

# Prevention is Better than Cure

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ID Physician  
DML and ADHB



# Disclosures

- GSK have paid my airfare and accommodation to be here to give this talk
- GSK are paying my registration and accommodation for me to attend the International Congress on Infectious Diseases in Bangkok later this month
- Sanofi paid my airfare and accommodation to attend the International Society of Travel Medicine Conference May 2011

# Outline

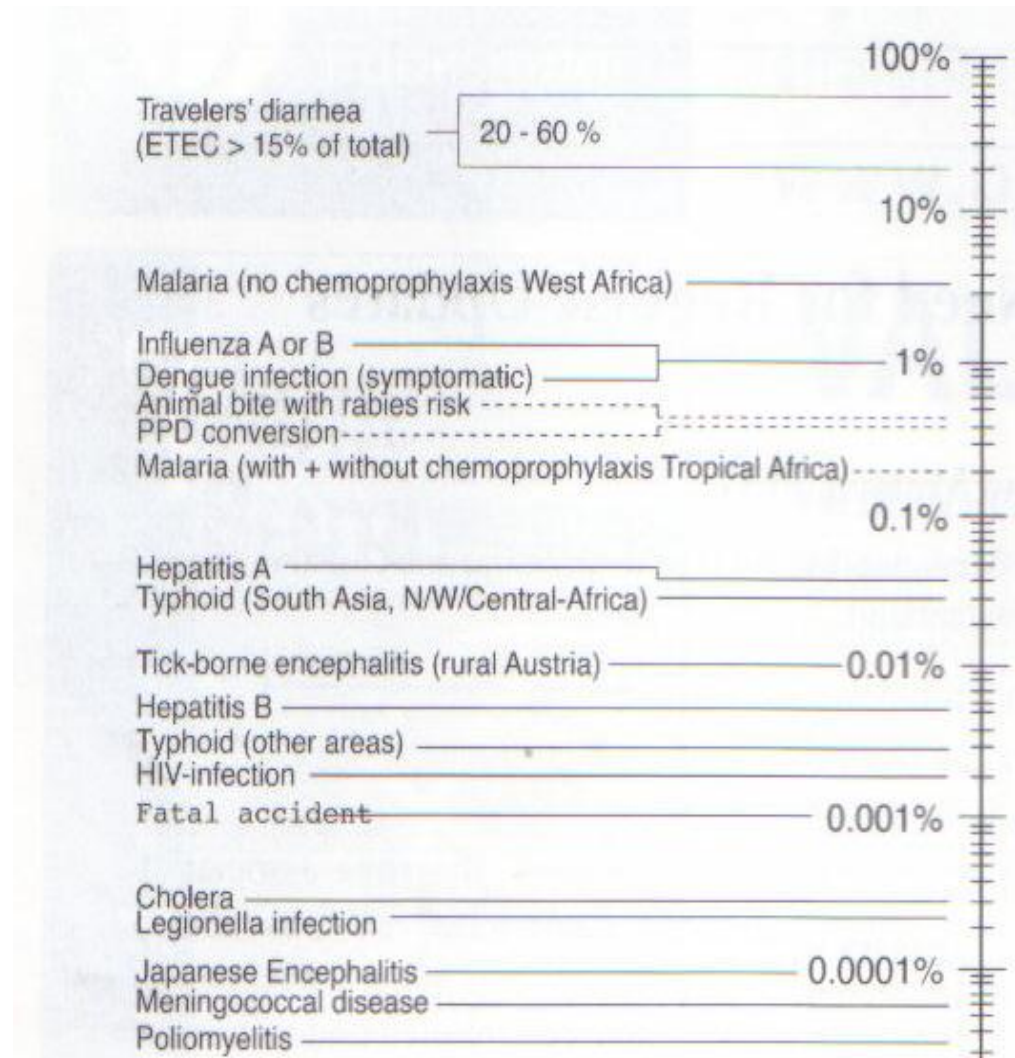
- Health problems during travel
- Visiting Friends and Relations
- Pre-travel care
  - advice
  - vaccinations
  - prescriptions

# Health Problems

- 40% unwell
- 3% see doctor while away and 8% after return
- 0.5% hospitalised
- diarrhoea



# Incidence Rate per Month



# GeoSentinel Surveillance Network

- 30 travel or tropical medicine sites on 6 continents saw 17,353 ill returned travellers 1996 to 2004.
- Rate per 1000 patients
  - Systemic febrile illness: 226
  - Acute diarrhoea: 222
  - Skin disorder: 170
  - Chronic diarrhoea: 113
  - Respiratory disorder: 77
  - NEJM 2006; 354: 119-30

# GeoSentinel Surveillance Network

- Malaria leading cause of fever from Africa
- Dengue ahead of malaria for all other regions
- Dengue, typhoid and malaria virtually equal causes of fever from South Central Asia

# Common Skin Problems

**Insect Bite Reaction**



**CLM**



# Deaths

- 1 in 100,000 dies
- Heart attacks (49%) followed by injuries and drownings (22%)
- More injuries than when at home
- Outcome of injury may be worse

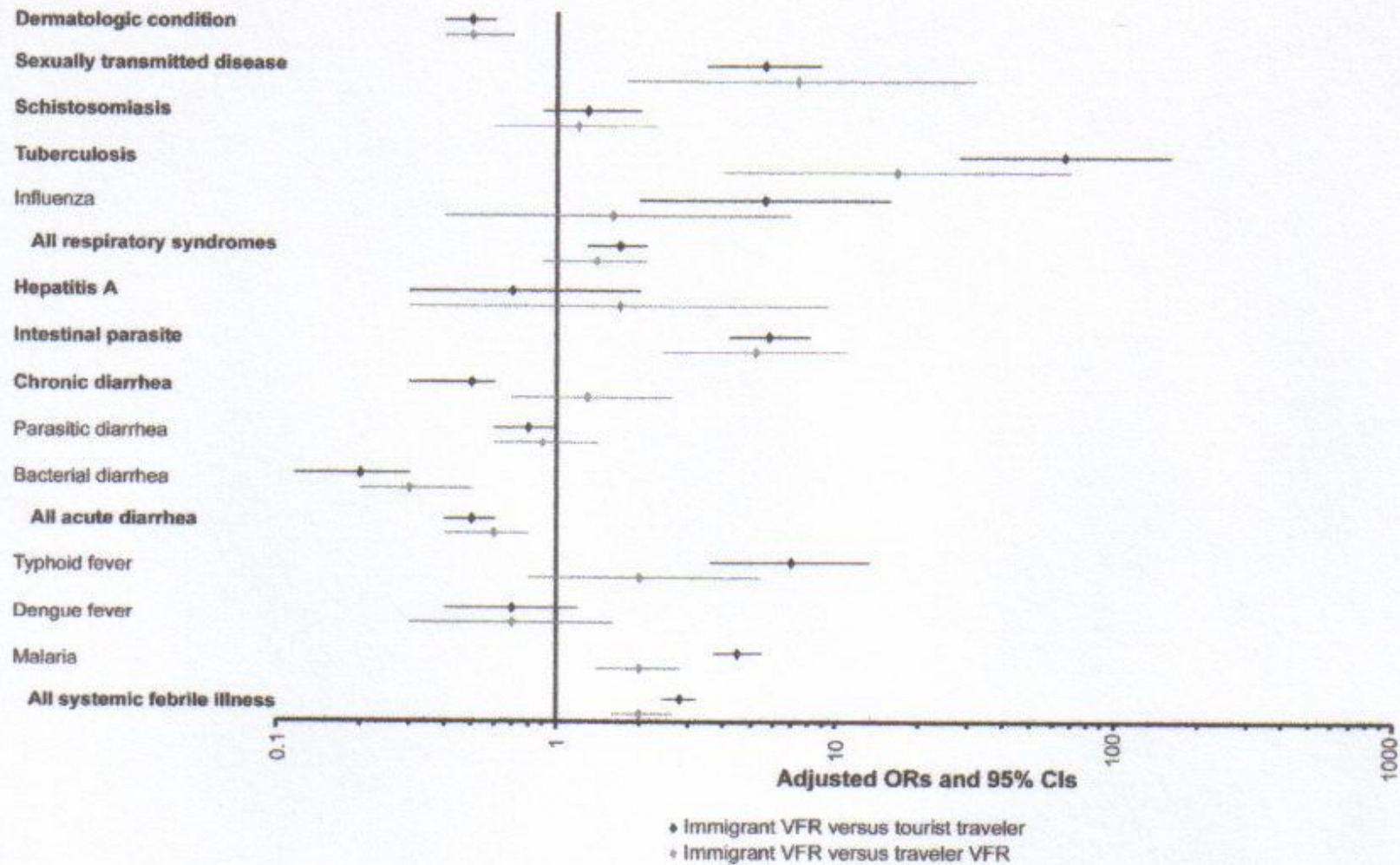






# Visiting Friends and Relations (VFRs)

- Less likely to seek pre-travel care
- May be in higher risk situations
- Increased risk of malaria (5x), typhoid (4x), hepatitis A (3x) and TB
- If you have such patients in your practice try and give them preemptive pre-travel advice
  - CID 2006; 43: 1185-93

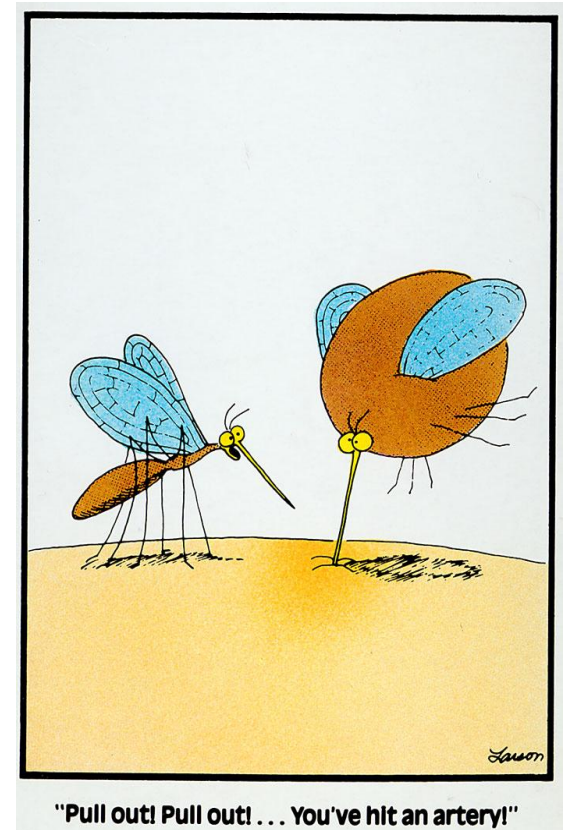


# 1. Advise and Discuss

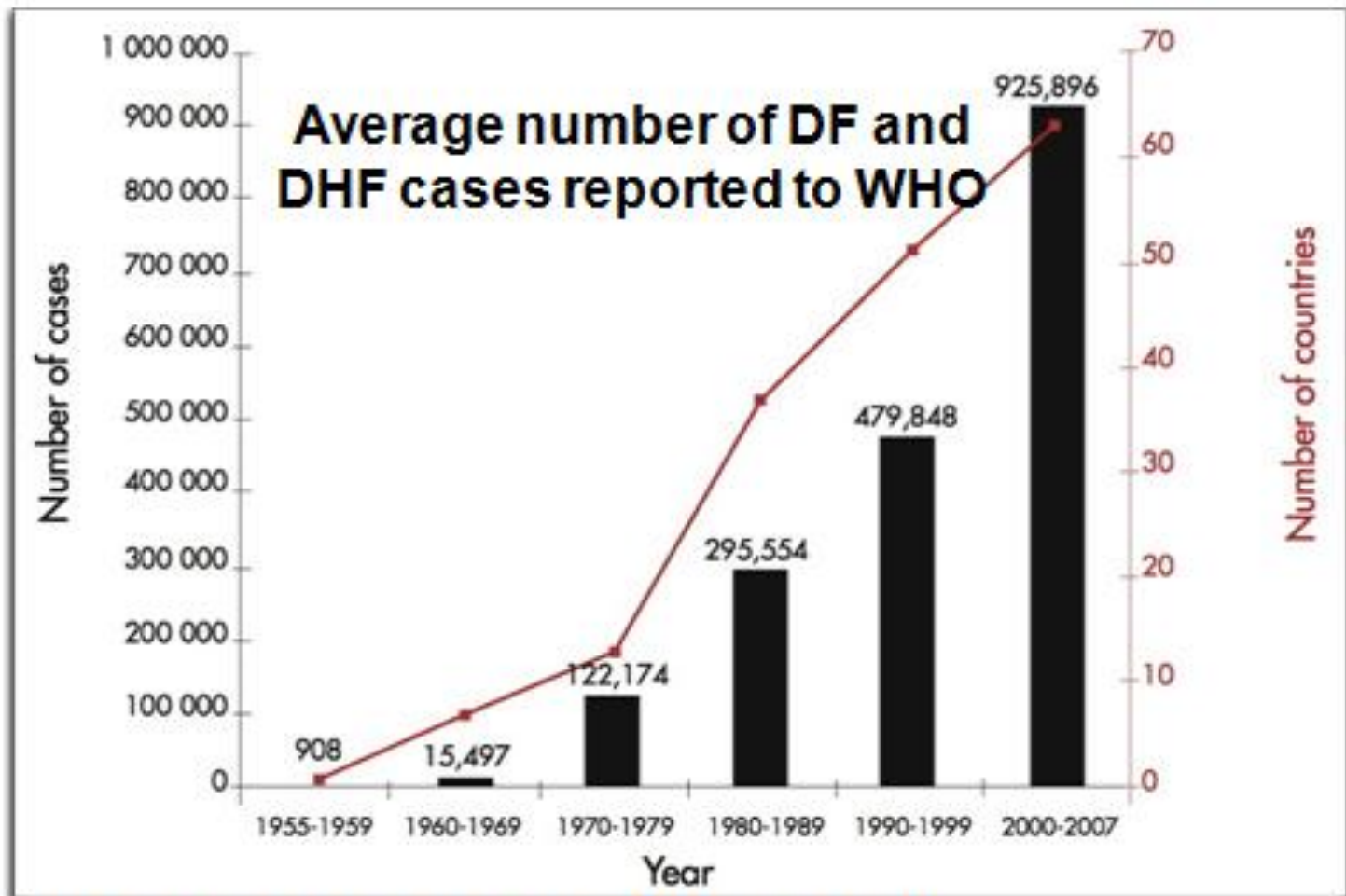
- Always
  - Insects
  - Ingestions
  - Indiscretions
  - Injury
  - Insurance
  - Injections
  - Immobility
  - Medication advice
- Sometimes
  - Immersion
  - Altitude
  - Inhalation

# Insects

- Spread many illnesses
- DEET containing repellent
  - Remarkable safety profile
  - Down to 2 months of age
- Permethrin impregnated nets
- Vitamin B does not reduce bites
- Pregnant women more attractive to mosquitoes



# Dengue is increasing dramatically



WHO. Dengue. Guidelines for Diagnosis, Treatment, Prevention and Control. Available at: [http://whqlibdoc.who.int/publications/2009/9789241547871\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf) Last updated: 2009. Accessed July 21, 2011.

# Ingestions

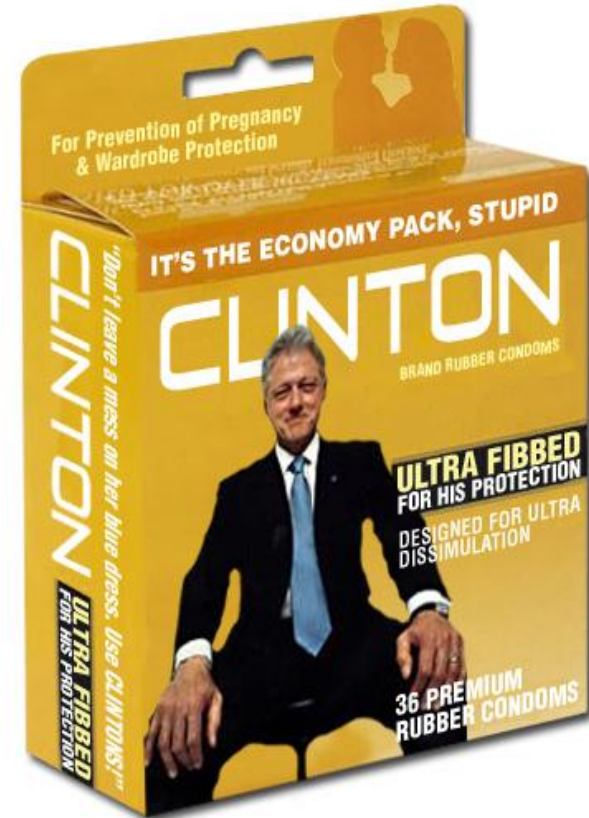
- No good evidence that care with oral intake reduces rates of traveller's diarrhoea
  - CID 2005; 41: S531-5
- May reduce other food borne illnesses
- Restaurant food more risky than that prepared in own kitchen
- Alcohol hand wash makes good sense

# New Water Treatment

- Chlorine dioxide
  - more potent than chlorine
  - minimal taste
  - effective against all water borne pathogens
  - Aqua Mira or Portable Aqua
  - Sensitive to sunlight

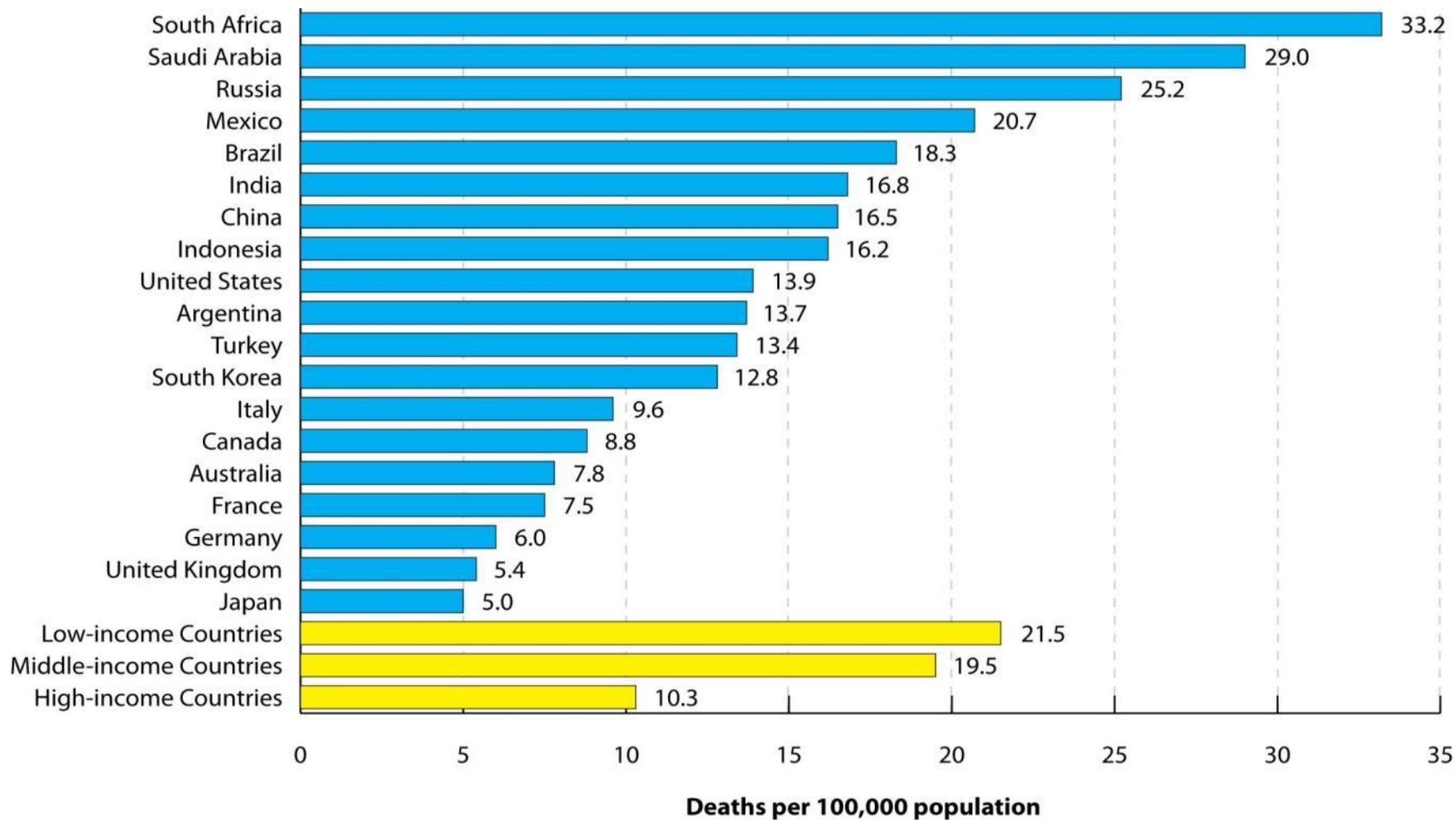
# Indiscretions

- Travel increases the probability of casual sex
- Travelling alone
- HIV is global (40 million infected, most don't know it)
- Many STIs are more common in developing countries and more resistant to treatment
- Condoms lower risk



# Injuries

- Be especially careful in countries that drive on the right hand side
- Avoid travelling alone and at night, bad weather
- Use helmets, seat belts etc
- Avoid looking like a rich tourist
- Keep valuables out of view
- Speak up if concerned about driver
- Flying may be safer than roads
- Don't swim alone or after drinking alcohol
- Don't feed or play with dogs or monkeys



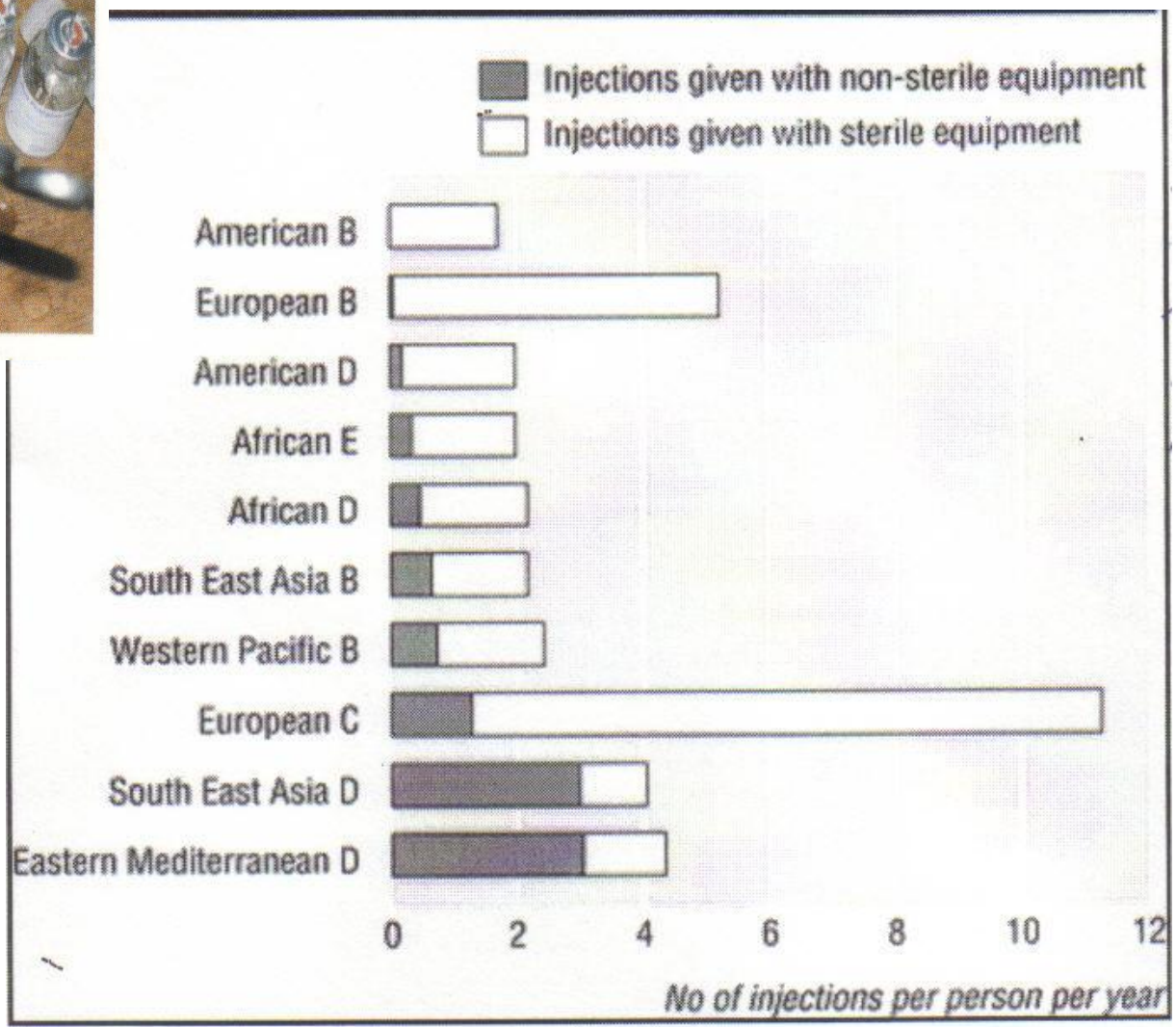
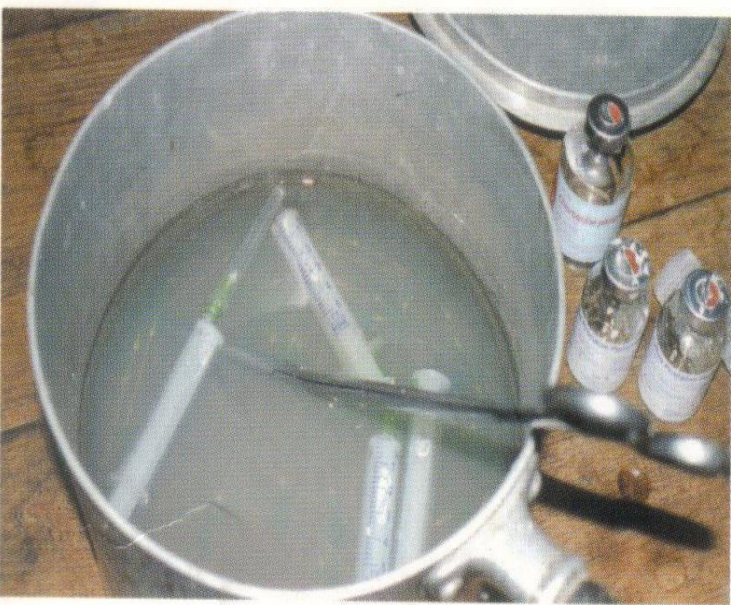
**FIA Foundation**  
for the Automobile and Society

# Insurance

- Vital for all travel
- Check for exclusions
- Read policy carefully to see what is covered, level of excess
- Have a special policy if preexisting medical conditions, working overseas, doing “hazardous recreational activities”

# Injectons

- Travellers end up having injections: 1.5% of Canadian travellers on 1 month trip
  - J Travel Med 2000; 7: 259-66
- Overuse of injections in many developing countries
  - BMJ 2003; 327: 1075-78
- Reuse of injection equipment without sterilisation is common
- Avoid any puncturing of the skin unless the equipment is sterile



# Immobility

- Any form of travel
- Risk related to duration of travel
- Those with preexisting VTE risk factors are most vulnerable

# Immobility

- Move legs frequently
- Drink plenty of water (not alcohol)
- Wear below knee compression stockings:  
incidence of DVT 19 times lower
  - Angiology 2001; 52:369-74
- High risk travellers can have clexane injections
- No evidence that aspirin helps

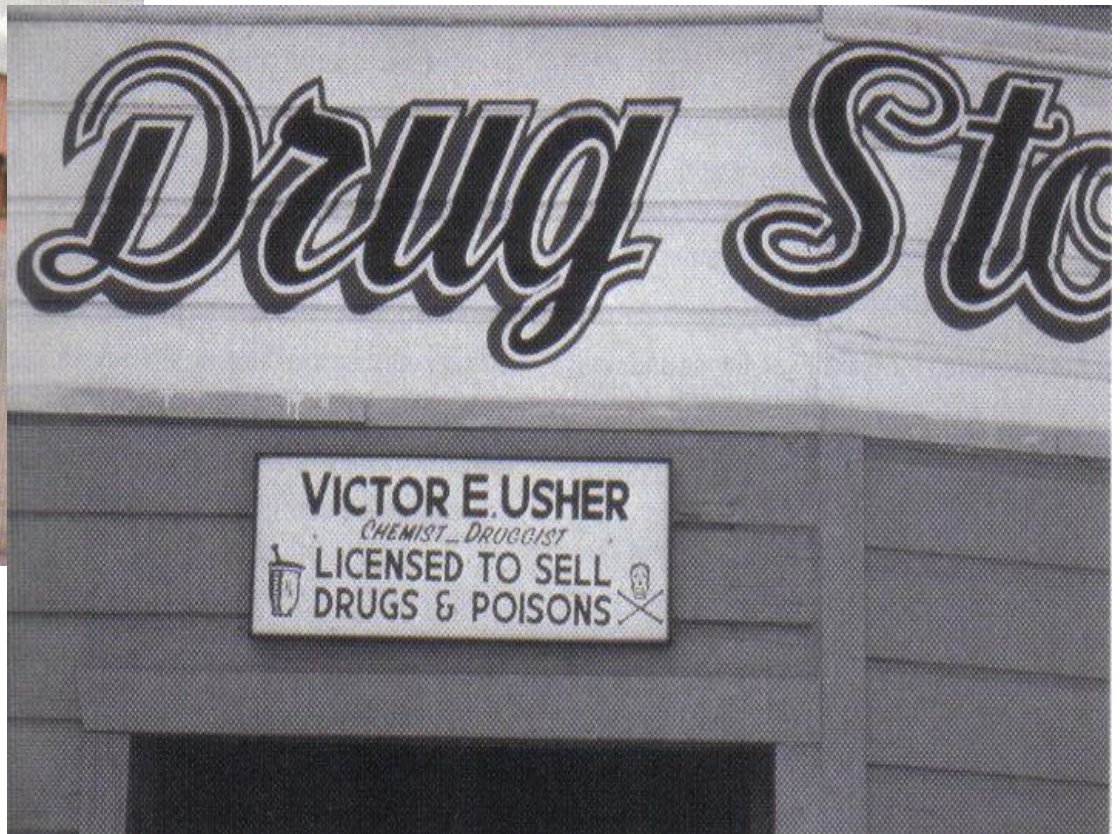
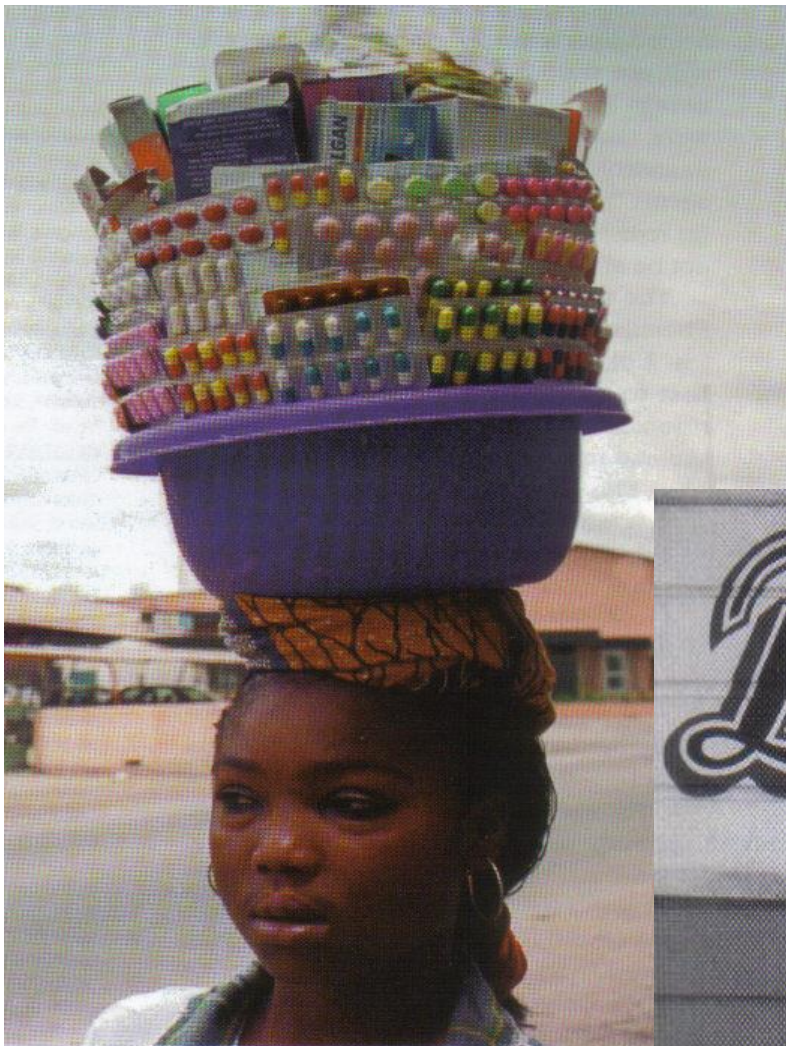
# Medication Advice

- Take a letter from usual Doctor about any chronic illness and usual medications
- Have vital medications in two bags in case one is lost
- Have a self help kit as medications overseas may be fakes.



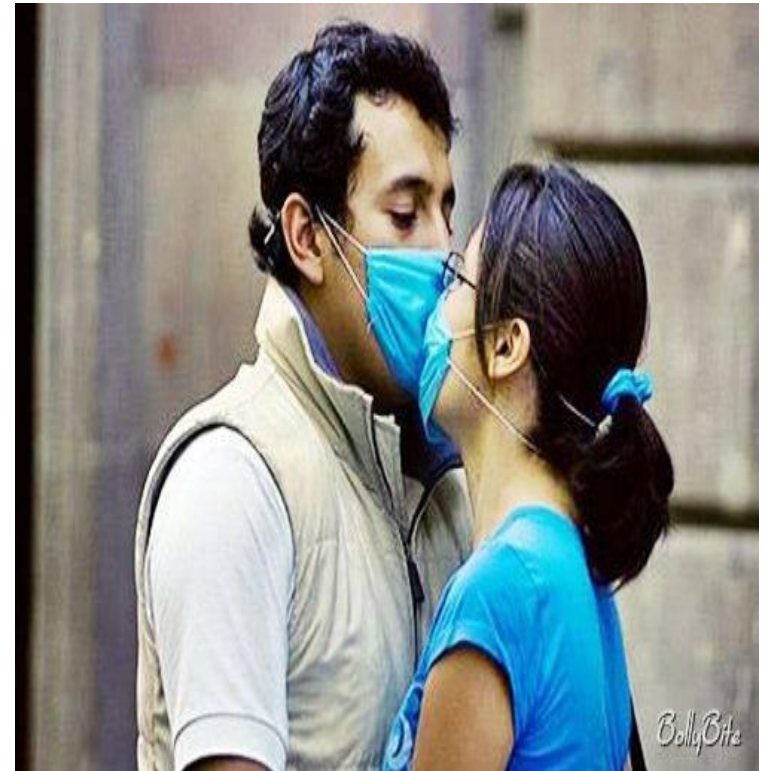
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# Inhalation

- TB, influenza, bird flu
- Dutch study showed 3.3% of travellers per year to areas of high TB endemicity are infected (2.8 per 1000 per month)
  - Lancet 2000; 356: 461-5
- Advise two step pre-travel mantoux testing with repeat after return or quantiferon gold for certain travellers
- BCG for young long term travellers



# Immersion



- Avoid fresh water in Africa and most of Middle East
- Mekong in Laos
- Pockets in Brazil , Suriname, Caribbean

# Altitude



- Ascend gradually
- Know the symptoms and be prepared to admit it if have them
- Never go higher if have symptoms
- Descend if symptoms worsen while resting

## 2. Vaccinate

- Always
  - National schedule ones
- Sometimes
  - Japanese encephalitis
  - Meningococcal
  - Rabies
  - Typhoid fever
  - Yellow fever
- Often
  - Hepatitis A
  - Hepatitis B
  - Influenza
- Occasionally
  - Cholera
  - BCG

# Hepatitis A

- Risk in travellers has declined 10 to 50 fold since 1970s
  - Clin Infect Dis 2006; 42: 490-7
- Primate studies suggest protection even when given after exposure so not too late to give it just before departure
- Don't need to restart if long interval between doses. Excellent boosting up to 8 years after initial dose
- Hepatitis A / hepatitis B combination or hepatitis A / typhoid combinations

# Hepatitis B

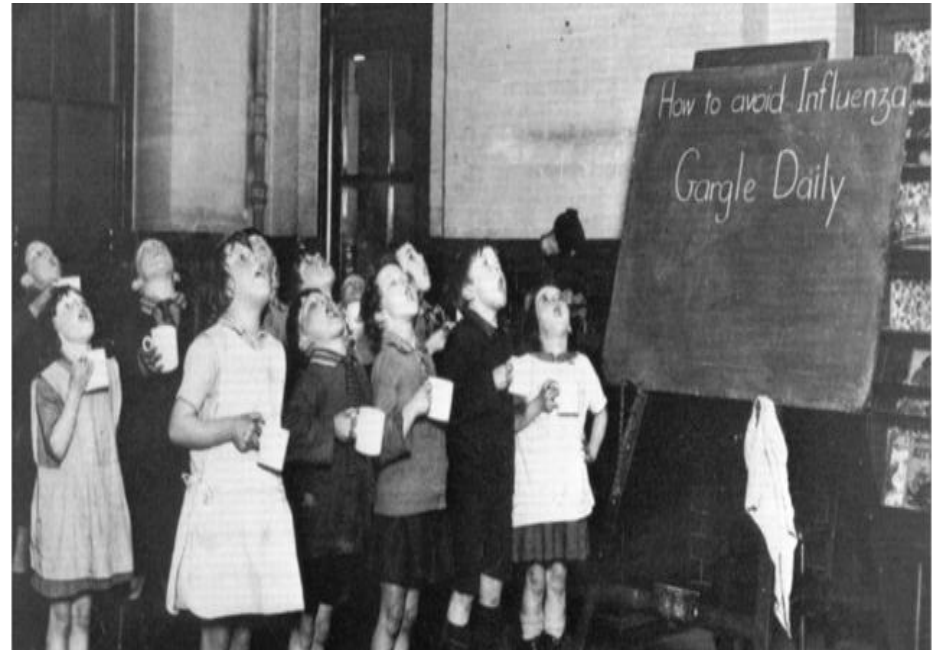
- Most infectious of all blood borne viruses
- Virus air dried is infectious for at least one week
- Recent study showed incidence in Danish travellers to be almost the same as hepatitis A: Hep A 12.8 and Hep B 10.2 per 100,000 non-immune travel months
- Risk increased for males, those travelling alone or in a group of friends, those having sex during travel

# Hepatitis B

- In adults under 40 years seroprotection after 1, 2 and 3 doses is 30-55 %, 75% and 90%
- 0, 1, 2 month or 0, 7 ,21 days should be followed by 4<sup>th</sup> dose at 12 months (protection then close to 100% and higher titre)
- With *Twinrix* 10 to 15% higher protection and higher titres after 2 doses and higher protection rate in > 60s (88% vs 73%)

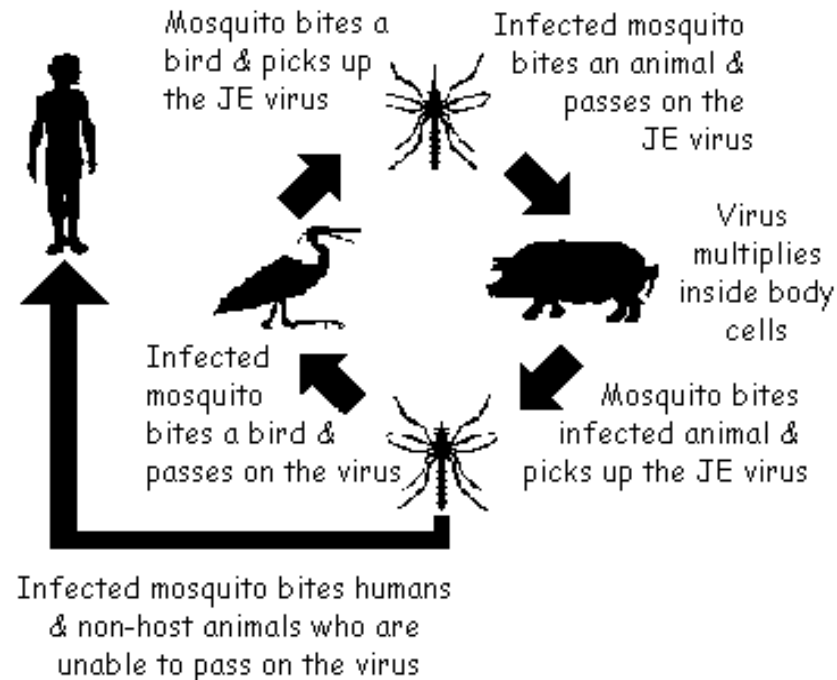
# Influenza

- May be the most common vaccine preventable disease of travellers
- Cruise ships attack rates 17 to 37 %
- Promote the vaccine
  - J Travel Med 2005; 12: 36-44



# Japanese encephalitis

- Spread by night feeding mosquitos in rural areas



# Japanese encephalitis

- Seasonal, rainy season

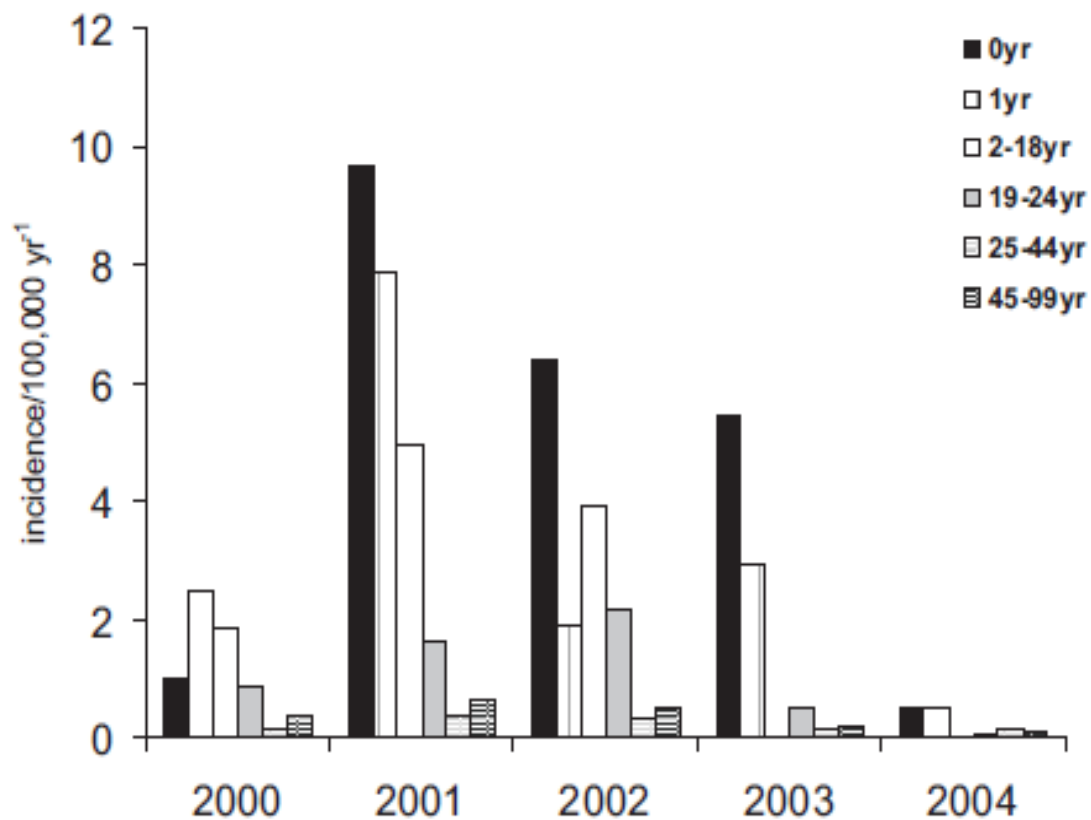


# Japanese encephalitis

- New vaccine: JESPECT
- Two doses 28 days apart
- Well tolerated
- Expensive
- Only for over 17 year olds

# Meningococcal Vaccines

- Menactra (conjugate) or Mencevax or Menomune (polysaccharide ones )
- All quadrivalent : A, C, Y, W-135
- Conjugate vaccine stimulates T cell dependent response so
  - effective at younger ages
  - better booster response
  - reduces nasopharyngeal carriage so herd immunity

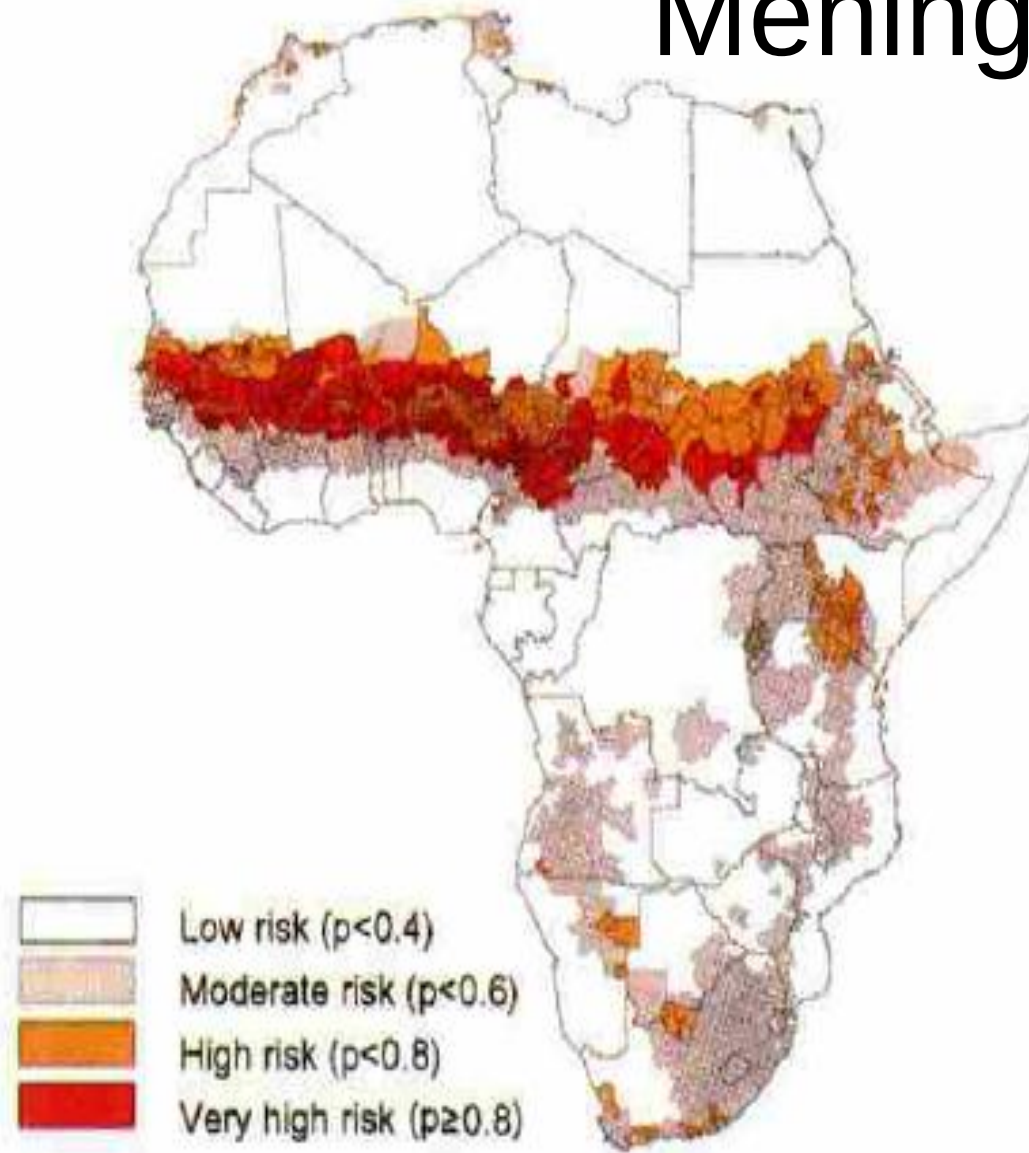


**FIGURE 1.** Incidence of meningococcal C disease in the Netherlands, by age group and year.

# Who to give it to?

- Travellers to meningitis belt of Africa
  - Particularly if during dry season, health care workers, infants and children
- Those doing the Hajj pilgrimage (meningococcal vaccine in past 3 years is required)
- Consider for adolescents and young adults planning to stay in hostels/ overcrowded conditions
- (Menactra a routine vaccine in US for 11-12 year olds with a booster at 16 years)

# Meningitis Belt



- **Sahel region**  
from Senegal and  
Guinea to  
Ethiopia
- Northern Uganda
- Eastern DRC
- Rift Valley
- Malawi
- NE Mozambique

# Rabies Vaccination

- Rabies kills at least 55,000 people per year
  - Most cases reported from Asia
- Rabies is uncommon in travellers : 27 known cases in travellers since 2000
- Exposures quite common:
  - Nepal: 1 in 6,000
  - Back packers in Thailand: licks 3.56%, bites 0.69%
  - GeoSentinel: 47 per 1000 ill travellers

# Who to vaccinate?

- Children
  - Half the victims of dog bites
  - More likely to be bitten on head
- Travellers to Asia
  - GeoSentinel study per 1,000 ill returned travellers
  - SE Asia: 124
  - South Central Asia: 90
  - South America: 25
  - Central America: 13
  - Sub Saharan Africa: 9

# Who to vaccinate?

- Travellers to countries where cell culture vaccine not available
  - Pakistan, Burma, Bangladesh, Peru and Argentina
- Long term/ expats
- Those likely to be exposed to animals
- Anyone who wants it

# How to vaccinate- IM

- Verorab 3 doses given on days 0,7 and 28 (21 days minimum): 0.5 ml IM
- Highly immunogenic
- Probably no need for future pretravel boosters
- If bitten travellers need to get two boosters

# How to vaccinate-ID

- Cheaper alternative: 0.1 ml ID d 0,7 and 28
- Must check for efficacy day 35 – 42 as only about 95% effective so 6 weeks to do
- Only 12 months protection
- Will need a booster prior to future travel
- Not if immunosuppression
- Quicker option 2 doses of 0.1ml ID on day 0 and 2 more on d 7, single 5<sup>th</sup> dose and blood test on day 21-28

# Educate all travellers about rabies

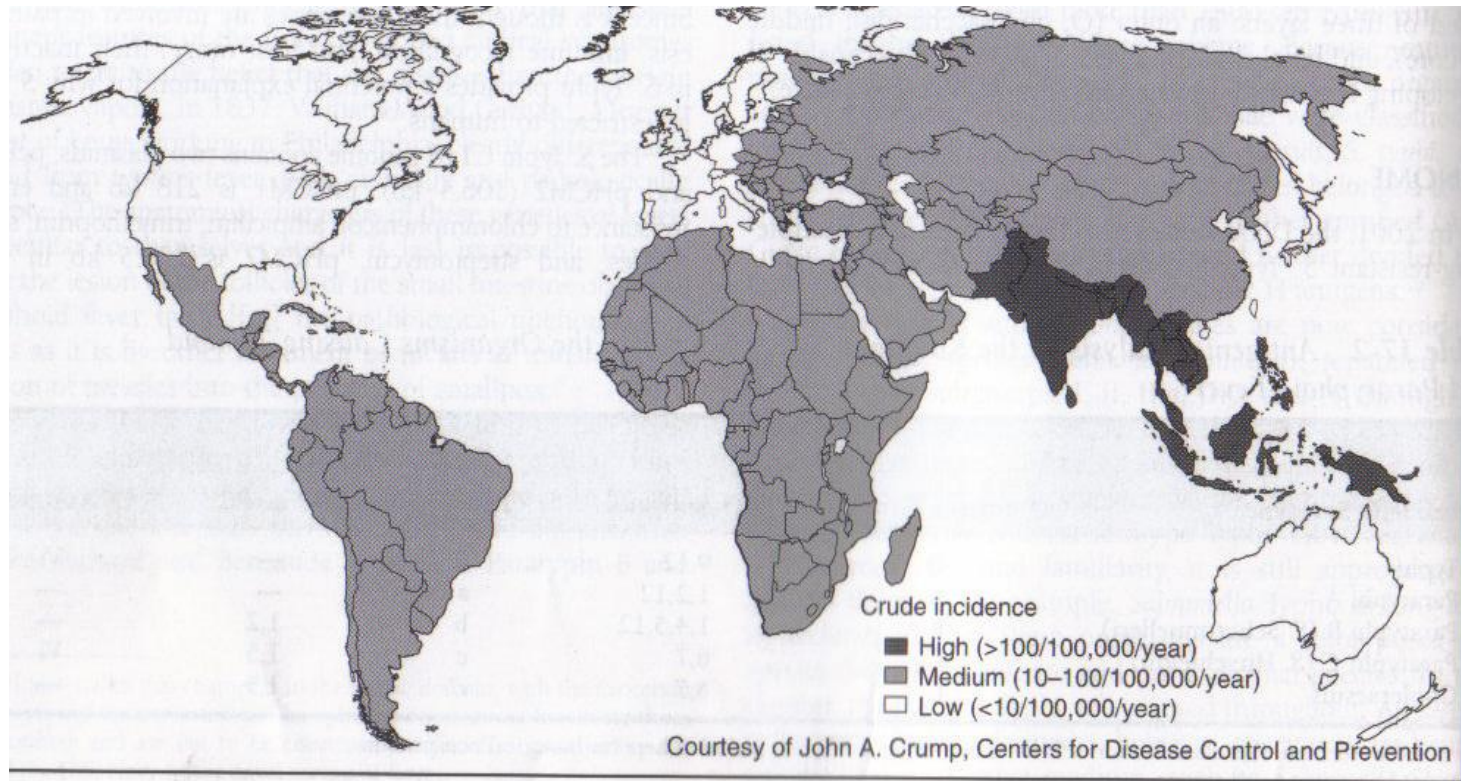
- Important to explain that in most parts of the world rabies is possible
- Try and avoid mammal bites especially dogs but any mammal including bats
- If bitten wash wound well
- If **vaccinated**: booster as soon as possible then another 3 days later



# If previously unvaccinated

- 4 doses of vaccine on days 0, 3, 7, 14
- Rabies immune globulin (RIG) 20 IU/kg body weight infiltrated at site of bite
- Acceptable vaccines are cell culture ones rather than nerve tissue (reactogenic and low immunogenicity)
  - Human diploid cell vaccine (HDCV)
  - **Rabivac<sup>TM</sup>** — purified vero cell vaccine (PVRV)
  - **Verorab, Imovax, Rabies vero, TRC Verorab<sup>TM</sup>** — purified chicken embryo cell vaccine (PCECV)
  - **Rabipur<sup>TM</sup>** — purified chicken embryo vaccine (PCECV)
  - **Lyssavac NTM** — purified duck embryo vaccine (PDEV)

# Typhoid fever



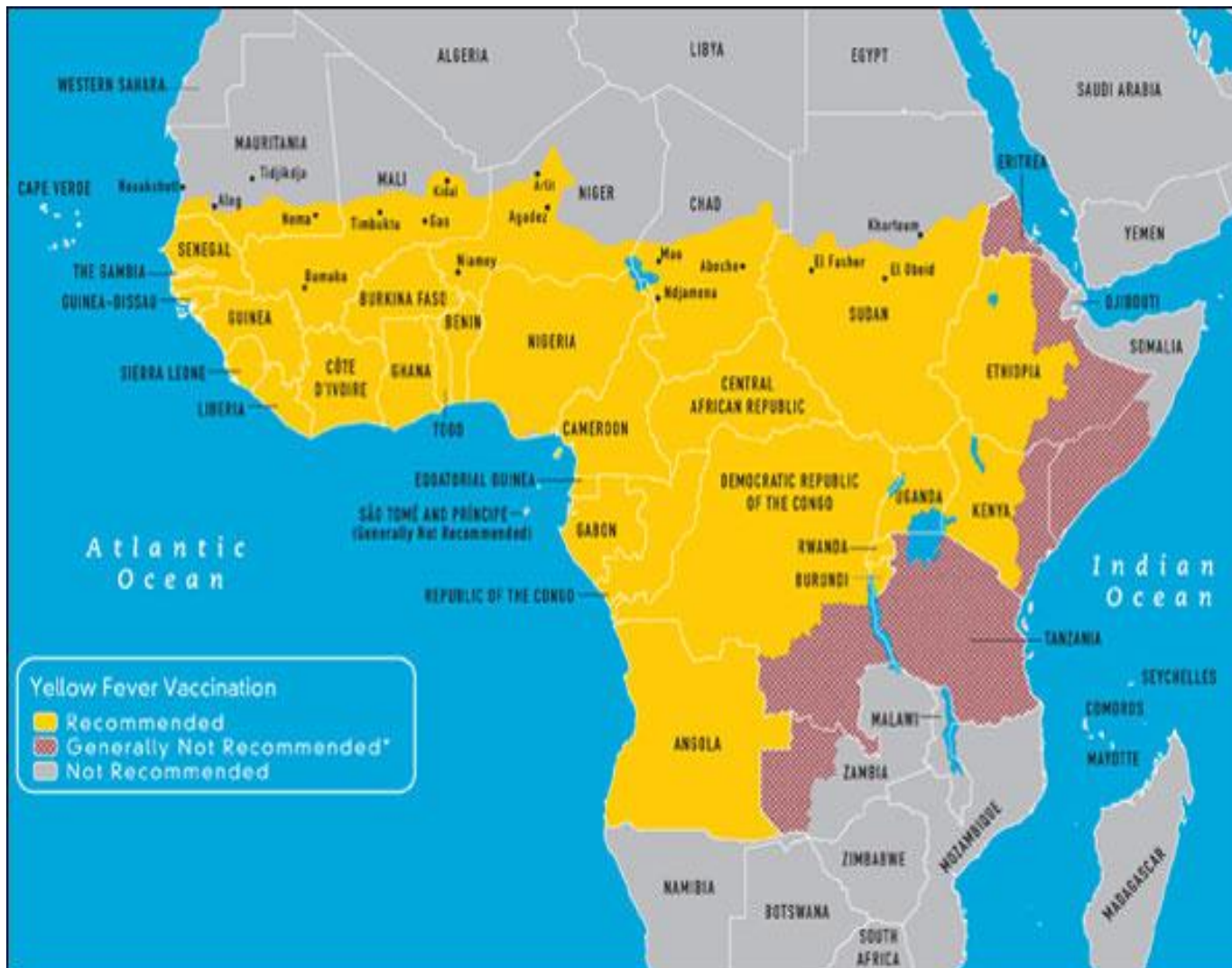
Protection following typhoid fever is neither complete nor enduring

Vaccine only protects against *Salmonella typhi* not paratyphi

# Yellow Fever Vaccination

- Between 1970 & 2009 9 cases in travellers
- 8 died, 1 had been vaccinated and survived
- Live attenuated vaccine
- Two reasons for giving it:
  - Protect traveller from illness
  - To cross borders



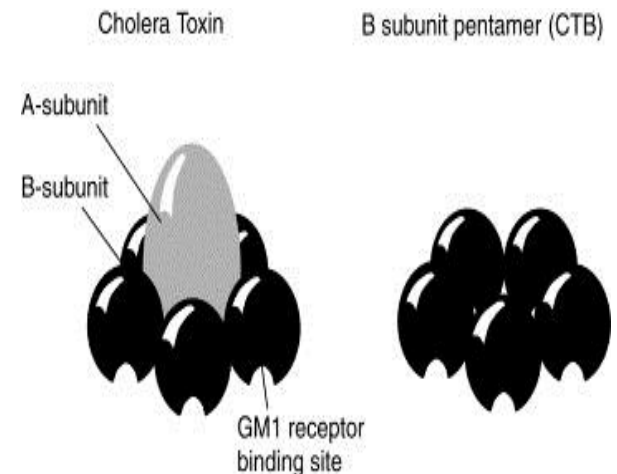


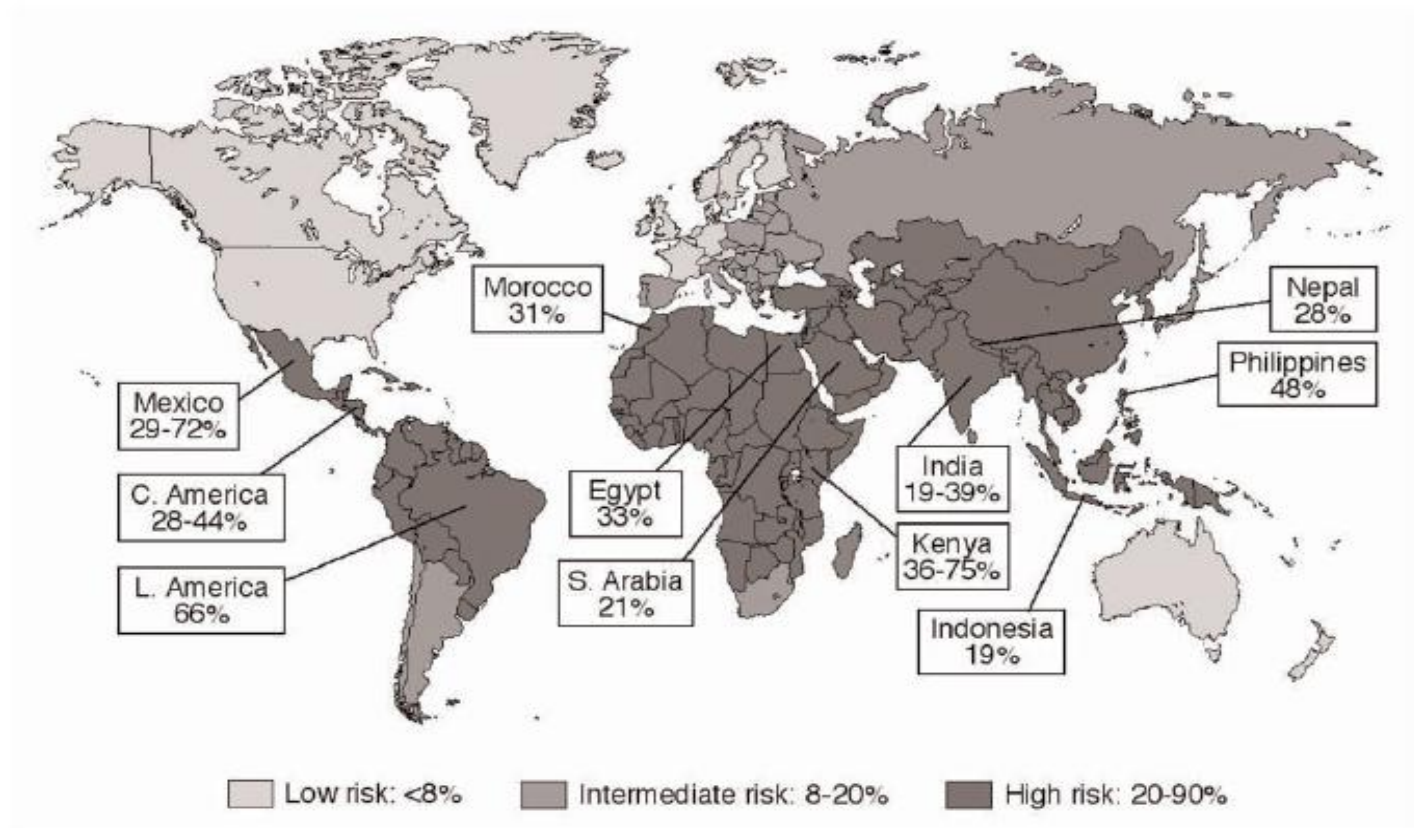
# Yellow Fever Vaccination

- Single dose, over 9 months
- About a third feel unwell in 3 to 7 days after vaccination. Generally mild
- Serious adverse events:
  - anaphylaxis- 1 in 100,000
  - neurologic-0.4-0.8 per 100,000 (1.6 >60, 2.3>70)
  - viscerotropic- (65% mortality) 0.4 per 100,000 risk factors: older age (1 >60, 2-3 >70) and thymus disease

# Cholera: Dukoral

- Inactivated: killed whole cell *V.cholerae* and recombinant cholera toxin B-subunit
- Cholera uncommon illness in travellers so usually just for health care/ aid workers
- Two- thirds of ETEC produce toxin that is similar to cholera toxin so through the B subunit there is some brief protection against ETEC





**Figure 1** Percentage incidence of travelers' diarrhea caused by enterotoxigenic *Escherichia coli*.

- Between 19 to 75% of TD is ETEC and about 60% of ETEC have heat labile toxin
- Consider it for those at high risk of TD or who would tolerate it poorly

# 3. Prescribe

- Always
  - Regular medications
- Sometimes
  - Acetazolamide
  - Antimalarial medication
  - Condoms
  - Diarrhoea self treatment
    - ORS, loperamide, norfloxacin

# Altitude

- Acetazolamide 125mg twice a day from the day before flying over 3,200m and for the first few days
  - Increased urination, tingling fingers and toes

# Malaria Prevention

- Decline in malaria in many countries and a decline being seen in travellers
- In a 12 month study we did in Auckland in 2009 no cases of malaria were diagnosed in tourist NZers. Diagnosed in VFRs, new arrivals, refugees, missionaries
- Main choices remain doxycycline, malarone or mefloquine . Primaquine may be used

# Antimalarials

|                        | <b>Mefloquine</b>                              | <b>Doxycycline</b>                      | <b>Malarone</b>                                            |
|------------------------|------------------------------------------------|-----------------------------------------|------------------------------------------------------------|
| Main SE                | Neuropsych                                     | GI, photosensitivity<br>vaginal thrush, | GI, vomiting, head<br>ache, mouth ulcers                   |
| Dose                   | 250mg/wk                                       | 100mg/day                               | 1 daily                                                    |
| Start                  | 3/52 pre                                       | 2/7 pre                                 | 2/7 pre                                                    |
| Continue<br>after risk | 4 weeks                                        | 4 weeks                                 | 7 days                                                     |
| Not for                | Epilepsy, depression,<br>psychiatric disorders | Childhood,<br>pregnancy                 | Pregnancy<br>Severe renal<br>impairment<br>(CrCl<30mL/min) |
| Cost                   | +++                                            | +                                       | ++++                                                       |

# *Malarone* for children<sup>1</sup>

- Previously only mefloquine or cut up (and no data to support this) *Malarone*
- Now Malarone Junior (NZ 11- 40kg)

| <i>Malarone Junior - prophylaxis</i> |                                                       |
|--------------------------------------|-------------------------------------------------------|
| Body Weight                          | Dosage (62.5mg atovaquone/25mg proguanil) per day     |
| 11-20kg                              | One tablet <i>Malarone Junior</i>                     |
| 21-30kg                              | TWO tablets <i>Malarone Junior</i> as a single dose   |
| 31-40kg                              | THREE tablets <i>Malarone Junior</i> as a single dose |
| >40kg                                | ONE tablet <i>Malarone</i> (adult) per day            |

- The tablet should usually be swallowed whole, but may be crushed and mixed with food or a milky drink immediately before taking.

# Antimalarials and warfarin

- 10 antibiotics including doxycycline can increase the risk of bleeding
- Mefloquine may enhance effect of warfarin
- Not much data on malarone but a report of enhanced effect with proguanil
- Get a baseline INR, start antimalarials some weeks before departure and check after a week of prophylaxis, check while away and after stopping

# Useful sites

- [www.who.int/ith](http://www.who.int/ith)
- [www.cdc.gov/travel](http://www.cdc.gov/travel)
- [www.fitfortravel.scot.nhs.uk](http://www.fitfortravel.scot.nhs.uk)
- <http://www.hpa.org.uk/Publications/InfectiousDiseases/TravelHealth/0701MalariapreventionfortravellersfromtheUK/>

# Traveller's Diarrhoea Treatment

- Rehydration most important: WHO, gastrolyte etc
- loperamide for mild to moderate
- norfloxacin if severe especially if fever
- Overseas azithromycin frequently used



Not all questions  
can be answered  
by

Google

St Nic's Church, Nottingham

You are warmly  
invited to our  
Sunday worship at  
9.00 and 10.30 am  
and 7.00 pm

There are groups for children  
and young people as part of  
our 10.30am worship.

[www.stnics.org](http://www.stnics.org)

# *Twinrix*® prescribing information

*Twinrix*® (inactivated hepatitis A and recombinant DNA hepatitis B vaccine) is available as an injection of 1.0mL, containing 720 units inactivated hepatitis A virus and 20mcg of hepatitis B protein; *Twinrix Junior*® is available as an 0.5mL dose, containing 360 ELISA units of inactivated hepatitis A virus, and 10mcg of hepatitis B protein. *Twinrix* and *Twinrix Junior* are private-purchase **prescription medicines** for active immunisation against hepatitis A and Hepatitis B virus infection. A prescription charge will apply. **Contraindications:** known sensitivity to any component of the vaccine. **Precautions:** do not administer intravenously; postpone in subjects suffering from acute severe febrile illness; will not prevent infection caused by hepatitis C and hepatitis E; not recommended for postexposure prophylaxis; has not been tested in patients with impaired immunity; ensure medical treatment is readily available in case of fainting or rare anaphylactic reaction following administration. **Common side effects** include fatigue, headache, fever, malaise, diarrhoea, nausea or vomiting, irritability, drowsiness, and local reactions such as pain, redness, and swelling at the injection site; other rarely reported reactions include flu-like symptoms, rash, anaphylactic reactions, hypotension, lymphadenopathy, myalgia, arthralgia, dizziness, convulsions and polyneuritis. Before prescribing *Twinrix* or *Twinrix Junior*, please review the full Data Sheet at [www.medsafe.govt.nz](http://www.medsafe.govt.nz). *Twinrix* and *Twinrix Junior* are registered trade marks of the GlaxoSmithKline group of companies. Marketed by GlaxoSmithKline NZ Limited, Auckland.

# *Malarone<sup>®</sup> prescribing information*

*Malarone<sup>®</sup>* (atovaquone 250mg and proguanil hydrochloride 100mg) and *Malarone<sup>®</sup> Junior* (atovaquone 62.5mg and proguanil hydrochloride 25mg) tablets. *Malarone* is a **private-purchase prescription medicine** for the prevention and treatment of *Plasmodium falciparum* malaria. Doses for children will vary according to bodyweight. **Contraindications:** in individuals with known hypersensitivity to atovaquone, proguanil hydrochloride, or any other component of the formulation; in those with severe renal impairment (creatinine clearance <30ml/min). **Warnings and precautions:** Closely monitor patients with acute malaria who present with diarrhoea or vomiting and patients with parasitaemia receiving concurrent metoclopramide or tetracycline. Coadministration with rifampicin or rifabutin is not recommended, and use caution with indinavir. Patients who vomit within 1 hour of dosing should take a repeat dose; those with diarrhoea should continue with normal dose schedule. No data are available on safety and effectiveness of *Malarone* for treatment in children who weigh less than 5kg or prophylaxis in children who weigh less than 11kg. No data are available on safety and effectiveness of *Malarone* for use during pregnancy or while breastfeeding. **Common side effects:** headache, stomach pain, diarrhoea, loss of appetite, nausea, vomiting, anaemia, neutropenia, hyponatraemia, insomnia, dizziness, rash, fever, coughing, and a temporary increase in levels of liver enzymes. Before prescribing *Malarone*, please review the full data sheet at [www.medsafe.govt.nz](http://www.medsafe.govt.nz). *Malarone* is a registered trade mark of the GlaxoSmithKline group of companies. Marketed by GlaxoSmithKline NZ Limited, Auckland.

# Malarone for children

- Previously only mefloquine or cut up (and no data to support this) malarone
- Now Malarone Junior (NZ >10 Kg, American CDC >5kg)

| Weight     | Dose  |
|------------|-------|
| 5- 8 kg    | 1/2   |
| >8-10 kg   | 3/4   |
| >10- 20 kg | 1     |
| >20-30 kg  | 2     |
| >30- 40 kg | 3     |
| >40 kg     | adult |

# Hepatitis B<sup>1</sup>

- In adults under 40 years seroprotection after 1, 2 and 3 doses is 30-55 %, 75% and 90%
- 0, 1, 2 month or 0, 7 ,21 days should be followed by 4<sup>th</sup> dose at 12 months (protection then close to 100% and higher titre)
- With *Twinrix* 10 to 15% higher protection and higher titres after 2 doses and higher protection rate in > 60s (88% vs 73%)