

The background features a light blue map of the world, a dark grey book with a textured cover, and a yellow document with illegible text. The text is centered over these elements.

# **Travel Medicine**

**Dr Armen Torchyan**

Department of Family and Community Medicine

College of Medicine

Slides by Dr. Afnan Younis



# Objectives

- Define travel medicine and its importance
- Levels of travel medicine (pre, during, post)
- Pre-travel consultation (risk assessment, risk management, immunization, prophylaxis, self-medications)
- Immunization (required, recommended, routine)
- Other infections (malaria, zika, traveler's diarrhea)
- Prevention (food, water and personal precautions, environmental precautions, vector and animal precautions, injury precautions)
- Travel emergency kit
- Post-travel care

# What is travel medicine?

An interdisciplinary specialty concerned with prevention, early detection, and research of health problems associated with travel.

# What does travel medicine do?

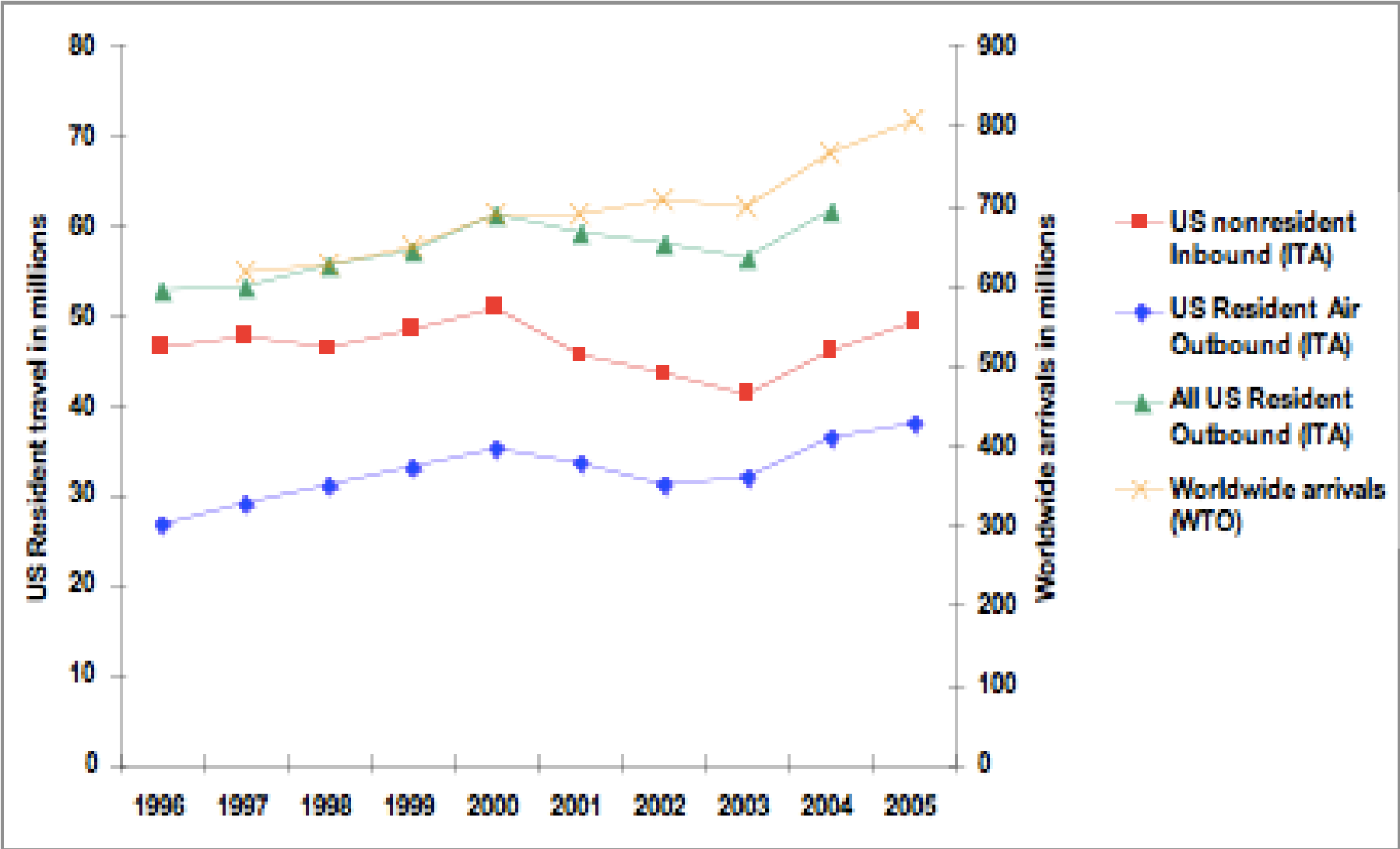
- Seeks to prevent illnesses and injuries occurring to **travelers** going abroad
- Manages problems arising in travelers **coming back** or coming from abroad
- Impact of **tourism** on health and to improve health and safety services to tourists
- Refugee and migrant health

# Why travel medicine?

## WORLDWIDE

- 1950 - 25 million international tourist arrivals
- 2000 - 664 million international tourist arrivals
- 2010 - 940 million international tourist arrivals (growth rate 7% from 2009)
- 2030 – forecast 1.8 billion

# International Travel



# Importance of travel medicine

Of 100,000 travellers to the developing world for 1 month

- 50,000 will develop some sort of health problem during their trip
- 8,000 will see a physician
- 5,000 will have to stay in bed
- 300 will have to be admitted to hospital either during their trip or on return
- 50 will need to be air evacuated
- 1 will die



# Concerns

- International travel carries a risk for travelers, community of origin and community of destination
- The risk for travelers includes diseases, injuries and death

# Types of travelers

- Tourists
- VFRs (visiting friends and relations)
- Business travellers
- Migrant workers
- Military
- Aid and Development workers
- Expatriates
- Students
- Gap Year travel
- Asylum seekers
- Refugees
- Pilgrims

# Special populations

- Elderly travellers
- Infants and children
- Pregnant women
- Travellers with chronic diseases
- Travellers with disability
- Immunocompromised traveller

# Special itineraries

- Cruise ship travel
- Diving
- Extended stay
- Extreme travel
- Mass gatherings (eg. The Hajj)
- Wilderness/remote regions travel

❖ Risk depends on destination

# Components of travel medicine

- Pre-travel
- During travel
- Post-travel

# Pre-travel consultation

(4-6 weeks before departure)

- Risk assessment (potential hazards)
- Risk management (advice to reduce exposure to health risks)
- Service delivery: immunization, prophylaxis or self-medications
- Empower traveler to manage his health

# Risk assessment

## Information about travelers

Age and sex

Medical history

Medications

Allergies

Immunization  
history

Special health  
needs

## Information about trip

Destination

Length of stay

Mode of transport

Purpose of trip and planed  
activities

Financial budget,  
accommodation, insurance

Healthcare in destination

# Risk factors and health problems facing international travelers

## **RISK**

- Overcrowding
- Low sanitation
- Climatic change
- Vector of diseases
- Stray animals
- Unsafe roads
- Security problems

## **HEALTH PROBLEMS**

- Aggravation of existing problem
- Food and water borne infections
- Air borne infections
- Unintentional & Intentional Injuries
- Vector borne diseases
- Zoonotic diseases



# Common diseases associated with international travel

## Gastrointestinal

- Traveler's diarrhea
- Typhoid fever
- Hepatitis A
- Cholera
- Poliomyelitis

## Respiratory diseases

- Influenza
- Meningitis
- Mers-Cov
- Tuberculosis

## Vector borne diseases

- Yellow fever
- Malaria
- Dengue fever
- Leishmaniosis
- Japanese encephalitis

## Behavior related

- Sexually transmitted diseases

## Zoonotic diseases

- Rabies

## Blood borne

- Hepatitis B

## Soil borne

- Tetanus

# Unintentional and intentional injuries

- Road traffic injuries
- Inter-personal violence
- Injury in recreational water
- Animal bites (domestic and wild animals)

# Risk management (give advise)



Food and water safety and hand hygiene



Insect bite prevention



Immunization



Malaria prevention

# Risk management (give advise)



Personal safety (RTA, fall, drowning, fire, robbery, STD)



Environmental risks (sun exposure, heat, high altitude, motion sickness, DVT)



Travelers with special needs (chronic disease, children, pregnant)



Traveler's medical insurance

# Preventive measures for common diseases among international travelers

Immunization

or  
and

Chemoprophylaxis

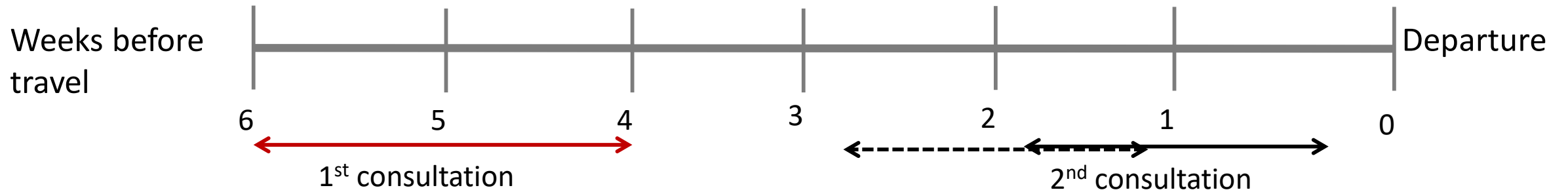
General measures for the prevention of infectious diseases

# Immunization

- Routine
  - Childhood immunizations
- Recommended
  - According to risk of infection
- Required
  - Yellow fever vaccine
  - Meningococcal vaccine



# Immunization for travelers



4-6 weeks before travel

Booster doses

# Routine immunizations

| In KSA               | Others in other countries |
|----------------------|---------------------------|
| Hepatitis A          | Human papilloma virus     |
| Hepatitis B          | Tick borne encephalitis   |
| BCG                  | Influenza                 |
| DPT                  |                           |
| MMR                  |                           |
| Polio                |                           |
| Pneumococcal         |                           |
| Meningococcal        |                           |
| Rota virus           |                           |
| Varicella            |                           |
| Hemophilus influenza |                           |



# Required immunizations

- Yellow fever (international health regulation)
- Meningococcal meningitis: by Saudi Arabia for Hajj and Umrah and seasonal workers.
- Polio

# Yellow fever vaccine

**Required** for travelers to a country under the **International health regulations.**

**Recommended:** for travelers to **endemic** area.



# Yellow fever vaccine

- Live attenuated virus vaccine
- Single subcutaneous injection
- Immunity starts after 10 days
- Valid for 10 years

## **Not recommended for**

- Infants < 9 months
- Immune compromised patients
- Pregnant women
- Egg allergies
- HIV-positive individuals

# Meningococcal meningitis

- **Required:** by Saudi government for **Hajj** or Umrah.
- **Recommended:** for travelers to **endemic** area.

## Risk:

- Sub-Saharan Africa (seasonal)
- Saudi Arabia (Hajj)
- Crowded student dormitory situations

# Meningitis belt



# Meningococcal vaccine

- Quadrivalent polysaccharide (MPSV4; A, C, Y, W-135) or conjugated with diphtheria
- Single dose (injection)

## Protection

- Protection is for 3–5 years in adults and older children
- Not effective for children below 2 years

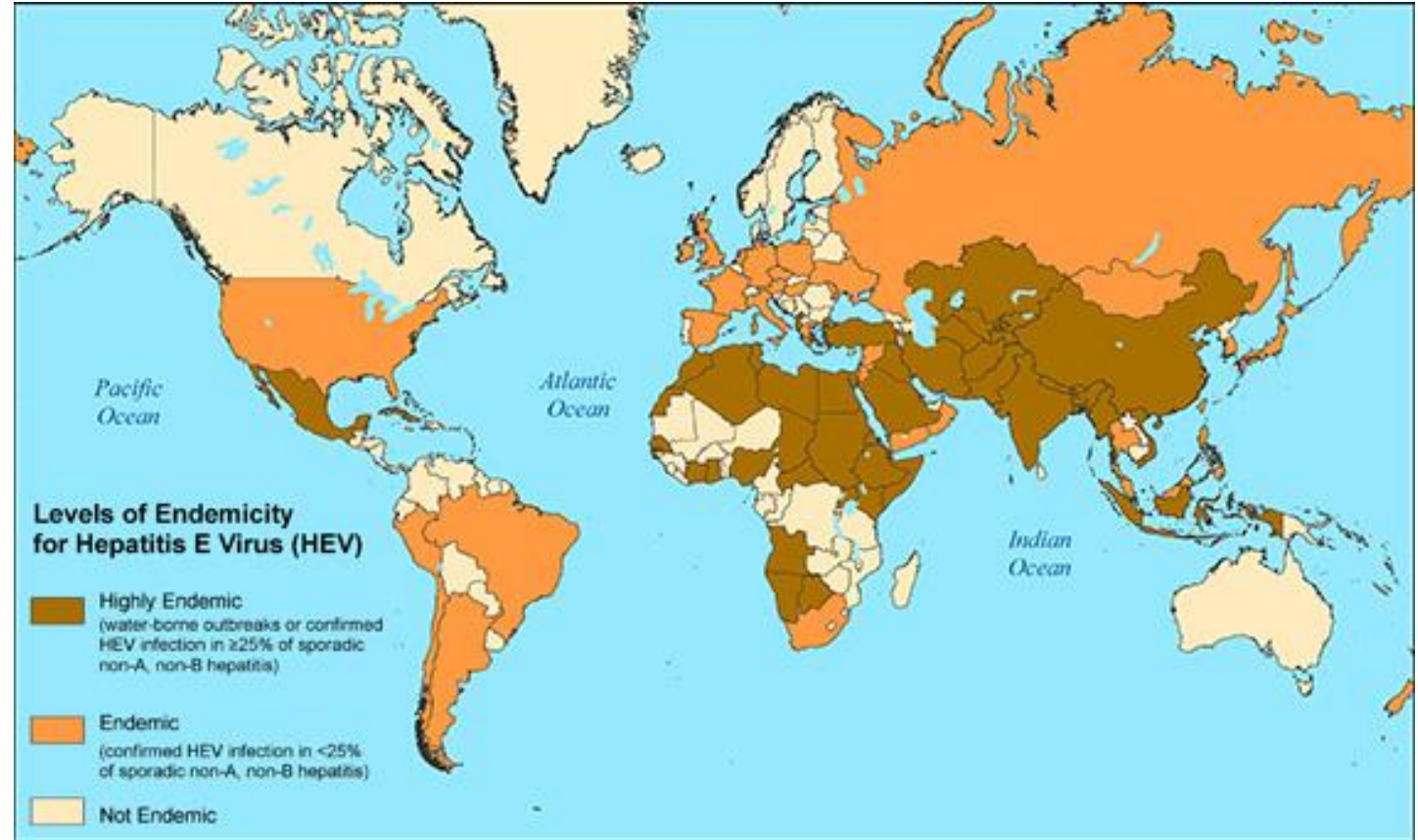
# Recommended immunizations (according to risk)

- Hepatitis A, B
- Typhoid
- Cholera
- Poliomyelitis
- Meningococcal meningitis
- Japanese encephalitis
- Rabies
- Tick-borne encephalitis



# Hepatitis A

- Endemic in many developing countries
- High mortality in elderly and pregnant women.
- Prevention by food, water, personal hygiene and immunization



# Hepatitis A vaccine

- **Two** doses of **inactivated** vaccines (HAVRIX® or VAQTA®)
- First dose: 70 – 85% develop antibodies within two weeks
- Second dose: after 12 to 18 months leading 100% sero-conversion
- If traveling in <4 weeks after 1<sup>st</sup> dose: immune globulin should be administered at a different anatomic injection site

## Protection

- 14 – 20 years in children
- 25 years among adults

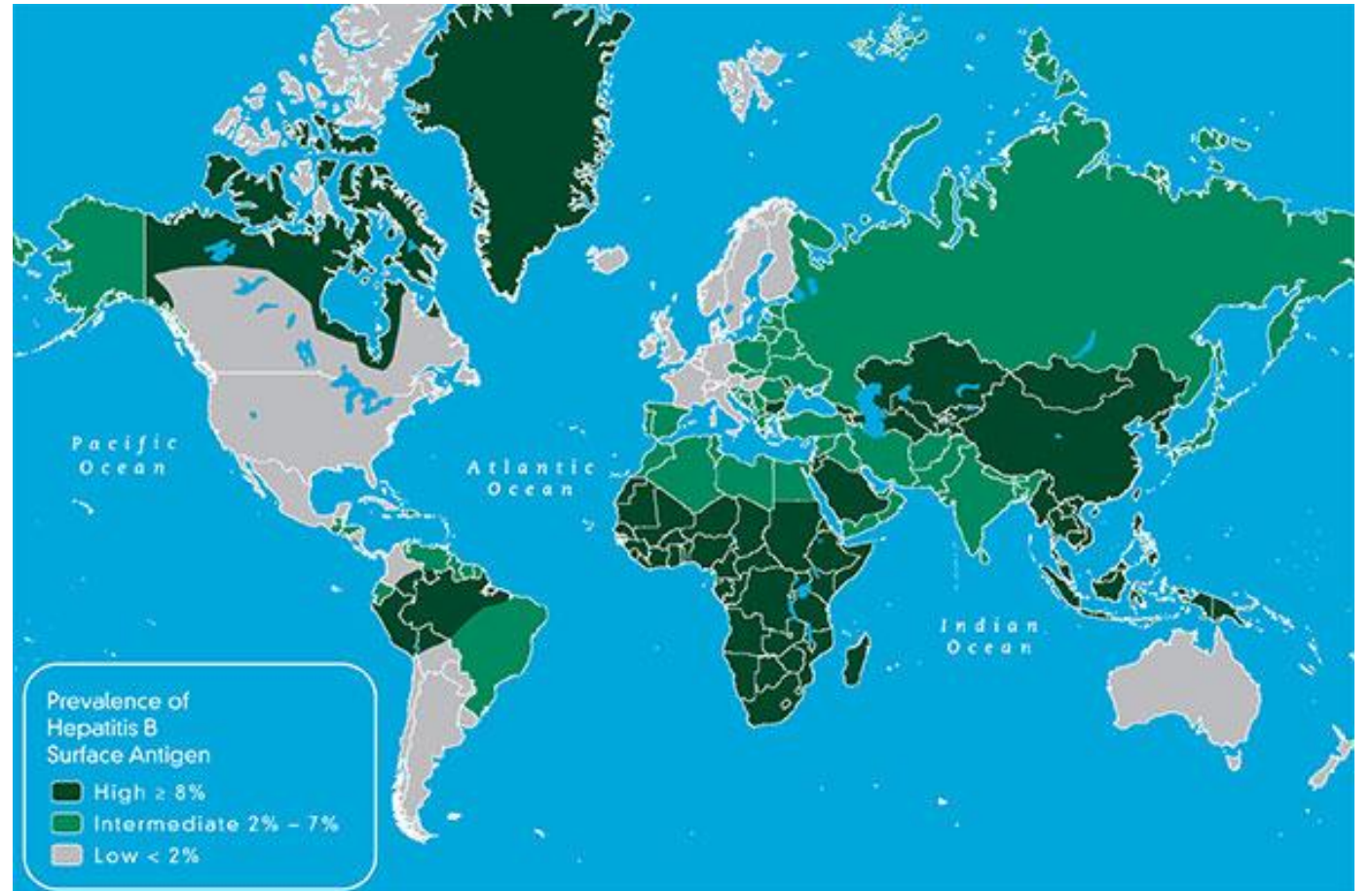
## Recommended

- Travelers to the developing countries
- 2 years and older

# Hepatitis B

Transmission: Blood-borne, sexual contact

Prevention: Avoid risk factors, immunization



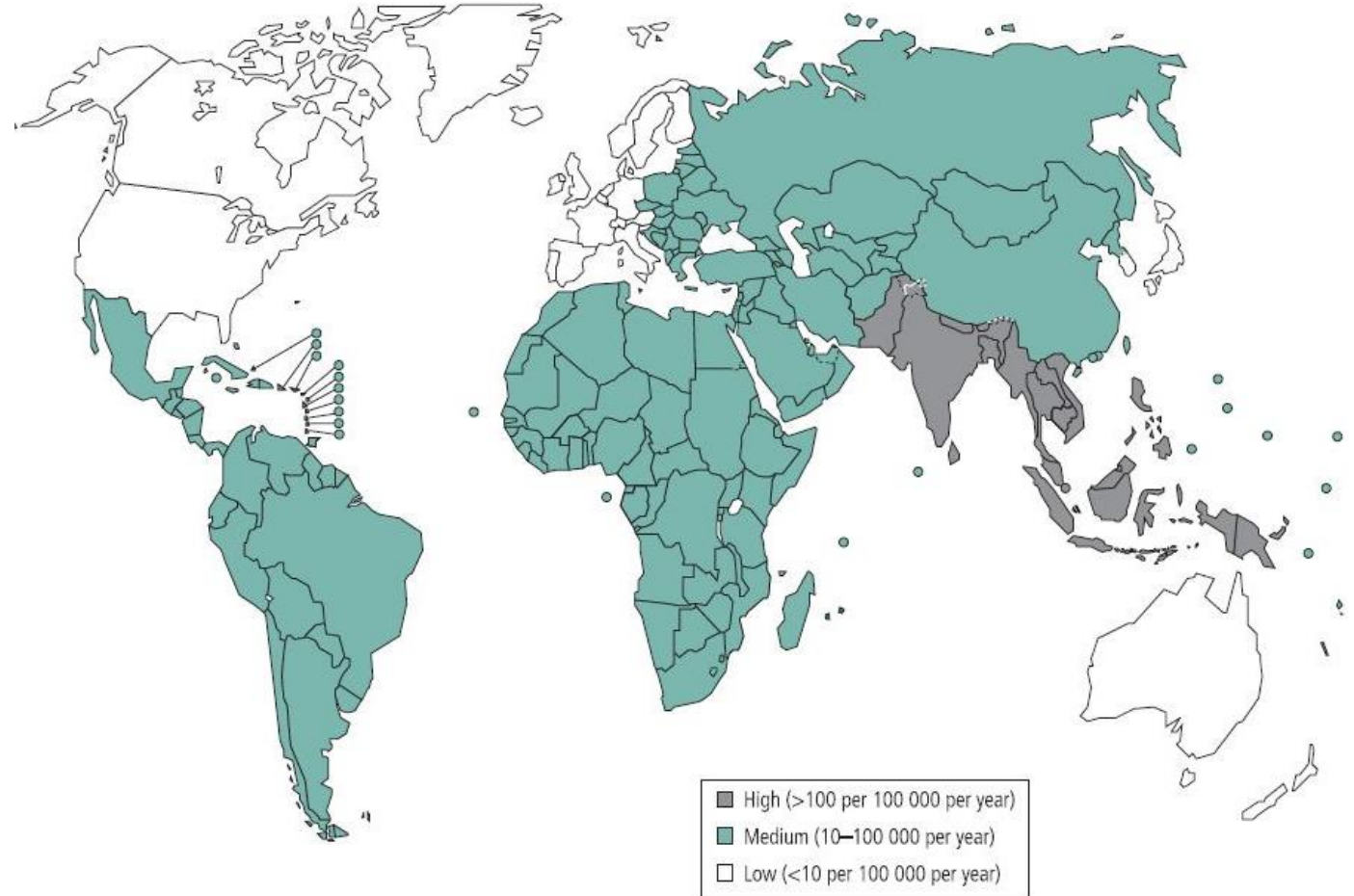
# Hepatitis B vaccine

- **Recombinant** vaccine given by intramuscular **injection**
- Monovalent or combined with hepatitis A (for those  $\geq 18$  years)
- Regular schedule: 0-, 1-, and 6-month with no booster dose
  - Accelerated schedule for the combined vaccine only (FDA)
    - 0-, 7-, and 21- days
    - Booster dose at 1 year

❖ Recommended for travelers to endemic areas and travelers with special risk

# Typhoid

- Transmission: by contaminated food and water
- Prevention: food, water, personal hygiene and vaccination



# Typhoid vaccine

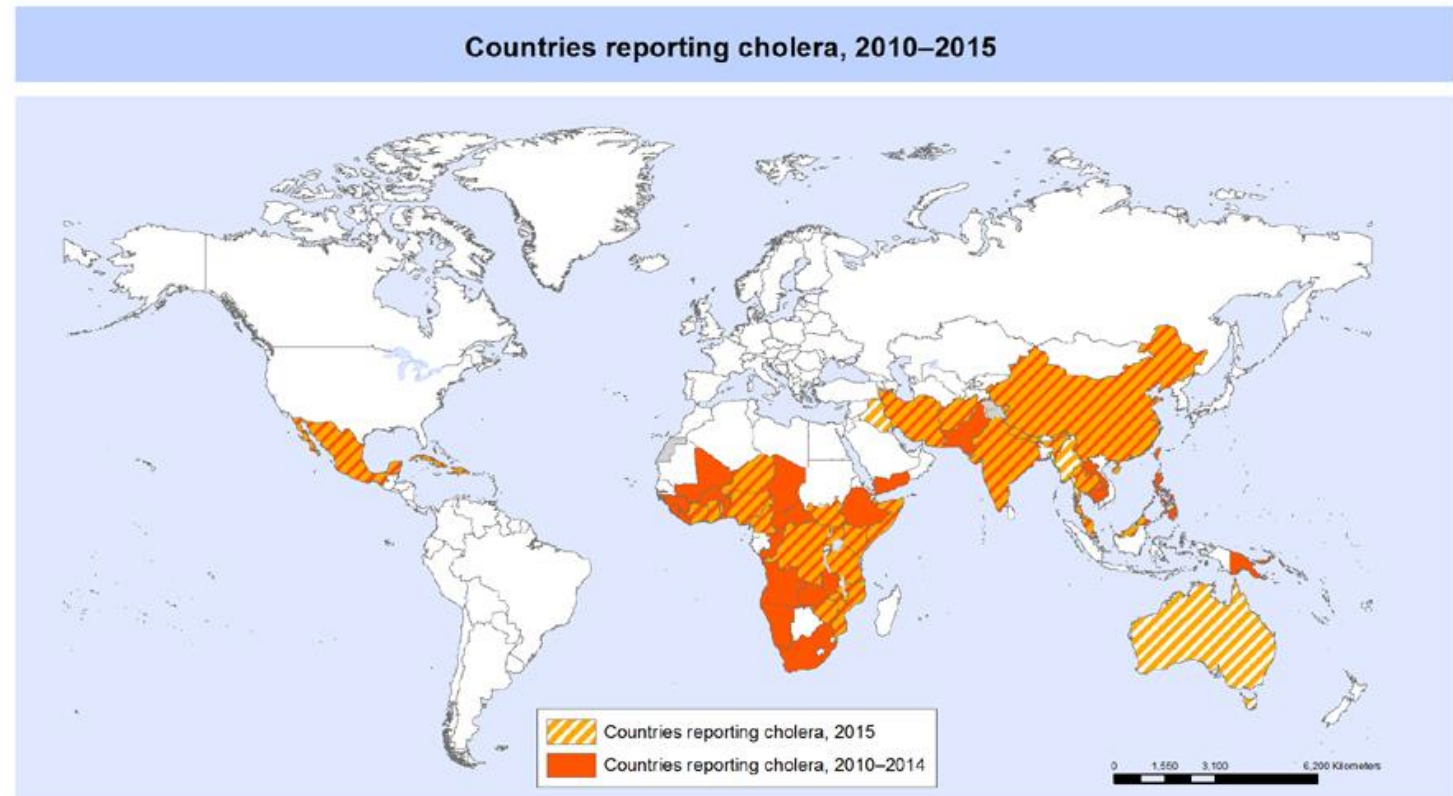
## Live attenuated (Ty21a)

- **Oral** vaccine
  - **Four** doses (One capsule on alternating days not with antibiotics)
  - Schedule should be completed at **least one week** before traveling
  - **Booster** every 5 – 7 years
- 
- Vi capsular polysaccharide vaccine (ViCPS)
    - **Single** dose **intramuscular** injection
    - At **least two weeks** before traveling
    - **Booster** at 2 years intervals
  - Both vaccines are effective but differ in duration of immunity
  - Compliance may be a problem with oral vaccine
  - Recommended to travelers to developing countries



# Cholera

- Transmission by contaminated food or water
- Rare in travelers
- Prevention:
  - food, water and Personal hygiene
  - Vaccination (oral)



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: Information Evidence and Research (IER)  
World Health Organization



© WHO 2015. All rights reserved.

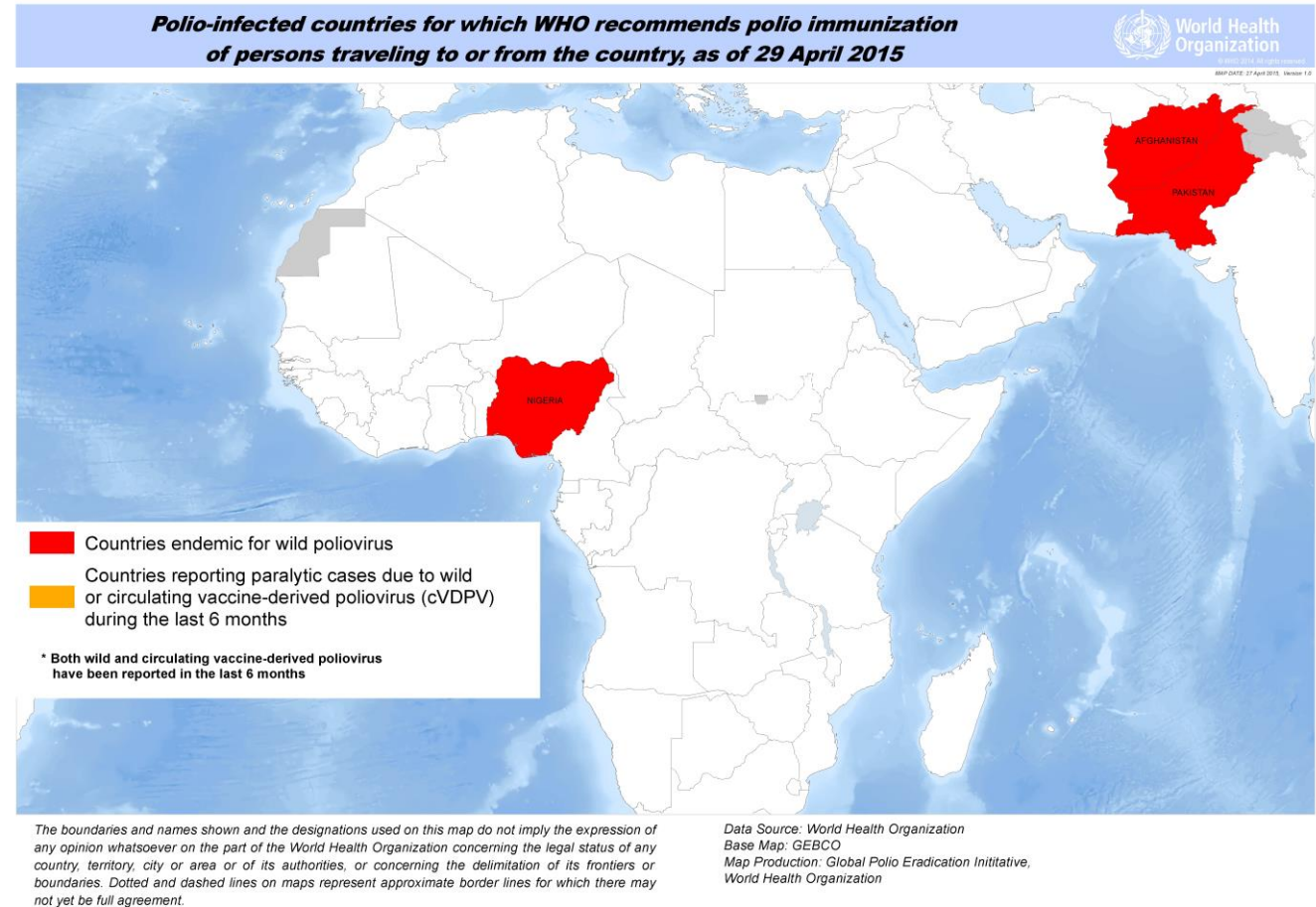
# Cholera vaccine

- **Live** attenuated **oral** vaccine
- Result in 60–80% protection for 6 to 12 months
- Not effective against the new serotype O139 (spread rapidly through Asia in mid 90s)



# Polio

- Transmission: contaminated food and water.
- Rare in travelers
- Prevention:
  - Food, water, personal hygiene
  - Vaccination (injectable, oral)



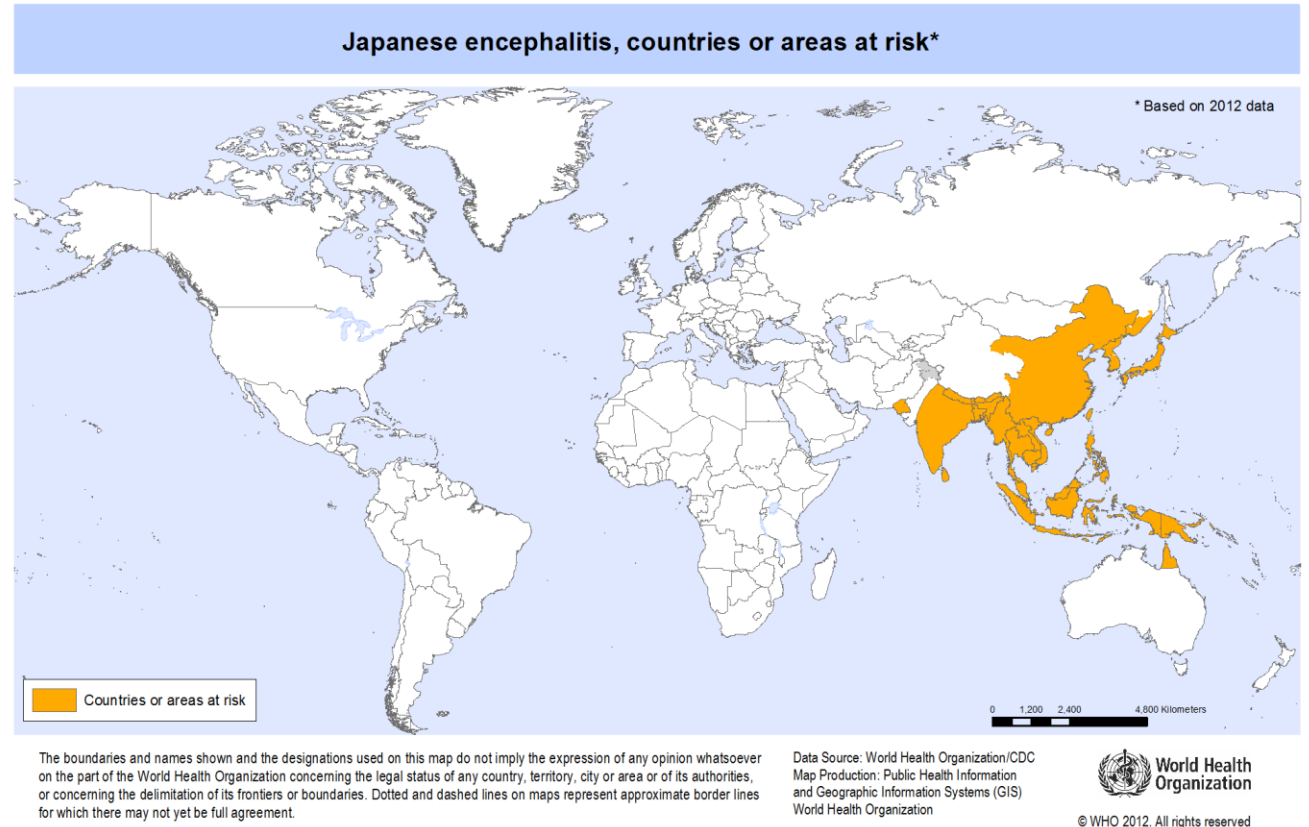
# Polio in Saudi Arabia



- In Saudi Arabia, proof of receipt of polio vaccine is **required** from travelers from endemic countries or countries vulnerable to infection or re-infection.
- (within the previous 12 months and at least 4 weeks prior to departure)
- All travelers from these countries will also receive 1 dose of OPV at border points on arrival in Saudi Arabia

# Japanese encephalitis

- Transmission: by mosquito bite
- Risk increases in travelers to rural Asia or long stay travelers.
- Prevention: vector control and vaccination

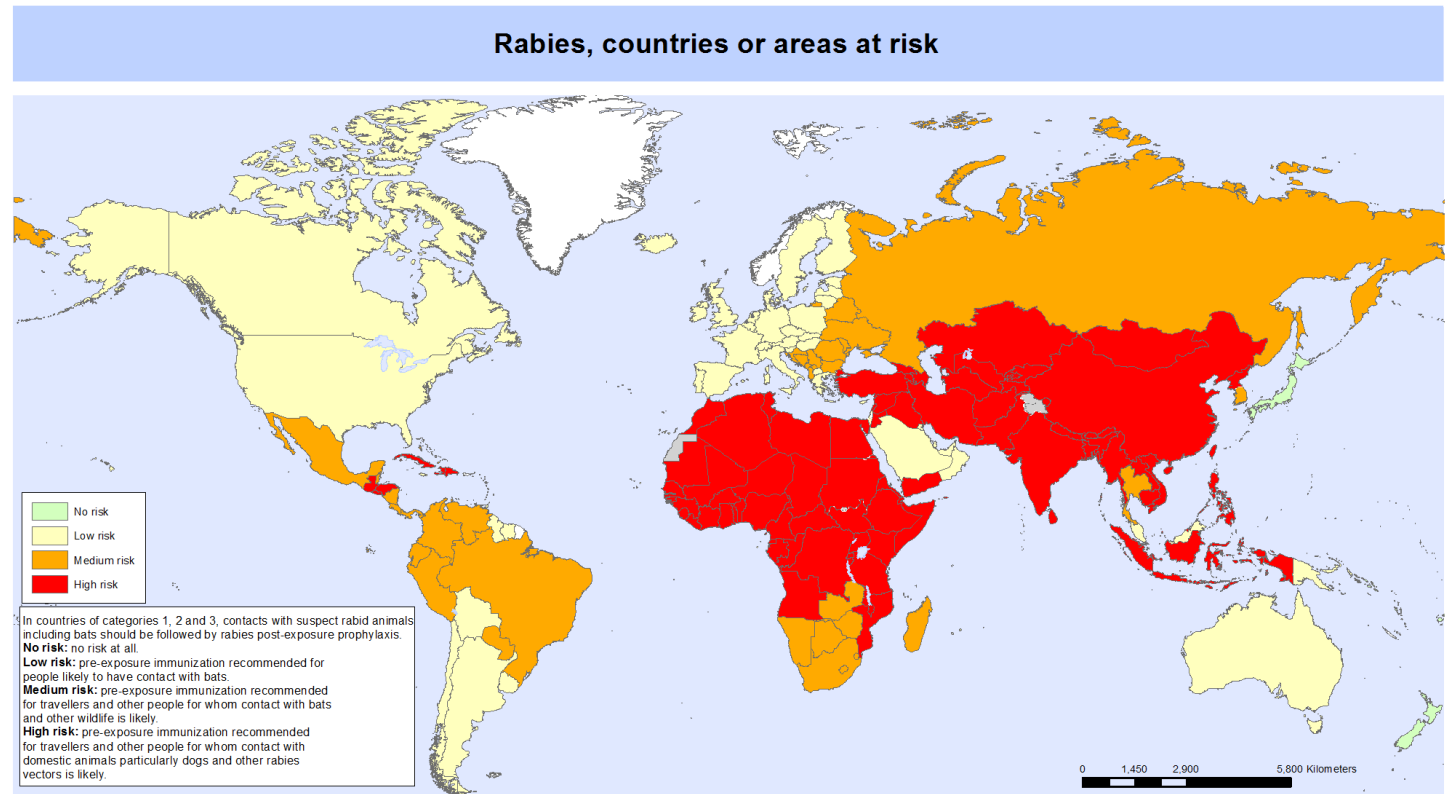


# Japanese encephalitis vaccine

- Two available vaccines
  - Given as **three** doses: 0, 7 and 30 days
    - Accelerated schedule of two doses at 0 and 7 days (80% conversion)
  - The last dose should be at **least 10** days before departure
  - Booster dose at 24 months if the risk continues
- ❖ Vaccine should be given at **least 10 days** prior to departure because of the possible **serious adverse** reactions

# Rabies

- Transmission: animal bite or scratch
- Risk: occupational , travel to rabies risk countries
- Prevention; immunization
  - Preexposure
  - Post exposure
  - Immunoglobulin



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 Control of Neglected Tropical Diseases (NTD)  
Map Production: Health Statistics and Information Systems (HSI)  
World Health Organization



© WHO 2013. All rights reserved.

# Rabies vaccine

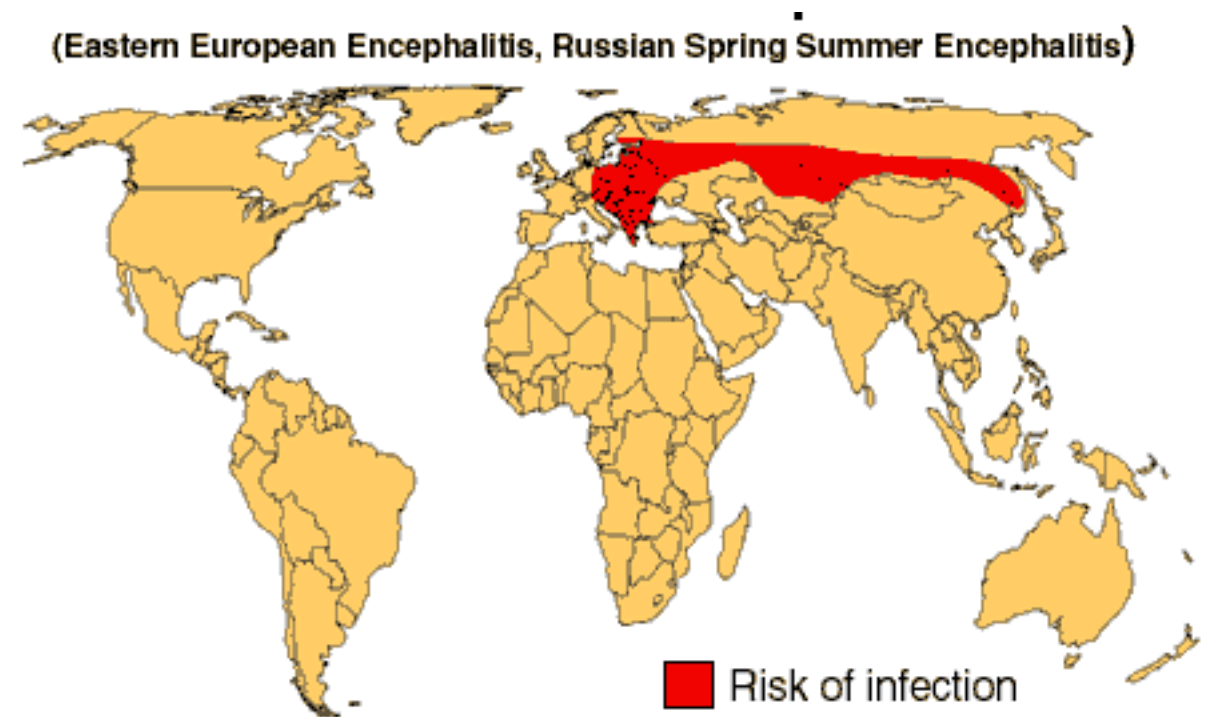
- Inactivated vaccine
- Three doses on 0, 7, and 21 or 28 (intramuscular)

## Note:

- Pre-exposure vaccine eliminates the need for rabies immune globulin (RIG) after exposure, but does not eliminate the need for additional post exposure rabies vaccinations.

# Tick-borne encephalitis

- Transmission by:
  - Ixodes sp. Ticks
  - Ingestion of unpasteurized dairy products
- Rural forested areas of east and central Europe, Russia and parts of Asia
- March – November



# Tick-borne encephalitis

## Prevention:

- Tick prevention
- Avoidance of unpasteurized dairy products
- Vaccination
- Self check and removal ASAP (tweezers)





# Other vaccines – influenza

## The risk

- Risk of exposure to the virus is **throughout the year in tropical and subtropical** areas
- The attack rate is 1.2–2.8% in travelers of **all age groups**

## The vaccine

- Inactivated parenteral vaccine
- live attenuated vaccine administered by nasal spray (for healthy persons 5–49 years)

## Recommended to travelers to

- tropics and subtropics at risk of serious related complications
- Southern Hemisphere from **April through September**

# Other vaccines - Tuberculosis

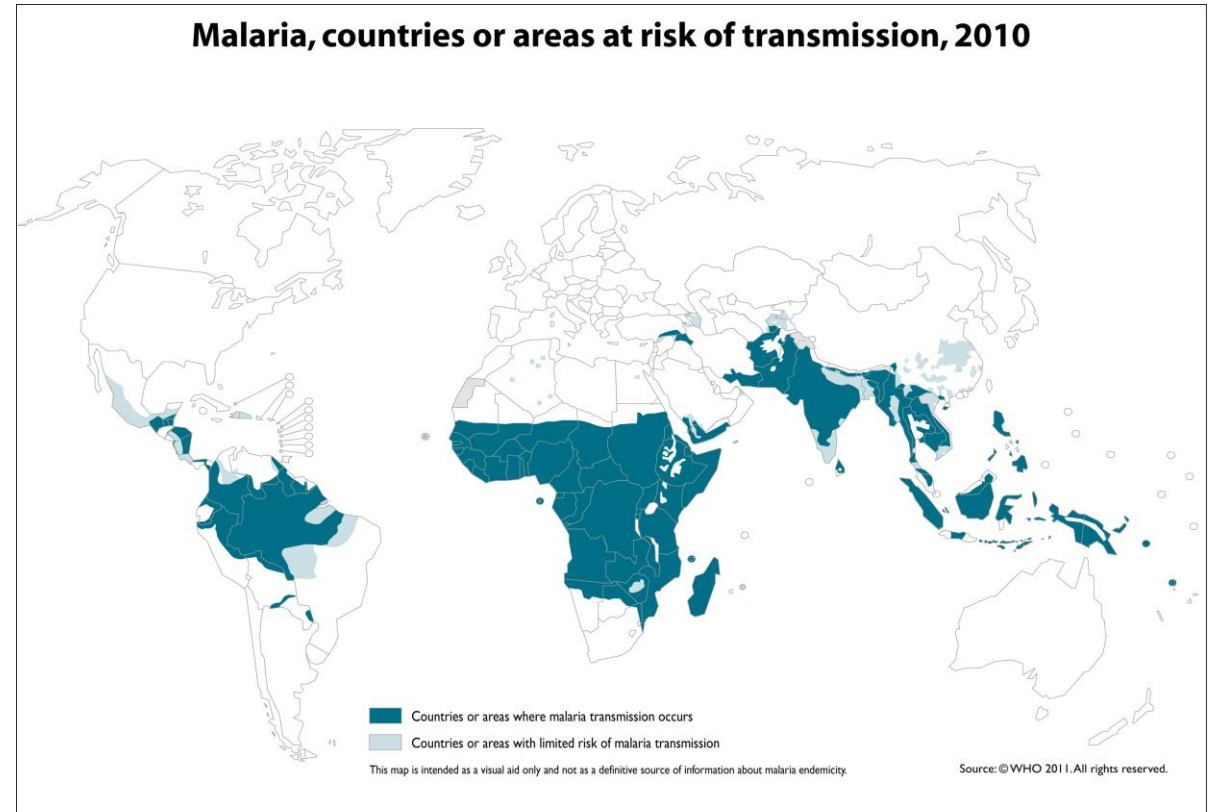
The vaccine

- BCG vaccine
- Live attenuated
- Single intradermal injection
  
- Recommended to long stay in developing countries
- Baseline tuberculin before travel with a follow up every 1 year

# Chemoprophylaxis

# Malaria

- Transmission by mosquito bite
- Prevention:
  - Awareness
  - Bite avoidance
  - Chemoprophylaxis
  - Diagnosis of febrile illness
- Fever in returned traveler is a medical emergency considered malaria until proven otherwise



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 lines on maps represent approximate border lines for which there may not yet be full agreement.

# Malaria chemoprophylaxis

- Proguanil (all areas)
  - 1 – 2 days before departure, daily during the journey and 7 days after return
- Doxycycline (all areas)
  - 1 – 2 days before departure, daily during the journey and 4 weeks

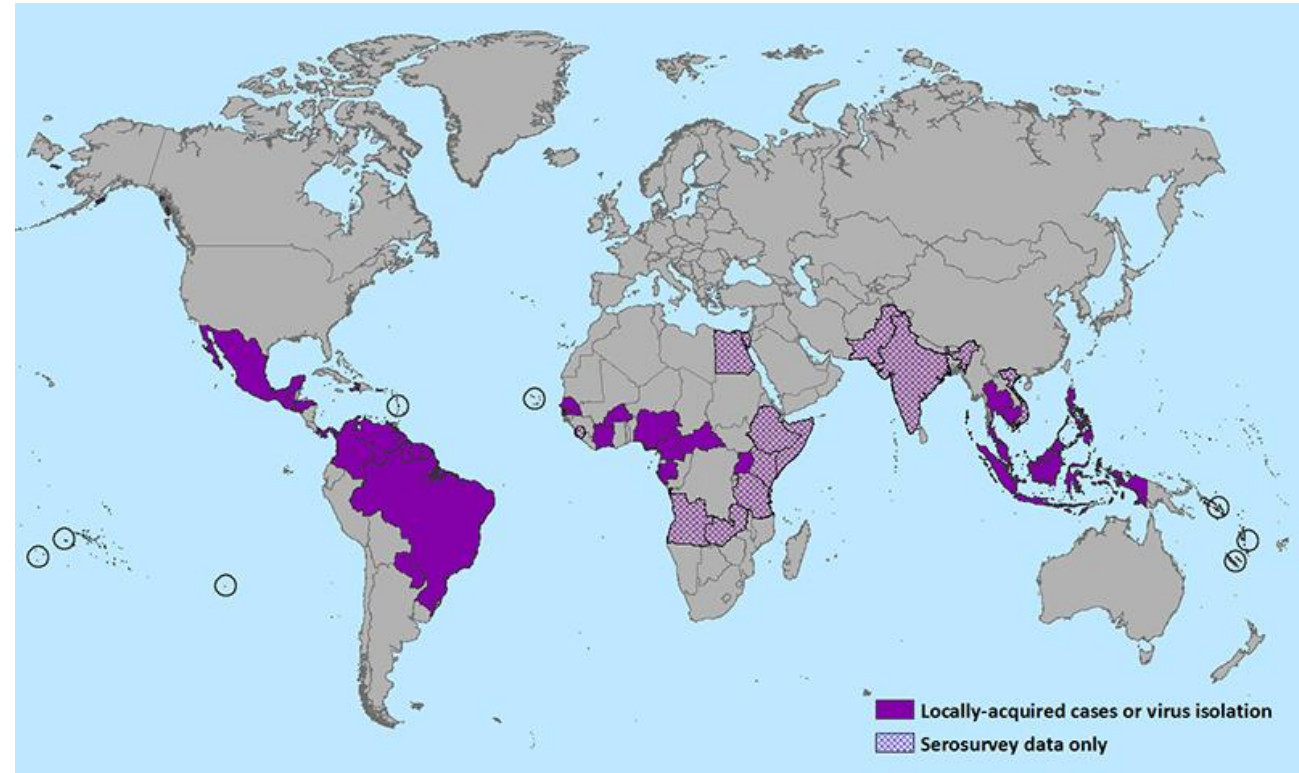
# Malaria chemoprophylaxis

- Chloroquine (chloroquine sensitive areas)
  - 1 – 2 weeks before departure, daily during the journey and 4 weeks after return
- Primaquine (predominant vivax areas and ovale)
  - 1 – 2 days before departure, daily during the journey and 7 days after return
- Mefloquine (mefloquine sensitive areas)
  - 2 weeks before departure, daily during the journey and 4 weeks after return

Other infections

# Zika virus

- Transmission by mosquito bite
- Risk to pregnant women → microcephaly and other brain abnormalities
- Prevention: preventing mosquito bites

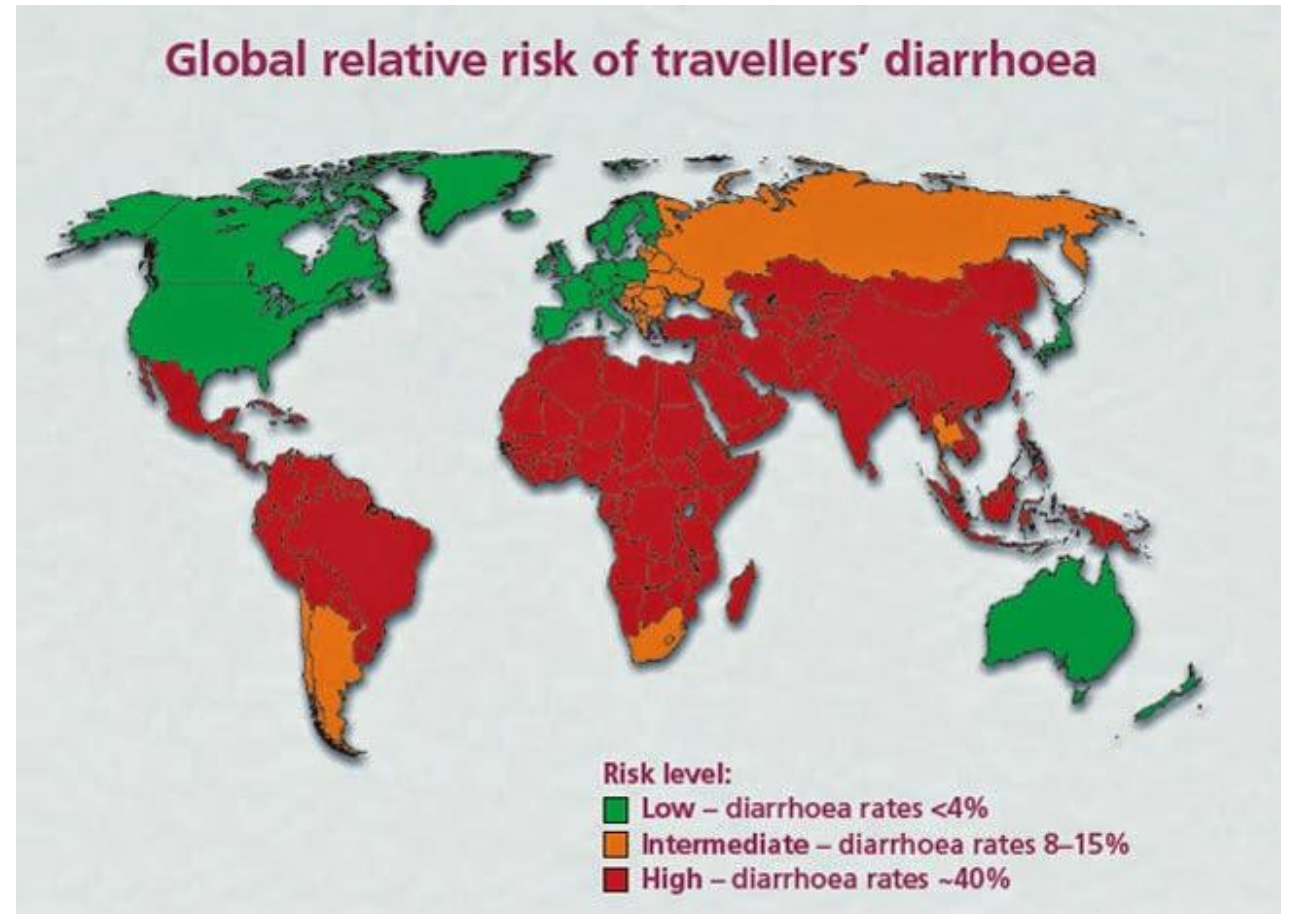




# Traveler's diarrhoea

## Cause:

- Bacterial (60-80%)
- Viral (10-20%)
- Parasitic (5-10%)



# Traveler's diarrhea

## Prevention:

- Wash It, Peel It, Cook It, or Forget It
- Only Drink Bottled Water
- Wash hands frequently



# Post-Travel Care

- Post-travel checkup
  - Long term travelers
  - Adventure travelers
  - Expatriates in developing world
- Post-travel care
  - Fever, chills, sweats
  - Persistent diarrhea
  - Weight loss

# Travelers' responsibilities

# Responsibilities of traveler

- Decide on the travel destination and timing
- Recognize and accept risk
- Visit the general practitioner prior to traveling
- Obtain travel insurance
- Adhere to the preventive precautions
- Carry medical kits and understand its use
- Assume the responsibility of the health and safety of children
- Respect people and culture in country of destination
- Visit the general practitioner upon return

# Responsibility of traveler: check status of destination

Warning level 1: Practice usual precautions

Presence of usual risk for infectious diseases as diarrheal diseases and malaria

Warning level 2: Practice enhanced precautions

Presence of MERS-CoV in Arabian Peninsula

Warning level 3: Avoid non-essential travel

Presence of outbreak (Ebola) and adverse security situation

# Responsibility of traveler: consult general practitioner

## Before departure

Timing: **4 to 6 weeks**

## Purpose

- Medical evaluation
- Risk assessment
- Receive preventive interventions
- Travel advice

## After arrival

- Have chronic diseases
- Spent >3 months in a developing country
- Received treatment for malaria while travelling
- Exposed to a serious infectious disease while travelling
- Experienced illness in the weeks following return (fever, persistent diarrhea, vomiting, jaundice, urinary disorders, skin disease or genital infection)

# Responsibility of traveler: carry emergency medical kits

- Usual prescription medications in sufficient quantities
- Essential over the counter medicines to meet common illnesses
  - Analgesics
  - Decongestant, cold medicine, cough suppressant
  - Antibiotic/antifungal/hydrocortisone creams antacid
- First aid kits
  - Band-Aids, gauze bandages, tape, Ace wraps
  - Tweezers, scissors, thermometer
- Special items according to destination
  - Insect repellent, sunscreen, lip balm



# Responsibility of traveler: issue travel insurance

- Required in case of
  - Illness
  - Accident
  - Death
- Covers
  - Changes to the itinerary
  - Emergency repatriation for health reasons
  - Medical care (illness and accidents)
  - Hospitalization
  - Repatriation of the body in case of death.

# Precautions

# Food and Water Precautions

- Bottled water
- Selection of foods
  - well-cooked and hot
- Avoidance of
  - salads, raw vegetables
  - unpasteurized dairy products
  - street vendors
  - ice



# Environmental Precautions

- Air Travel
- Jet Lag
- Sun Protection
- Extreme Heat and Cold
  - dehydration, heat stroke
  - hypothermia, frostbite
- Altitude
- Water recreation
  - Drowning, boating & diving accidents
  - Risk of schistosomiasis or leptospirosis
  - Biological and chemical contamination



# Vector Precautions

- Covering exposed skin
- Insect repellent containing DEET 25 – 50%
- Treatment of outer clothing with permethrin
- Use of permethrin-impregnated bed net
- Use of insect screens over open windows
- Air conditioned rooms
- Use of aerosol insecticide indoors
- Use of pyrethroid coils outdoors
- Inspection for ticks



# Animal Precautions

- Animal avoidance
- Rabies
  - Specific animal threats
  - Medical evaluation of bites/scratches
  - Post exposure immunization and immunoglobulin
- Envenomations
  - Snakes, scorpions, spiders
  - Maritime animals



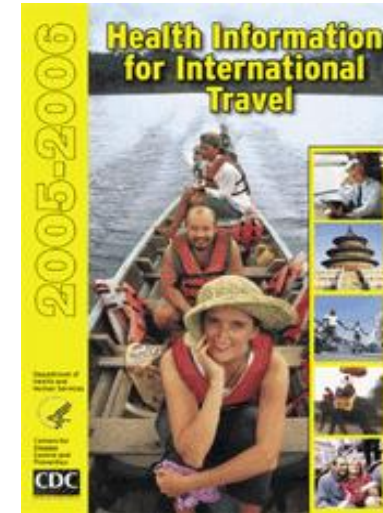
# Injury and Crime

- Vehicles
  - Risk of road and pedestrian accidents
  - Night travel
  - Seat belts and car seats
- Avoid the use of drugs and alcohol
- Understanding local crime risks
  - Scam awareness
  - Situational awareness
  - Location avoidance



# Travel Health Resources

- CDC Travelers' Health Website
  - [www.cdc.gov/travel](http://www.cdc.gov/travel)
- World Health Organization
  - [www.who.int/int](http://www.who.int/int)
- State Department
  - [travel.state.gov](http://travel.state.gov)
- International Society of Travel Medicine
  - [www.istm.org](http://www.istm.org)
- Health Information for International Travel
  - CDC "Yellow Book"
- International Travel and Health
  - WHO "Green Book"





# References

- World Health Organization. International Health Regulations, 2005. Geneva: World Health Organization; 2008 [cited 2016 Sep. 27]. Available from:  
[http://whqlibdoc.who.int/publications/2008/9789241580410\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf)
- [TravellersDiarrhoea.co.uk](http://TravellersDiarrhoea.co.uk)
- WHO. World Health Organization. Available at: <http://www.who.int/ith/en/> (Accessed: 14 March 2018).
- *The Pretravel Consultation - Chapter 2 - 2018 Yellow Book | Travelers' Health | CDC* (no date). Available at: <https://wwwnc.cdc.gov/travel/yellowbook/2018/the-pre-travel-consultation/the-pre-travel-consultation> (Accessed: 13 March 2018).

# Exercise



|                    |                    |                     |
|--------------------|--------------------|---------------------|
| <b>HEAT-STROKE</b> | <b>POLIO</b>       | <b>MALARIA</b>      |
| <b>CHOLERA</b>     | <b>TYPHOID</b>     | <b>YELLOW-FEVER</b> |
| <b>ANALGESICS</b>  | <b>COUGH-SYRUP</b> | <b>RABIES</b>       |
| <b>ZICA</b>        | <b>HEPATITIS-B</b> | <b>MANINGITIS</b>   |

### **HORIZONTAL:**

- 1- Vector borne infection
- 2- Important in your travel tool kit
- 3- Oral and injectable vaccines
- 4- Environmental risk for travelers
- 5- Special risk to pregnant women
- 6- Required vaccine

### **VERTICAL:**

- 1- Special importance in hajj
- 4- Blood borne infection
- 7- Main way to prevent it is water food and personal hygiene
- 8- Animal borne infection



