
Low <2%

Immunization: some destinations, plans

Hepatitis B

Risk associated with:

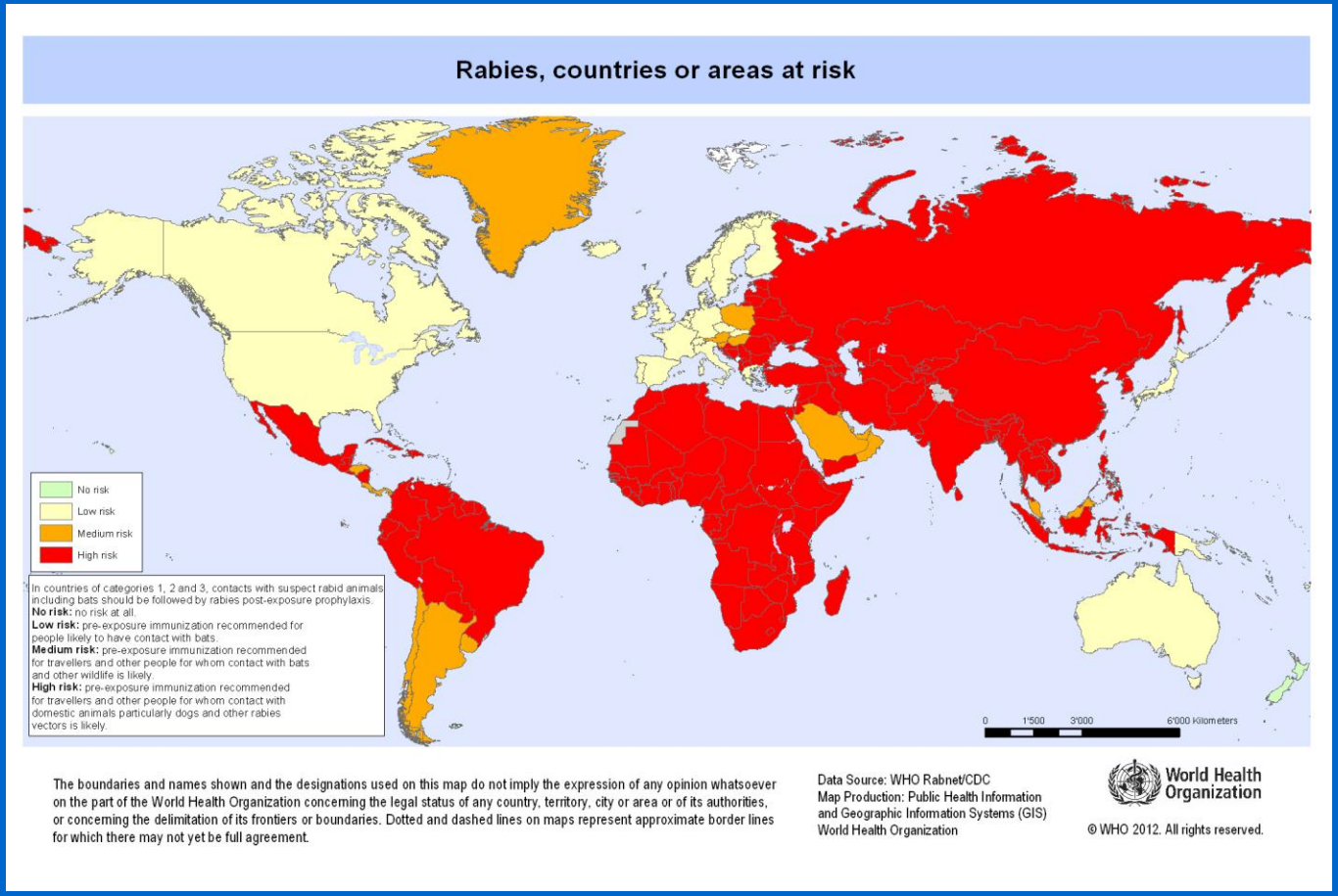
- Blood or fluid exposure
  - health care work
  - injection drug use
  - sexual contact
- prolonged stay (> 6 months) in endemic areas

Immunization: some destinations, plans

- Several vaccines on the market (plus Twinrix®)
- Inactivated viral antigen vaccines
- Primary series in adults: 0, 1, 6 months

  …but two doses are good (~80%)
- Need for booster doses is unclear
- Yeast hypersensitivity is a contraindication

Rabies


Rabies, countries or areas at risk
No risk
Low risk
Medium risk
High risk
In countries of categories 1, 2 and 3, contacts with suspect rabid animals including bats should be followed by rabies post-exposure prophylaxis.
No risk: no risk at all.
Low risk: pre-exposure immunization recommended for people likely to have contact with bats.
Medium risk: pre-exposure immunization recommended for travellers and other people for whom contact with bats and other wildlife is likely.
High risk: pre-exposure immunization recommended for travellers and other people for whom contact with domestic animals particularly dogs and other rabies vectors is likely.
0 1'500 3'000 6'000 Kilometers
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
Data Source: WHO Rabnet/CDC
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization
World Health Organization
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Immunization: some plans

Rabies

- Vaccines: HDCV, PCEC
- For risk of animal contact in enzootic areas or persons with occupational risk anywhere
- Considerations
  - destination
  - activities
  - length of stay
  - age
  - availability of postexposure care

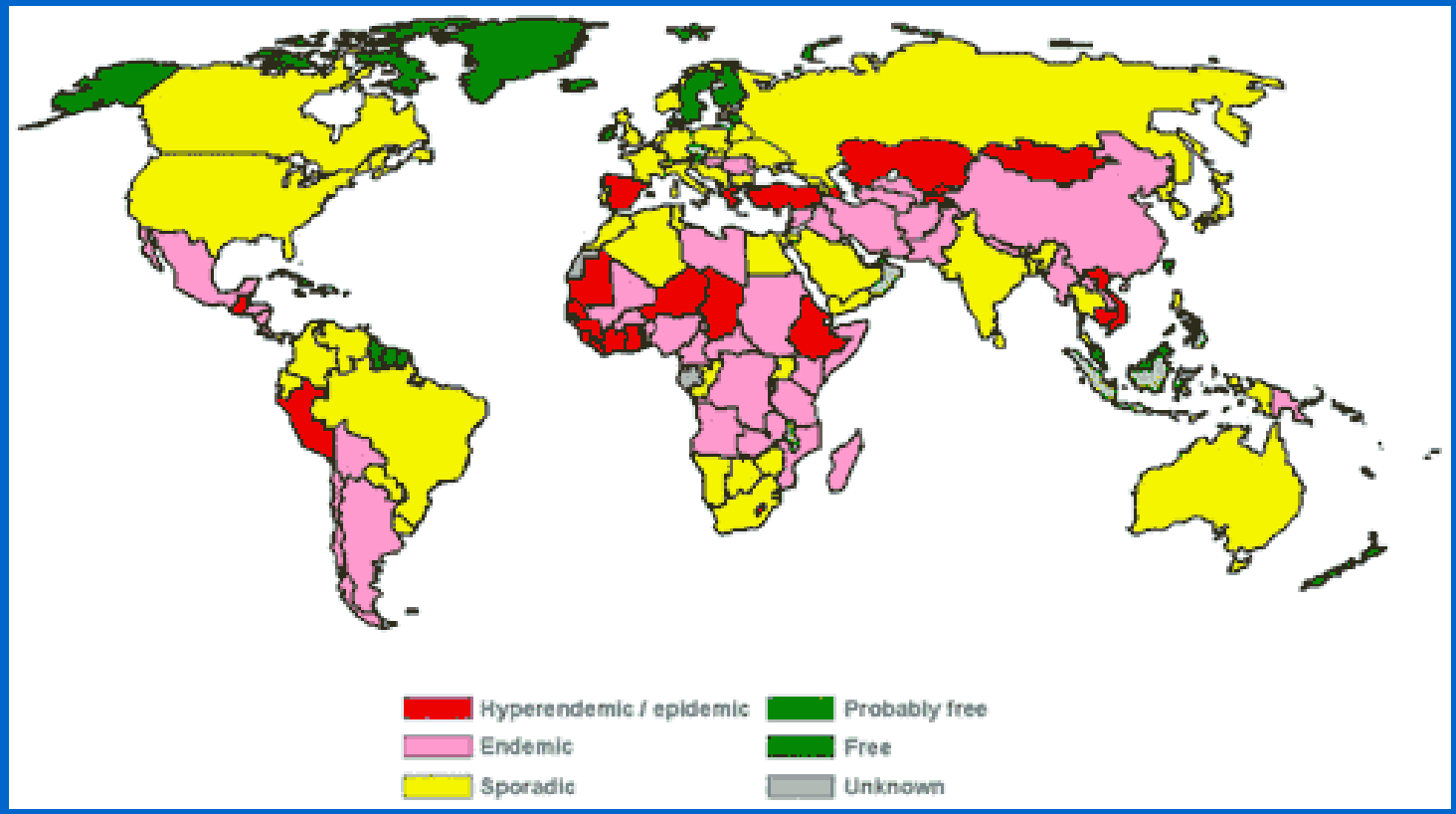
Immunization: some plans

- Rabies: inactivated-virus, cell culture vaccines
- Primary: IM days 0, 7, 21-28
- Booster: single dose prn low Ab titer
  - frequent exposure: every 2 years
  - continuous exposure: every 6 months
- Precautions
  - Immunosuppressives & antimalarials can diminish immune response
  - HDCV: contains neomycin, may cause serum sickness
  - PCEC: contains ovalbumin, neomycin, chlortetracycline

Immunization: some plans

- Rabies
  - ID vaccine is no longer recommended (USA)
    - slightly less immunogenic in general
    - less immunogenic in immunocompromised
    - chloroquine may weaken immune response
    - very poor response if given SC

Anthrax


Hyperendemic / epidemic
Endemic
Sporadic
Probably free
Free
Unknown

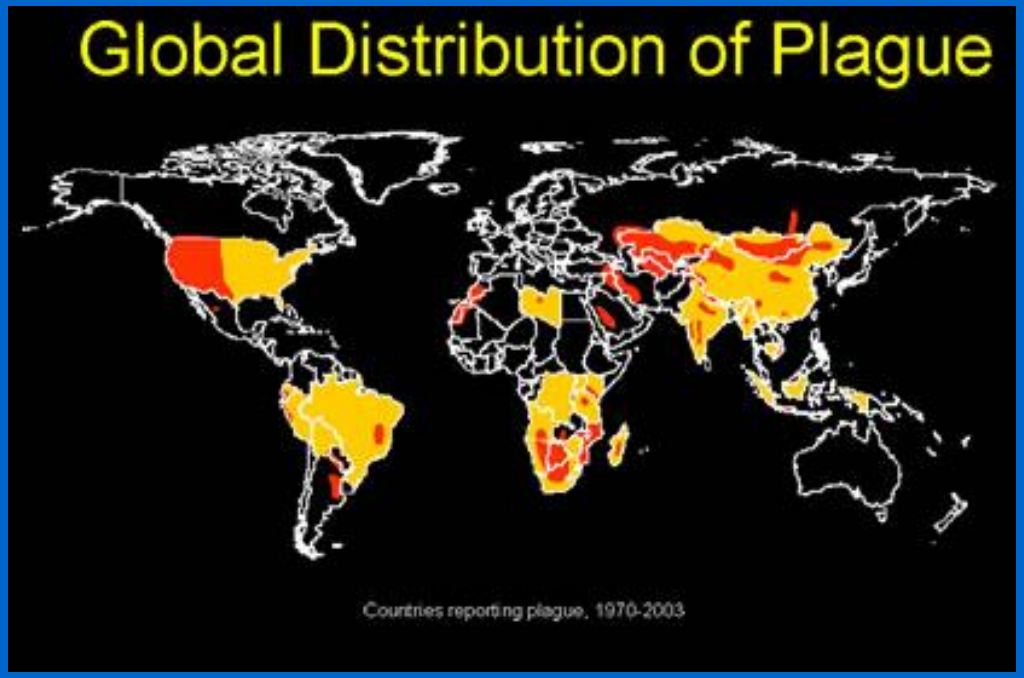
Immunization: some plans

Anthrax

- Biothrax®: cell-free filtrate of bacterial culture
- Indications: work with animals or in areas with enzootic anthrax, lab workers, military
- Primary series: dose at 0, 4 weeks
- Boosters: doses at 6, 12, 18 months, then annually?
- Efficacy 92 % (cutaneous & inhalational anthrax)

Immunization: some plans

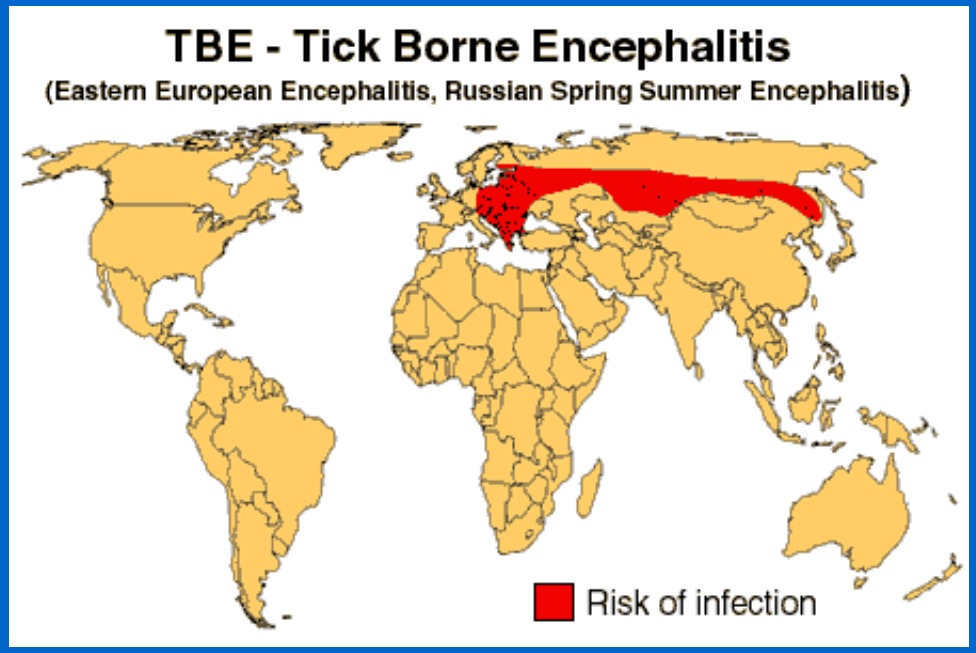
- Plague (S. E. Asia, epidemic areas)
  - vaccination vs. prophylaxis?



CDC

Immunization: some plans

- Tick-borne encephalitis
  - immune globulin or vaccine (not in USA)



Immunization?

- Cholera (Dukoral)
  - available overseas
  - recombinant cholera toxin B subunit
  - cholera: 85% protection for ~ 6 months
  - ETEC: 50% protection for < 3 months
- BCG

After return

"I'm afraid you've got cows, Mr. Farmsworth."

After return

- If ill, see a doctor with experience in travel medicine.
- If well, after 1-2 months consider:
  - CBC with differential
  - Stool for O & P (3)
  - PPD (if negative pre-travel)

Thank you