Weill Cornell Medicine-Qatar

Travel Medicine

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04.9.17

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- Pre-travel consultation
  - Basic elements/topics of discussion
  - Destination based recommendations
    - » Vaccines
    - » Medications
      - Antimalarials
      - Diarrhea
      - Altitude related illnesses
- Travel related illnesses
  - Common insect borne diseases

Background Information

- Medical history
- Immunocompromised state
  - Medications, HIV, cancer
- Pregnancy/Breastfeeding
- Psychiatric condition/Seizure disorder
- Recent:
  - Surgery
  - Cardiopulmonary/Cerebrovascular events
- Medications
- Allergies

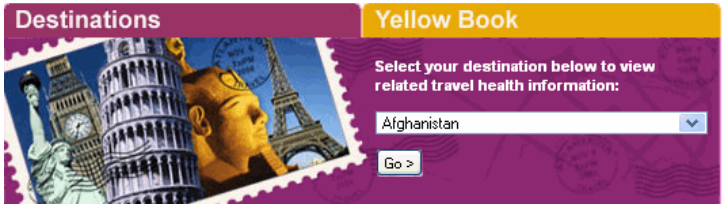
Detailed itinerary: stopovers/side trips

What is the purpose of the trip? Will there be any additional activities?

References

Travelers' Health
http://wwwnc.cdc.gov/travel

- Outbreaks
- Travel issues "in the news"
- "Destinations"
  - http://wwwnc.cdc.gov/travel/destinations/list.htm

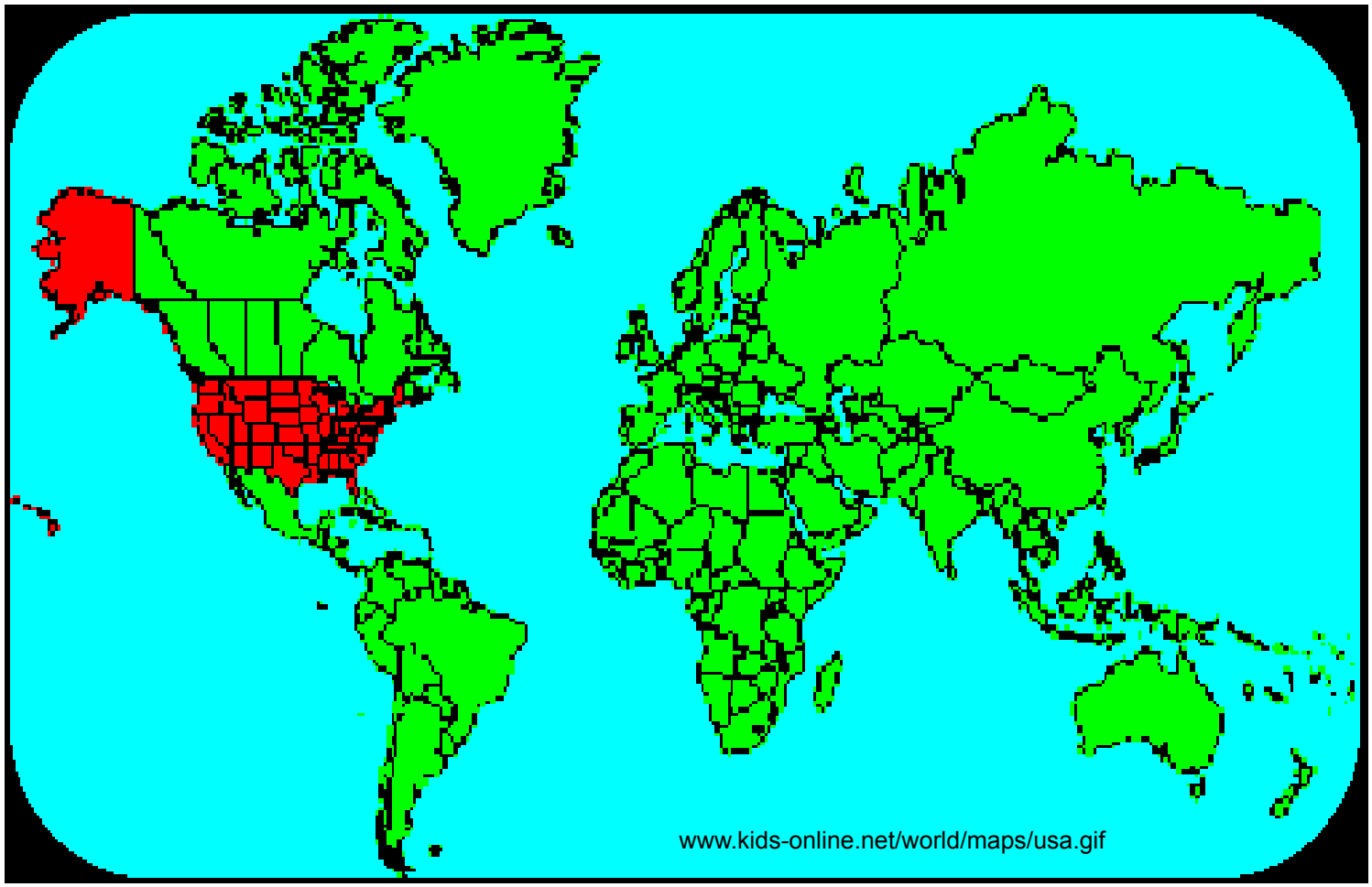


- Malaria map application
  - http://cdc-malaria.ncsa.uiuc.edu/

Keep it simple

Follow the rules

If you can get it here
You can get it there -
and it might be easier



Routine vaccinations
Not just for kids

Recommended Adult Immunization Schedule—United States - 2016

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 1. Recommended immunization schedule for adults aged 19 years or older, by vaccine and age group[1]

VACCINE ▼ / AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza*,[2]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap)*,[3]	Substitute Tdap for Td once, then Td booster every 10 yrs					
Varicella*,[4]	2 doses					
Human papillomavirus (HPV) Female*,[5]	3 doses					
Human papillomavirus (HPV) Male*,[5]	3 doses					
Zoster[6]					1 dose	
Measles, mumps, rubella (MMR)*,[7]	1 or 2 doses depending on indication					
Pneumococcal 13-valent conjugate (PCV13)*,[8]	1 dose					
Pneumococcal 23-valent polysaccharide (PPSV23)[8]	1 or 2 doses depending on indication					1 dose
Hepatitis A*,[9]	2 or 3 doses depending on vaccine					
Hepatitis B*,[10]	3 doses					
Meningococcal 4-valent conjugate (MenACWY) or polysaccharide (MPSV4)*,[11]	1 or more doses depending on indication					
Meningococcal B (MenB)[11]	2 or 3 doses depending on vaccine					
Haemophilus influenzae type b (Hib)*,[12]	1 or 3 doses depending on indication					

*Covered by the Vaccine Injury Compensation Program

- Recommended for all persons who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection; zoster vaccine is recommended regardless of past episode of zoster
- Recommended for persons with a risk factor (medical, occupational, lifestyle, or other indication)
- No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the America College of Physicians (ACP), the American College of Obstetricians and Gynecologists (ACOG) and the American College of Nurse-Midwives (ACNM).

Routine vaccinations adults

- Td or Tdap
- Influenza
- Pneumococcal

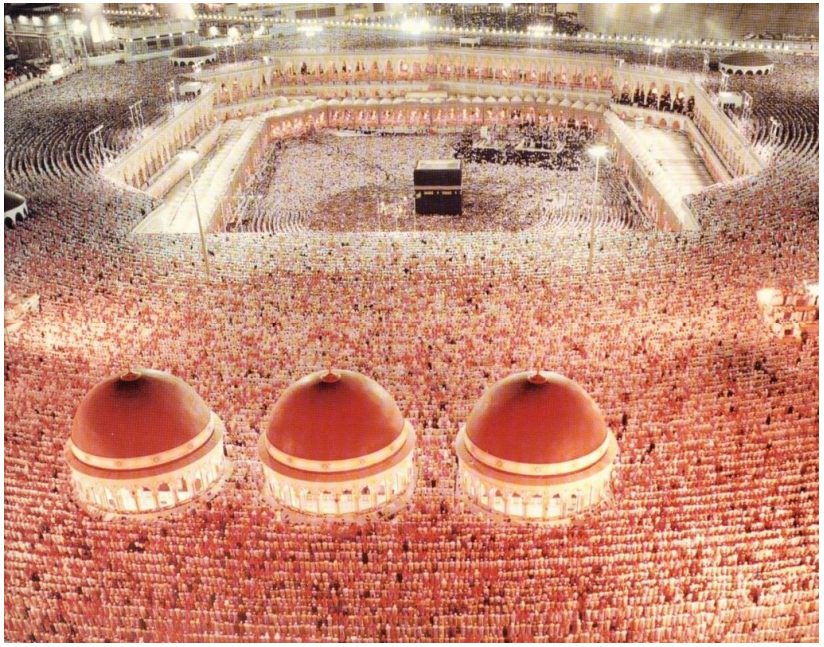
Travel related vaccines

- Required
  - By country of entry
    - May include stop overs
- Recommended
  - CDC

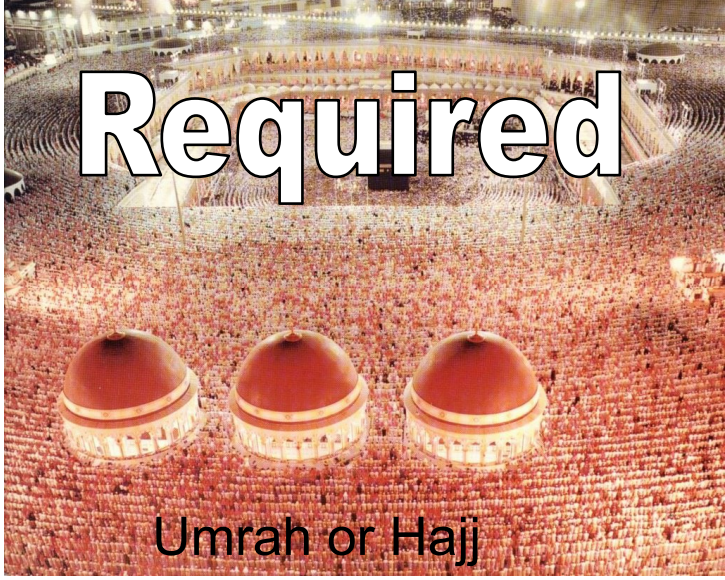
Required vaccinations

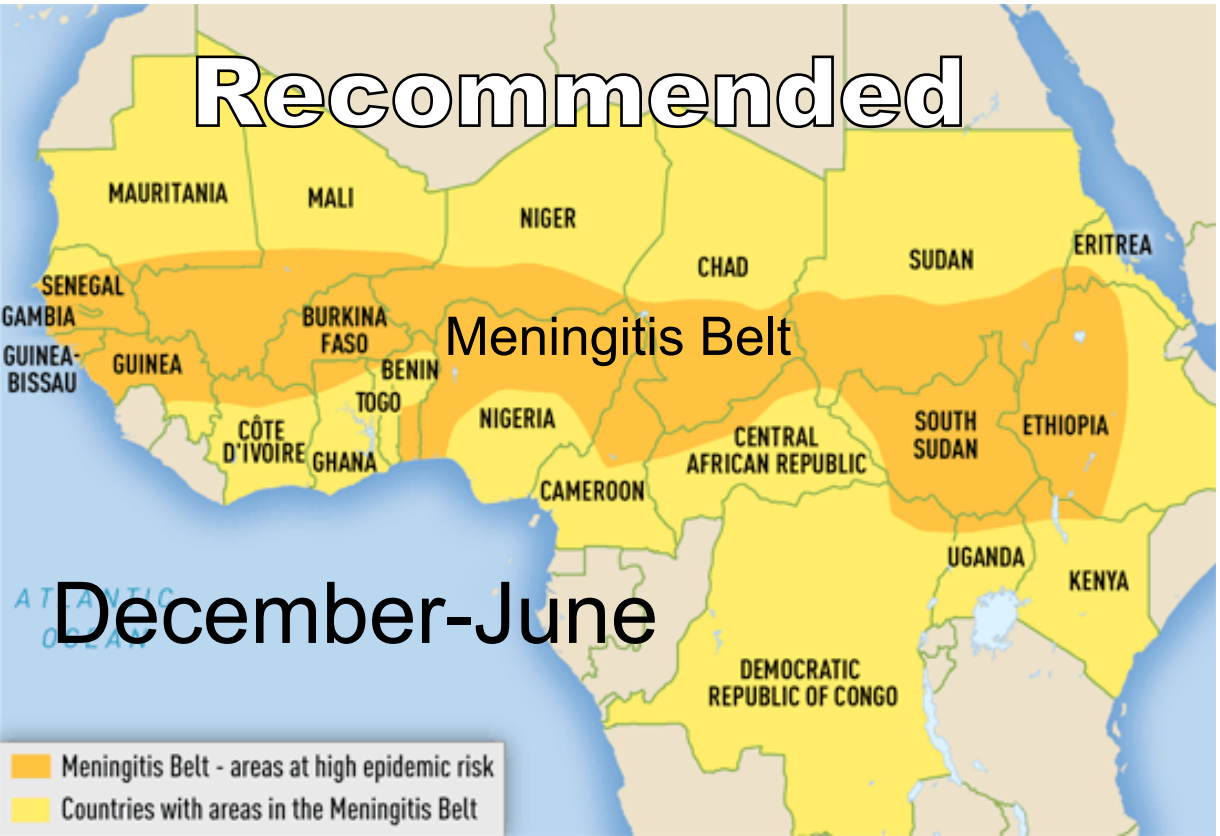
- Yellow fever
  - Areas of South America and Africa

- Meningococcal
  - Saudi Arabia
    - religious pilgrims



Meningococcal Meningitis Vaccine





It’s not required do I need it?

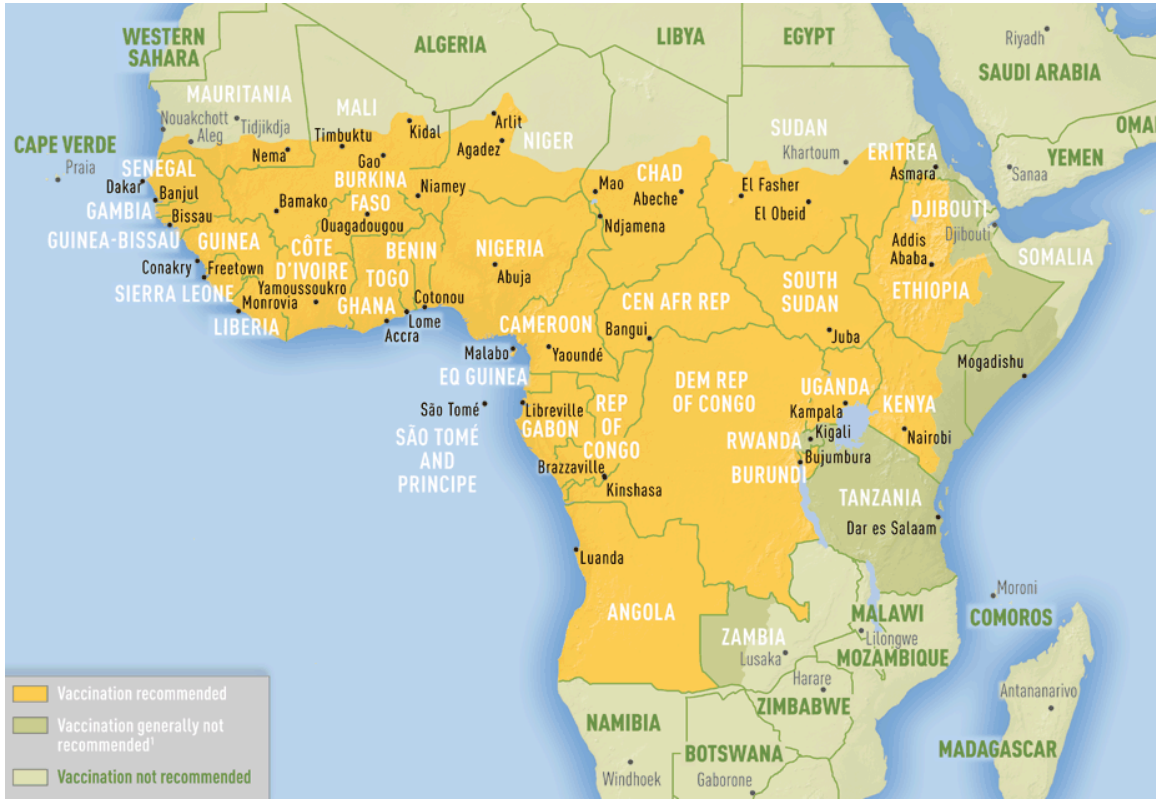
- Absolutely!!!!
- Getting sick…catching a fatal disease **will** ruin your vacation.

http://associationsnow.com/wp-content/uploads/2014/10/1028_sick.jpg

Meningococcal vaccines
Serogroups A, C, W, Y

- Conjugate vaccines (MenACWY)
  - Menactra® or Menveo®
  - Adults <55 years
  - ≥56 years
    - MenACWY preferred if
      - Previously vaccinated (MenACWY)
      - Multiple doses anticipated
    - Not licensed for this age group.
- Polysaccharide vaccine (MSP4)
  - Menomune®
  - ≥55 years vaccine naïve

Geographic areas of Yellow Fever Risk



CDC January 2017

Yellow fever – Brazil

Disease outbreak news

24 February 2017

World Health Organization

From 1 December 2016 to 22 February 2017, a total of 1336 cases of yellow fever infection (292 confirmed, 920 suspected, and 124 discarded), including 215 deaths (101 confirmed, 109 suspected, 5 discarded), have been detected in six states (Bahia, Espírito Santo, Minas Gerais, Rio Grande do Norte, São Paulo, and Tocantins). The estimated case fatality rate is 35% for confirmed cases and 12% for suspected cases. To date, the majority (86%) of the confirmed cases are men and of which, approximately 81% are aged between 21 and 60 years.

The New York Times

AMERICAS

Yellow Fever Outbreak in Brazil Prompts a State of Emergency

By DOM PHILLIPS JAN. 13, 2017

RIO DE JANEIRO — The governor of the Minas Gerais State in southeastern Brazil declared a public health emergency on Friday over an outbreak of yellow fever that appears to have killed at least 10 people so far and led to reports of more than 100 suspected cases of the disease.

The New York Times

HEALTH

UN Sends 3.5M Emergency Yellow Fever Vaccines to Brazil

By THE ASSOCIATED PRESS MARCH 30, 2017, 11:19 A.M. E.D.T.

LONDON — The World Health Organization said it and partners have shipped 3.5 million doses of yellow fever vaccine to Brazil to help the country stamp out its worst outbreak in years.

WHO helps maintain an emergency stockpile of yellow fever vaccine of about 6 million doses, intended to help poor countries. In a statement on Thursday, WHO said Brazil would reimburse the cost later; one of the five vaccine producers is Brazilian.

To date, more than 490 cases of yellow fever have been reported. Since January, WHO and partners have shipped more than 18 million vaccines to Brazil, although no accountability mechanism exists to verify how the shots are used.

SKN puts measures in place after yellow fever outbreak in Brazil

St KITTS & NEVIS OBSERVER

By **Web Editor** - April 7, 2017

"scheduling public health nurses around the clock at the airport and at the sea port… travellers who will be coming from countries where yellow fever is endemic…should be able to produce their yellow fever vaccination certificate".

Yellow Fever Vaccine Booster Doses

A single dose of yellow fever is adequate for most travelers

- Exceptions:
  - Women who were pregnant (regardless of trimester) when they received their initial dose
  - Hematopoietic stem cell transplant after vaccination if sufficiently immunocompetant to be safely vaccinated
  - HIV infected when vaccinated - booster every 10 years
  - Vaccinated >10 years ago and will be in high risk settings due to season, location, activities, and duration of their travel [Category B].
    - Prolonged period in endemic areas
    - Highly endemic areas (e.g. rural West Africa peak season
    - ongoing outbreak.
- Laboratory workers check titers every 10 years or boost

Yellow fever vaccine single dose for life

- World Health Organization adopted single dose valid life (beginning 2016)

- Uncertain when and if all countries with yellow fever vaccination requirements will adopt this change
  - Need to check individual country requirements

Yellow fever vaccine in adults

Contraindications

- Allergy to a vaccine component
- Symptomatic HIV infection or CD4 <200/mm3
- Neoplasm, transplant, immunosuppression/ immunomodulatory rx

Precautions

- Age ≥60 years
- Asymptomatic HIV infection and CD4 200 to 499/mm3
- Pregnancy
- Breastfeeding

Yellow fever vaccine reactions

Generally mild

- Headaches,
- Myalgias,
- Low-grade fever

Rare serious events

- Anaphylaxis,
- Yellow fever vaccine-associated viscerotropic disease (YEL-AVD)
- Yellow fever vaccine-associated neurologic disease (YEL-AND)

POLIO GLOBAL ERADICATION INITIATIVE

every last child

- WHO
- Rotary International
- CDC
- UNICEF
- Gates Foundation

THIS WEEK

Polio this week as of 5 April 2017

Case breakdown by country

Countries	Year-to-date 2017		Year-to-date 2016		Total in 2016		Onset of paralysis of most recent case	
	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV
Afghanistan	3	0	2	0	13	0	21-Feb-2017	NA
Lao People's Democratic Republic	0	0	0	3	0	3	NA	11-Jan-2016
Nigeria	0	0	0	0	4	1	21-Aug-2016	28-Oct-2016
Pakistan	2	0	7	0	20	1	13-Feb-2017	17-Dec-2016

NA: onset of paralysis in most recent case is prior to 2015. Figures exclude non-AFP sources. Lao PDR cVDPV1, all others cVDPV2.
cVDPV definition: see document "Reporting and classification of vaccine-derived polioviruses" at [pdf]

2017 Polio Vaccine Recommendations

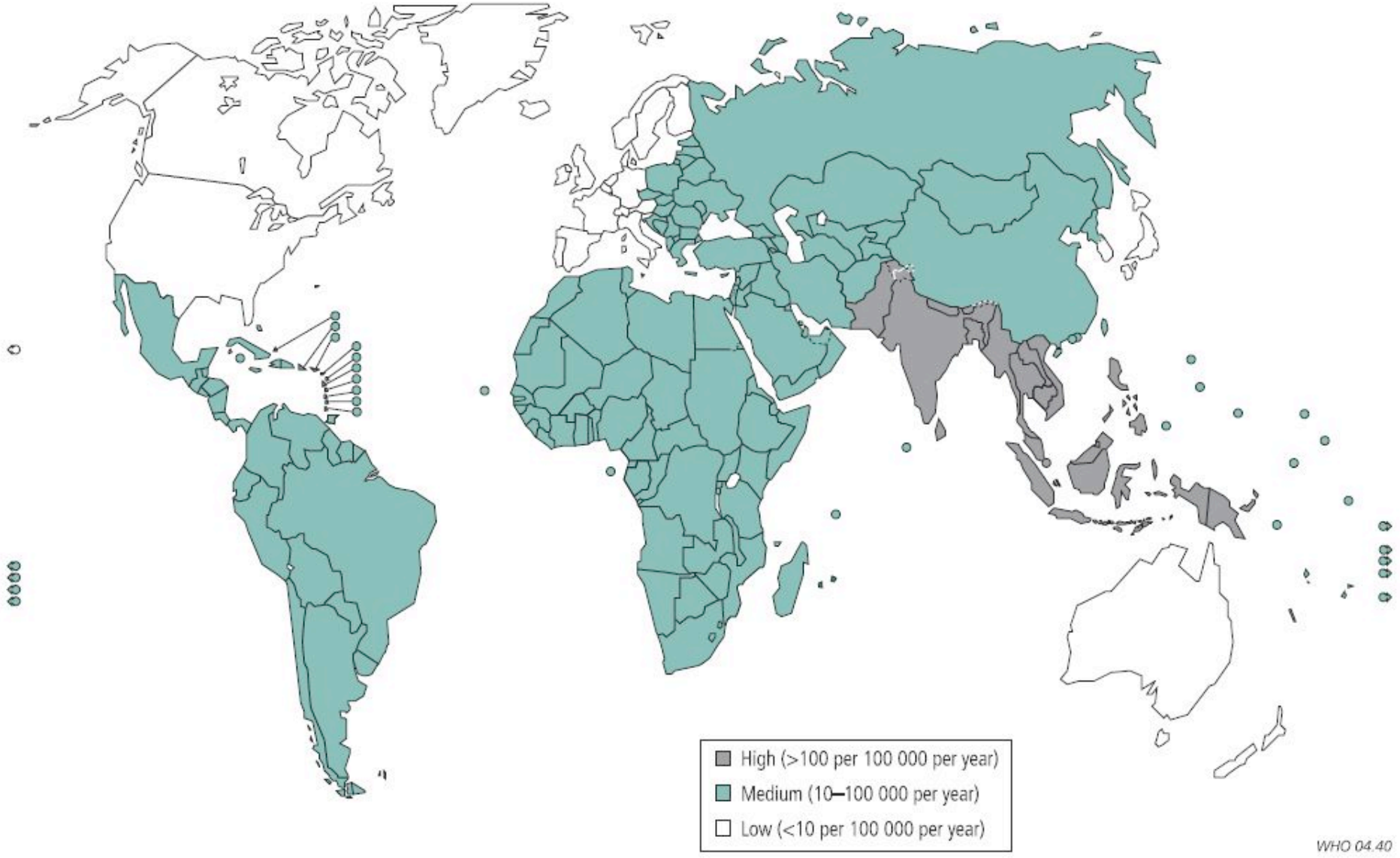
- Has completed a routine series of polio vaccine
  - adult IPV booster dose

- Unvaccinated, incompletely vaccinated, or unknown vaccination status
  - 3 doses of IPV

- >4 week stay and last dose >12 months before exit
  - additional dose of IPV or OPV in country.
    - 4 weeks – 12 months before leaving

★ **Proof of vaccination may be required**

Geographical distribution of typhoid fever



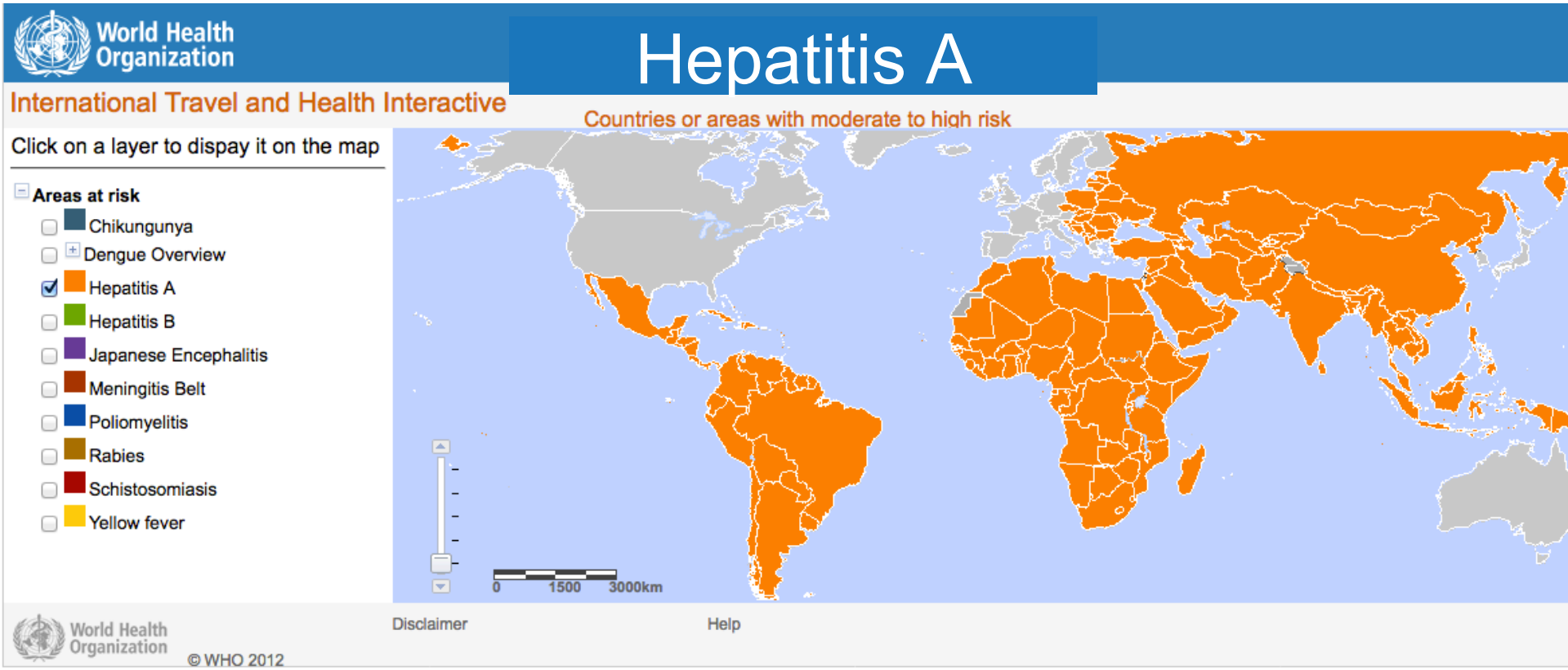
https://www.cdc.gov/globalhealth/immunization/othervpds/typhoid.html

Typhoid Vaccines

- Vaccines
  - Oral: Live attenuated
  - Injectable: Vi polysaccharide antigen
  - 60-70% efficacy against *S. typhi*; not *S. paratyphi*

- Schedules
  - Oral: 4 capsules on alternate days; booster at 5 years
  - Vi antigen: single dose; booster at 2 years

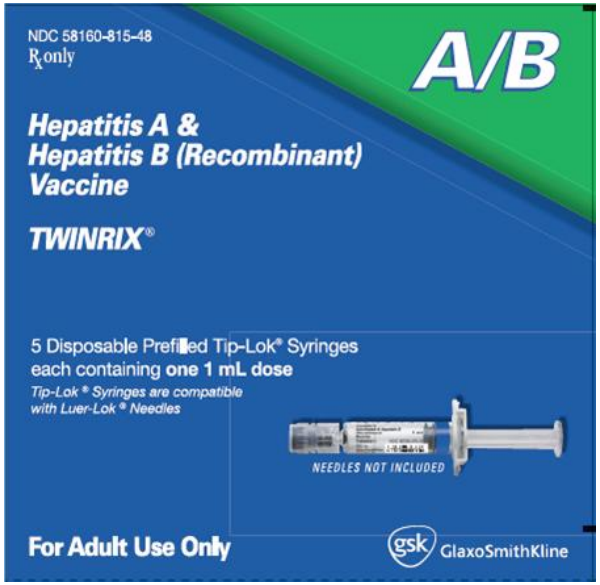
Hepatitis A



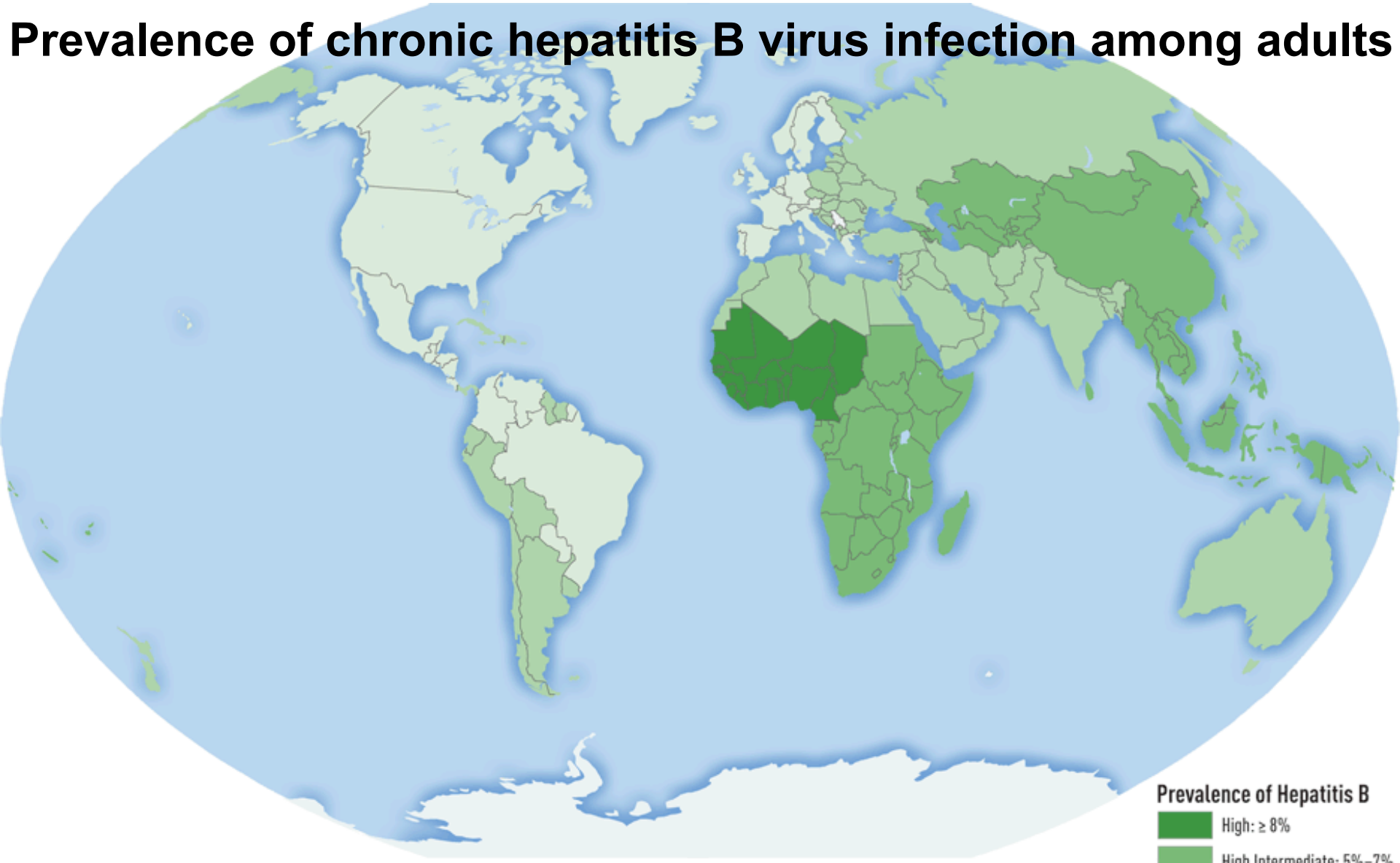
- One of the most common vaccine-preventable travel infections
- Risk related to living conditions, length of stay, area visited
  - Risk is highest: rural areas, poor sanitation (eat/drink)
  - Occur in developing countries with “standard” tourist itineraries, accommodations, and eating behaviors.

Hepatitis A vaccines

- Monovalent
  - Havrix (GlaxoSmithKline) or Vaqta (Merck & Co.)
  - Schedule; 0, 1, 6 months
  - Effective any time before departure most <40 years
- IgG (0.02 mL/kg)
  - Unable to take vaccine
  - With vaccine for optimal protection if departure <2 weeks
    - adults aged >40 years, immunocompromised, chronic liver disease or other chronic medical conditions
- Twinrix (A/B combination)
  - 0, 1, 6 months
    - **2 shots** for full hep. A protection
  - Accelerated schedule
    - 0, 7, 21–30 days + 12 months



Prevalence of chronic hepatitis B virus infection among adults



CDC 2016

Risk Factors Hepatitis B

Vaccine schedule

- 0, 1, 6 months
- Accelerated; 0, 7, and 21–30 days + 12 months

*Start the series even if it cannot be completed before departure

Meeting Coverage

ACIP: Cholera Vax Recommended for Travelers

www.cdc.gov/cholera/images/general/gen-family-standing-water.gif

by Molly Walker
Staff Writer, MedPage Today

June 22, 2016

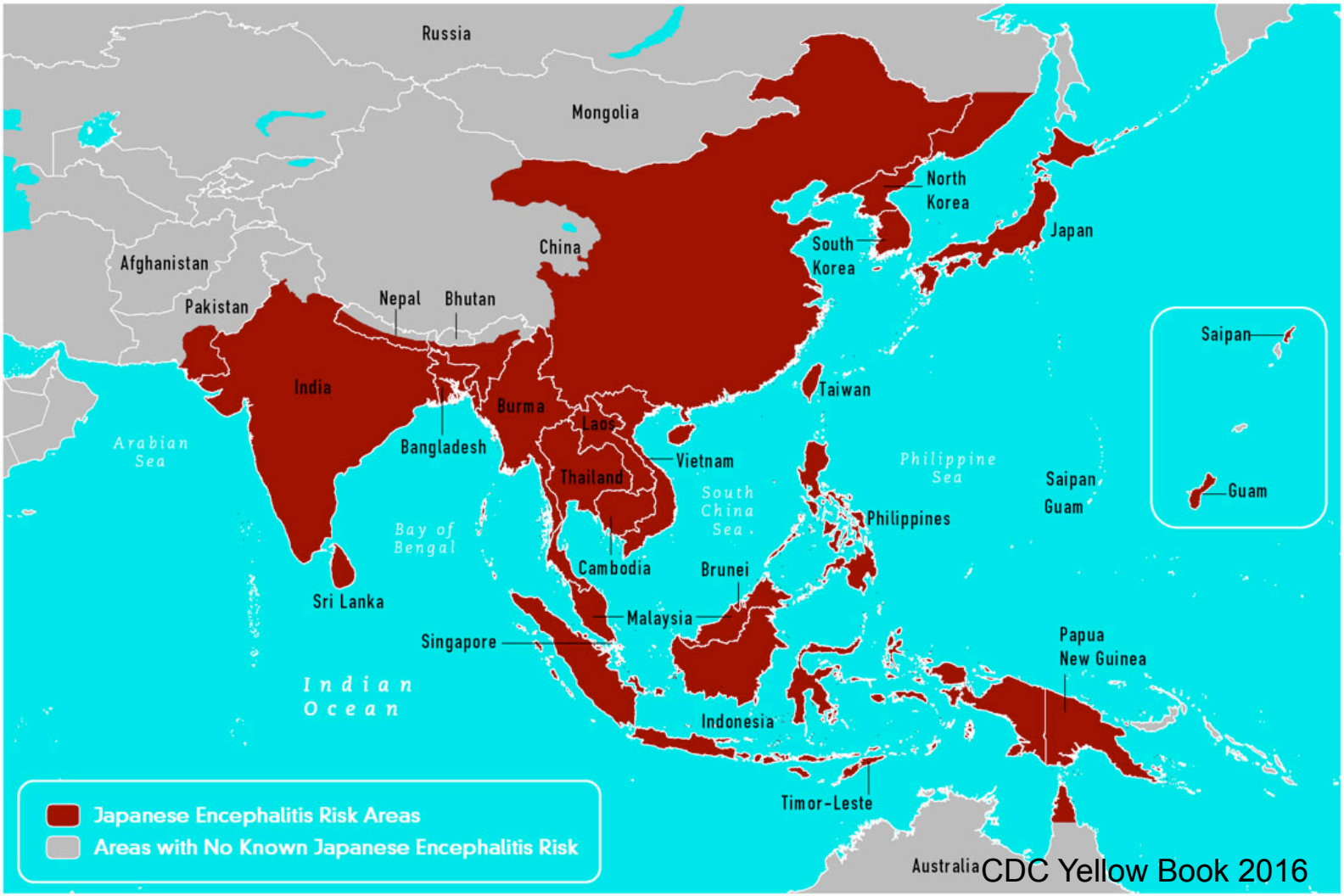
ATLANTA -- The CDC's Advisory Committee on Immunization Practices voted unanimously to recommend the newly FDA-approved cholera vaccine for use in adult travelers to areas with active cholera transmission.

This was a grade A recommendation (for all persons in an age or risk-factor based group) of the CVD 103-HgR vaccine (Vaxchora), which the FDA recently approved for preventing cholera serogroup O1 among adults 18-64 years old.

Cholera Vaccine
Vaxhora (lyophilized CVD 103-HgR)

- Adults 18 - 64 years
- Areas of active cholera transmission
  - Endemic/epidemic and includes cholera activity within the past year
- Reduce chance severe diarrhea
  - 90% at 10 days
  - 80% at 3 months
  - Duration of effect not known beyond 3-6 months
- Side Effects – uncommon
  - Tiredness, headache, abd. Pain, N/V, lack of appetite, diarrhea

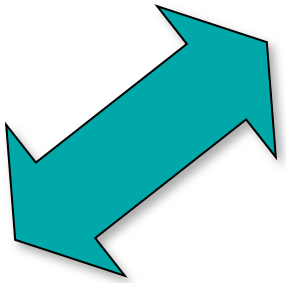
Geographic distribution of Japanese encephalitis



CDC Yellow Book 2016


http://unearthingasia.com/wp-content/uploads/2009/09/philippines.jpg


4.bp.blogspot.com/_FEjSaXfs5WU/Szkd1FucG9I/AAAAAAAALA/uas




img.chinasmack.com/wp-content/uploads/2011/04/china-garbage-pig-farm-03-300x200.jpg


http://www.judsweb.com/wp-content/uploads/outdoor%20camping%20gear.jpg

Japanese Encephalitis Vaccine Recommendations

Endemic areas during the transmission season

- ≥1 month endemic areas.
  - long-term/recurrent travelers, expatriates in urban areas with visits to rural or agricultural areas
- <1 month outside an urban with increased risk
  - substantial time outdoors rural or agricultural areas, especially during the evening or night
  - camping, hiking, trekking, biking, fishing, hunting, or farming
  - without air conditioning, screens, or bed nets.
- Ongoing JE outbreak
- Uncertain: specific destinations, activities, duration of travel

*JE vaccine is not recommended for short-term travel to urban areas or times outside of transmission season.

Japanese Encephalitis Vaccine (IXIARO)

Vaccine series

- two-dose series spaced 28 days apart
- booster dose if primary series ≥ one year previously with continued risk or potential reexposure.
- last dose should be given at least 1 week before travel.

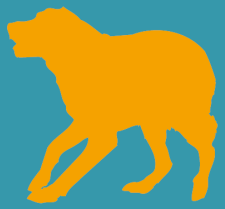
Allergic reactions

- Previous reaction = contraindication to further doses.
- Protamine sulfate, a compound known to cause allergic reactions in some people.

RABIES

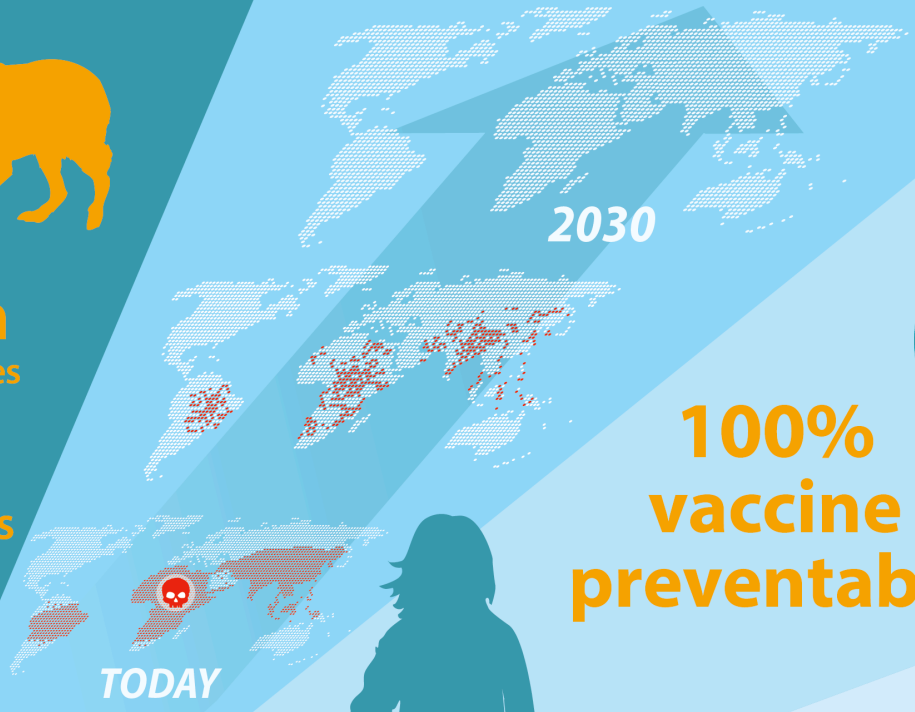
Zero deaths by 2030

99% human cases result from **dog bites**

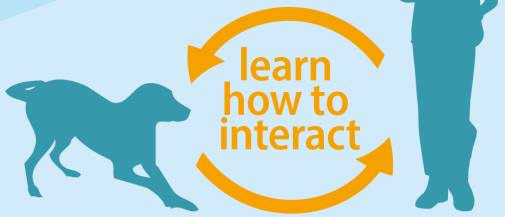


One death every **15 minutes** worldwide

4 out of 10 deaths are in **children**



100% vaccine preventable



no bite no rabies

World Health Organization

#rabies
28 September
World Rabies Day
www.who.int/rabies/en

http://badattitudes.com/MT/rabies.jpg

http://dailyridge.com/?p=4355

Table 3-16. Preexposure immunization for rabies[1]

VACCINE	DOSE (mL)	NUMBER OF DOSES	SCHEDULE (DAYS)	ROUTE
HDCV, Imovax (Sanofi)	1.0	3	0, 7, and 21 or 28	IM
PCEC, RabAvert (Novartis)	1.0	3	0, 7, and 21 or 28	IM

Abbreviations: HDCV, human diploid cell vaccine; IM, intramuscular; PCEC, purified chick embryo cell.

[1] Patients who are immunosuppressed by disease or medications should postpone preexposure vaccinations and consider avoiding activities for which rabies preexposure prophylaxis is indicated. If this is not possible, immunosuppressed people who are at risk for rabies should have their antibody titers checked after vaccination.

CDC 2016 Yellow Book

Table 3-17. Postexposure immunization for rabies[1]

IMMUNIZATION STATUS	VACCINE/ PRODUCT	DOSE	NUMBER OF DOSES	SCHEDULE (DAYS)	ROUTE
Not previously immunized	RIG plus	20 IU/kg body weight	1	0	Infiltrated at bite site (if possible); remainder IM
	HDCV or PCEC	1.0 mL	4[2]	0, 3, 7, 14 (28 if immuno-compromised[3])	IM
Previously immunized[4,5]	HDCV or PCEC	1.0 mL	2	0, 3	IM

Abbreviations: RIG, rabies immune globulin; IM, intramuscular; HDCV, human diploid cell vaccine; PCEC, purified chick embryo cell.

CDC 2016 Yellow Book

Ancient Disease

~ 2700 BC Chinese medical writings

- The *Nei Ching* - The Canon of Medicine
  - several characteristic symptoms malaria described

The New York Times

Malaria Is a Likely Killer in King Tut's Post-Mortem

By JOHN NOBLE WILFORD
Published: February 16, 2010

Ben Curtis/Associated Press

King Tutankhamen's tomb in the Valley of the Kings in 2007. Several pathologies have been diagnosed in the Tut mummy.

(Z. Hawass et al. JAMA. 2010;303(7):638-647)

The New York Times

February 8, 2011, 5:29 pm

George Clooney Answers Your Questions About Malaria

By NICHOLAS KRISTOF

“ fever, the chills, and exciting adventures in the toilet..weak..really just very bad flu conditions with a little food poisoning thrown in to make you the perfect party guest”

Symptoms of malaria in 24 civilians

Fever and chills	24
“Classical” malaria fever	7
Headache	23
Myalgias	11
Nausea/vomiting	11
Diarrhea	10
Abdominal pain	7
Weight loss	7
Lethargy and confusion	6
Fatigue	6
Pharyngitis	4

AJM 1976;61:159-164

Fever + travel = malaria until proven otherwise

"Since untreated malaria can progress to severe forms that can be rapidly (< 24 hours) fatal,malaria should always be considered in patients that have a history of exposure"*

CDC

*past travel or residence in disease endemic area

Malaria

A preventable and treatable mosquito-borne illness that killed an estimated **584,000** people in 2013, mostly African children

Global risk
WHO Malaria Report 2014

Estimated **3.2 billion** people at risk,
1.2 billion at high risk

- Area of malaria transmission
- Area of limited risk

97 countries
with ongoing transmission
13 of the countries reported no new cases in 2013

198 million
cases in 2013

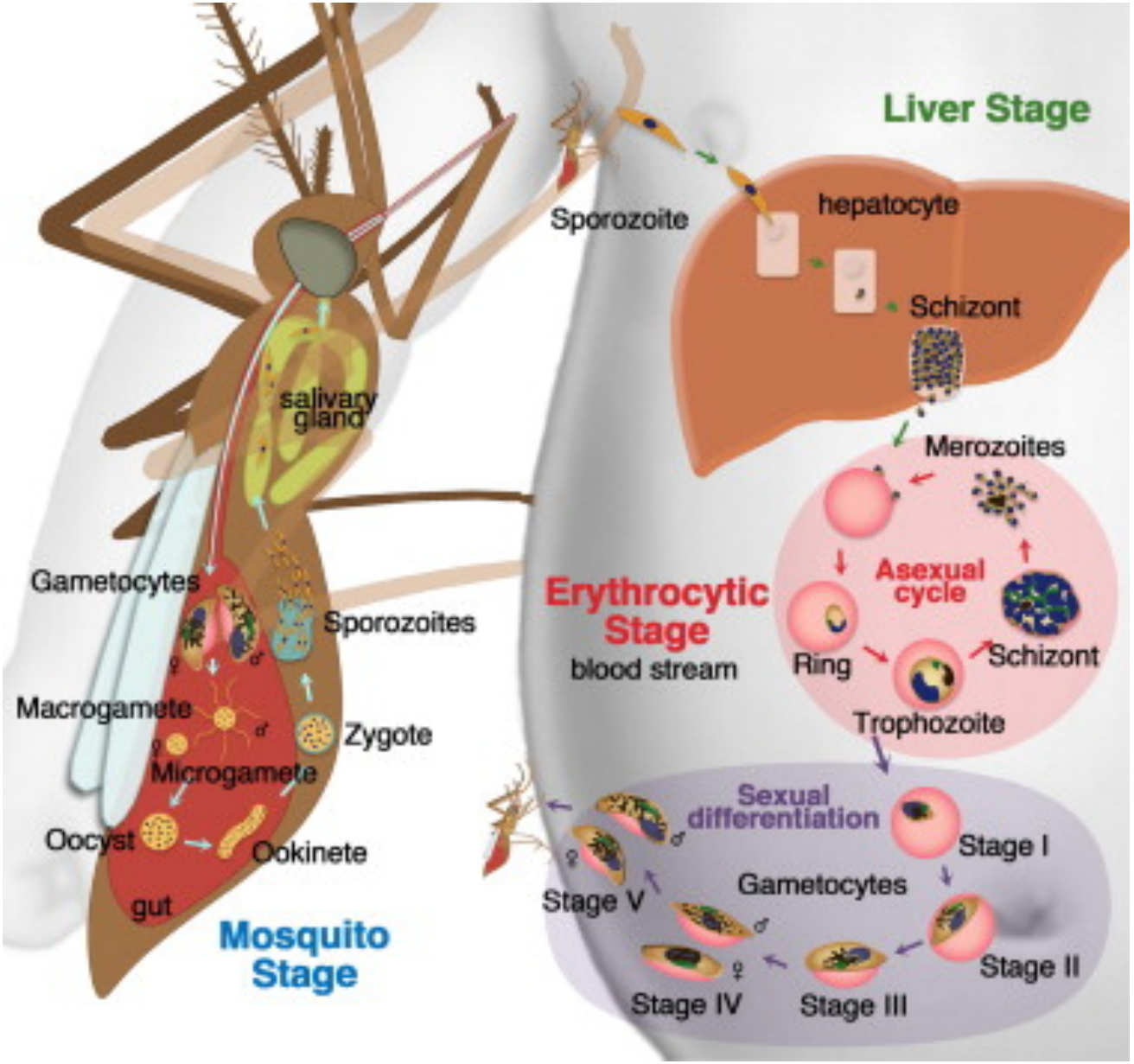
International funding for malaria control
$2.7 billion
in 2013
Target: $5.1 billion

90 percent
of all malaria deaths occur in sub-Saharan Africa

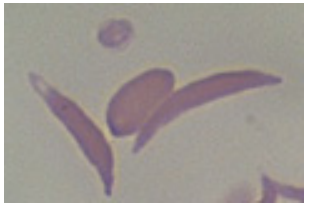
In 2013 an estimated
453,000 children under five killed

Source : WHO

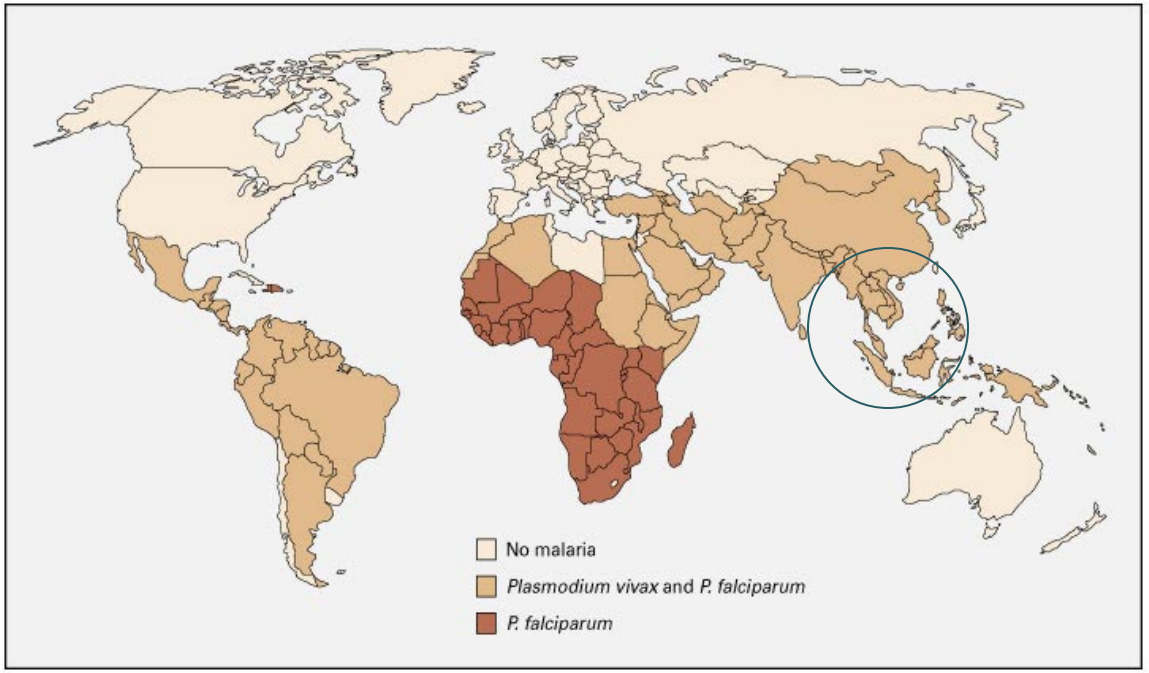
AFP



Bioorganic & Medicinal Chemistry Letters
15 May 2013, Vol.23(10):2829–2843



- *P. falciparum*
  - Africa, Guinea, Haiti, S. America, S.E. Asia, Oceana
- *P. vivax* (Duffy binding protein)
  - Central America, India subcontinent, S. America, S.E. Asia
- *P. malariae*
  - most endemic areas
- *P. ovale*
  - rare outside of Africa



- *P. knowlesi*
  - Southeast Asian country or region in Malaysia
  - Long-tailed and rhesus macaques
  - Initial description in 1930's

http://www.bbc.co.uk/news/science-environment-12424620

Malaria in “safe” destinations

www.cruiseandstay.net/images/Map_Caribbean.gif

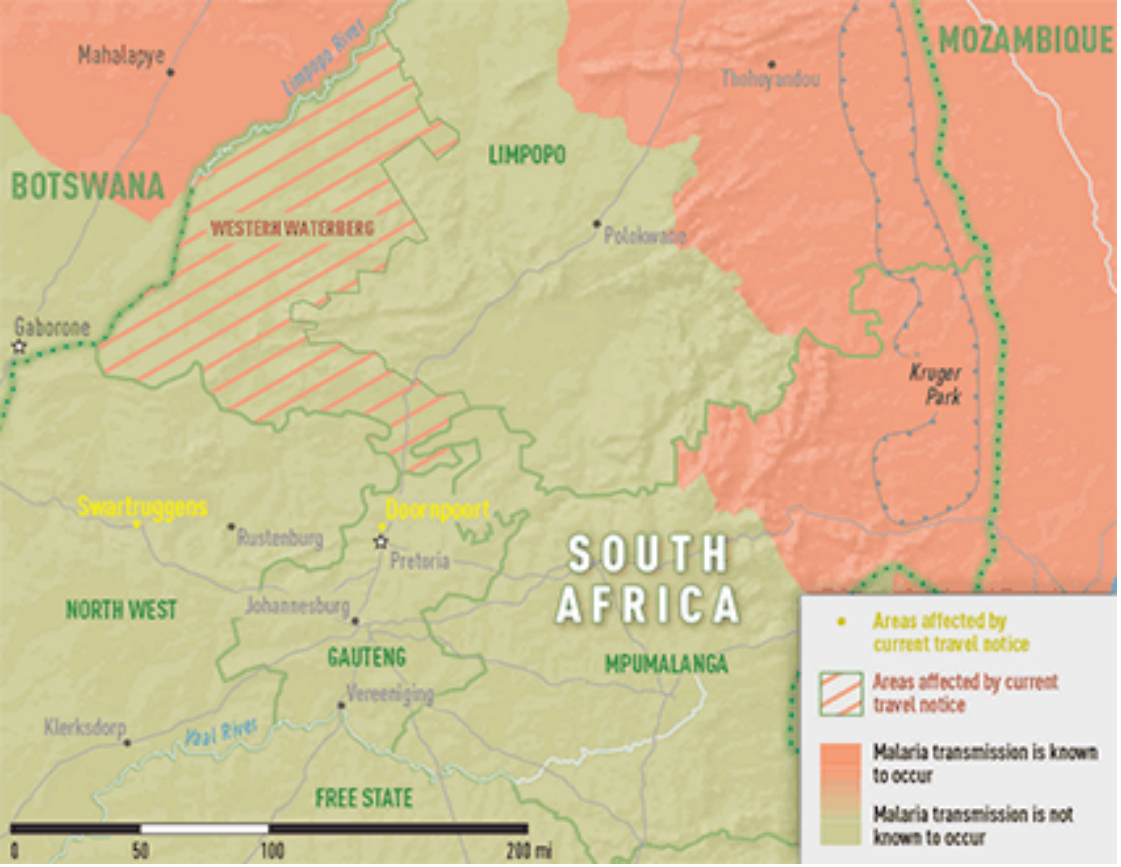
CDC Expert Commentary

Prophylaxis Guidelines for Malaria in 'Off-the-Radar' Areas

Paul Arguin, MD

Disclosures | November 23, 2015

In summer 2015, a number of cases of malaria were reported in travelers returning to the United States from the Dominican Republic (Figure).



Malaria
South Africa
March 12, 2017

53 cases of malaria where transmission does not usually occur:

- Limpopo Province- cities of Thabazimbi and Lephalale
- North West Province- Swartruggens
- Gauteng Province- Doornpoort neighborhood N. of Pretoria

CDC recommends prophylaxis:

- western Waterberg district of Limpopo Province
- Other areas normal mosquito precautions

Malaria prophylaxis

Chloroquine (if sensitive)
- Weekly, start 1 week prior to travel

Atovaquone/proguanil (Malarone)
- Daily dosing
- Nausea/vomiting, headache

Doxycycline
- Daily dosing, photosensitivity,
- Yeast infections

Mefloquine (Larium)
- Weekly, start **2 weeks** prior to travel
- Contraindicated with
  - seizures
  - arrythmias
  - serious psychiatric illness

Mefloquine (Larium)

Weekly administration

Contraindicated with

- seizures
- arrythmias
- ➢ serious psychiatric illness

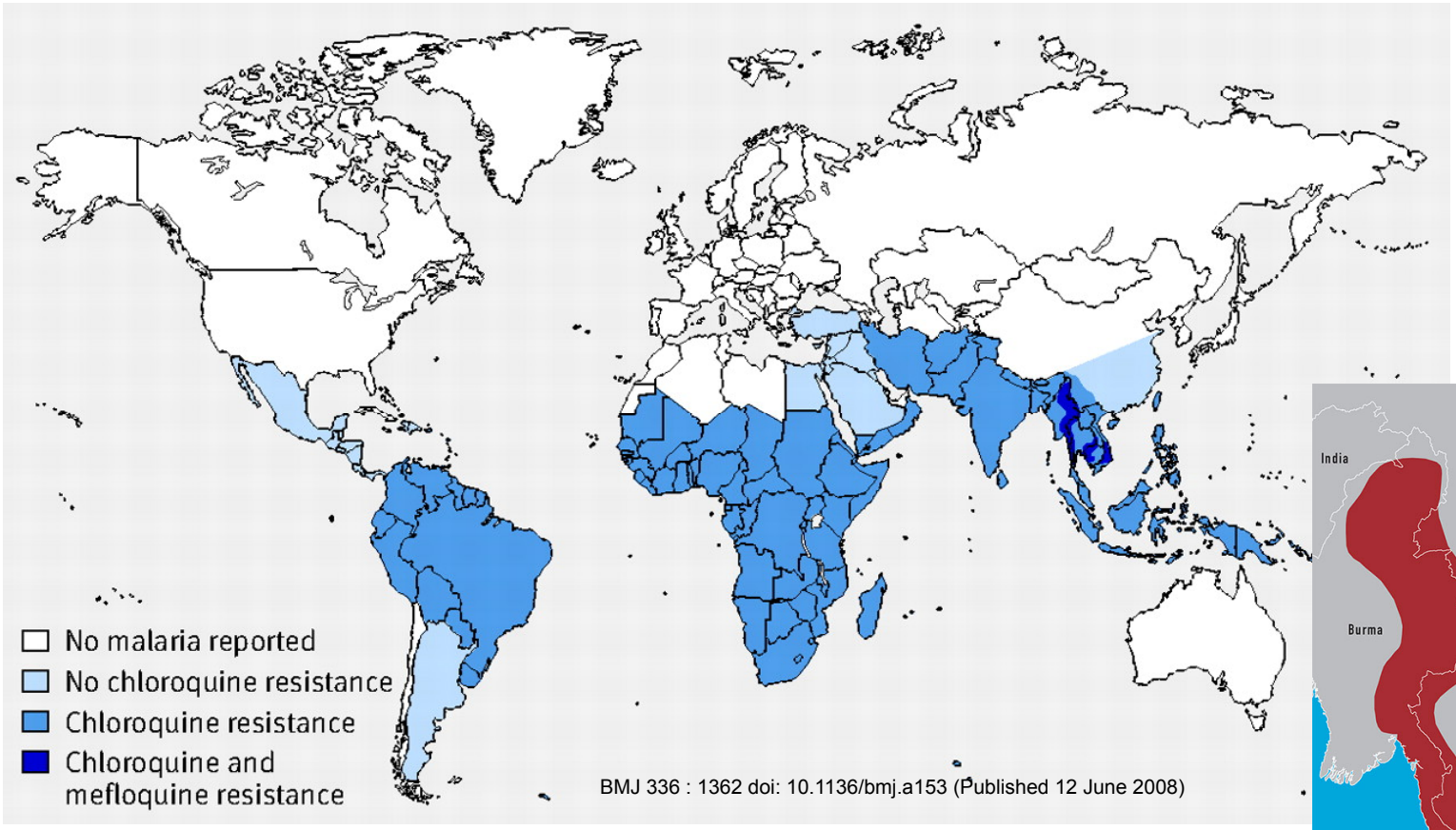
Newsday, May 21, 2002

July 2013

FDA Slaps 'Black Box' Warning on Malaria Drug Linked to Killings

"The neurologic side effects can include dizziness, loss of balance, or ringing in the ears. The psychiatric side effects can include feeling anxious, mistrustful, depressed, or having hallucinations. Neurologic side effects can occur at any time during drug use, and can last for months to years after the drug is stopped or can be permanent."

P. falciparum drug resistance



BMJ 336 : 1362 doi: 10.1136/bmj.a153 (Published 12 June 2008)

CDC - Malaria map application

CDC Malaria Map Application

Home Resources

Search

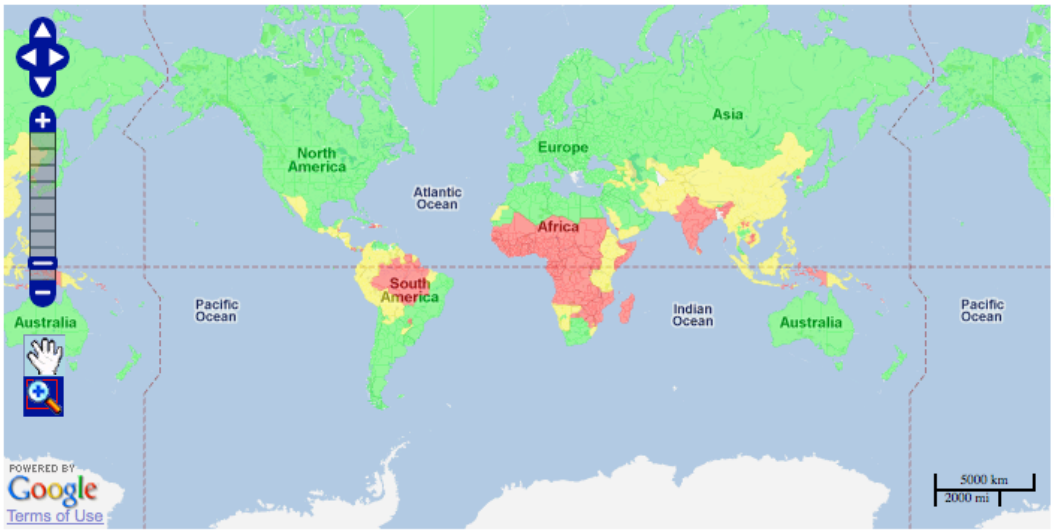
Thailand

Search all populated places (~ 6 secs)

Country
Thailand

Province

City



Alternative Color:

Choose a different color scheme:

Red, yellow, green

Map Legend:

Malaria everywhere
Read textbox for complete details
No known malaria

You searched for country named **Thailand**
Malaria in Country:

Country Name	Malaria in Country	Drug Resistance	Malaria Type	Prophylaxis for Areas with Malaria
Thailand	Rural, forested areas that border Cambodia, Laos, Burma (Myanmar). Rural, forested areas in districts of Phang Nga and Phuket. None in cities of Bangkok, Chang Mai, Chang Rai, Pattaya, Koh Samui, Koh Phangan, Phang Nga, and Phuket.	Chloroquine Mefloquine	P. falciparum 50% (up to 75% some areas), P. vivax 50% (up to 60% some areas), P. ovale remainder	Atovaquone/proguanil or doxycycline.

SCIENCE

Nobel Prize in Medicine Awarded to 3 Scientists for Parasite-Fighting Therapies

NY Times

By LAWRENCE K. ALTMAN OCT. 5, 2015

44 COMMENTS

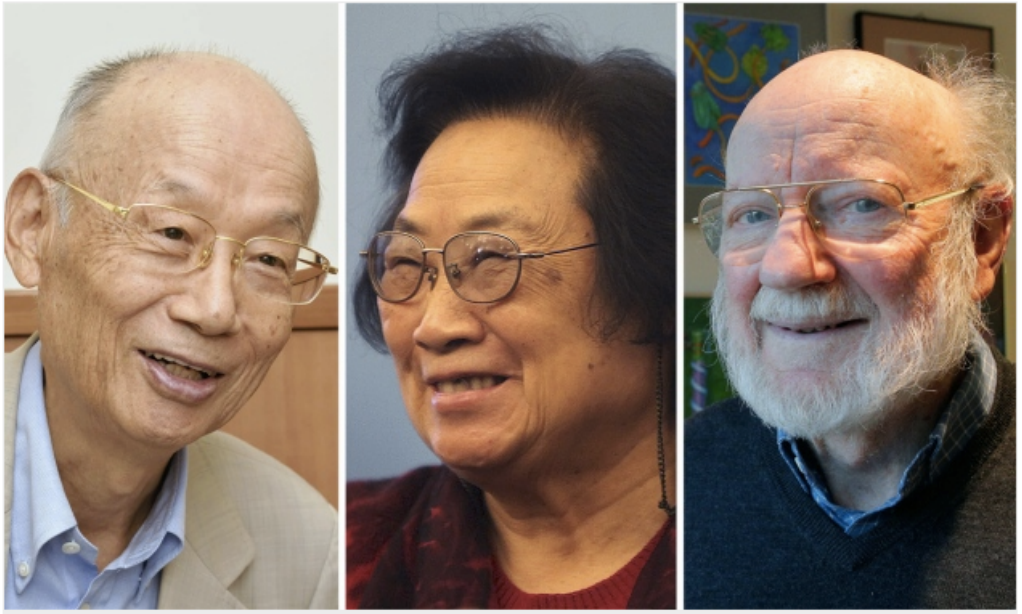
Anti-parasite drugs sweep Nobel prize in medicine 2015

Chinese pharmacologist Youyou Tu developed key antimalarial drug artemisinin.

Ewen Callaway & David Cyranoski

05 October 2015 | Updated: 05 October 2015 Nature News

PDF Rights & Permissions



The Yomiuri Shimbun via AP Images, Reuters/Stringer, Reuters/Brian Snyder.

Satoshi Ōmura, Youyou Tu and William C. Campbell.

Artemisinin

Satoshi Omura

Youyou Tu

- Artemisinin derivatives (artemether, artesunate)
  - Onset of action may be more rapid than with quinine
    - Coma, high parasitemia
  - Suppositories
  - Late recrudescence (3-4 weeks post rx)
    - Treat with additional agents (MFQ, tetracycline, pyr/sufa)
  - Artimisinin-based combination treatment (ACT)

The leaves of *Artemisia annua*, the sweet wormwood tree, are the source of artemisinin.

http://homepage.mac.com/derya/iblog/B1248376957/C1945754333/E1402415279/index.html

The New York Times

Spread of Malaria Feared as Drug Loses Potency

By THOMAS FULLER
Published: January 26, 2009

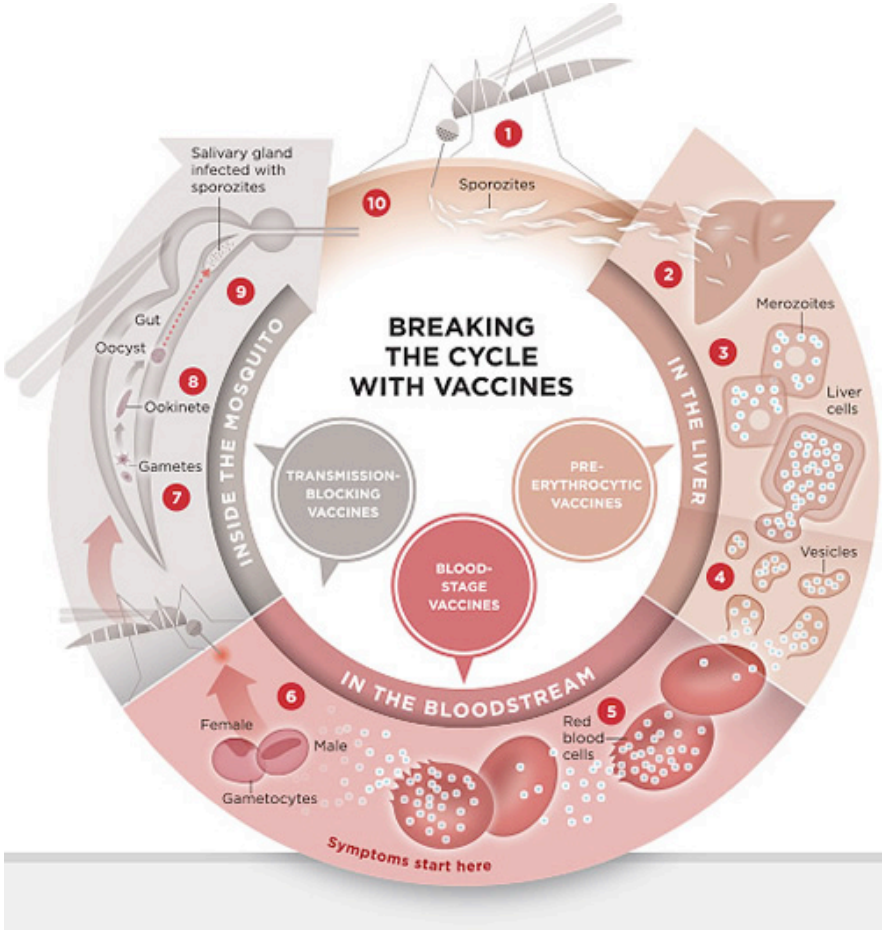
TASANH, Cambodia — The afflictions of this impoverished nation

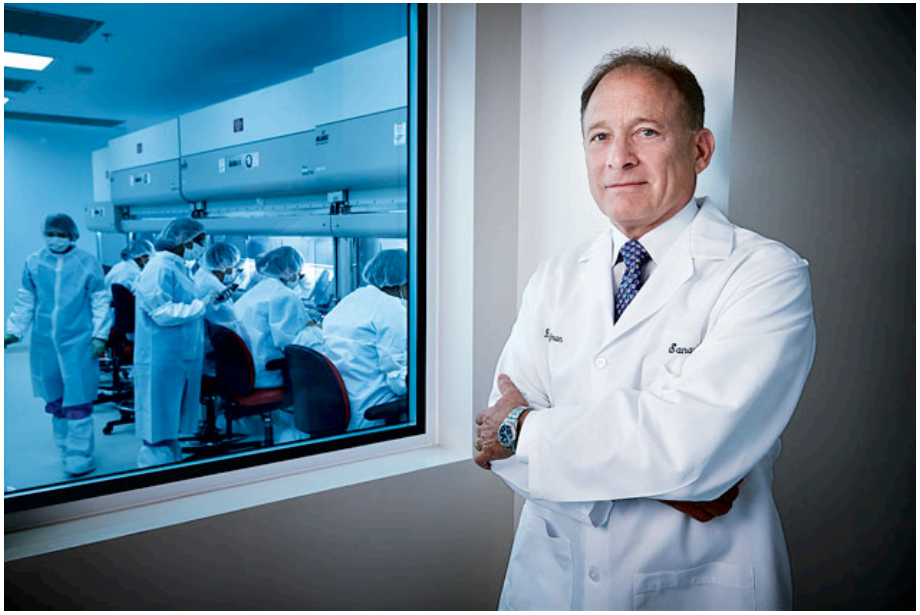
CDC 2014
Resistance in Greater Mekong subregion: Cambodia, Myanmar, Thailand and Vietnam

Thomas Fuller/International Herald Tribune

Malaria patients in the intensive care ward of the provincial hospital in Battambang, Cambodia.

2018 travelers vaccine

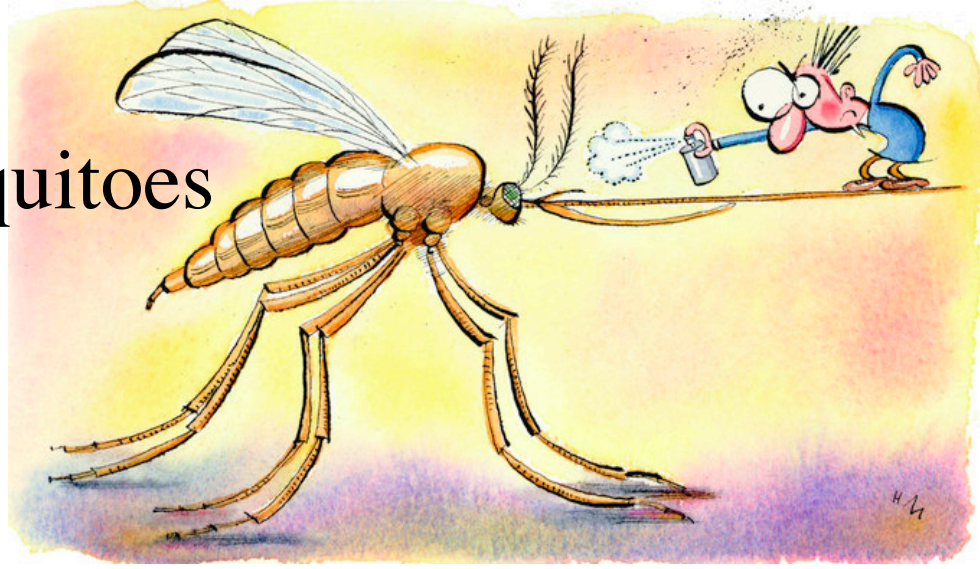




Dr. Stephen Hoffman

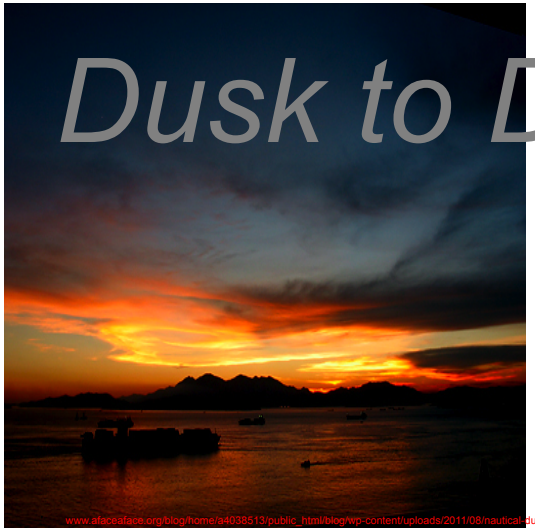
The New York Times APRIL 1, 2014

Getting the Jump on Mosquitoes



- Insect repellents
  - Conventional
    - DEET
    - Picaridin
  - Biopesticide
    - Oil of Lemon Eucalyptus (OLE or PMD)
    - IR3535

- Screened/ air conditioned accommodations



- Clothing/bed nets
  - Permethrin

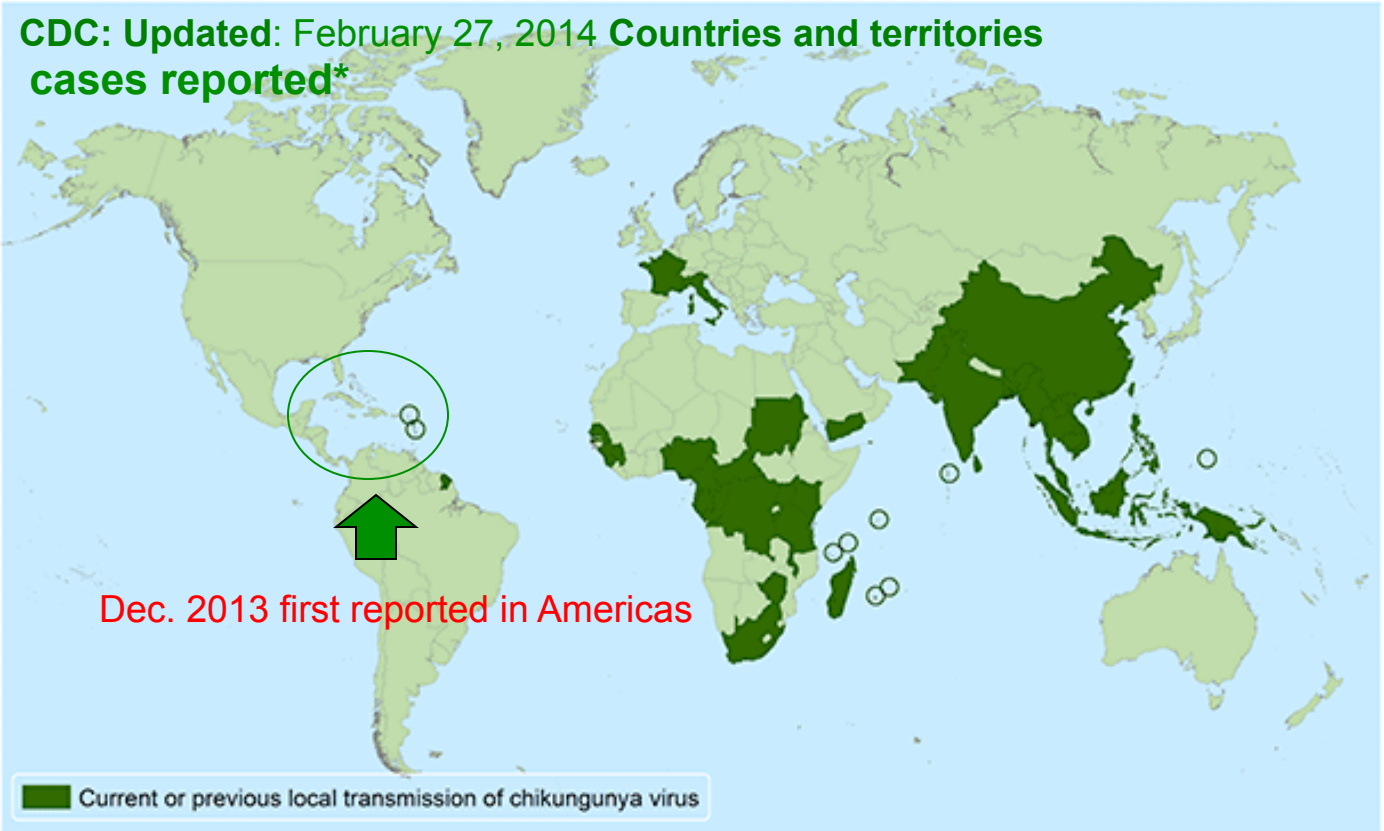
Dengue

Dengue Risk Areas
Areas with No Known Dengue Risk

Chikungunya

Makonde "*that which bends up*"
Swahili "*the illness of the bended walker*"
-joint pain/arthritis & fever
-headache, myalgias, rash


http://link.springer.com/article/10.1007%2Fs13337-010-0012-1/fulltext.html#Fig4



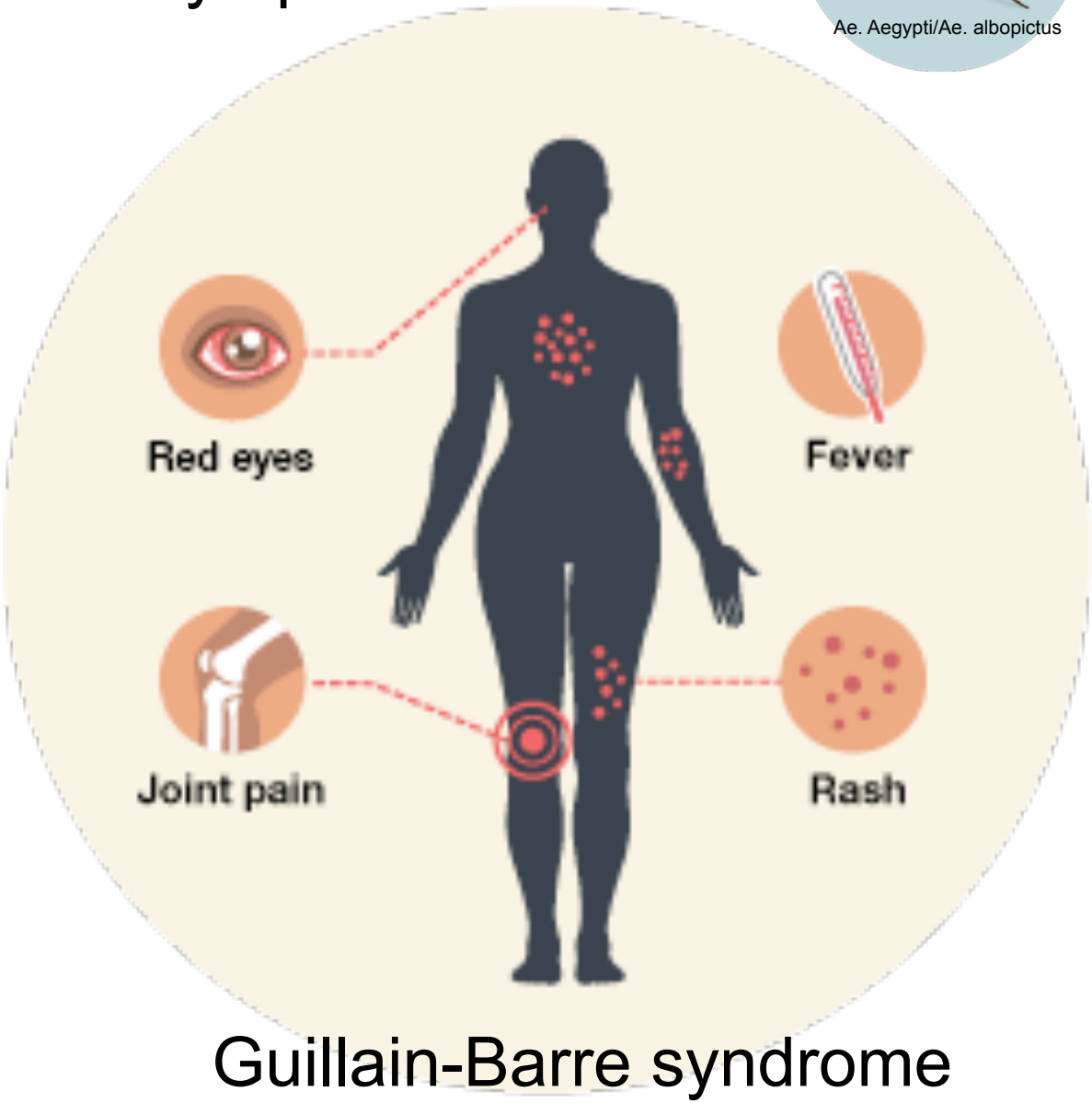
Zika Virus Infection


Ae. Aegypti/Ae. albopictus

Many people no or mild symptoms

Most common:

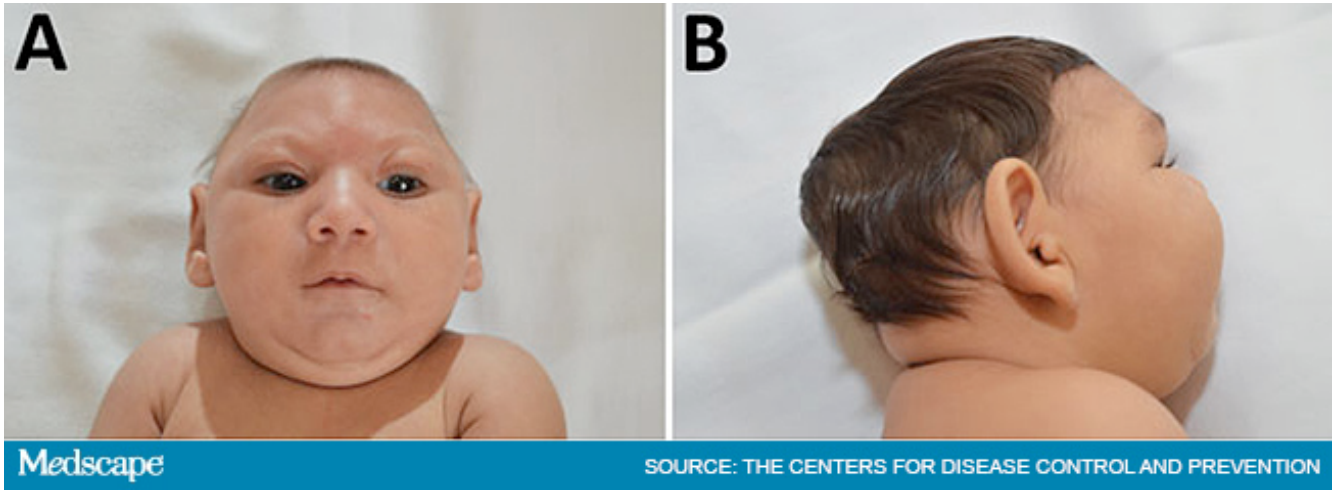
- Fever
- Rash
- Headache
- Joint pain
- Conjunctivitis
- Muscle pain



Guillain-Barre syndrome

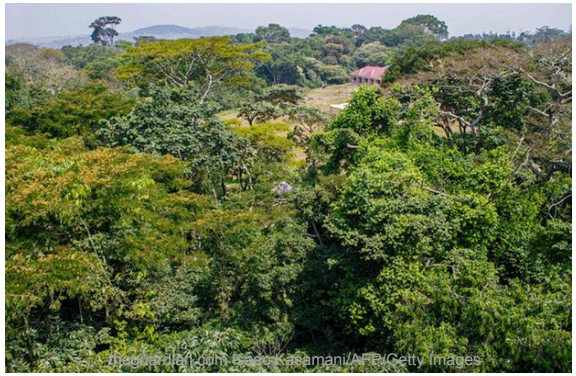
Congenital Zika Virus Syndrome Major Findings

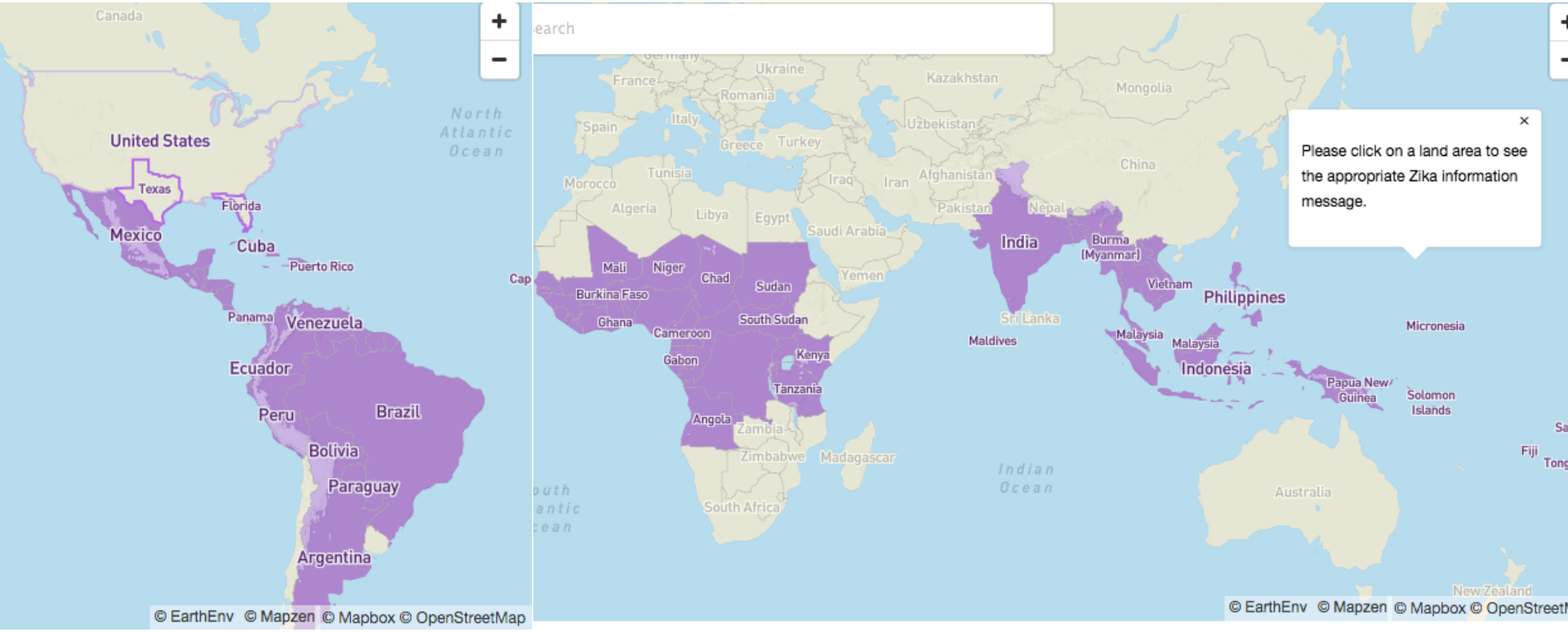
- severe microcephaly
- thin cerebral cortices with subcortical calcifications;
- macular scarring and focal pigmentary retinal mottling
- congenital contractures
  - clubfoot or arthrogryposis
  - hypertonia restricting body movement soon after birth.



Countries and Territories with Zika Virus

First discovered 1947 in the Zika Forest in Uganda





International areas

Zika Travel Recommendation: Low elevation High elevation

No Known Zika:

CDC 2016

Travel to Zika virus endemic area and pregnancy advice

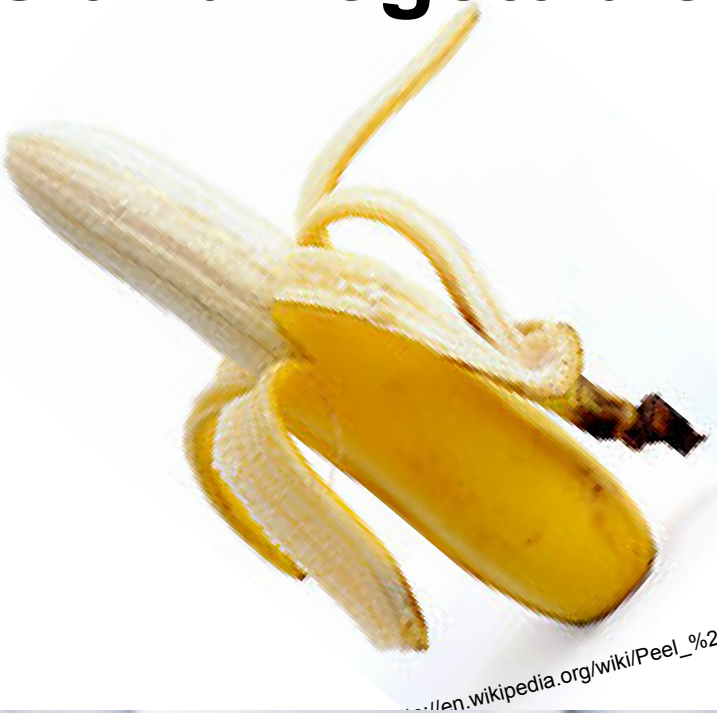
- If without symptoms of infection wait **at least 8 weeks** post travel before attempting pregnancy to minimize risk.

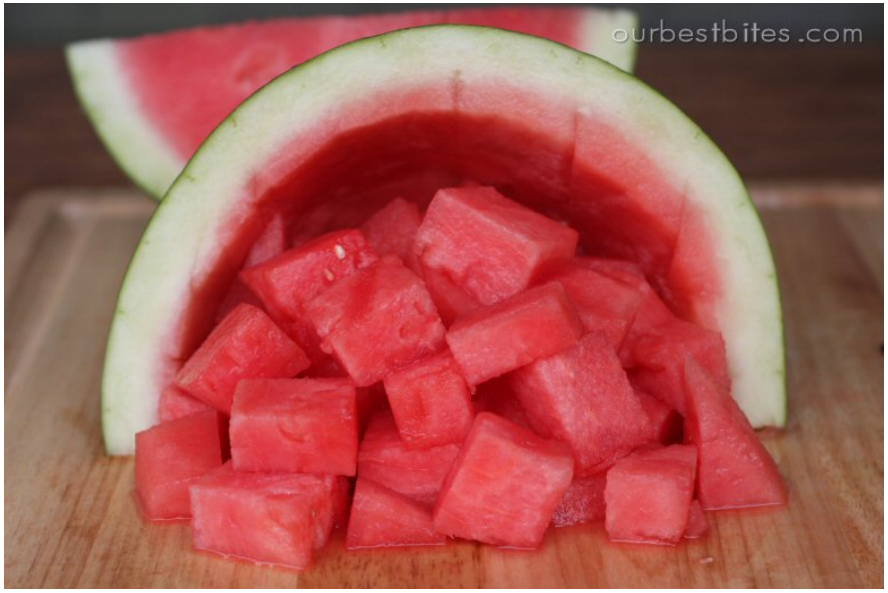
- Men with a pregnant wife should for the **duration of the pregnancy**:
  - Use condoms every time they have sex or
  - Not have sex

- Men who have confirmed Zika or symptoms of Zika should for **at least 6 months** after symptoms begin
  - Use condoms or
  - Not have sex

CDC 2016

Fresh fruits and vegetables?





What can you drink?


http://www.b...n.com/rogo/DSCN0479.JPG


http://www.strangebrew.ca/swig/boil.jpg


got
(pasteurized)
milk?
foodinsight.org/FACTS

Fecal – Oral

- Brush teeth with bottled water
- Shower
  - Don't drink the water
- Airplane food
  - --Take care - where was the last port?
- "The best" resorts/hotels
  - Not safe- field sanitation is the issue

Diarrhea

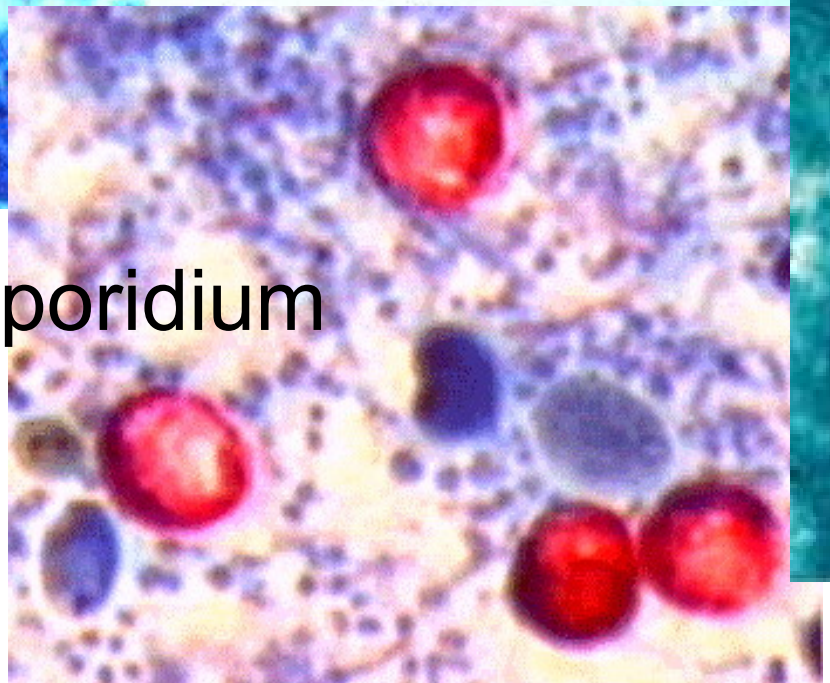
- Bacteria most common cause
  - Enterotoxigenic Escherichia coli
  - Campylobacter jejuni,
  - Shigella spp., and
  - Salmonella spp.
  - other E. coli species
- Imodium (Loperamide) →
- Empiric treatment
  - Fluoroquinolone (ciprofloxacin or levofloxacin)
    - Single dose - 3 days
    - Tendon rupture
    - SE Asia resistant Campylobacter isolates
  - Azithromycin
  - Rifaximin
    - noninvasive strains of E. coli
    - No fever or blood in the stools

Parasites
The exotics

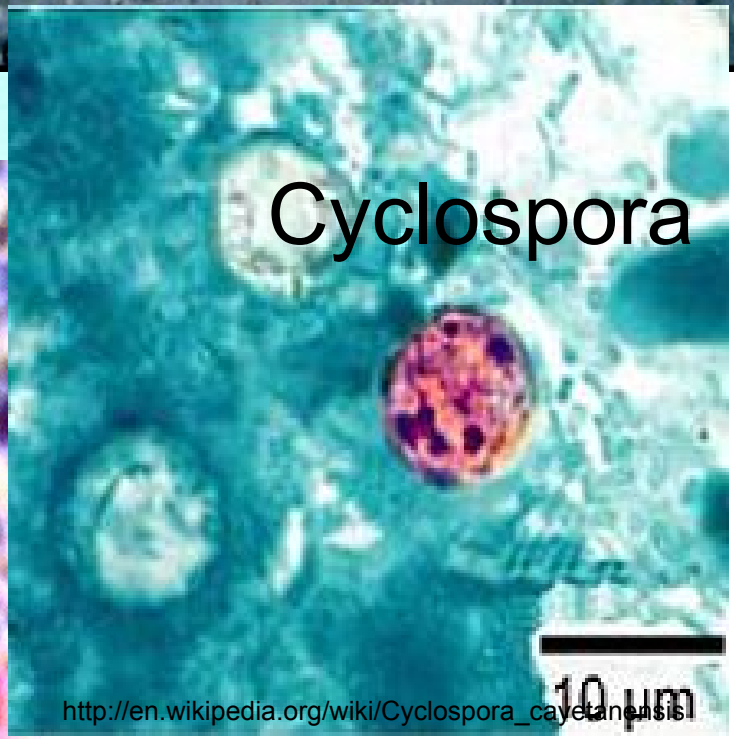
Giardia = #1

CDC

E. histolytica



Cryptosporidium



Cyclospora

10 µm

http://en.wikipedia.org/wiki/Cyclospora_cayetanensis

Giardia lamblia

water.usgs.gov/pubs/ FS/fs-027-01/

Fecal contamination

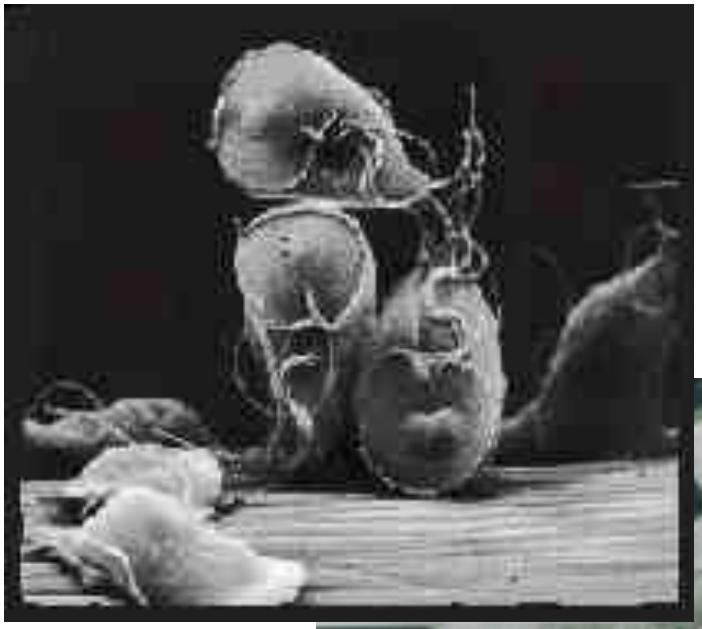
- Cysts in food or water
- Streams
  - beavers
- Day care centers

Symptoms

- Diarrhea with foul smelling stools
- Flatulence

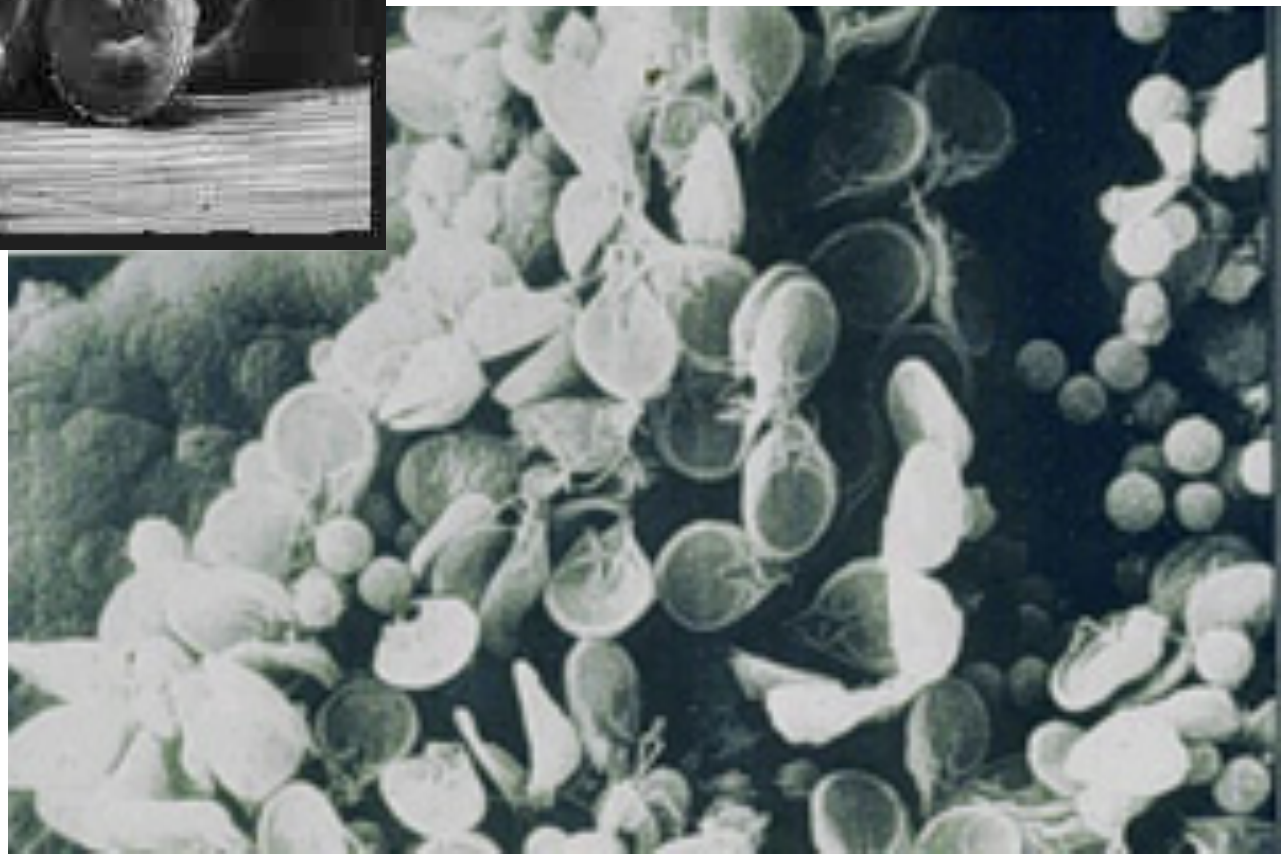
Phil Walczak / KTUU

www.bayareahiking.50megs.com/columns/Giardia1TN.jpg



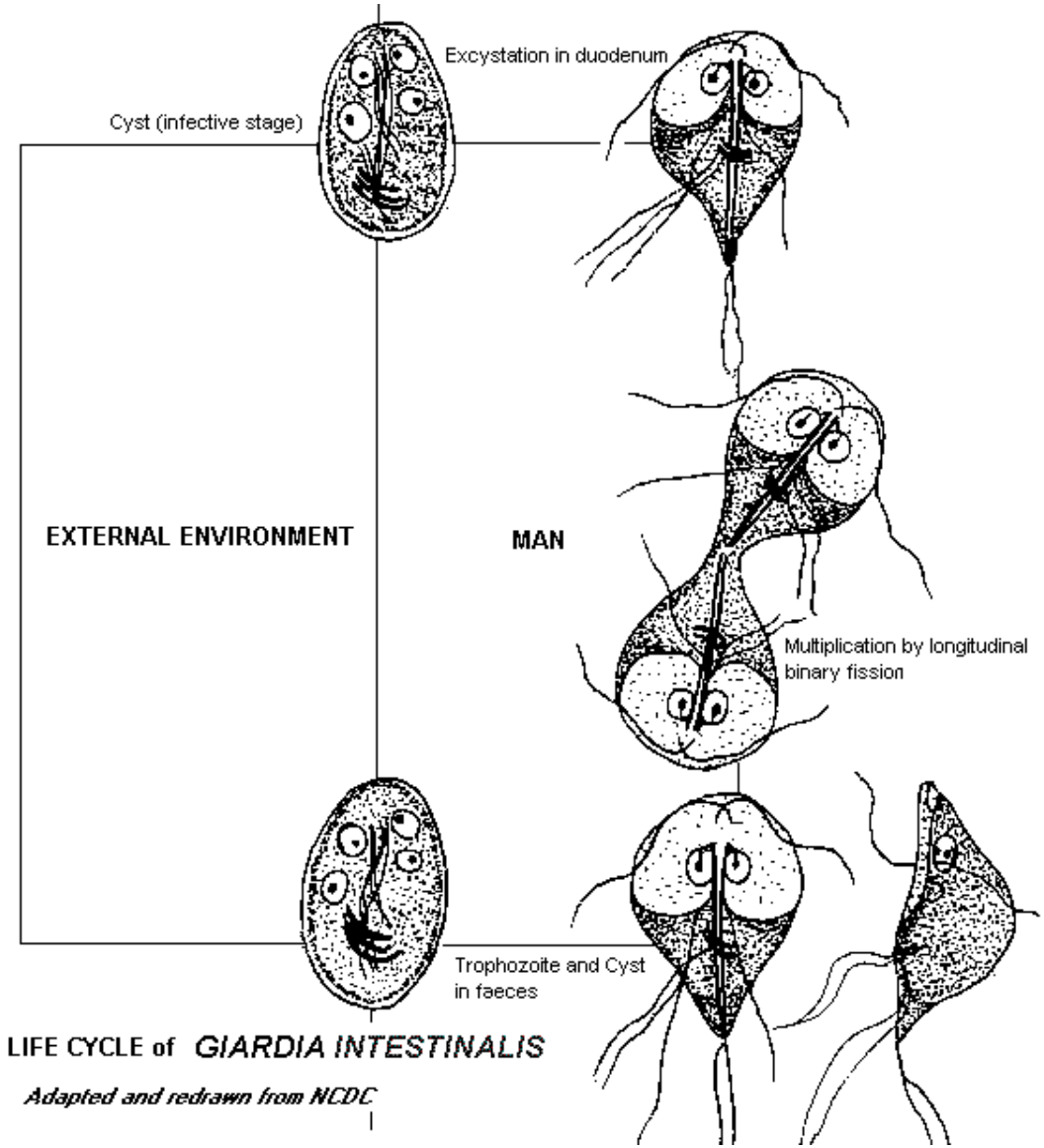
Giardia lamblia

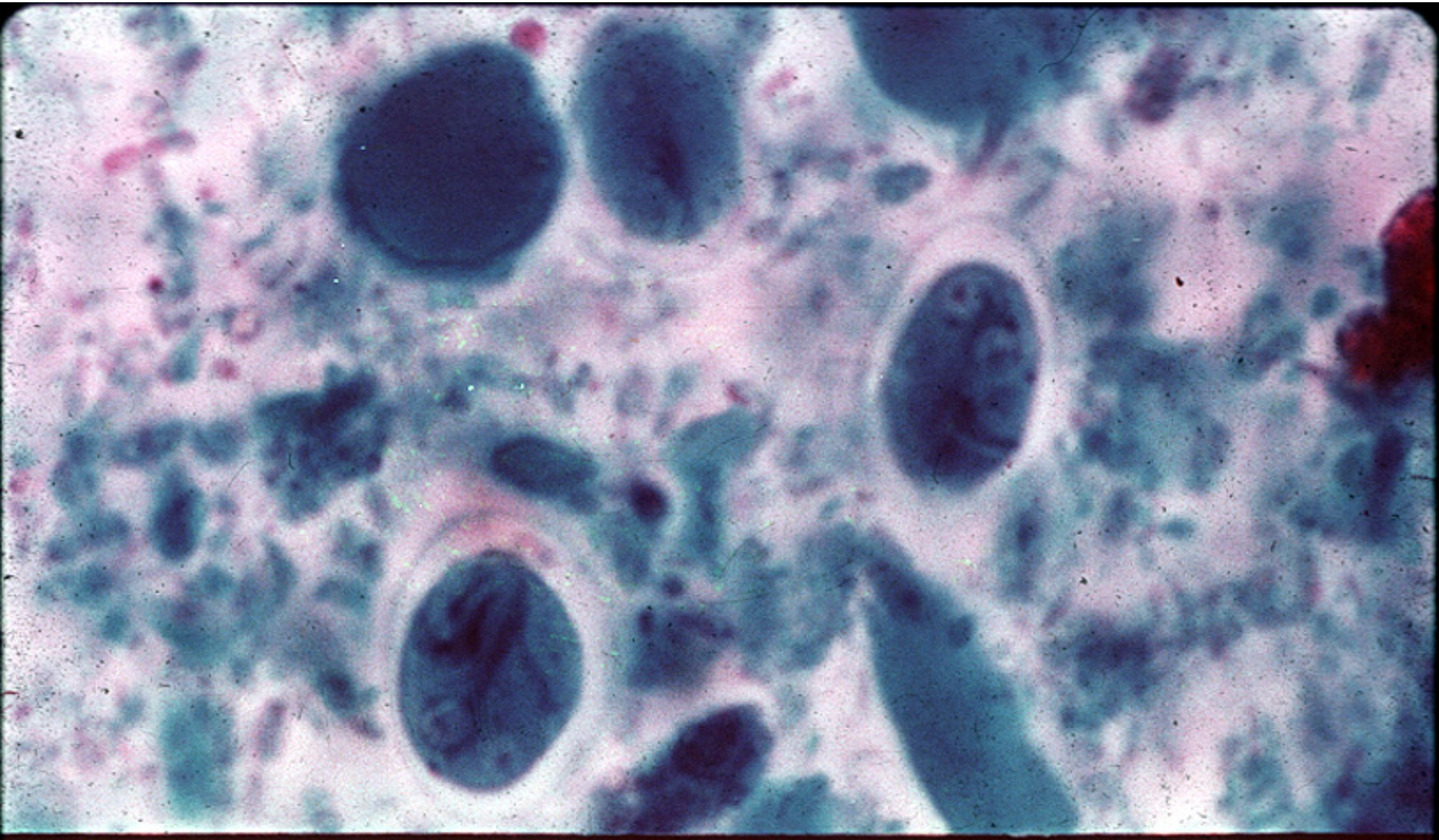
The trophozoite stage, attached to
the mucous epithelium of the small intestine



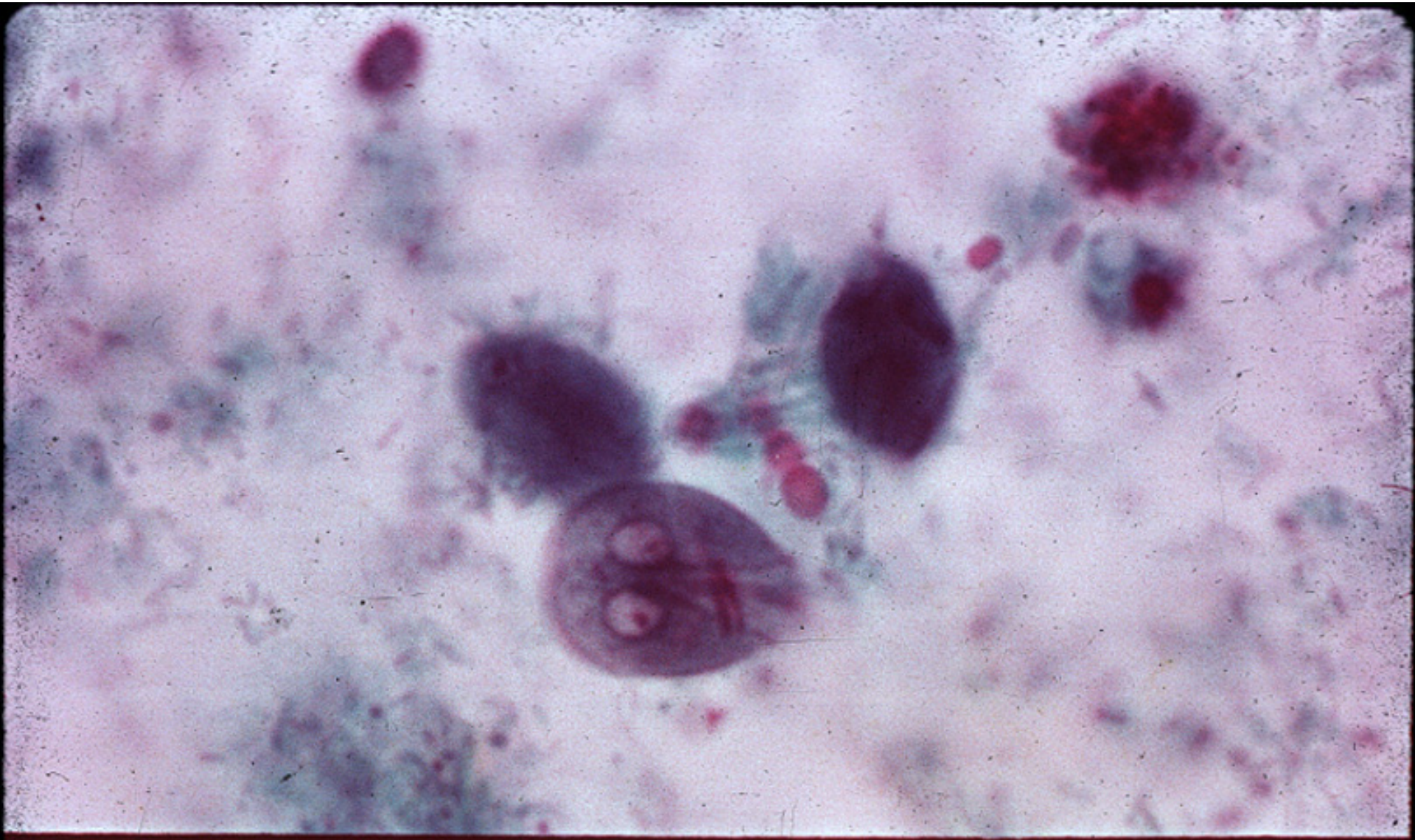
http://cal.nbc.upenn.edu/merial/Introduction/images/giardiasm.jpg

Cyst and trophozoite forms





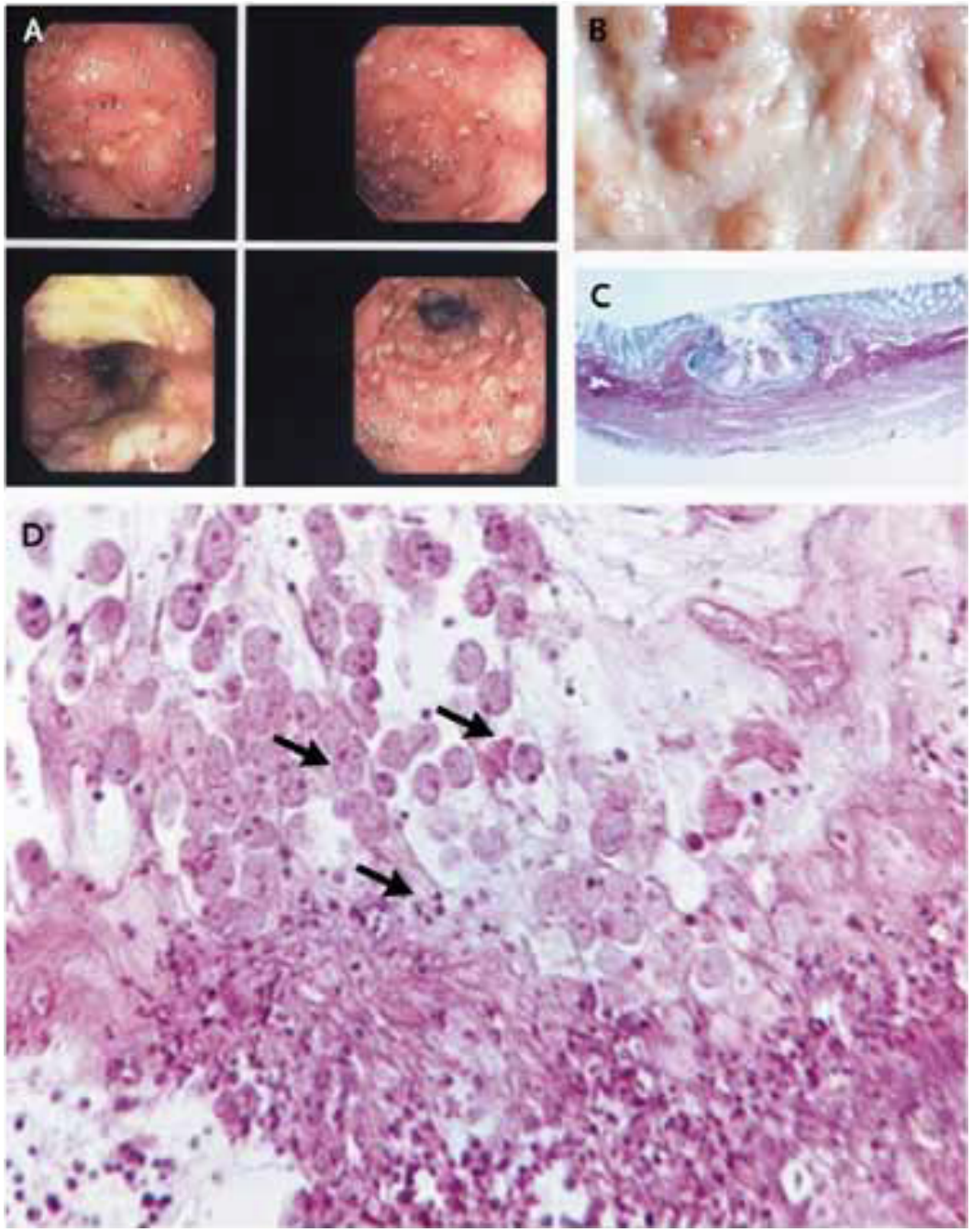
50. *G. lamblia* cysts



49. *Giardia lamblia* trophozoite

Entamoeba histolytica

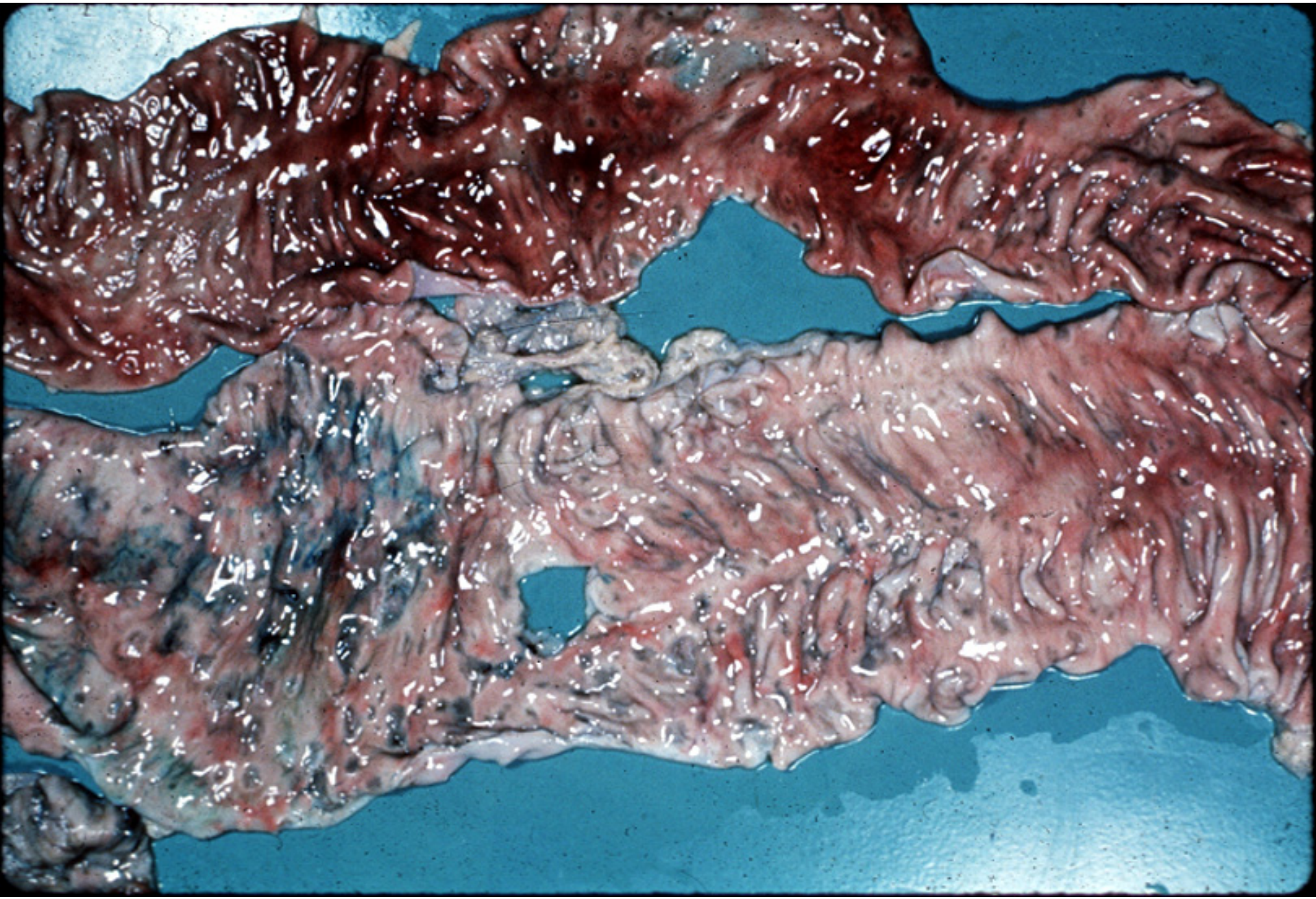
www.bioltrop.org/08-diagparasito/ amibiase.htm



Endoscopic and Pathological Features of Intestinal Amebiasis

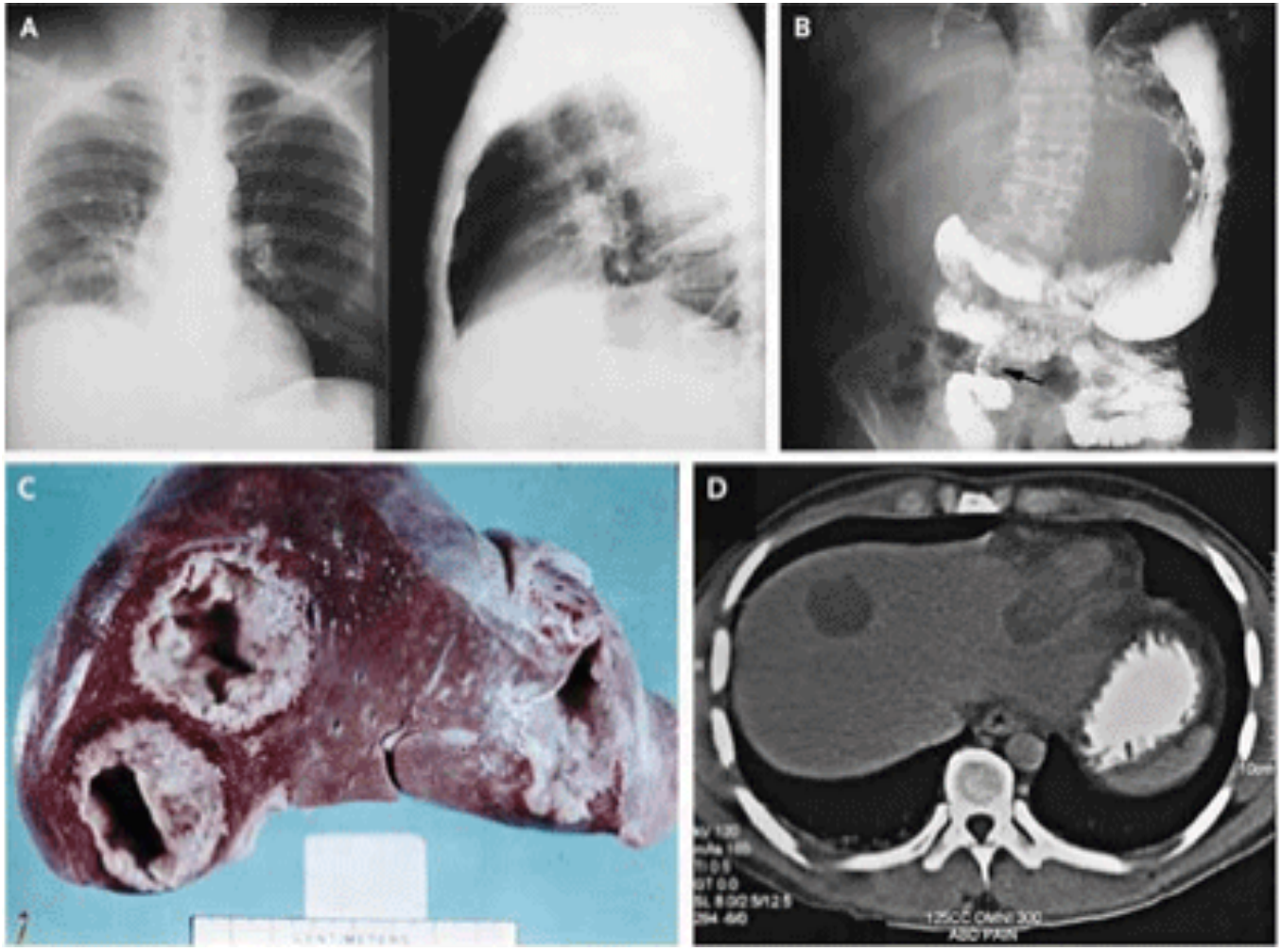
Panel A Intestinal amebiasis on colonoscopy. Panel B shows colonic ulcers averaging 1 to 2 mm in diameter on gross pathological examination. Panel C shows a cross-section of a flasked-shaped colonic ulcer (hematoxylin and eosin, x20). Panel D shows an inflammatory response to intestinal invasion by *Entamoeba histolytica* (hematoxylin and eosin, x100). Arrows indicate *E. histolytica* trophozoites.

NEJM 2003;348:1565-73



Extraintestinal Amebiasis

Panel A Posteroanterior (left-hand side) and lateral (right-hand side) chest radiograph in a patient with amebic liver abscess: elevated right hemidiaphragm and evidence of atelectasis. Panel B shows luminal narrowing (arrow) on a barium-enema examination in a patient with ameboma. Panel C shows two abscesses in the right lobe and one abscess in the left lobe in a patient with amebic liver abscess. In Panel D, abdominal computed tomography amebic liver abscesses: one in the right lobe and one in the left lobe.



NEJM 2003;348:1565-73

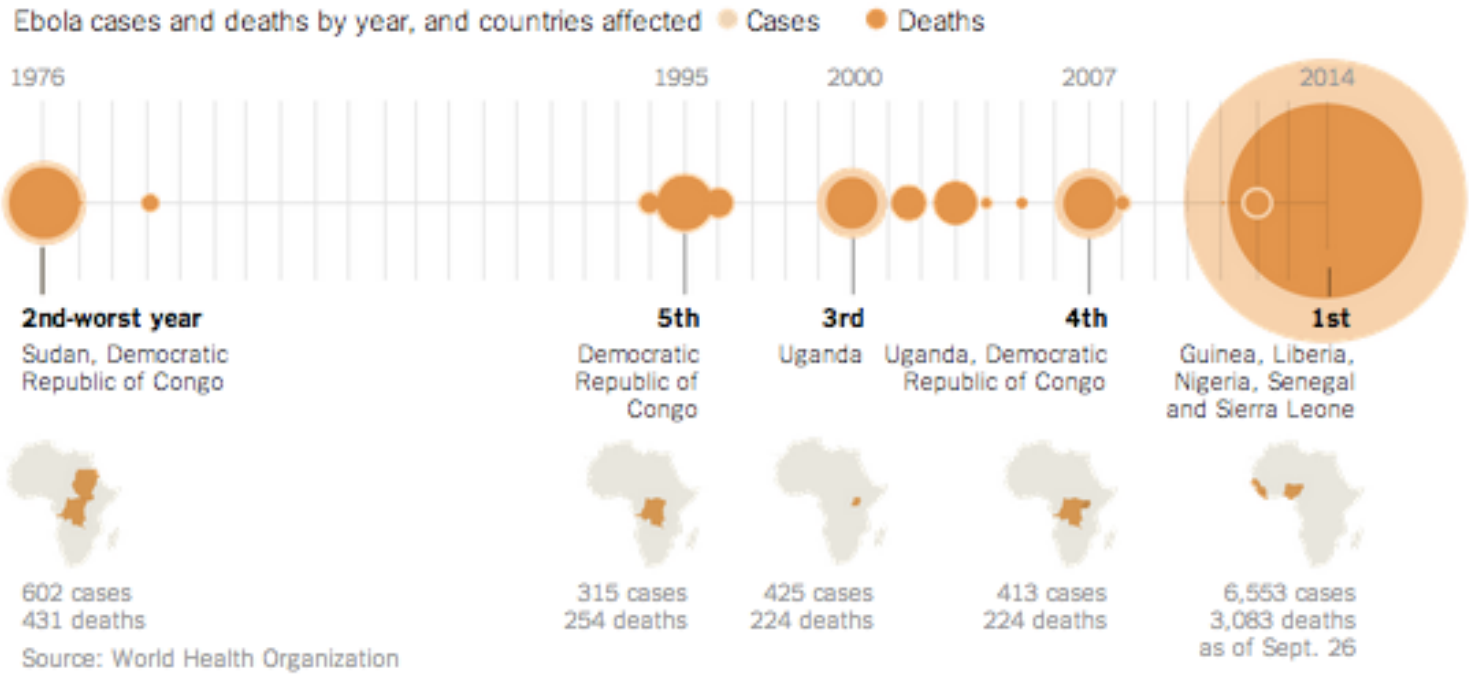
Viral diarrhea
cruise ships but……

10 -20% cases of travelor’s diarrhea

- Rotoviruses
- Noroviruses


U.S.News
& WORLD REPORT

Ebola 2014


Ebola cases and deaths by year, and countries affected
Cases
Deaths
1976
1995
2000
2007
2014
2nd-worst year
Sudan, Democratic Republic of Congo
602 cases
431 deaths
5th
Democratic Republic of Congo
315 cases
254 deaths
3rd
Uganda
425 cases
224 deaths
4th
Uganda, Democratic Republic of Congo
413 cases
224 deaths
1st
Guinea, Liberia, Nigeria, Senegal and Sierra Leone
6,553 cases
3,083 deaths
as of Sept. 26
Source: World Health Organization
The New York Times

Ebola Epidemic 2014 -2016….

Countries with Former Widespread Transmission and Current, Established Control Measures[1]

Country	Total Cases (Suspected, Probable, and Confirmed)	Laboratory-Confirmed Cases	Total Deaths
Guinea[2]	3814	3358	2544
Sierra Leone[3]	14124	8706	3956
Liberia[4]	10678	3163	4810
Total	**28616**	**15227**	**11310**

CDC/WHO April 13, 2016

http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/case-counts.html

Ebola Virus Ecology and Transmission

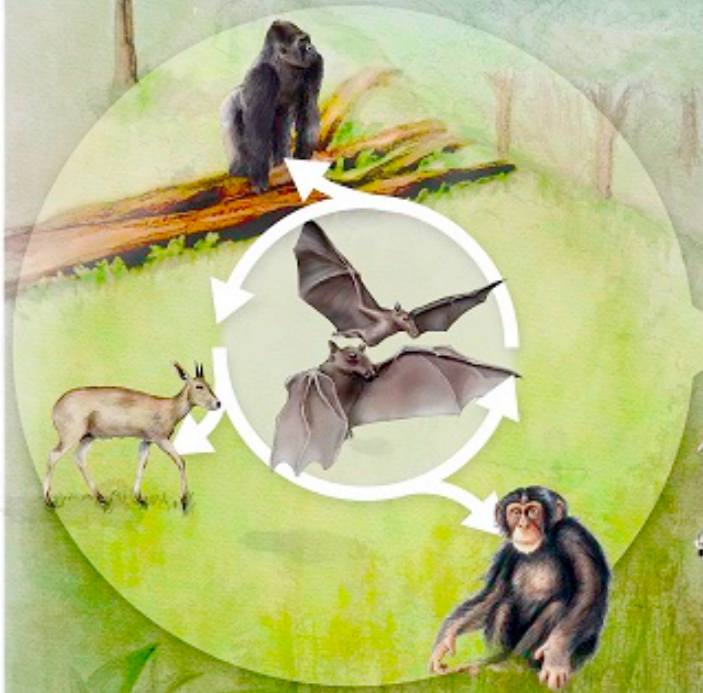
Ebola virus disease is a zoonotic disease. Zoonotic diseases involve animals and humans.

Animal-to-Animal Transmission
Evidence suggests that bats are the reservoir hosts for the Ebola virus. Bats carrying the virus can transmit it to other animals, like apes, monkeys, and duikers (antelopes), as well as to humans.

Spillover Event
A "spillover event" occurs when an animal (bat, ape, monkey, duiker) or human becomes infected with Ebola virus through contact with the reservoir host. This contact could occur through hunting or preparing the animal's meat for eating.

Human-to-Human Transmission
Once the Ebola virus has infected the first human, transmission of the virus from one human to another can occur through contact with the blood and body fluids of sick people or with the bodies of those who have died of Ebola.

Survivor
Ebola survivors face new challenges after recovery. Some survivors report effects such as tiredness and muscle aches, and can face stigma as they re-enter their communities.



Traditional funeral practice

Unprotected healthcare worker

Unprotected contact with blood and body fluids

Survivor

The New York Times

Guinea: Government Bans Bat Soup to Halt Ebola Outbreak

By DONALD G. McNEIL MARCH 26, 2014

To help quell its first Ebola outbreak, the West African nation of Guinea has banned bat soup. Bats are believed to be the natural reservoirs of the filovirus that causes Ebola, and fruit bats are a popular food in West Africa, usually cooked in a peppery soup or smoked over a fire. While boiled bat meat is presumably safe, smoked meat could be dangerous, and butchering bats for the table certainly is. The current outbreak in Guinea has killed 63 people, but the appearance of new cases has slowed significantly, the country's health ministry said. Most outbreaks are thought to start when jungle hunters eat the flesh of apes that died of Ebola, presumably after eating fruit contaminated by bat feces or saliva. But where bats are in the diet — as they are in parts of Africa, Asia and the Pacific — no intermediary host is needed.

http://beforeitsnews.com/mediadrop/uploads/2014/13/f2fbedca9968090065cd1d26d2404a22721f12a.jpg

Ebola: days since last case

http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/distribution-map.html

2016 Ebola Travel Recommendations

- **No** travel notices: Guinea, Liberia, and Sierra Leone
  - **No** longer widespread transmission
    - Small numbers of cases may continue to occur.
  - Virus can remain in certain body fluids of people who have recovered
    - Semen, fluids: eyes, around brain and spine.
    - **No** risk of Ebola to most travelers,
    - Avoid contact with:
      - Sick people, dead bodies, or blood and body fluids
      - Animals (such as bats or monkeys)
      - Raw or undercooked meat
        - » Do not eat or handle bushmeat (wild animals hunted for food).

21 day monitoring
post possible Ebola exposure

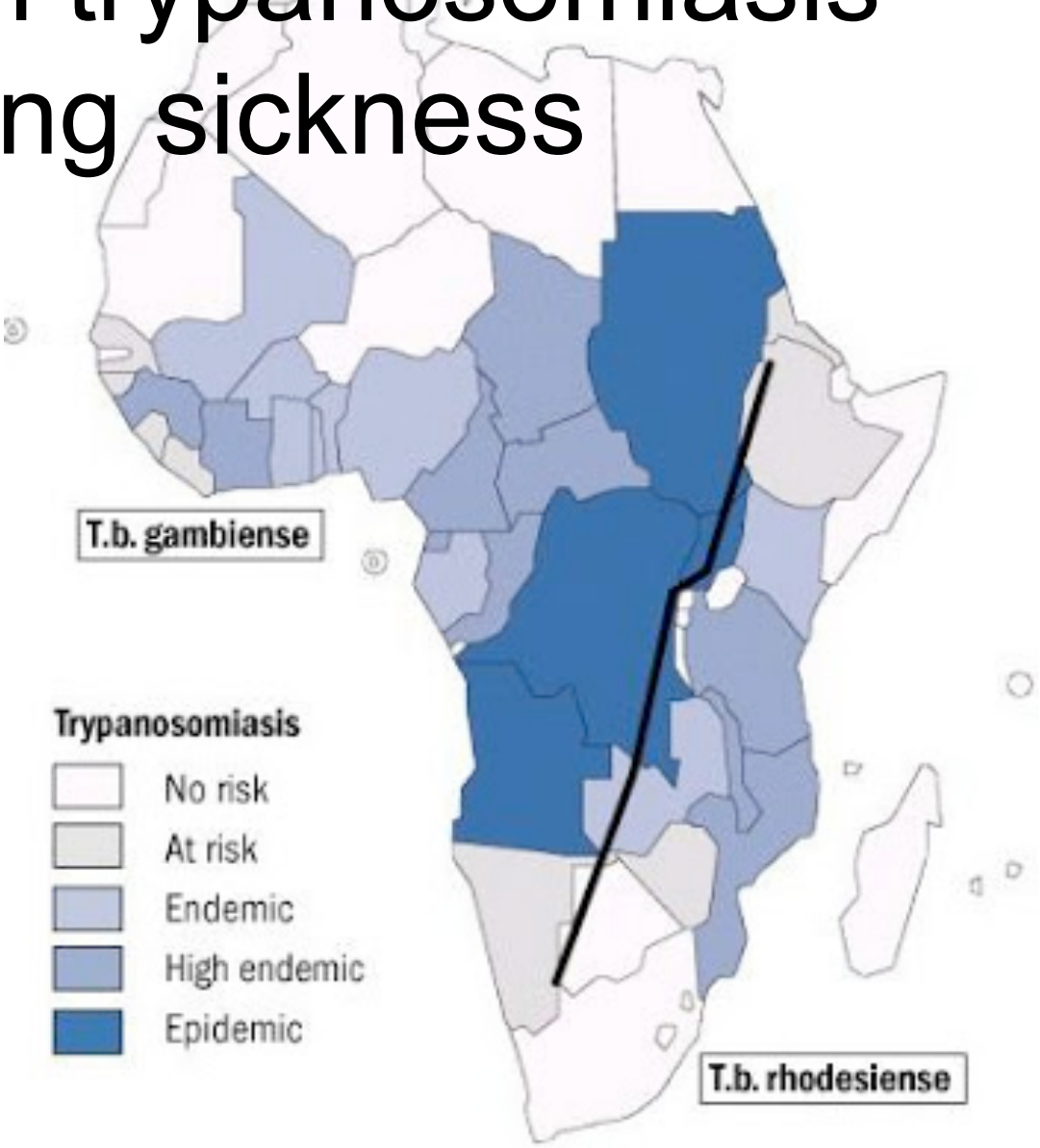
– health care workers who cared for patients with Ebola while the patients were infectious.
  - **Direct active monitoring twice daily** reporting of measured temperatures and symptoms
  - direct observation during at least one of those encounters).

– Anyone who entered an Ebola patient care area

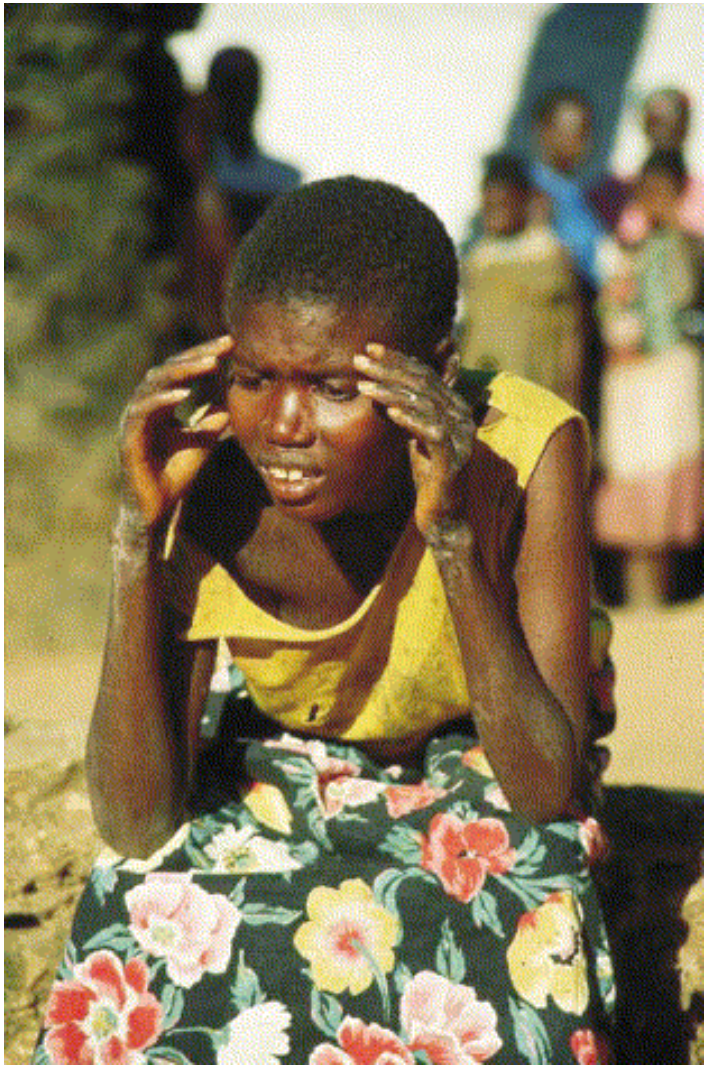
  & Laboratory workers who handled specimens before inactivated
  - **Active monitoring daily** reporting for 21 days after the last potential exposure

Tse tse fly
Glosina

African trypanosomiasis
Sleeping sickness



Stage 2 disease - invasion of internal organs



- *T. brucei rhodesiense*
  - Few weeks
- *T. brucei gambiense*
  - Several months to years

The Lancet 2003; 362:1469-1480

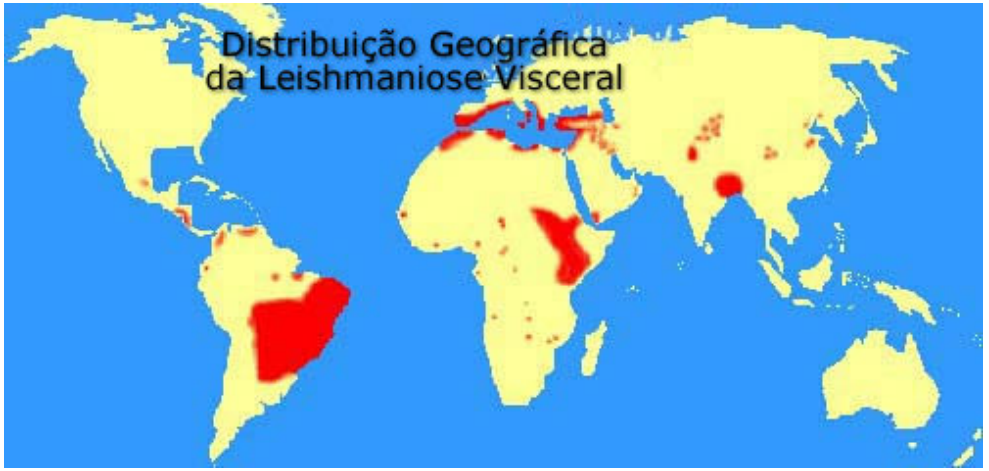
Leishmaniasis

promastigote

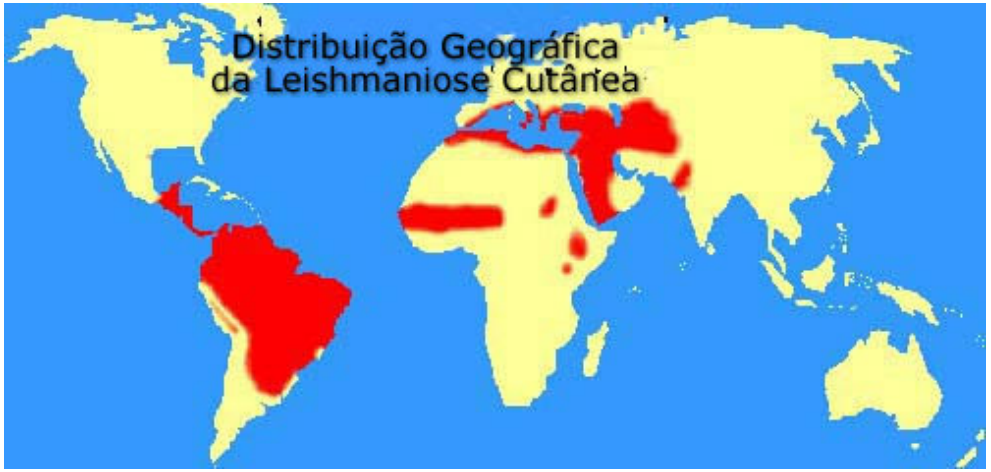
www.sbri.org/mission/disease/ leishmania.asp

Distribution of Leishmaniasis

Visceral



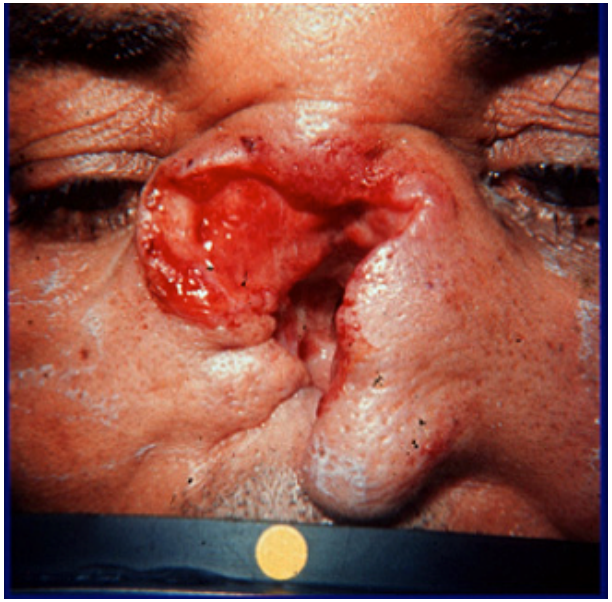
Cutaneous



Leishmaniasis

Cutaneous

Mucocutaneous

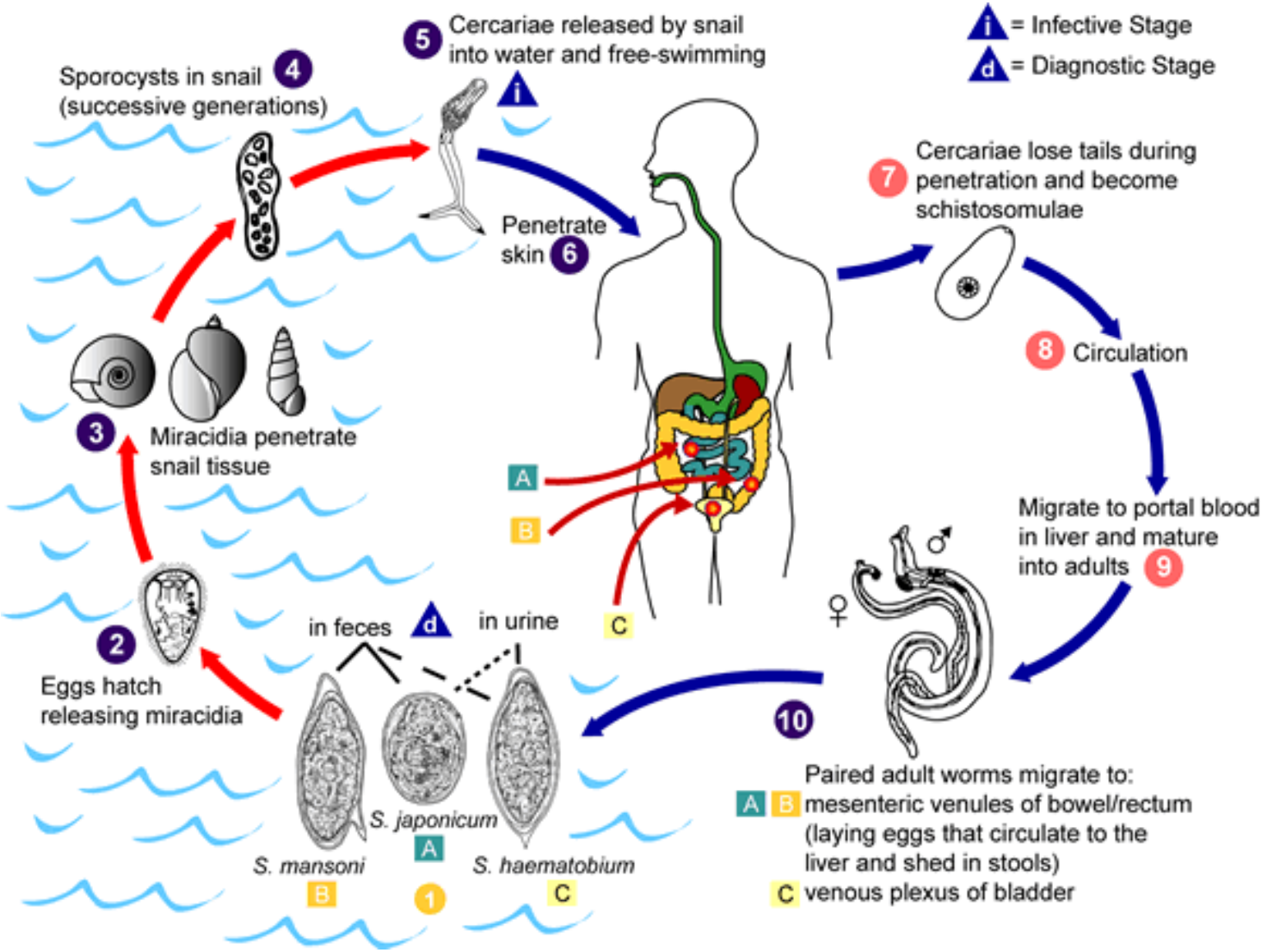


Visceral

Beware fresh water

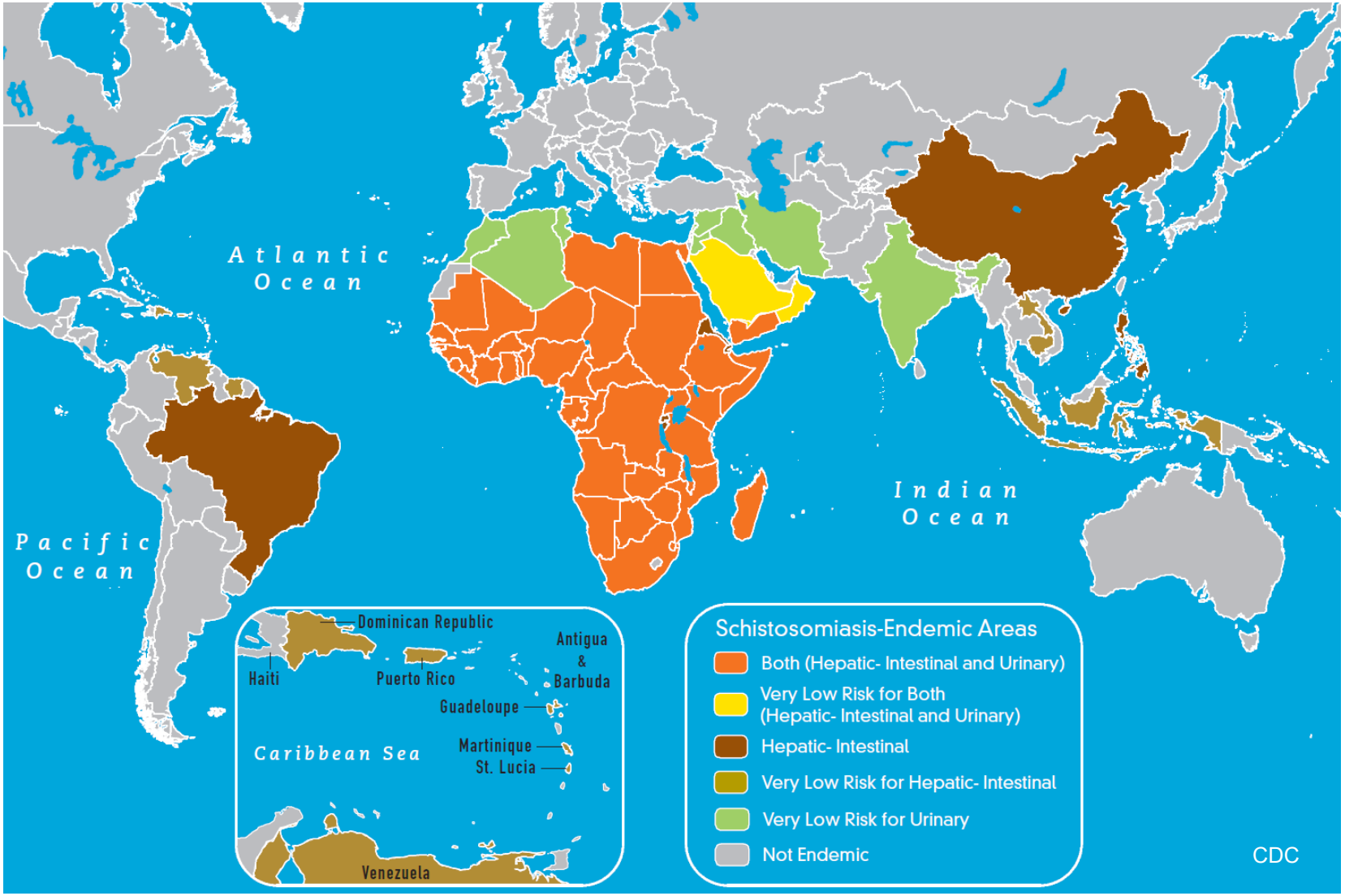
www.nomoss.com/GoPlay/costaphotos/ costawaterfall1.jpg

Schistosomiasis



www.dpd.cdc.gov/dpdx/images/ParasiteImages/S-Z/Schistosomiasis/Schistomes_LifeCycle.gif

Distribution of Schistosomiasis



Altitude

- How high are you going?
- How quickly will you reach high altitude?
- How long is the ascent?

- Degree of hypoxic stress depends upon
  - Altitude
  - Rate of ascent
  - Duration of exposure

Box 2-02. Tips for acclimatization

- Ascend gradually, if possible. Avoid going directly from low altitude to more than 9,000 ft (2,750 m) sleeping altitude in 1 day. Once above 9,000 ft (2,750 m), move sleeping altitude no higher than 1,600 ft (500 m) per day, and plan an extra day for acclimatization every 3,300 ft (1,000 m).
- Consider using acetazolamide to speed acclimatization, if abrupt ascent is unavoidable.
- Avoid alcohol for the first 48 hours.
- Participate in only mild exercise for the first 48 hours.
- Having a high-altitude exposure at more than 9,000 ft (2,750 m) for 2 nights or more, within 30 days before the trip, is useful.

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Table 2-06. Risk categories for acute mountain sickness

RISK CATEGORY	DESCRIPTION	PROPHYLAXIS RECOMMENDATIONS
Low	• People with no prior history of altitude illness and ascending to less than 9,000 ft (2,750 m) • People taking more than 2 days to arrive at 8,200–9,800 ft (2,500–3,000 m), with subsequent increases in sleeping elevation less than 1,600 ft (500 m) per day, and an extra day for acclimatization every 3,300 ft (1,000 m)	Acetazolamide prophylaxis generally not indicated.
Moderate	• People with prior history of AMS and ascending to 8,200–9,100 ft (2,500–2,800 m) or higher in 1 day • No history of AMS and ascending to more than 9,100 ft (2,800 m) in 1 day • All people ascending more than 1,600 ft (500 m) per day (increase in sleeping elevation) at altitudes above 9,900 ft (3,000 m), but with an extra day for acclimatization every 3,300 ft (1,000 m)	Acetazolamide prophylaxis would be beneficial and should be considered.

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High	• History of AMS and ascending to more than 9,100 ft (2,800 m) in 1 day • All people with a prior history of HACE or HAPE • All people ascending to more than 11,400 ft (3,500 m) in 1 day • All people ascending more than 1,600 ft (500 m) per day (increase in sleeping elevation) above 9,800 ft (3,000 m), without extra days for acclimatization • Very rapid ascents (such as less than 7-day ascents of Mount Kilimanjaro)	Acetazolamide prophylaxis strongly recommended.

Abbreviations: AMS, acute mountain sickness; HACE, high-altitude cerebral edema; HAPE, high-altitude pulmonary edema.

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CLINICAL PRESENTATION

Altitude illness is divided into 3 syndromes: acute mountain sickness (AMS), high-altitude cerebral edema (HACE), and high-altitude pulmonary edema (HAPE).

Acute Mountain Sickness

AMS is the most common form of altitude illness, affecting, for example, 25% of all visitors sleeping above 8,000 ft (2,500 m) in Colorado. Symptoms are those of an alcohol hangover: headache is the cardinal symptom, sometimes accompanied by fatigue, loss of appetite, nausea, and occasionally vomiting. Headache onset is usually 2–12 hours after arrival at a higher altitude and often during or after the first night. Preverbal children may develop loss of appetite, irritability, and pallor. AMS generally resolves with 24–72 hours of acclimatization.

High-Altitude Cerebral Edema

HACE is a severe progression of AMS and is rare; it is most often associated with HAPE. In addition to AMS symptoms, lethargy becomes profound, with drowsiness, confusion, and ataxia on tandem gait test. A person with HACE requires immediate descent; death from HACE can ensue within 24 hours of developing ataxia, if the person fails to descend.

High-Altitude Pulmonary Edema

HAPE can occur by itself or in conjunction with AMS and HACE; incidence is 1 per 10,000 skiers in Colorado and up to 1 per 100 climbers at more than 14,000 ft (4,270 m). Initial symptoms are increased breathlessness with exertion, and eventually increased breathlessness at rest, associated with weakness and cough. Oxygen or descent is life-saving. HAPE can be more rapidly fatal than HACE.

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Acetazolamide

Acetazolamide prevents AMS when taken before ascent and can speed recovery if taken after symptoms have developed. The drug works by acidifying the blood, which causes an increase in respiration and arterial oxygenation and thus aids acclimatization. An effective dose that minimizes the common side effects of increased urination and paresthesias of the fingers and toes is 125 mg every 12 hours, beginning the day before ascent and continuing the first 2 days at altitude, or longer if ascent continues. Allergic reactions to acetazolamide are uncommon. As a nonantimicrobial sulfonamide, it does not cross-react with antimicrobial sulfonamides. However, it is best avoided by people with history of anaphylaxis to any sulfa. People with history of severe penicillin allergy have occasionally had allergic reactions to acetazolamide. The pediatric dose is 5 mg/kg/day in divided doses, up to 125 mg twice a day.

Dexamethasone

Dexamethasone is effective for preventing and treating AMS and HACE, and perhaps HAPE as well. Unlike acetazolamide, if the drug is discontinued at altitude before acclimatization, rebound can occur. Acetazolamide is preferable to prevent AMS while ascending, with dexamethasone reserved for treatment, as an adjunct to descent. The adult dose is 4 mg every 6 hours. An increasing trend is to use dexamethasone for "summit day" on high peaks such as Kilimanjaro and Aconcagua, in order to prevent abrupt altitude illness.

Nifedipine

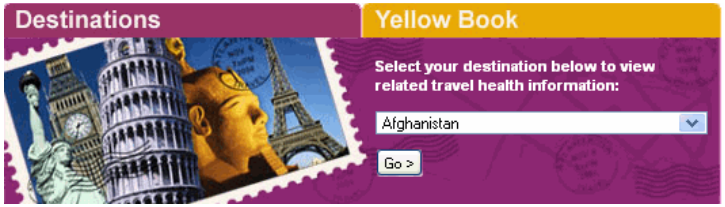
Nifedipine prevents HAPE and ameliorates it as well. For prevention, it is generally reserved for people who are particularly susceptible to the condition. The adult dose for prevention or treatment is 30 mg of extended release every 12 hours, or 20 mg every 8 hours.

CDC 2016 Yellow Book

References

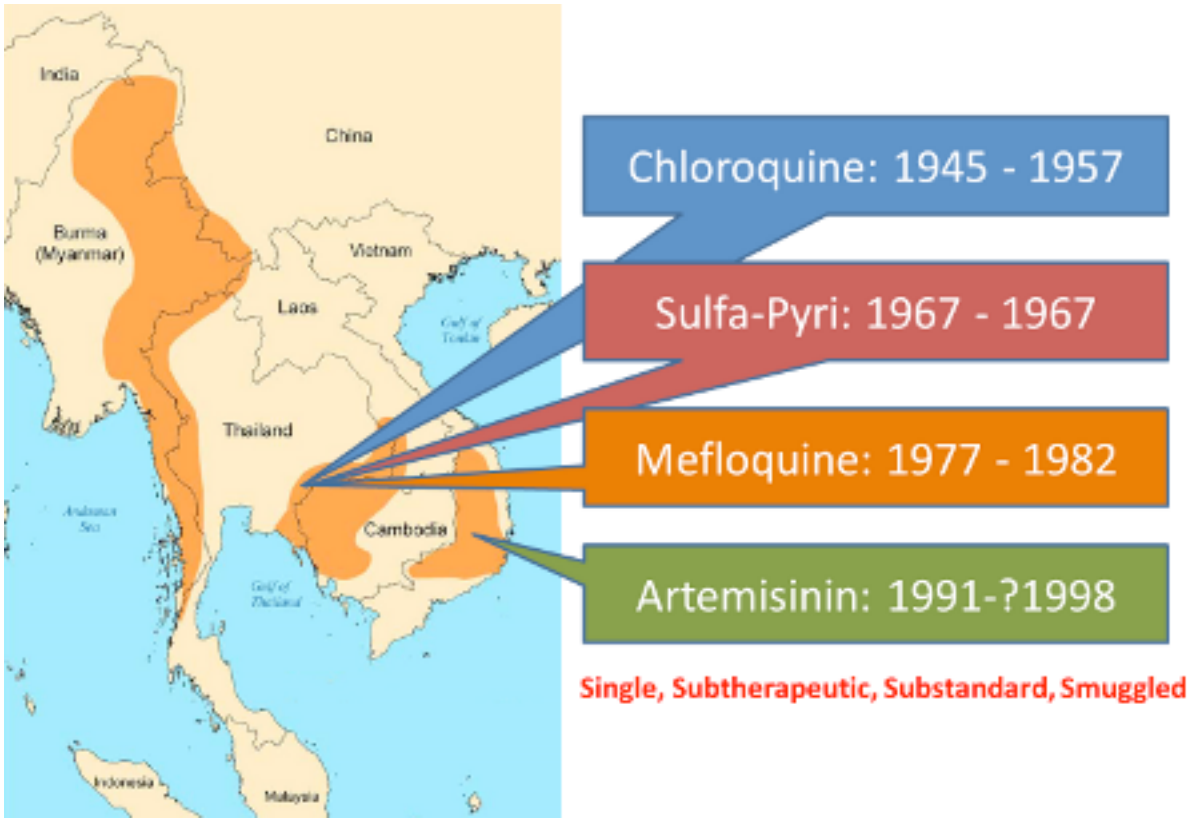
Travelers' Health
http://wwwnc.cdc.gov/travel

- Outbreaks
- Travel issues "in the news"
- "Destinations"
  - http://wwwnc.cdc.gov/travel/destinations/list.htm



- Malaria map application
  - http://cdc-malaria.ncsa.uiuc.edu/

http://www.feejee.com/beach.jpg



http://www.malariasite.com/tag/mefloquine/

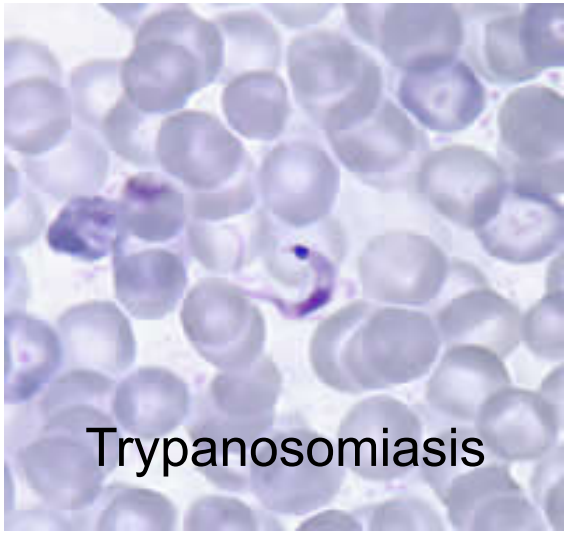
The INDEPENDENT Monday 30 March 2015

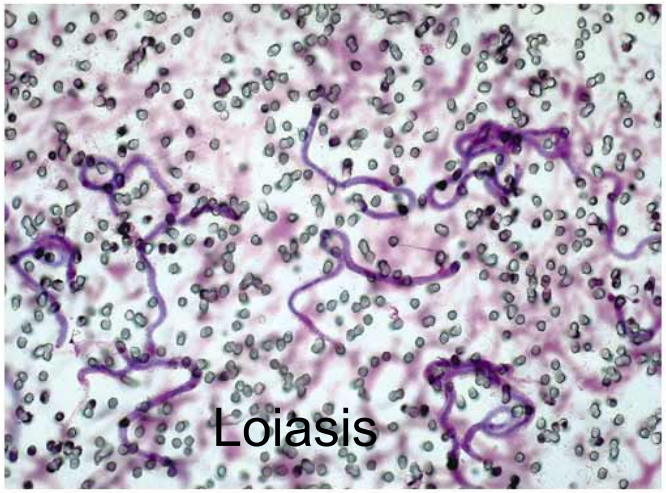
Meningitis B: Britain to offer a nationwide vaccination programme against disease

Britain will become the first country in the world to offer a nationwide vaccination programme against meningitis B, the most common cause of bacterial meningitis that kills one in ten infected babies and leaves many more maimed for life.

The illness is the most common cause of bacterial meningitis that kills one in ten infected babies and leaves many more maimed for life.

Keep Records - bring the slides





G, rabies immune globulin; IM, intramuscular; HDCV, human diploid cell vaccine; PCEC, purified chick embryo cell.

e prophylaxis should begin with immediate, thorough cleansing of all wounds with soap and water.

ses for the immunosuppressed patient. The first 4 vaccine doses are given on the same schedule as for an immunocompetent patient, and the fifth

ay 28; patient follow-up should include monitoring antibody response. See http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm for more

World Health Organization recommends this fifth dose for all patients, not just those who are immunocompromised.

nds 4 postexposure vaccine doses, on days 0, 3, 7, and 14, unless the patient is immunocompromised in some way, in which case a fifth dose is given

munization with HDCV or PCEC, prior postexposure prophylaxis with HDCV or PCEC, or people previously immunized with any other type of

d a documented history of positive rabies virus neutralizing antibody response to the prior vaccination.

be administered.

CDC 2012 guidelines

Travel and Zika

Suggested timeframe to wait before trying to get pregnant		
Possible exposure via recent travel or sex without a condom with a man infected with Zika		
	Women	**Men**
Zika symptoms	Wait at least 8 weeks after symptoms start	Wait at least 6 months after symptoms start
No Zika symptoms	Wait at least 8 weeks after exposure	Wait at least 8 weeks after exposure. Talk with your healthcare provider
People living in areas with Zika		
	Women	**Men**
Zika symptoms	Wait at least 8 weeks after symptoms start	Wait at least 6 months after symptoms start
No Zika symptoms	Talk with doctor or healthcare provider	Talk with doctor or healthcare provider

Decisions about pregnancy planning are personal and complex, and the circumstances for women and their partners will vary. Women and their partners should discuss pregnancy planning with a trusted doctor or healthcare provider. As part of counseling with healthcare providers, some women and their partners living in areas with active Zika virus transmission might decide to delay pregnancy.

Women who do not want to get pregnant should talk with their doctor or healthcare provider about ways to prevent unintended pregnancy, including how to use birth control the right way every time. Women should consider safety, effectiveness, availability, and acceptability when choosing a birth control method.

CDC March 2016

Middle East Respiratory Syndrome (MERS)

oronavirus

- first reported in Saudi Arabia in 2012

evere acute respiratory illness

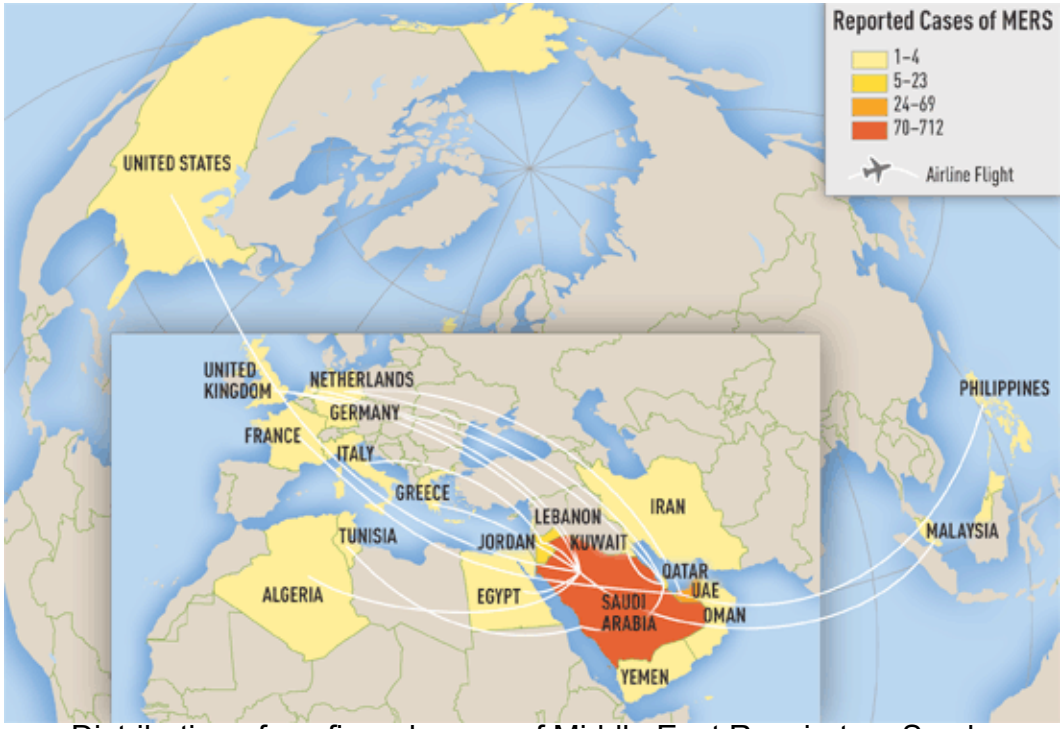
-Fever, cough, SOB, multiple organ dysfunction

gh mortality

- 3-4/10 patients have died.

S cases of MERS

- May 2014
- Indiana and Florida
  - Health care workers
  - Traveled to US from
    - Saudi Arabia

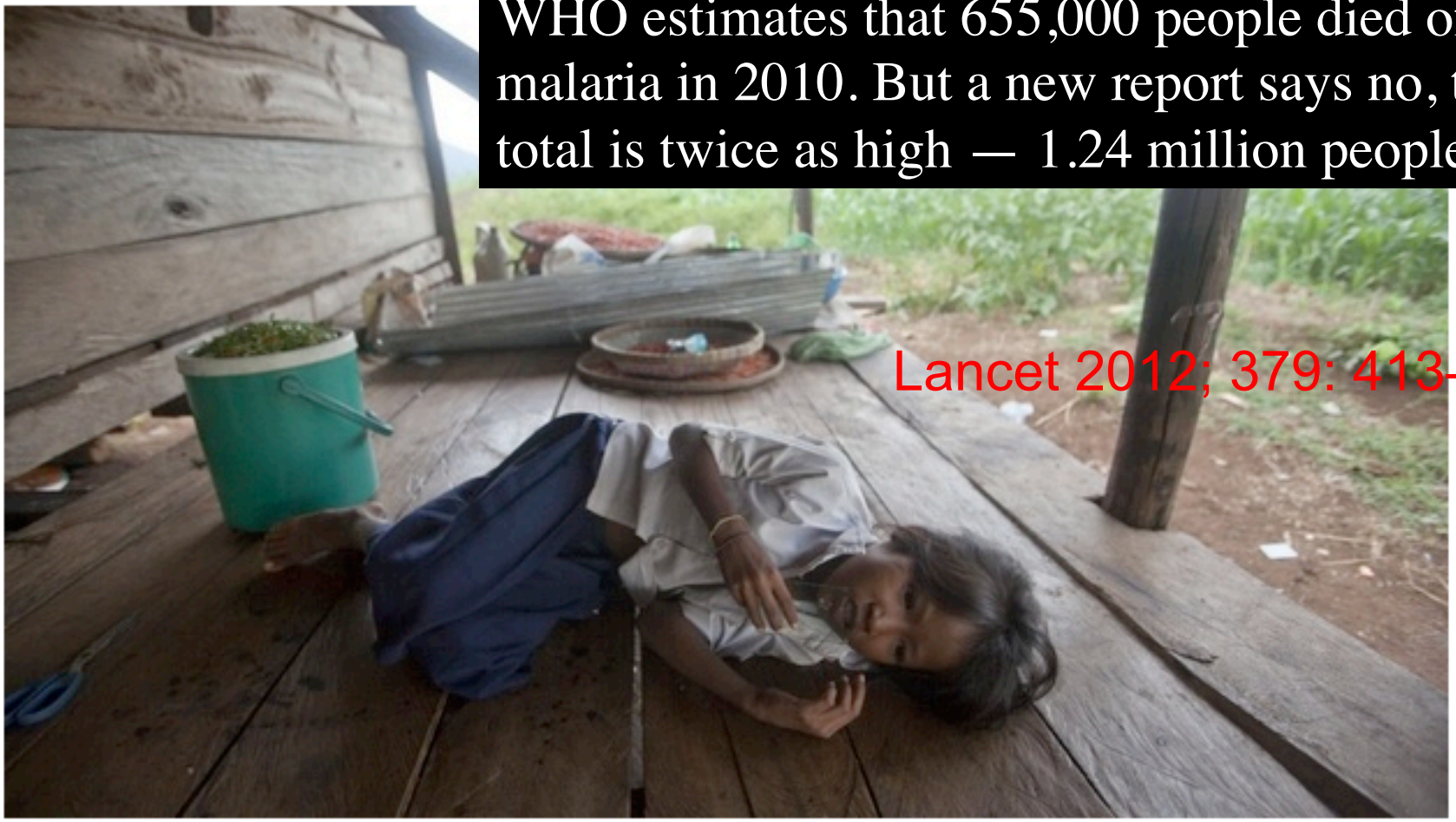


Distribution of confirmed cases of Middle East Respiratory Syndrome

Researchers Say Malaria Deaths Are Twice The Official Count

NPR Feb. 12, 2012
by RICHARD KNOX

WHO estimates that 655,000 people died of malaria in 2010. But a new report says no, the real total is twice as high — 1.24 million people



Lancet 2012; 379: 413–3141

Enlarge David Longstreath/AP

Chhay Meth, 9, suffering through an attack of malaria at the family's home in O'treng village on the outskirts of Pailin, Cambodia, in 2009. A drug-resistant form of malaria in the region medical led officials to declare a health emergency.