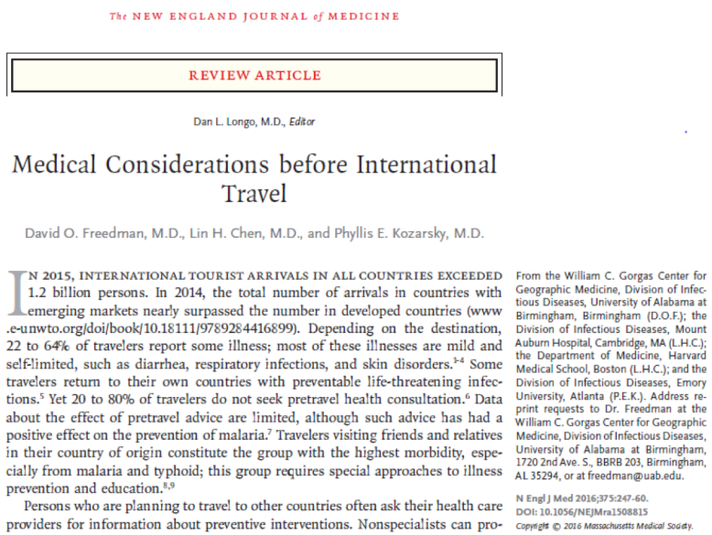
Illness Prevention Advice for Travelers



The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Dan L. Longo, M.D., *Editor*

Medical Considerations before International Travel

David O. Freedman, M.D., Lin H. Chen, M.D., and Phyllis E. Kozarsky, M.D.

IN 2015, INTERNATIONAL TOURIST ARRIVALS IN ALL COUNTRIES EXCEEDED 1.2 billion persons. In 2014, the total number of arrivals in countries with emerging markets nearly surpassed the number in developed countries (www.e-unwto.org/doi/book/10.18111/9789284416899). Depending on the destination, 22 to 64% of travelers report some illness; most of these illnesses are mild and self-limited, such as diarrhea, respiratory infections, and skin disorders.[1-4] Some travelers return to their own countries with preventable life-threatening infections.[5] Yet 20 to 80% of travelers do not seek pretravel health consultation.[6] Data about the effect of pretravel advice are limited, although such advice has had a positive effect on the prevention of malaria.[7] Travelers visiting friends and relatives in their country of origin constitute the group with the highest morbidity, especially from malaria and typhoid; this group requires special approaches to illness prevention and education.[8,9]

Persons who are planning to travel to other countries often ask their health care providers for information about preventive interventions. Nonspecialists can pro-

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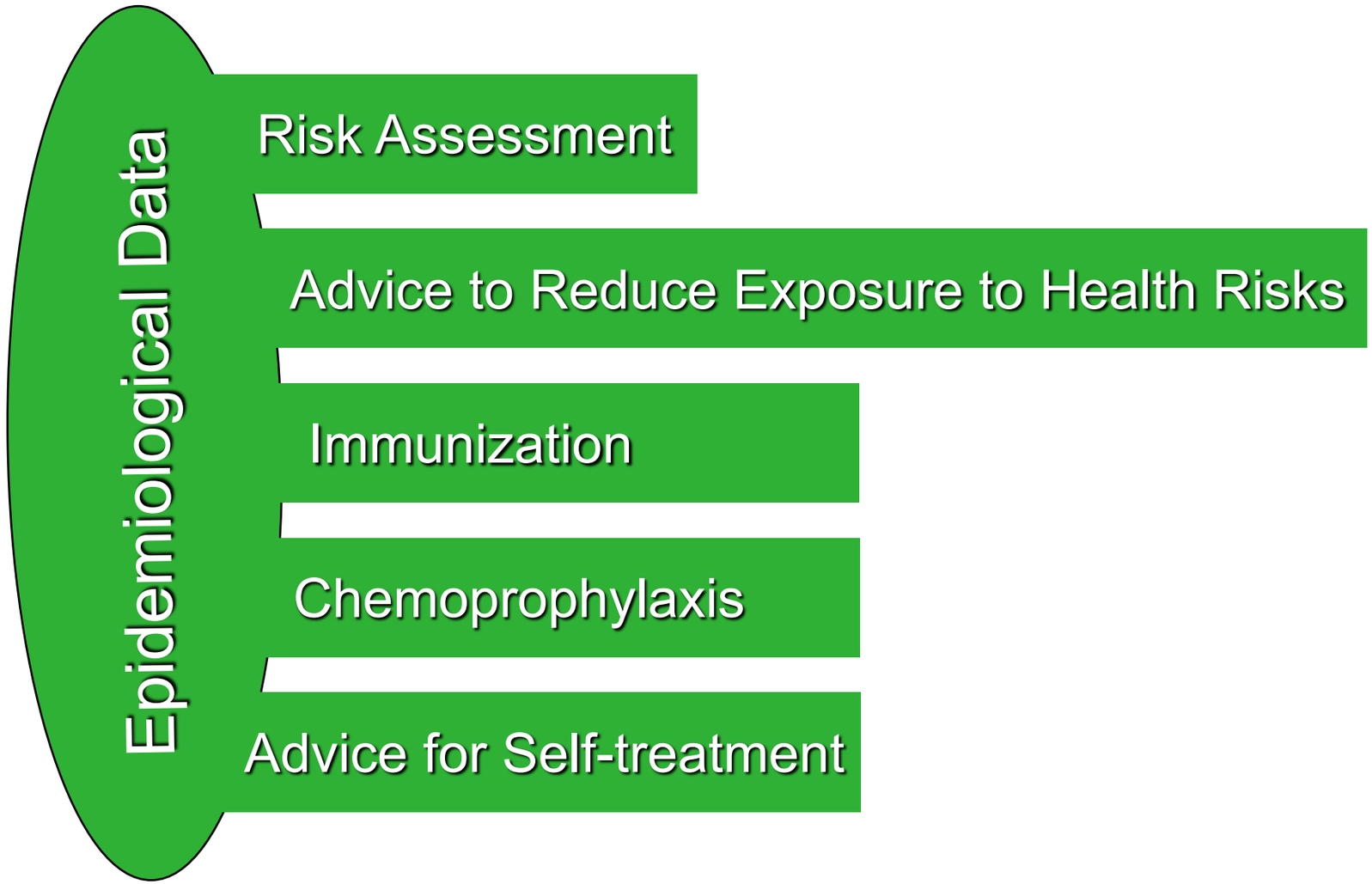
The Pre-Travel Consultation



Risk Assessment

- Medical history, including medication, disabilities, immune status, immunizations, surgeries, allergies, pregnancy or breast-feeding
- Prior travel experience
- Specific itinerary, including regions, season, and dates
- Activities (e.g., adventure travel and events involving mass gatherings)
- Type of accommodations
- Travelers' risk tolerance
- Financial challenges

Standard In-office Interventions

Administration of immunizations

- Updating of routine vaccines — MMR, Tdap, pneumococcal, varicella, influenza
- Routine travel vaccines —hepatitis A, typhoid, hepatitis B
- Special travel vaccines —yellow fever, rabies, polio, meningococcal, Japanese encephalitis, cholera, tickborne encephalitis

Malaria chemoprophylaxis (if risk)

- Individualize to itinerary and patient

Travelers'diarrhea

- Food and water precautions
- Oral rehydration and use of loperamide and bismuth
- Antibiotic self-treatment options for severe diarrhea
- Prophylaxis with bismuth or antibiotic (only if high risk)

Focused Education Before the Trip

Vector borne diseases (if risk)

- Personal protection measures for malaria, dengue, chikungunya, Zika virus infection, leishmaniasis, rickettsial disease, sleeping sickness

Medical kit and medical care abroad

- Personal health kit
- Available medical facilities
- Evacuation insurance; supplemental health insurance

Other travel related illnesses (as applicable)

- Altitude illness
- Travelers' thrombosis
- Motor vehicle injury
  - Road-fatalities #1 cause of death
- Bloodborne and sexually transmitted
- infections
- Swimming, water exposure, and marine hazards
- Transportation-associated illnesses
- Respiratory infection and tuberculosis
- Rabies and animal-associated illness
- Skin conditions and wounds

Table 2. Vaccines That Should Be Available during Pretravel Consultation.*

Disease and Vaccine Type	Adult Dose	Route of Administration	Standard Schedule	Accelerated Schedule for Series	Estimated Duration of Protection	References
Available in the United States						
Cholera: live attenuated bacteria	1 sachet	Oral	Single dose	NA	3–6 mo	Jackson and Chen[19]
Hepatitis A: inactivated virus	1 ml	Intramuscular	2 doses: day 0 and at 6–12 mo†	Available in combined hepatitis A and B formulation: days 0, 7, and 21 and at 12 mo‡	>20 yr (seropositivity); >40 yr (antibody modeling)	ACIP,[20] Theeten et al.[21]
Hepatitis B: recombinant hepatitis B surface antigen	1 ml	Intramuscular	3 doses: day 0 and at 1 mo and 6 mo	Available in combined hepatitis A and B formulation: days 0, 7, and 21 and at 12 mo‡	30 yr	Mast et al.,[22] FitzSimons et al.[23]
Combined hepatitis A and B: inactivated virus and recombinant viral antigen	1 ml	Intramuscular	3 doses: day 0 and at 1 mo and 6 mo	4 doses: days 0, 7, and 21 and at 12 mo‡	>15 yr (data on monovalent vaccines support long-term protection from anamnestic response)	Van Damme et al.[24]
Influenza						Grohskopf et al.[25]
Inactivated virus or recombinant, trivalent or quadrivalent	0.5 ml (0.1 ml for intradermal administration)	Intramuscular (intradermal formulation for age 18–64 yr)	1 dose	NA	1 yr	
Live attenuated virus, quadrivalent	0.1 ml in each nostril	Intranasal spray	1 dose	NA	1 yr	
Japanese encephalitis: inactivated virus, derived from cell culture	0.5 ml	Intramuscular	2 doses: days 0 and 28	2 doses: days 0 and 7	1–2 yr after initial dose; >6 yr if boosted at 1–2 yr	Fischer et al.,[26] CDC,[27] Jelinek et al.,[28] EMA,[29] Paulke-Korinek et al.,[30] Rabe et al.[31]
Measles–mumps–rubella: live attenuated virus	0.5 ml	Subcutaneous	2 doses: day 0 and at 4 wk		Lifelong, after 2 doses total at any time in life	McLean et al.[32]
Meningococcal disease — quadrivalent ACYW-135: bacterial polysaccharide, conjugated§	0.5 ml	Intramuscular	1 dose (off-label for those >55 yr old)	NA	3–5 yr	Cohn et al.,[33] Baxter et al.[34]

Poliomyelitis: inactivated virus	0.5 ml	Subcutaneous	Single dose in those who received primary childhood series	NA	Lifelong, after primary series plus a booster in adulthood (age ≥18 yr)	Wallace et al.[35]
Rabies: inactivated virus, derived from cell culture	1 ml	Intramuscular (0.1 ml intradermally may be considered for use off-label)	3 doses before exposure: days 0, 7, and 21–28	NA	Patient should be informed that 2 additional doses are required on days 0 and 3 after each possible rabies exposure; no boosters are otherwise indicated	Manning et al,[36] Wieten et al.[37]
Tetanus–diphtheria–acellular pertussis (Tdap) or tetanus–diphtheria (Td): toxoid, protein antigen	0.5 ml	Intramuscular	1 dose in those who received primary childhood series	NA	10 yr; 5 yr for travelers at high risk for wounds (e.g., adventure travelers, those engaging in activities that may result in injuries, and travelers to places where medical care is substandard)	CDC[38]
Typhoid						Jackson et al.[39]
Bacterial cell-wall polysaccharide	0.5 ml	Intramuscular	1 dose	NA	2–3 yr	
Live attenuated bacteria	4 capsules	Oral	4-capsule series, one every other day		5 yr	
Yellow fever: live attenuated virus	0.5 ml	Subcutaneous	1 dose	NA	10 yr for high-risk patients (in some countries, protection is considered to be long-term)	Gershman and Staples,[40] WHO,[41] Staples et al.[42]
Not currently available in the United States						
Cholera: inactivated whole-cell bacteria combined with recombinant B subunit of cholera toxin	1 sachet	Oral	2 doses, 1 wk apart	NA	2 yr	WHO[43]
Tickborne encephalitis: inactivated virus derived from cell culture	0.5 ml	Intramuscular	3 doses: day 0, at 1–3 mo, and at 5–12 mo	3 doses: days 0, 7, and 21 (protective 7 days after dose 3)	3 yr	WHO[44]

1st Update Since 2011

Storage/handling now separate

Vaccine Recommendations and Guidelines of the ACIP

- ACIP Recs Home
- Vaccine-Specific Recommendations +
- Recs Listed by Date
- Comprehensive Recommendations and Guidelines −
  - **General Best Practice Guidelines** −
    - Introduction
    - Methods
    - Timing and Spacing of Immunobiologics
    - Contraindications and Precautions
    - Preventing and Managing Adverse Reactions
    - Vaccine Administration
    - Storage and Handling of Immunobiologics
    - Altered Immunocompetence

CDC > ACIP Recs Home > Comprehensive Recommendations and Guidelines

General Best Practice Guidelines for Immunization

Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)

Kroger AT, Duchin J, Vázquez M

Printer friendly version [1.16 MB, 194 pages]

INTRODUCTION
Purpose and topics covered in this report…

METHODS
Method of development of: Timing and Spacing, Contraindications and Precautions, Preventing and Managing Adverse Reactions…

TIMING AND SPACING OF IMMUNOBIOLOGICS
Vaccine scheduling, supply and lapsed schedule, spacing of doses, simultaneous and nonsimulaneous administration, licensed combination vaccines, interchangeability of formulations, extra doses, conjugate vaccines…

CONTRAINDICATIONS AND PRECAUTIONS

ACIP 2017 Updates

- Anticoagulated patients, schedule vaccination prior to next dose of drug, use 23-gauge or smaller needle, followed by firm pressure on the site, without rubbing, for at least 2 minutes. A bruising rate of <4% results using this approach.
- Stop antiviral drugs active against herpesviruses (e.g., acyclovir or valacyclovir) at least 24 hours before Varivax, ProQuad, and Zostavax). If clinically appropriate, delay use or resumption of antiviral therapy for 14 days after vaccination.
- No data exist to suggest that commonly used antiviral drugs have an effect on rotavirus vaccine or MMR.
- A precaution is a condition in a recipient that might increase the risk for a serious adverse reaction, might cause diagnostic confusion, or might compromise the ability of the vaccine to produce immunity. A person might experience a more severe reaction to the vaccine than would have otherwise been expected; however, the risk is less than the risk expected with a contraindication. In general, vaccinations should be deferred when a precaution is present. However, a vaccination might be indicated if the benefit of protection from the vaccine outweighs the risk for an adverse reaction (*eg YF vax over age 60*).

Zoster: Vaccine Highlight of 2017

- Shingrix (Zoster Vaccine Recombinant, Adjuvanted; GSK) is now FDA-approved and recommended by CDC for the prevention of herpes zoster (shingles) and related complications in immunocompetent persons aged ≥ 50 years.
- Those previously vaccinated with Zostavax (Zoster Vaccine Live Attenuated; Merck) should be revaccinated.
- Shingrix, administered as 2 doses at 0 and 2 to 6 months, is recommended preferentially over Zostavax (only recommended for use in persons aged ≥ 60 years) for all age groups due to a significantly higher efficacy and slower waning immunity.
- As a recombinant vaccine, Shingrix is not contraindicated in immunocompromised individuals, but no data in this population are currently available.
- Soon available in Canada and Europe

YF Vax Supply Canada

- Shipping at 60% known demand to limited centers
- A full dose of vaccine or postponing the trip if a full dose is not available is preferred.
- However, fractional dosing (one-fifth dose; 0.1 mL) of YF-VAX, recommended as an alternative by the Committee to Advise on Tropical Medicine and Travel (CATMAT) but is not acceptable for entry requirements under the IHR.
  - The official International Certificate of Vaccination or Prophylaxis card should not be used to document a fractional dose.
  - Provides alternative documentation strategy meant to confuse entry authorities
  - www.phac-aspc.gc.ca/publicat/ccdr-rmtc/16vol42/dr-rm42-8/assets/pdf/16vol42_8-ar-02-eng.pdf.

Meningococcal Polysaccaride Discontinued

- Menomune (Meningococcal [Groups A, C, Y, and W-135] Polysaccharide Vaccine; Sanofi Pasteur) worldwide production and distribution has been discontinued.
- In the United States, a limited supply was available until mid-2017, with expiration dates in June or September 2017.
- The use of conjugated MenACWY (Menactra, Menveo, Nimenrix) vaccines for persons for whom vaccination is indicated (off-label for age 55 or greater in many countries) is recommended by all authorities worldwide.

New Meningococcal B Vaccines

- Trumenba (Pfizer); Bexsero (Novartis)
  - FDA label: Age 10-25 (Bexsero >2m elsewhere)
- ACIP: for the following aged ≥ 10 years:
  - Persons with anatomic or functional asplenia, including sickle cell disease
  - Persons with complement deficiencies or taking eculizumab (Soliris)
  - Local meningococcal B outbreak
  - Certain microbiologists
  - Permissive use in adolescents 16-18yr (up to 23)

Travel Not an Independent Risk for MenB

Global incidence of serogroup B invasive meningococcal disease: a systematic review

Shruti Sridhar, Brian Greenwood, Christopher Head, Stanley A Plotkin, Marco A Sáfadi, Samir Saha, Muhamed-Kheir Taha, Oyewale Tomori, Bradford D Gessner

Use of recently licensed vaccines against *Neisseria meningitidis* serogroup B (NmB) will depend partly on disease burden estimates. We systematically reviewed NmB incidence and mortality worldwide between January, 2000, and March, 2015, incorporating data from 37 articles and 12 websites. Most countries had a yearly invasive NmB incidence of less than 2 per 100 000 people. Within these relatively low incidence rates (compared with common causes of invasive bacterial diseases), substantial variation was detected between countries, with a notably higher incidence in Australia, Europe, North America, and South America. China and India had reports only of sporadic cases, and except for South Africa, sub-Saharan Africa showed a near absence of disease. In countries with consistently collected data, NmB incidence has tended to decrease, even as the proportion of invasive meningococcal disease cases caused by serogroup B has increased. With few exceptions, case-fatality ratios were fairly consistent, ranging between 3% and 10%. In high-income countries, incidence rates of NmB were relatively low compared with other vaccine-preventable diseases and might be decreasing.

Lancet Infect Dis 2015

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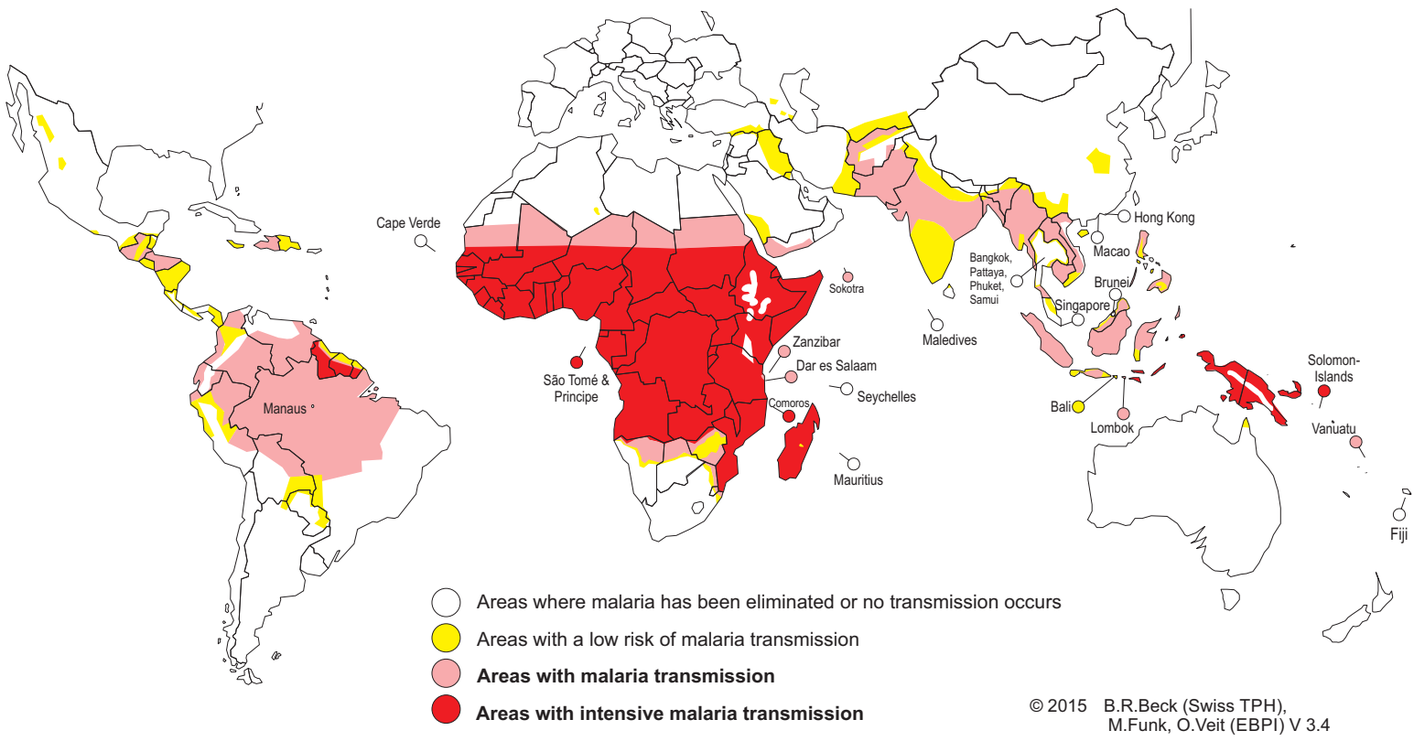
S1473-3099(15)00217-(

Agence de Médecine Préventive, Ferney-Volt France (S Sridhar MPH); **of Infectious and Tropic Disease, London School Hygiene and Tropical M London, UK** (B Greenwo

Malaria-most important parasitic disease, 300 million cases/yr, 3-5 million deaths, mostly in children under 5. 90% of cases in Africa.



Malaria - Prophylactic Drugs

- Central America, Middle East, Korea
  - Chloroquine 500mg once/wk and 4 wks after
- All Other Malarious Areas
  - Mefloquine (Lariam®) [except SE Asia] or Atovaquone/Proguanil (Malarone®) or Doxycycline
  - Equivalent efficacy
  - Individualize to itinerary and traveler

Malaria Drugs-Chloroquine

- 500 mg chloroquine phosphate salt (300 mg base)
  - Once/week including 4 weeks post-travel
- Only effective in Central America above the Panama Canal, Caribbean,Middle East, parts of China, Korea
- Cheap, safe in pregnancy (despite US FDA), safe in children
- Well tolerated
- Hydroxychloquine is effective

Malaria Drugs-Chloroquine Resistant

- Mefloquine 250 mg
  - Once/week including 4 weeks post-travel
  - Insomnia, vivid dreams, anxiety in some patients
  - Most convenient option for long trips
- Doxycycline 100 mg
  - Daily dosing including 4 weeks post-travel
  - Photosensitivity, GI irritant, esophageal ulcers, vaginal candidiasis
  - Miss 1 day can get malaria
  - Inexpensive

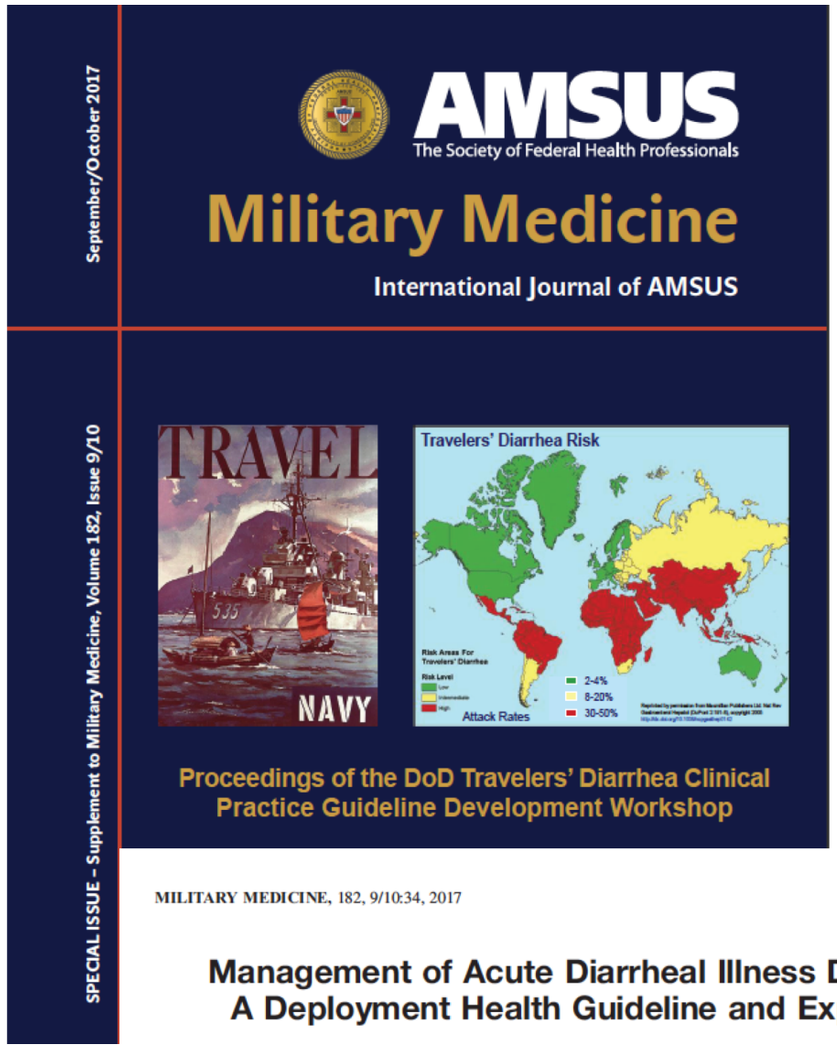
Malaria (Atovaquone/Proguanil) 250/100 combination tablet

- Highly effective for treatment
- Highly effective prophylaxis in natives of endemic countries
  - More limited data in travelers
  - Effective for *P. vivax* prevention
- Well-tolerated
- Once/day with meals plus 7 days after
- High cost ($6/day)
  - Viable only for short-term travelers

Table 3. Drug Regimens for Prophylaxis against Malaria.*

Drug (trade name)	Tablet Size	Adult Dose	Use in Children†	Use in Pregnancy	Initiation	Discontinuation
Primary drug for all malaria species in all areas						
Atovaquone–proguanil (Malarone and generics)	Adults: 250 mg of atovaquone and 100 mg of proguanil; children: 62.5 mg of atovaquone and 25.0 mg of proguanil	250 mg and 100 mg once daily	Yes; FDA-approved for body weight ≥11 kg (for weight of 5 to <11 kg, recommended off-label by CDC)	No (insufficient data; not recommended by CDC)	1–2 days	7 days
Alternative drugs for all malaria species						
Mefloquine hydrochloride (generics only in U.S.)	250 mg (228-mg mefloquine base)‡	250 mg once weekly	Yes, all ages	Yes	3 wk preferable; 1–2 wk acceptable	4 wk
Doxycycline hyclate (Vibramycin, Vibra-Tabs, other brand names, and generics); doxycycline monohydrate (Monodox, Adoxa, and generics)	Hyclate: 20 mg, 50 mg, 100 mg; monohydrate: 100 mg	100 mg once daily	Contraindicated for age <8 yr because of staining of dental enamel	No (teratogenic)	1–2 days	4 wk
Alternative drug for areas with exclusively chloroquine-sensitive malaria						
Chloroquine phosphate (generics only in U.S.)	500 mg (300-mg chloroquine base); some generics available in 250-mg tablets (150-mg base)	500 mg once weekly	Yes, all ages	Yes	1 wk	4 wk
Alternative drug for areas with exclusively *Plasmodium vivax* malaria						
Primaquine phosphate for primary prophylaxis (off-label use)§	26.3 mg (15-mg primaquine base)	30-mg base once daily	Yes, all ages	No (potential toxic effects for fetal erythrocytes)	1 day	7 days
Primary drug for relapse prevention (*P. vivax* or *P. ovale* only)						
Primaquine phosphate for relapse prevention	26.3 mg (15-mg primaquine base)	30-mg base once daily	Yes, all ages	No	As soon as possible after exposure, for which another agent taken for primary prophylaxis	14 days total

* Initiation is defined as the time before the first exposure to malaria, and discontinuation as the time after the last exposure (with the exception of primaquine phosphate for relapse prevention, for which discontinuation is 14 days after the start of primaquine). AV denotes atrioventricular, G6PD glucose-6-phosphate dehydrogenase, and RCT randomized clinical trial.
† See http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/malaria#4661 for dosing information for children.
‡ In some countries, 250-mg Lariam tablets contain 250 mg of mefloquine base, equivalent to 274 mg of mefloquine hydrochloride.
§ Intensive-exposure areas warranting postexposure primaquine treatment after any trip duration include but are not limited to Papua New Guinea, Timor-Leste, and certain areas of Indonesia. In other areas with *P. vivax* or *P. ovale*, persons who have had prolonged exposure (>6 months) or intensive exposure should consider postexposure primaquine treatment.



1. Changing Definitions of TD
2. Single-dose Azithromycin

Clinical Infectious Diseases

MAJOR ARTICLE

Trial Evaluating Ambulatory Therapy of Travelers' Diarrhea (TrEAT TD) Study: A Randomized Controlled Trial Comparing 3 Single-Dose Antibiotic Regimens With Loperamide

Mark S. Riddle,[1,a] Patrick Connor,[2,a] Jamie Fraser,[3,4] Chad K. Porter,[1] Brett Swierczewski,[5] Emma J. Hutley,[6] Brook Danboise,[7] Mark P. Simons,[8] Christine Hulseberg,[7] Tahaniyat Lalani,[3,4,9] Ramiro L. Gutierrez,[1] and David R. Tribble[3]; for the TrEAT TD Study Team

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MILITARY MEDICINE, 182, 9/10:34, 2017

Management of Acute Diarrheal Illness During Deployment: A Deployment Health Guideline and Expert Panel Report

CAPT Mark S. Riddle, MC USN; Gregory J. Martin, MD†; COL Clinton K. Murray, MC USA‡; CAPT Timothy H. Burgess, MC USN§; Col Patrick Connor, FRCP L/RAMC‖; COL James D. Mancuso, MC USA¶; Maj Elizabeth R. Schnaubelt, USAF MC**; Lt Col Timothy P. Ballard, USAF MC††; Jamie Fraser, MPH§‡‡; David R. Tribble, MD, DrPH§ on behalf of the Travelers' Diarrhea Deployment Health Guideline Expert Panel*

ABSTRACT Background: Acute diarrheal illness during deployment causes significant morbidity and loss of duty days. Effective and timely treatment is needed to reduce individual, unit, and health system performance impacts. Methods: This critical appraisal of the literature, as part of the development of expert consensus guidelines, asked several key questions related to self-care and healthcare-seeking behavior, antibiotics for self-treatment of travelers'

New ACG & ISTM Guidelines

PRACTICE GUIDELINES nature publishing group

CME

ACG Clinical Guideline: Diagnosis, Treatment, and Prevention of Acute Diarrheal Infections in Adults

Mark S. Riddle, MD, DrPH[1], Herbert L. DuPont, MD[2] and Bradley A. Connor, MD[3]

Acute diarrheal infections are a common health problem globally and among both individuals in the United States and traveling to developing world countries. Multiple modalities including antibiotic and non-antibiotic therapies have been used to address these common infections. Information on treatment, prevention, diagnostics, and the consequences of acute diarrhea infection has emerged and helps to inform clinical management. In this ACG Clinical Guideline, the authors present an evidence-based approach to diagnosis, prevention, and treatment of acute diarrhea infection in both US-based and travel settings.

Changing of the Definitions

Old Definition (Frequency based)

- Three or more loose or liquid stools (LLS) occurring within a 24-hour period

OR

- Two or more LLS with 24 hours with associated GI/systemic symptoms

  - Mild: ≤ 3 LLS
  - Moderate: 4 – 5 LLS
  - Severe: ≥ 6 LLS

New Definition (Impact based)

Mild
Illness that is tolerable, and does not interfere with activities

Moderate
Illness that able to allows you to function but with forced change in activities

Severe
Total disability due to diarrhea

Febrile / Dysentery
fever (≥101°F) and/or gross blood in stools

Most Definitive Study on ESBL Colonization in Travelers

Import and spread of extended-spectrum β-lactamase-producing Enterobacteriaceae by international travellers (COMBAT study): a prospective, multicentre cohort study

Maris S Arcilla, Jarne M van Hattem*, Manon R Haverkate, Martin C J Bootsma, Perry J J van Genderen, Abraham Goorhuis, Martin P Grobusch, Astrid M Oude Lashof, Nicky Molhoek, Constance Schultsz, Ellen E Stobberingh, Henri A Verbrugh, Menno D de Jong, Damian C Melles, John Penders*

Summary

Background International travel contributes to the dissemination of antimicrobial resistance. We investigated the acquisition of extended-spectrum β-lactamase-producing Enterobacteriaceae (ESBL-E) during international travel, with a focus on predictive factors for acquisition, duration of colonisation, and probability of onward transmission.

Methods Within the prospective, multicentre COMBAT study, 2001 Dutch travellers and 215 non-travelling household members were enrolled. Faecal samples and questionnaires on demographics, illnesses, and behaviour were collected before travel and immediately and 1, 3, 6, and 12 months after return. Samples were screened for the presence of ESBL-E. In post-travel samples, ESBL genes were sequenced and PCR with specific primers for plasmid-encoded β-lactamase enzymes TEM, SHV, and CTX-M group 1, 2, 8, 9, and 25 was used to confirm the presence of ESBL genes in follow-up samples. Multivariable regression analyses and mathematical modelling were used to identify predictors for acquisition and sustained carriage, and to determine household transmission rates. This study is registered with ClinicalTrials.gov, number NCT01676974.

Lancet Infect Dis 2016

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See Online/Comment
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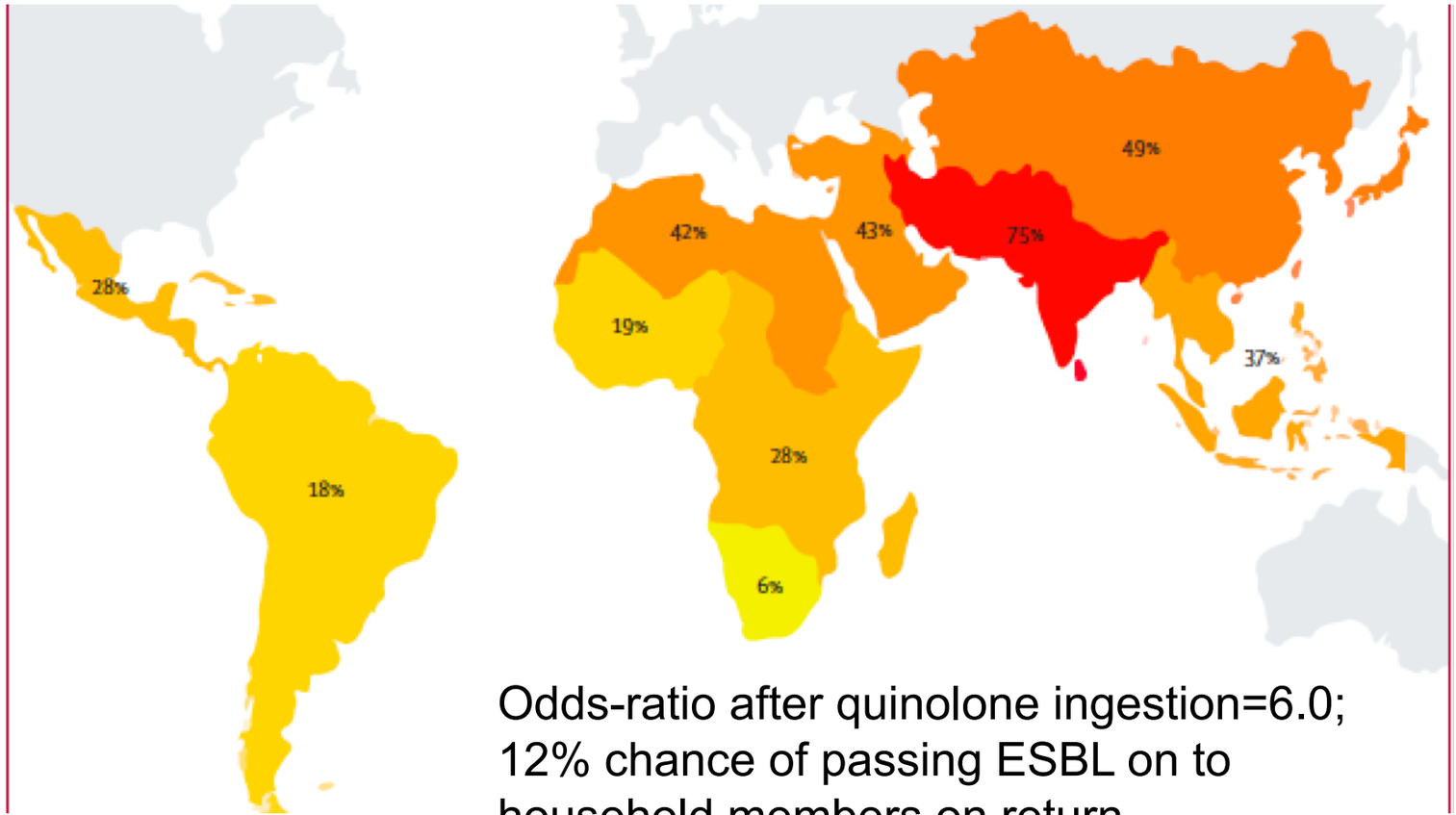
% Colonization by Region in Returned Travelers



Odds-ratio after quinolone ingestion=6.0;
12% chance of passing ESBL on to household members on return

Time to Decolonization

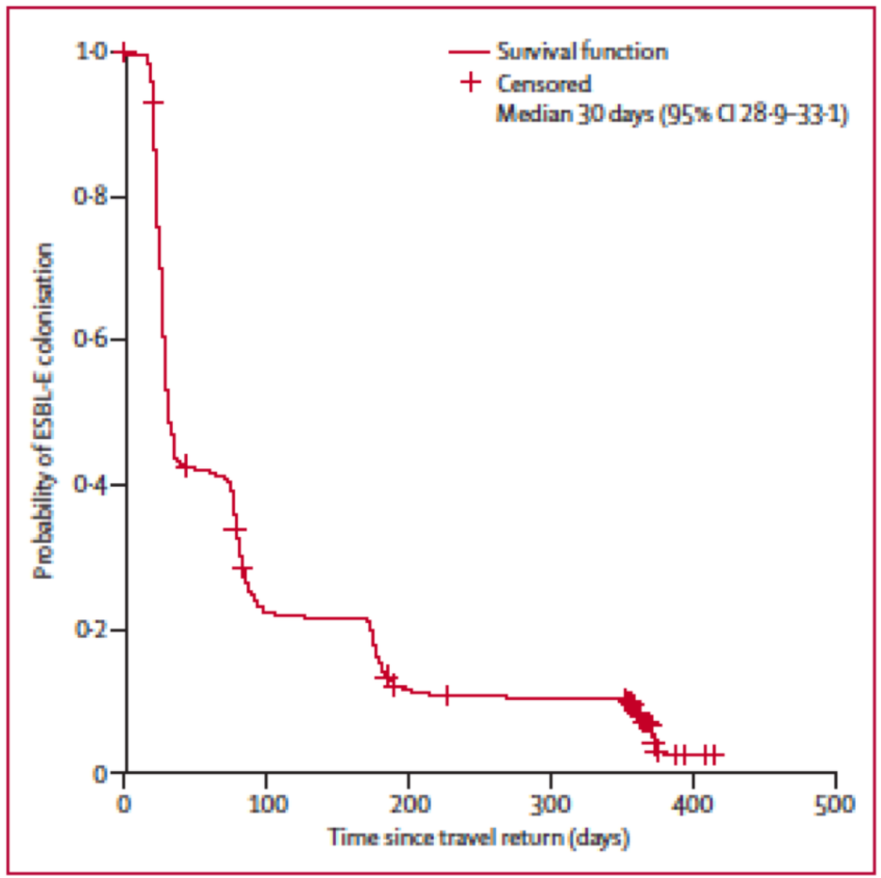


Figure 2: **Kaplan-Meier estimate of time to decolonisation of ESBL-E in travellers**

12% still colonized at 1 yr.

Travelers Diarrhea Self-Treatment During Travel

- Rehydration not typically an issue
- Initial Loperamide
- Empiric Quinolone only for severe diarrhea
  - Emerging role for Azithromycin
  - Quinolone resistant campylobacter now significant

Move to Single-Dose Therapy

Table 2: Antibiotic Treatment for Severe Bacterial TD in Adults[1]

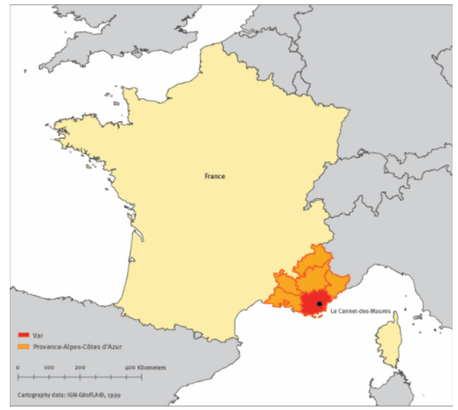
PATHOGEN	ANTIBIOTIC PRESCRIPTION[2, 3]	DOSE/SCHEDULE	PRIMARY CONTRAINDICATIONS[4]
Typical non-invasive bacterial causes of severe TD	Ciprofloxacin 500 mg; 6 tablets	750 mg single dose (1½ tablets) If symptomatic after 24 hr: 500 mg orally, twice per day on days 2 and 3	Quinolone allergy; pregnancy; concomitant administration with tizanidine
	Levofloxacin 500 mg; 3 tablets	500 mg orally, single dose If symptomatic after 24 hr: 500 mg orally, once per day on days 2 and 3	Quinolone allergy; pregnancy
	Ofloxacin 400 mg; 6 tablets	400 mg orally, single dose If symptomatic after 24 hr: 400 mg orally, twice per day on days 2 and 3	Quinolone allergy; pregnancy
	Azithromycin 500 mg; 4 tablets	1000 mg orally, single dose If symptomatic after 24 hr: 500 mg orally, once per day on days 2 and 3[5]	Azithromycin allergy
Non-invasive *E. coli* that cause TD (includes ETEC, EPEC, EAEC)	Rifaximin 500 mg; 6 tablets	200 mg orally, 3 times per day x 3 days	Rifamycin (or component) allergy; pregnancy; adults aged ≥ 65 (studies on safety in this age group have not been done)

CHIK Not Zika in the Americas

Number of Reported Cases to PAHO of Chikungunya in the Americas, 2017 (through EW 46)	
Country	Number of Autochthonous Cases
Brazil	171,930
Bolivia	3,295
Panama	2,046
Peru	1,683
Colombia	1,025
Paraguay	744
Nicaragua	733
El Salvador	528
Costa Rica	380
Venezuela	336
Guatemala	333
French Guiana	261
Ecuador	192
Mexico	37
Martinique	24
Guadeloupe	11
Puerto Rico	8
Saint Barthelemy	3
Saint Martin	3

CHIK Outbreaks France and Italy, 2017

- Aug. 2017 France and Italy reported autochthonous transmission of CHIK
- Two outbreaks are unrelated
- France: Var Department affected in southern France
  - 17 confirmed and probable cases
  - Latest date of onset September 9, 2017
- Italy: Lazio (including Rome) and Calabria regions affected
  - >400 confirmed and suspected cases
  - Latest date of onset October 17,2017 in Anzio, Lazio Region



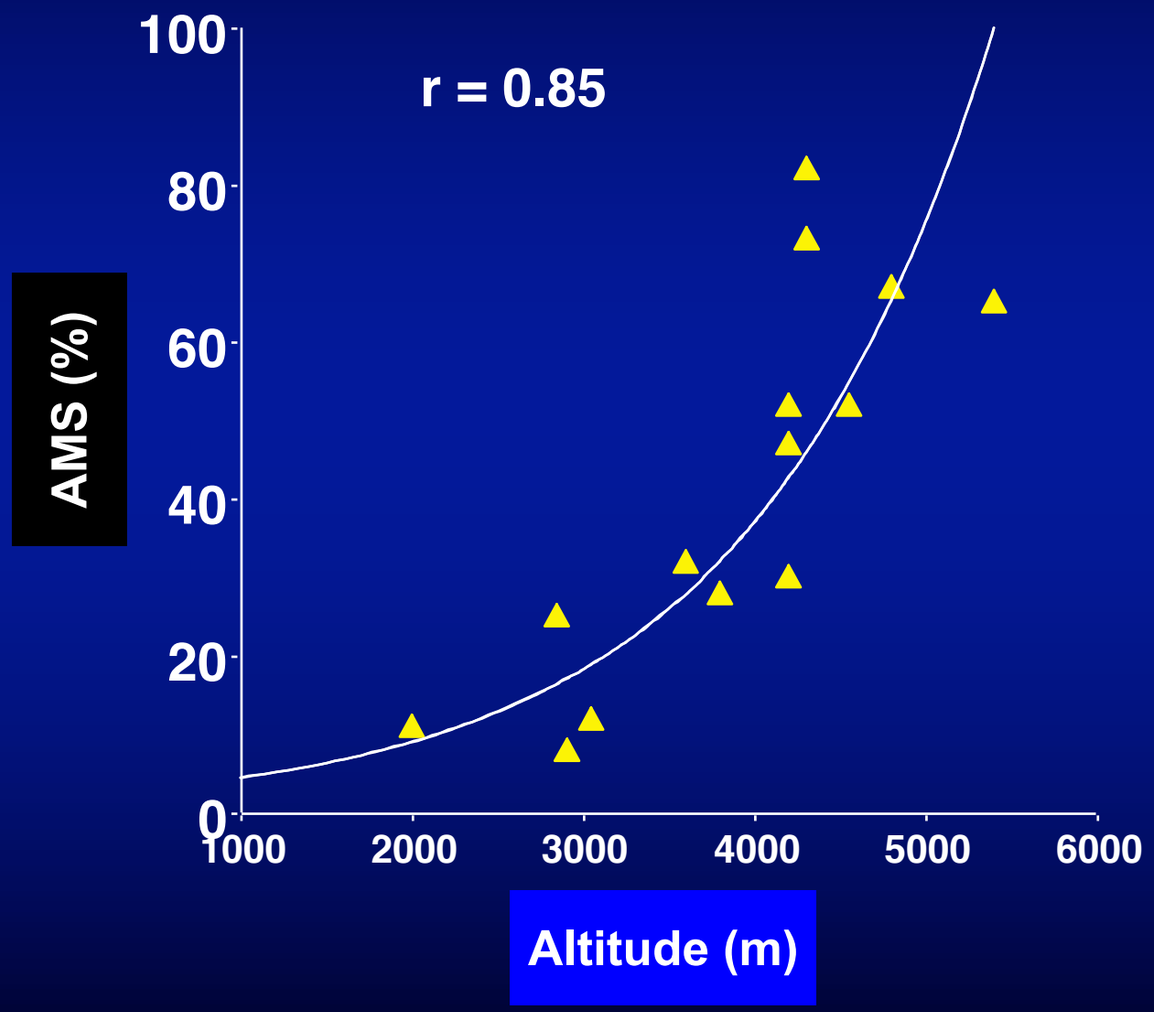
Common Itineraries to Know

- Cusco, Inca Trail
- Kiliminjaro (5895m)
  - Marango (Coca Cola) route-4 to 5 days-AVOID
    - Acetazolamide ineffective on this route
  - Lemosha route—7 days
- La Paz
- Lhasa, Tibet
- Quito, borderline 2,900m
- Nepal: not if Kathmandu, Pokhara only

High Altitude Illness

- Rate of Ascent
- Altitude reached
- Sleeping altitude
  - Hotel always at mountain base
  - Always camp in the valleys not peaks or passes
- Individual susceptibility
  - Not predictable but reproducible

AMS Frequency as a Function of Altitude



Recommending Acetazolamide

- Clearly should be considered in abrupt unavoidable ascents to over 9200 feet (2800 m)
- Benefit is high—risk is low
- Speeds acclimatization
  - Pee HCO3; metabolic acidosis induces hyperventilation and increased O2 binding to RBCs
- Can carry as standby if prophylaxis not used

Acetazolamide Use

- RCT for 250 mg bid (1968)
- However, 125 mg dose is associated with fewer AE's (20-25% at 250mg dose)
  - Decreased headache, parasthesias
- 2 good meta-analyses in 2012 establish 125 bid as effective. 2014 WMS guidelines.
  - *J Travel Med. 2012;19:298-307; BMJ. 2012 Oct 18;345:e6779*
- Start 24 hours before ascent above 2800m
- Continue until 24h after attaining peak altitude

AMS	• headache† – can progress from mild to excruciating • anorexia—can progress to nausea and vomiting • fatigue—can progress to extreme lassitude

Cerebral form (HACE)	• begins as AMS becomes HACE when AMS has progressed to include:
	  ○ decreased level of consciousness and/or
	  ○ truncal ataxia (elicited by tandem gait test)
	• can progress to coma and death
	• can occur alone or in combination with HAPE

Pulmonary form (HAPE)	• presents as decreased exercise tolerance (increased difficulty walking uphill), which can progress to:
	  ○ severe breathlessness with exertion
	  ○ breathlessness at rest
	  ○ substantial chest fullness
	  ○ cough‡
	• eventually progresses to production of pink, frothy sputum (a pre-terminal event)
	• can present with or without cerebral symptoms§

Absolute Indications for Descent

- Ataxia
- Change in level of consciousness
- Pulmonary edema
- Symptoms worsening after 24 hours at that altitude with or without treatment

Treatment of High Altitude Illness

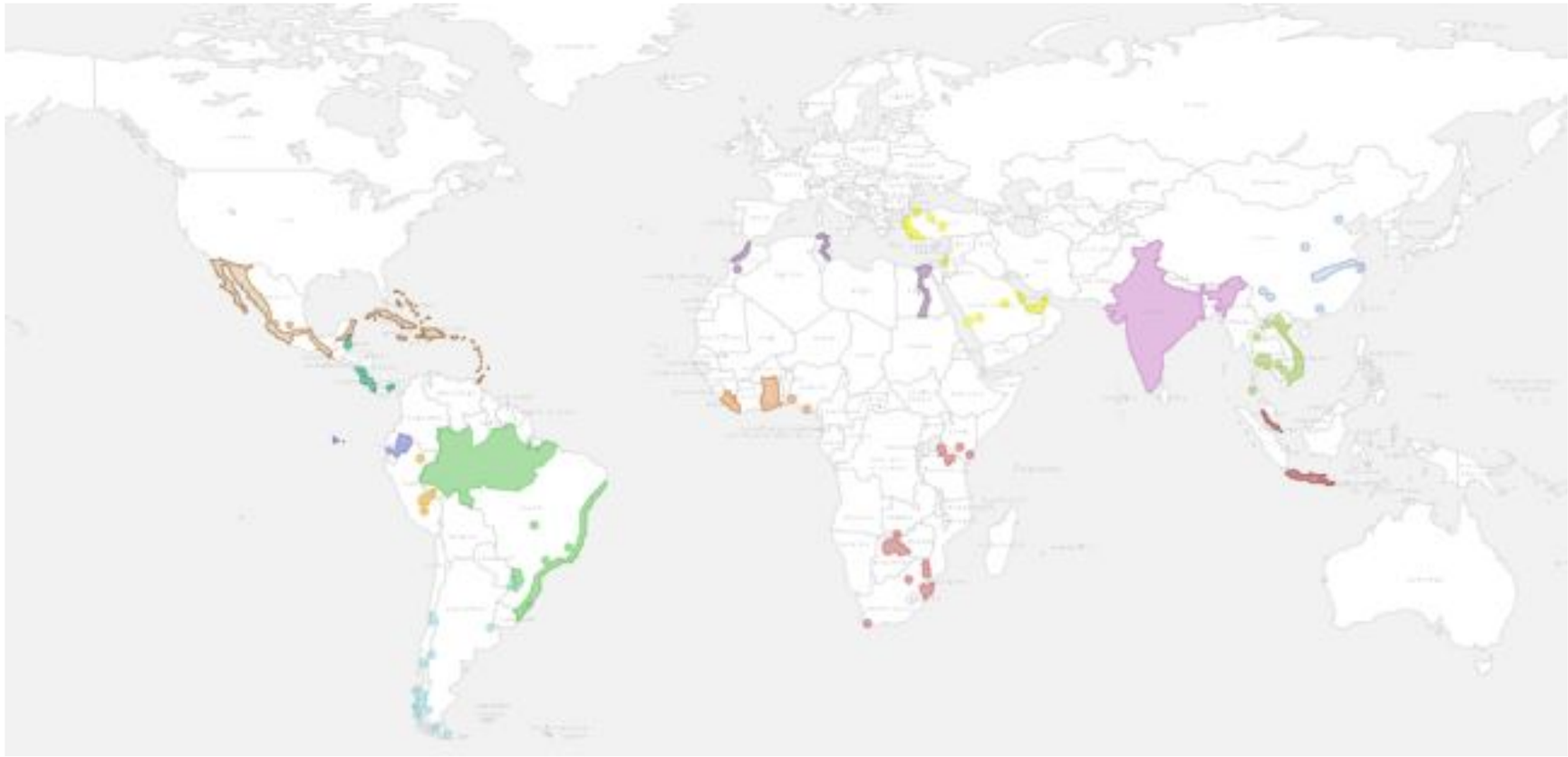
- Descend, descend, descend, if available, use O2 pending descent
- Mild AMS can be treated with stop, rest, acclimatize
  - Acetazolamide 125-250 bid
- For HAPE, HACE, drugs (not discussed today), portable hyperbaric chamber is for when immediate descent not possible

Three Rules to Avoid Dying of Altitude Illness

- Rule #1: Learn to recognize the early symptoms of altitude illness and be willing to admit you have them.
- Rule #2: Never ascend to sleep at a higher altitude with any symptoms of altitude illness.
- Rule #3: Descend if your symptoms are getting worse while resting at the same altitude.

Clinical Pearls: Who Gets What, Where?

Cases=10 most common leisure Itineraries



India

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A and typhoid for all destinations • Japanese encephalitis for long-term stays or exposure to intensive rural farming during shorter stays • Rabies for at-risk travelers and long-term stays	Chemoprophylaxis for most destinations except those at an altitude of >2000 m in north and some short-stay urban destinations; consult detailed maps	• Take precautions against mosquitos, especially in rural farming areas due to encephalitis risk • Avoid animal contact • Exercise strict caution with regard to ingestion of food and water • Take precautions against motor-vehicle injury	Dengue, chikungunya, tuberculosis, typhoid, paratyphoid, hepatitis E, and enteric bacterial disease

China: Usual urban tourist destinations and major river cruises

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A and typhoid for all destinations • Japanese encephalitis for long-term stays or exposure to intensive rural farming during shorter stays • Rabies for at-risk travelers and long-term stays	• Chemoprophylaxis not needed • Risk of malaria in a few remote, infrequently visited areas	Avoid animal contact; avoid markets with live poultry and do not eat undercooked poultry	Air pollution (poses substantial risk for persons with cardiopulmonary disease), schistosomiasis, influenza, acute respiratory illness, and avian influenza

Vietnam, Cambodia, Thailand, and Laos: Urban and suburban tourist destinations, including major beach resorts and islands in Thailand

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A and typhoid for all destinations • Japanese encephalitis for long-term stays or exposure to intensive rural farming during shorter stays or Mekong River cruises during farming season • Rabies for at-risk travelers and long-term stays	Chemoprophylaxis not needed if all overnight stays are in Ho Chi Minh City, Hanoi, or coastal cities of Vietnam, on Mekong River cruise boats, in Siem Reap, Luang Prabang, Phnom Penh, Bangkok, or Chiang Mai, or at major beach resorts or on islands in Thailand	• Avoid animal contact • Avoid markets with live poultry; do not eat undercooked poultry • Take precautions against mosquitos (especially in rural farming areas due to risk of Japanese encephalitis) and chiggers • Take precautions against sexually transmitted infections	Dengue, chikungunya, leptospirosis, scrub typhus, and murine typhus

Malaysia and Indonesia: Urban tourist destinations, coastal and offshore resorts in peninsular Malaysia, Java, Bali

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A, typhoid for all destinations • Japanese encephalitis for long-stay or intense rural farming area exposure on short-term stays • Rabies for risk groups and all long-term stays	• No chemoprophlaxis for urban areas or any common resort • Significant risk in some other areas of Malaysia and Indonesia	• Take precautions against mosquitos, especially in rural farming areas due to sporadic risk of Japanese encephalitis • Exercise extreme vigilance given terrorist threat	Dengue, chikungunya, leptospirosis, scrub typhus, murine typhus

Turkey and the Middle East: Major urban tourist destinations excluding Hajj pilgrims

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for rural or long-term stays or for adventure travel	No malaria risk	• Exercise extreme vigilance given terrorist threat • Take precautions against mosquitos	Leishmaniasis

Kenya, Tanzania (East Africa), South Africa, Zambia, and Botswana (southern Africa):
Short-stay safari tours

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for adventure travel • Yellow fever for Kenya	Chemoprophylaxis for all game parks except certain parks in South Africa; consult detailed maps	• Take precautions against contact with ticks and tsetse flies • Avoid Kenya if medical contraindications to yellow fever vaccine	Tick-bite fever (*Rickettsia africae*) in southern Africa; schistosomiasis in all rivers, lakes, streams, and ponds; African trypanosomiasis in Kenya, Tanzania, and Zambia

Nigeria, Ghana, and Liberia:
Visiting friends and relatives, business destinations

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Yellow fever, hepatitis A, typhoid, meningococcal (ACWY) for all destinations • Rabies for risk groups and all long-term stays	• Intense transmission everywhere • Chemoprophylaxis mandatory for all ages, including those born and raised in Africa	• Take precautions against mosquitos • Avoid freshwater exposure • Avoid travel if medical contraindications to yellow fever vaccine	Schistosomiasis in all rivers, lakes, streams, ponds; dengue, Lassa fever (rare); significant hepatitis B risk

Egypt, Morocco, and Tunisia:
Usual tourist destinations and resorts

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for rural or long-term stays or for adventure travel	No malaria risk	• Take precautions against mosquitos • Exercise extreme vigilance given terrorist threat • Avoid freshwater exposure • Take precautions against exposure to sun, water, and marine hazards • Exercise caution with regard to swimming	Schistosomiasis in all rivers, lakes, streams, ponds; leishmaniasis

Peru: Machu Picchu and Cuzco with Amazon or jungle extension

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A and typhoid for all destinations • Yellow fever for Amazon or jungle	Chemoprophylaxis for Amazon or jungle; chloroquine effective in Madre de Dios region but not in other jungle areas	Take precautions against altitude sickness in Cuzco and Machu Picchu	Dengue, chikungunya, and Zika virus infection; cutaneous leishmaniasis in jungle areas

Mexico and the Caribbean: Tourist resorts

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
Hepatitis A and typhoid for rural or long-term stays or for adventure travel	• Caribbean — chemoprophylaxis for Haiti, all resorts in the Dominican Republic, and no other Caribbean destination • Mexico — no chemoprophylaxis for any typical tourist destination; limited risk in some remote areas; chloroquine effective throughout risk areas in Caribbean and Mexico	• Take precautions against exposure to sun, water, and marine hazards • Exercise caution with regard to swimming • Take precautions against mosquitos • Take precautions against sexually transmitted infections	Dengue, chikungunya, and Zika virus infection; complications from medical tourism

Ecuador: Quito, Andean highlands, Galapagos with Amazon or jungle extension

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for rural or long-term stays or for adventure travel • Yellow fever for the jungle/Amazon only; no risk in the Galapagos	No risk in Quito, Andean cities, Guayaquil, or the Galapagos; limited risk in jungle and Amazon regions	• Take precautions against altitude sickness in the highlands • Take precautions against mosquitos	Dengue, chikungunya, Zika, leishmaniasis; motion sickness on cruise boats; safety standards in cruise vessels

Belize, Costa Rica, Nicaragua, and Panama: Usual urban areas and tourist resorts and eco-tourism destinations in rain-forested areas.

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for rural or long-term stays or for adventure travel • No yellow fever risk except in Darien province Panama	• Costa Rica — no risk • Nicaragua — no risk in proximity to Managua, Lake Managua, or Lake Nicaragua • Belize — no risk in coastal tourist resorts or offshore islands • Panama — risk only in infrequently visited areas of Darien, western Colon, and Ngobe–Bugle; chloroquine effective	• Take precautions against mosquitos • Take precautions against exposure to sun, water, and marine hazards • Exercise caution with regard to swimming	Dengue, chikungunya, Zika; leishmania in the rainforest

Chile and Argentina: Usual urban tourist destinations with Iguassu Falls extension

Vaccines (other than routine)	Malaria Prevention	Key Risk-Prevention Strategies	Other Common Disease Risks
• Hepatitis A for all destinations • Typhoid for rural or long-term stays or for adventure travel • Yellow fever for Iguassu Falls only	No malaria risk anywhere	• Take precautions against altitude sickness for some ski destinations, Aconcagua, and certain treks • Avoid rodent droppings	Dengue, chikungunya, Zika in limited areas of far north Argentina; hantavirus

Thank You

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