Travel Medicine—Special Populations: Immigrants in the U.S.

What's New in Medicine - September 6, 2019

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Disclosures

- Elsevier Publishers: Royalties
  - The Travel & Tropical Medicine Manual, 5th Edition
    (Editors: Sanford, Pottinger, and Jong)
  - Netter's Infectious Diseases, 1st Edition
    (Editors: Jong and Stevens)

- Valneva USA, Inc: Honoraria
  - Japanese Encephalitis Vaccine Advisory Board
  - Speakers Bureau

Learning Objectives

- Review the demographics of immigrant populations in the U.S.
- Become aware of latent imported infectious diseases associated with geographic origins
- Identify novel I.D. risks in U.S. regions for immigrants and other travelers within the U.S.
- Become familiar with the approach to travel medicine when immigrants make return visits to their countries of origin

Demographics - Overview

As of 2017

- 45 million immigrants resided in U.S.
- Immigrants comprised 14% of overall U.S. population of 326 million
- 1 in 7 U.S. residents is foreign born

Source: Zong J, Batalova J, Burrows M. March 14, 2019 Spotlight. Frequently requested statistics on immigrants and immigration in the United States. (https://www.migrationpolicy.org) Accessed 7-3-19.

Demographics - Origins

Top 3 Countries or Regions of Birth
for immigrants residing in U.S. (2015-2017)

- Mexico 25.5% (11.3 million)
- Asian countries 13.7% (6.1 million)
  - *China 4.9% (2.2M)*
  - *India 4.6% (2M)*
  - *Philippines 4.2% (1.9M)*
- African Countries 4.8% (2.1 million)
  - *Nigeria 0.007% (327K)*
  - *Ethiopia 0.005% (222K)*
  - *Egypt 0.004% (192K)*

Sources: Zong J et al. Op. cit.
American Immigration Council. June 28, 2012. African immigrants in America: a demographic overview. (https://www.americanimmigrationcouncil.org) (Accessed 7-3-19)

Top 5 states with regard to Immigrants as a Percentage of the Total State Population, 2017

- California (27 percent)
- New York (23 percent)
- New Jersey (23 percent)
- Florida (21 percent)
- Nevada (20 percent)

Sources: Zong J et al. Op. cit.
Huth L. May 1, 2018. Immigration in America by the numbers. U.S. News & World Report. (Accessed 7-3-19)

Top 5 States by Absolute Growth in Immigrant Populations, 2000-2017

- Texas (1,950,000)
- California (1,790,000)
- Florida (1,710,000)
- New York (670,000)
- New Jersey (580,000)

Sources: Anderson M. February 17, 2017. African immigrant population in U.S. steadily climbs. Pew Research Center. (Accessed 7-3-19)
American Immigration Council. June 28, 2012. African immigrants in America: a demographic overview. (https://www.americanimmigrationcouncil.org) (Accessed 7-3-19)
Jervis R. June 4, 2019. At US-Mexican border, migrants from Africa, Haiti wait to seek asylum. USA TODAY. (Accessed 7-3-19)

Immigrant Health Screen-summary*

Applicants are inadmissable into the U.S. if they have

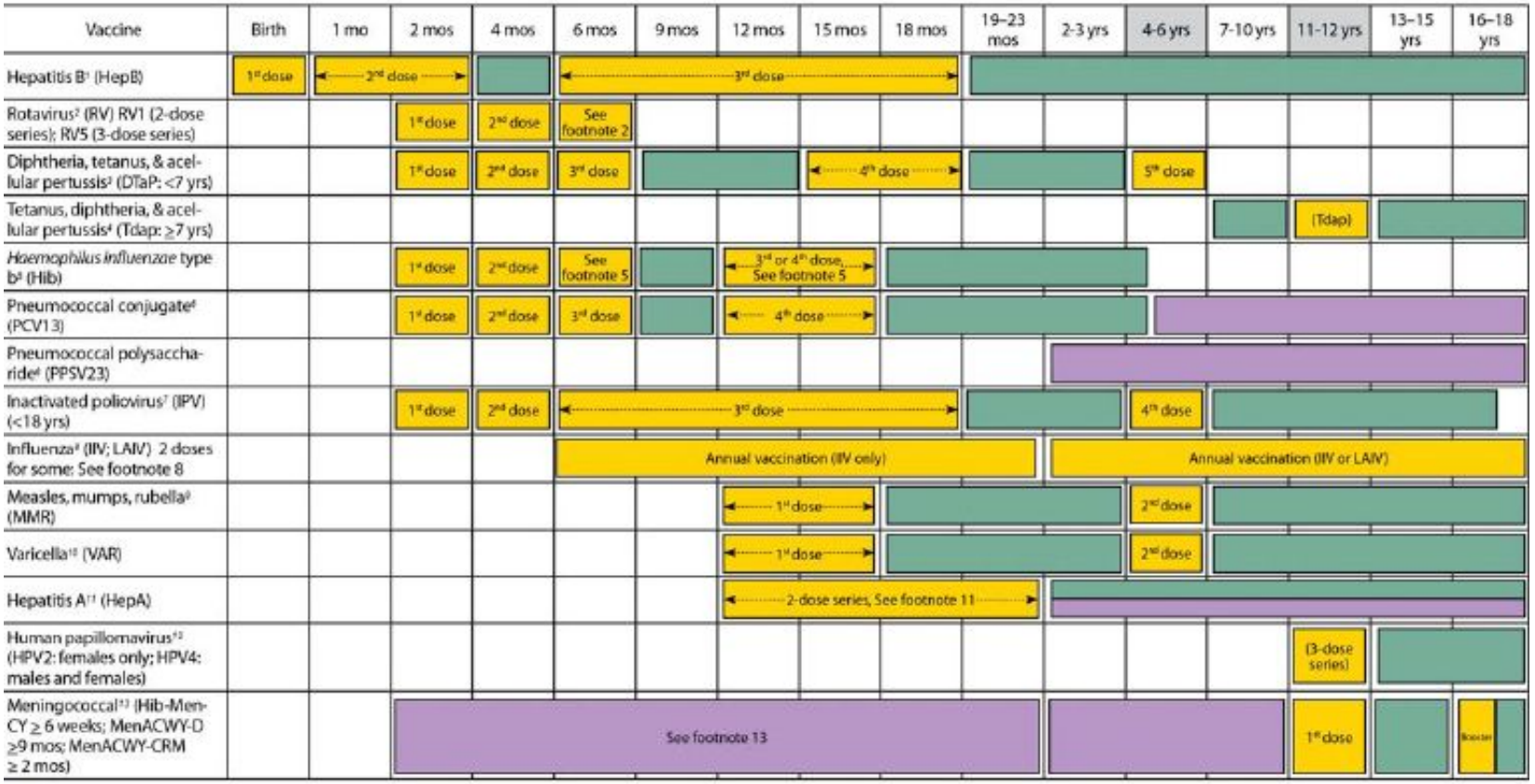
- 1) A communicable disease of public health significance
  - Quarantinable disease (e.g. cholera, yellow fever, plague, viral hemorrhagic fevers, diphtheria, infectious TB, smallpox)
  - Communicable disease that requires WHO notification that may constitute a public health emergency of international concern) (e.g. human influenza caused by a new subtype, poliomelitis due to wild-type poliovirus, SARS, smallpox)
- 2) A physical or mental disorder and behavior associated with the disorder that may pose or has posed, a threat to the property, safety, or welfare of the applicant or others
- 3) A history of physical or mental disorder associated with behavior which posed a threat to the property, safety or welfare of the applicant or others and which is likely to recur or lead to other harmful behavior
- 4) Or are a drug abuser or addict

**Division of Global Migration and Quarantine. CDC immigration requirements: addendum to technical instructions for medical examination of aliens. Updated screening for communicable Diseases of public health significance. Aug 6, 2014. www.cdc.gov (Accessed 7-3-19)*

Examples of Imported Infectious Diseases	MEXICO & LATIN AMERICA	ASIA & SOUTH PACIFIC	AFRICA & MIDDLE EAST
Childhood vaccine-preventable diseases	M-M-R, chickenpox	M-M-R, chickenpox	M-M-R, chickenpox
Systemic infections	Tuberculosis, Hansen's disease, Dengue, Zika virus	Tuberculosis, Hansen's disease, Dengue	Tuberculosis, Hansen's disease, Polio, Dengue, Zika
Viral Hepatitis	Hepatitis A, B, C	Hepatitis A, B, C	Hepatitis A, B, C
Malaria	*P.vivax, P.falciparum*	*P.falciparum, P.vivax, P.malariae, P.ovale, P.knowlesi*	*P.falciparum, P.vivax, P.ovale*
Systemic parasites	Cysticercosis, Neurocysticercosis, Chagas disease	Cysticercosis, Lung flukes, Liver flukes, Intestinal flukes	Schistosomiasis, Filariasis, Lung flukes
Intestinal parasites-protozoans	Amebiasis, Giardiasis	Amebiasis, Giardiasis	Amebiasis, Giardiasis
Intestinal parasites-helminths	Tapeworms	Liver flukes, Roundworms	Schistosomiasis, Roundworms
Sexually transmitted infections	Syphilis, Gonorrhea, HIV	Syphilis, Gonorrhea, HIV	Syphilis, Gonorrhea, HIV

U.S. Childhood Immunization – ACIP 2019

These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are in bold.



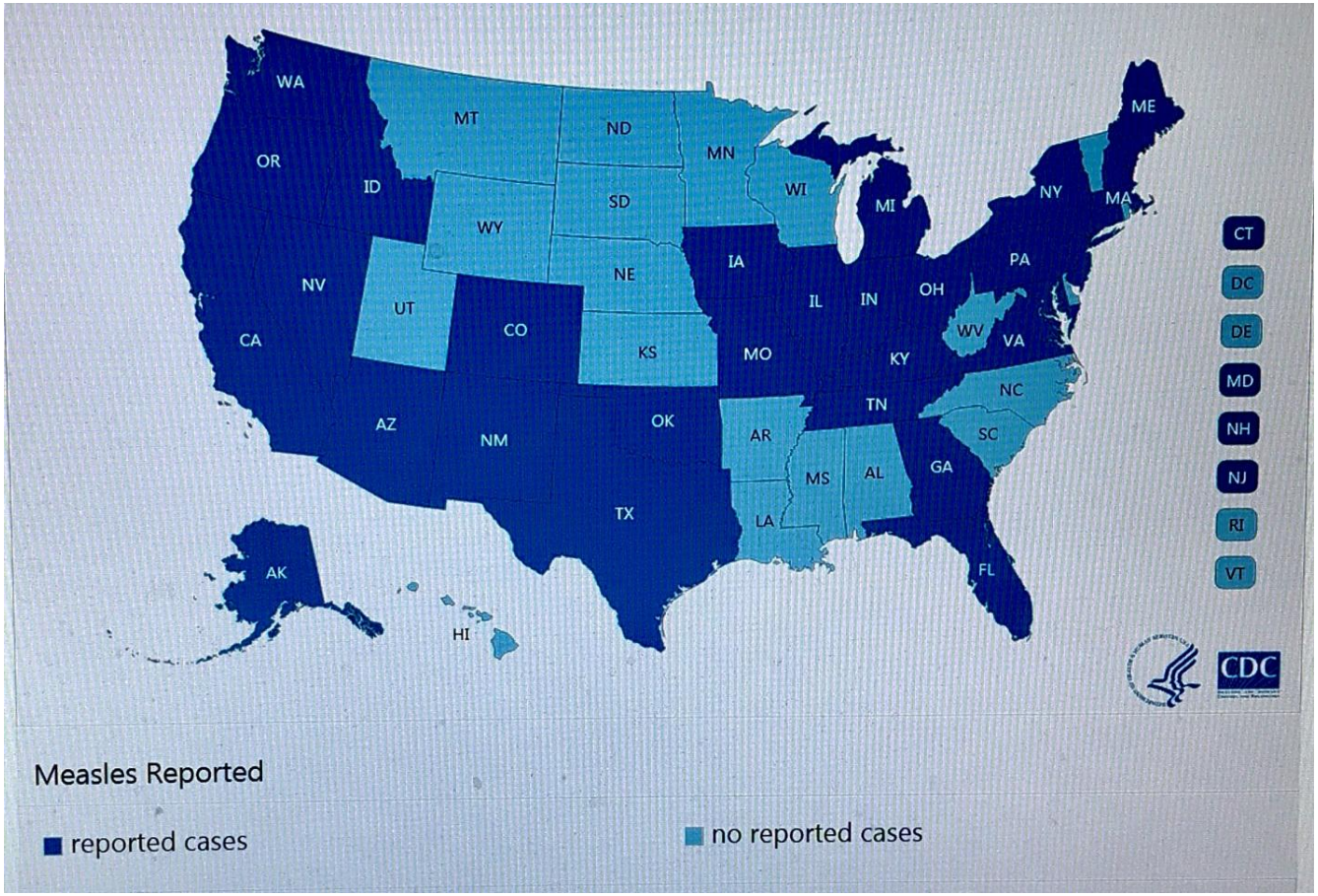
This schedule includes recommendations in effect as of January 1, 2014. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at http://www.cdc.gov/vaccines/hcp/acip-recs/index.html. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (http://www.vaers.hhs.gov) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm) or by telephone (800-CDC-INFO [800-232-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/acip), the American Academy of Pediatrics (http://www.aap.org), the American Academy of Family Physicians (http://www.aafp.org), and the American College of Obstetricians and Gynecologists (http://www.acog.org).

NOTE: The above recommendations must be read along with the footnotes of this schedule.

Source: www.cdc.gov

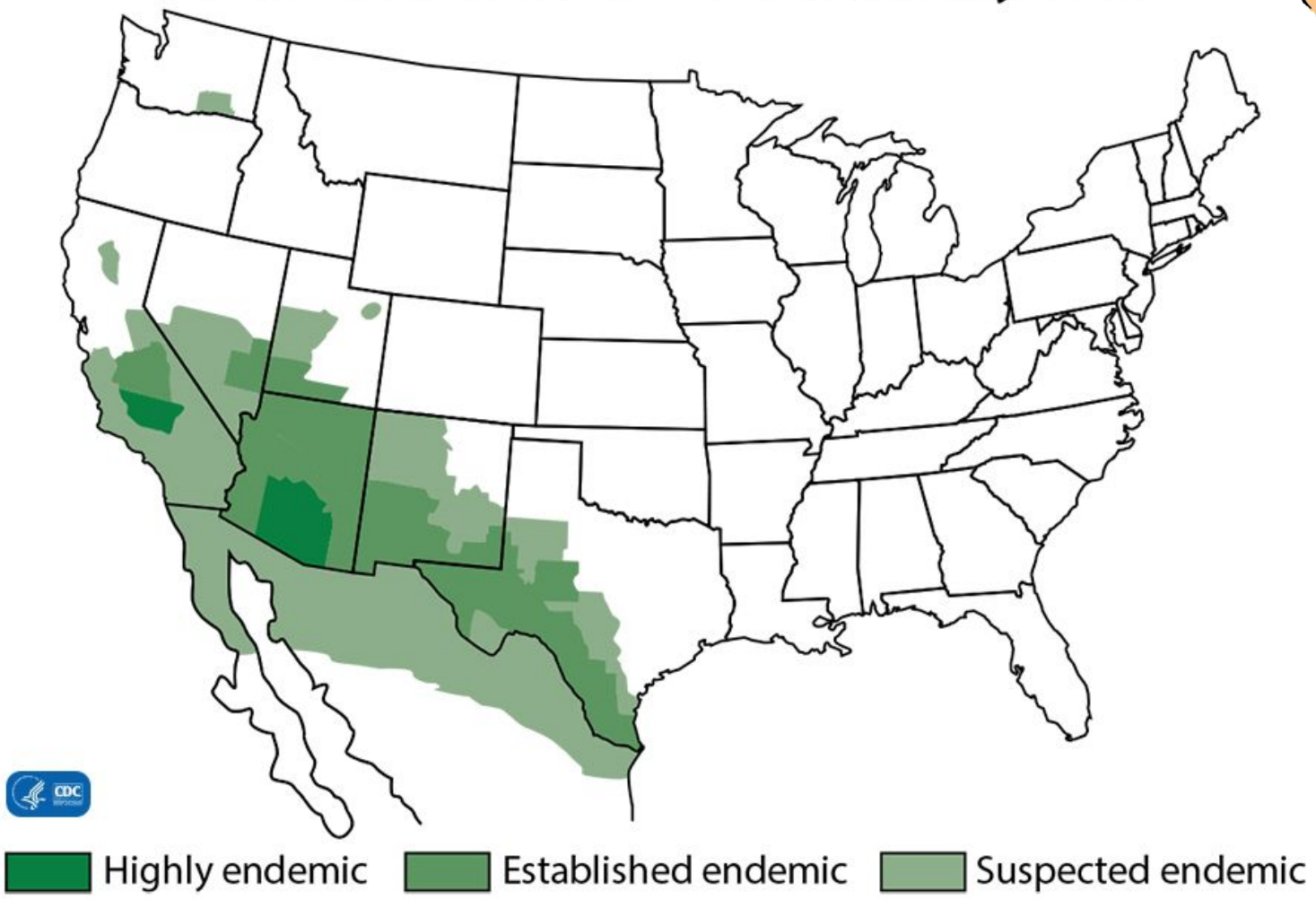
U.S. Measles Outbreak - 2019



From January 1 to July 18, 2019, 1,148** individual cases of measles have been confirmed in 30 states. This is the greatest number of cases reported in the U.S. since 1992 and since measles was declared eliminated in 2000.

Source: www.cdc.gov/measles/cases-outbreaks.html. Accessed 7-2[illegible]19

Areas Endemic for Coccidioidomycosis

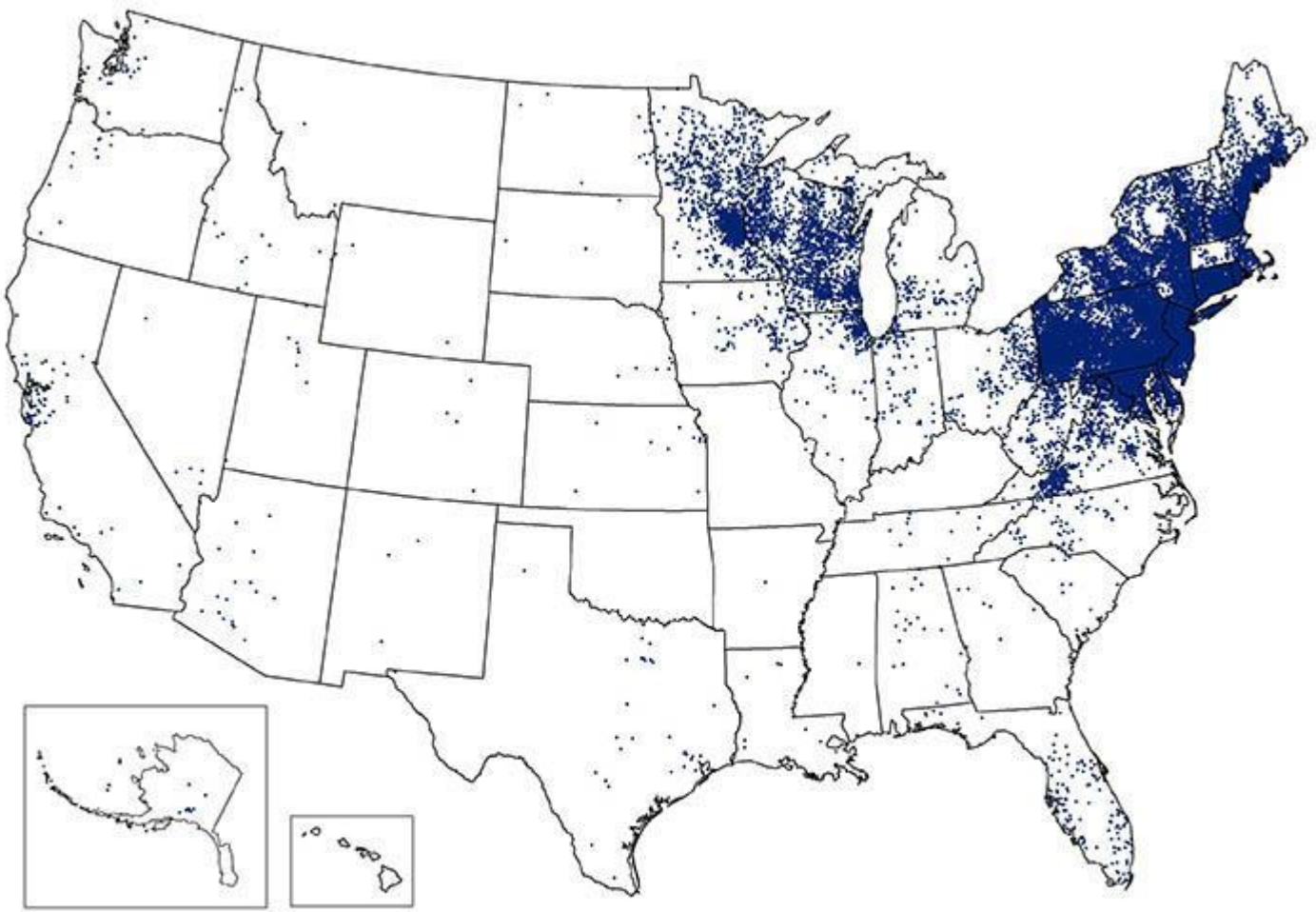


Source:
www.cdc.gov/fungal/dseases/coccidioidomycosis/maps.
(Accessed 7-26-19)

Histoplasmosis Outbreaks in the U.S. 1938-2013

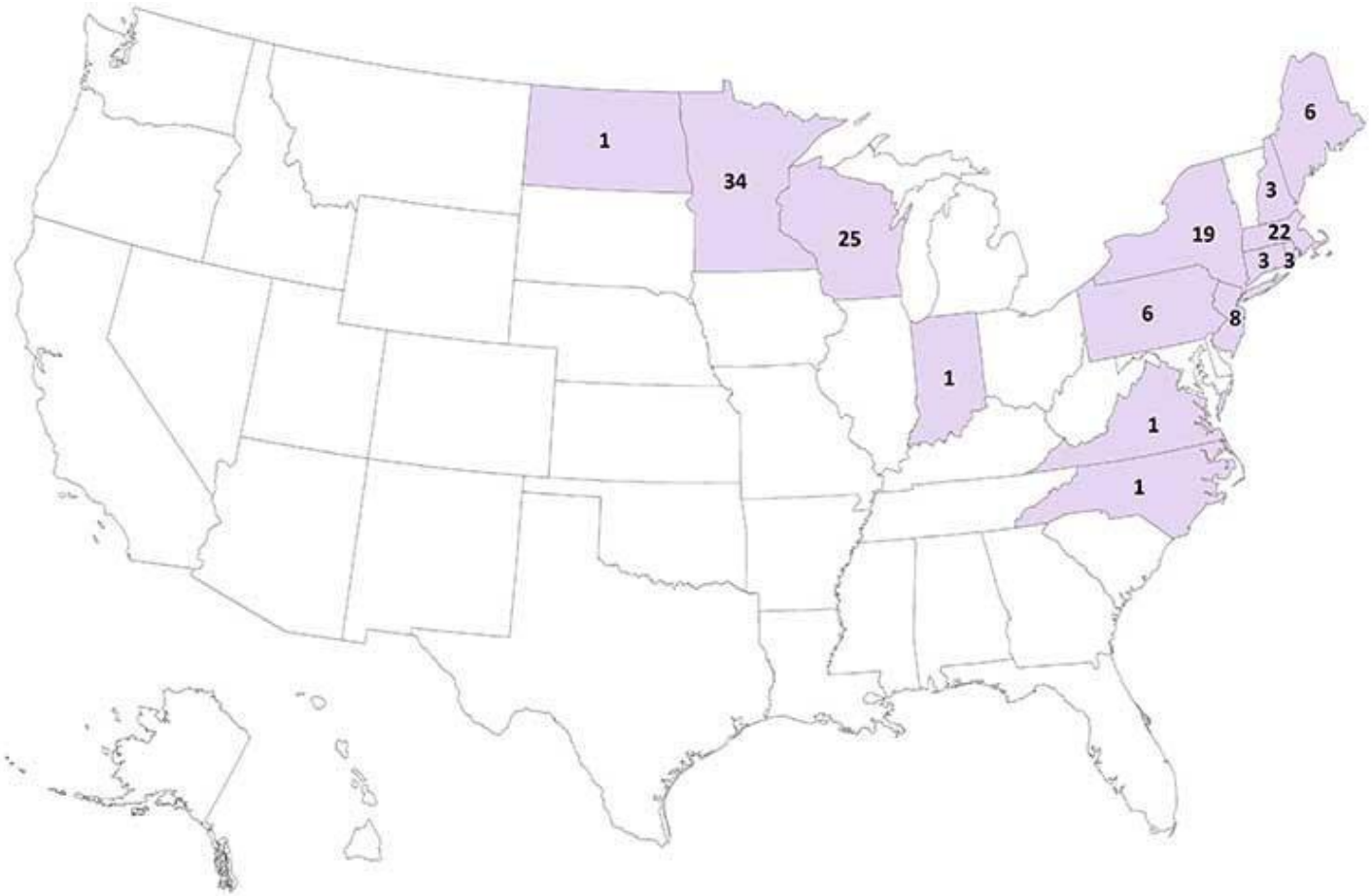
Source: www.cdc.gov/fungal/diseases/histoplasmosis/maps. (Accessed 7-26-1019)

Reported Cases of Lyme Disease – United States, 2017



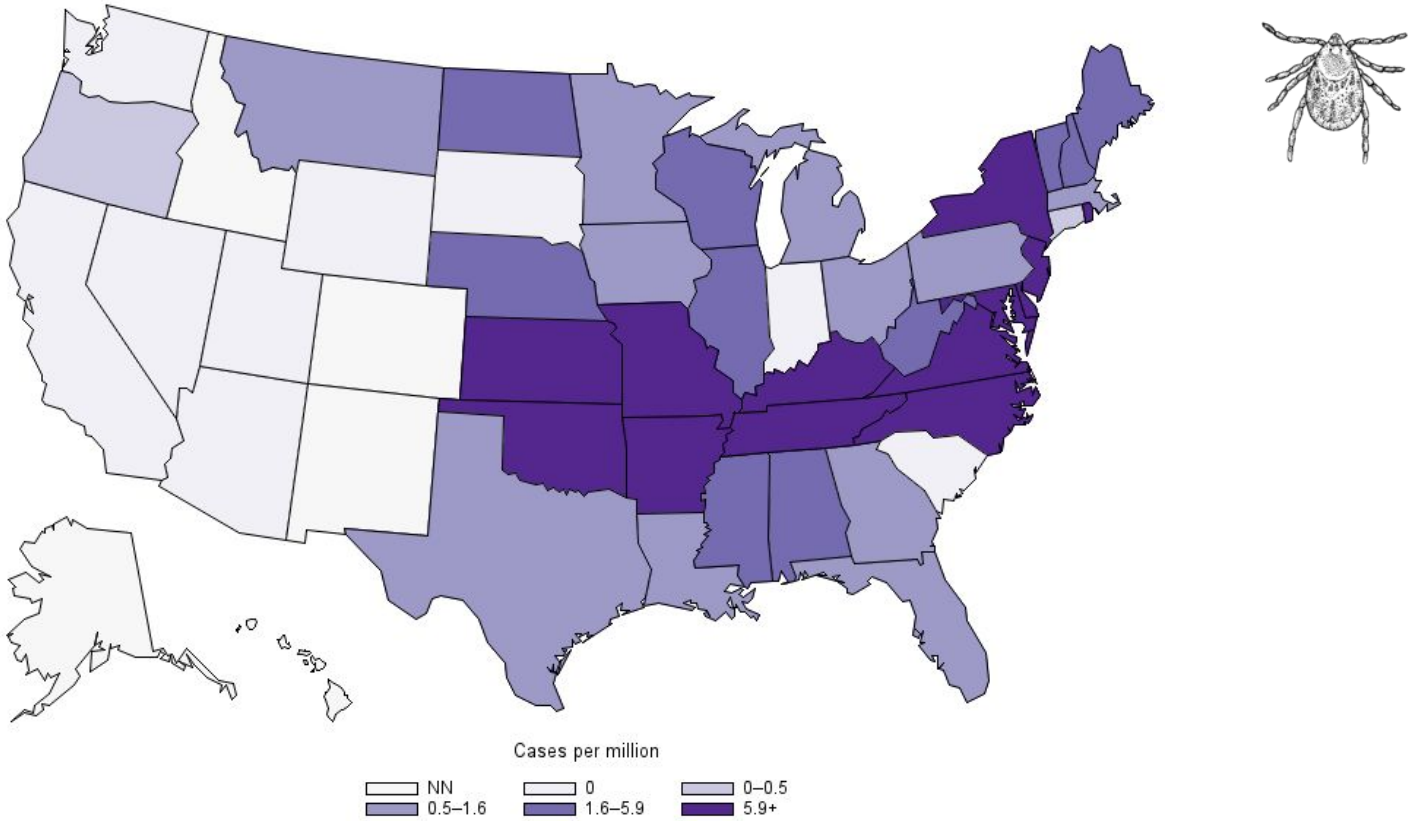
Source: Centers for Disease Control and Prevention (Accessed 7-11-2019)

Powassan virus neuroinvasive disease cases reported by state of residence, 2009-2018.



Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention. (Accessed 7-11-2019)

Reported incidence for *E. chaffeensis* in the United States for 2017

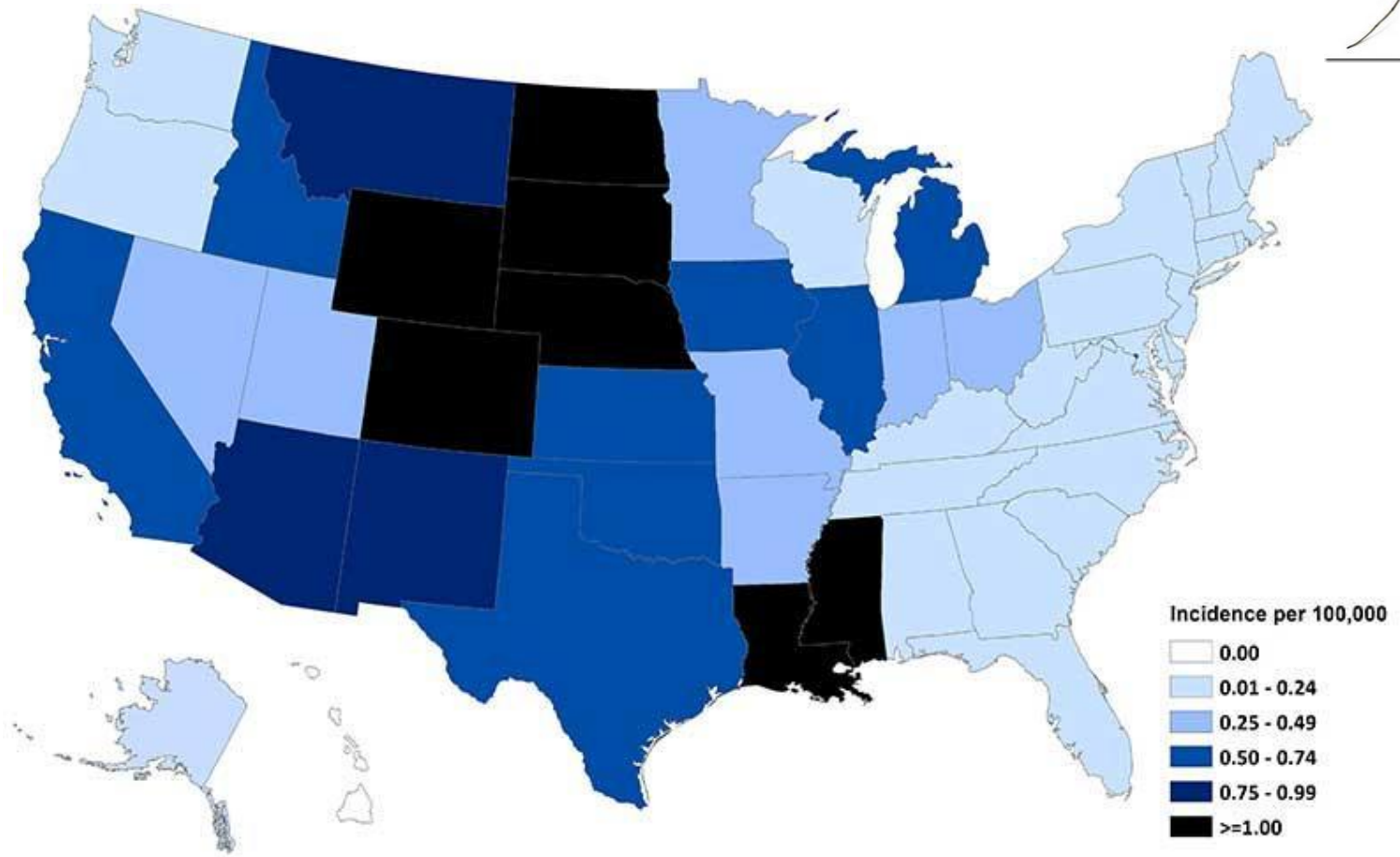


This figure shows the incidence of ehrlichiosis cases caused by *Ehrlichia chaffeensis* by state in 2017 per million persons.
Ehrlichiosis was not notifiable in Alaska, Colorado, the District of Columbia, Hawaii, Idaho, or New Mexico in 2017.
The incidence rate was zero for Arizona, California, Indiana, Nevada, South Carolina, South Dakota, Utah, Washington, and Wyoming.

- The incidence rate ranged from >0 to <0.5 cases per million persons in Connecticut.
- Incidence ranged from 0.5 to <1.6 cases per millionpersons in Florida, Georgia, Iowa, Louisiana, Massachusetts, Michigan, Minnesota, Montana, Ohio, Oregon, Pennsylvania, and Texas.
- Incidence ranged from 1.6 to <5.9 cases per million persons in Alabama, Illinois, Maine, Mississippi, Nebraska, New Hampshire, North Dakota, Vermont, West Virginia and Wisconsin.
- **The highest incidence rates, greater than or equal to 5.9 cases per million persons, were found in Arkansas, Delaware, Kansas,**
- **Kentucky, Maryland, Missouri, New Jersey, New York, North Carolina, Oklahoma, Rhode Island, Tennessee, and Virginia.**

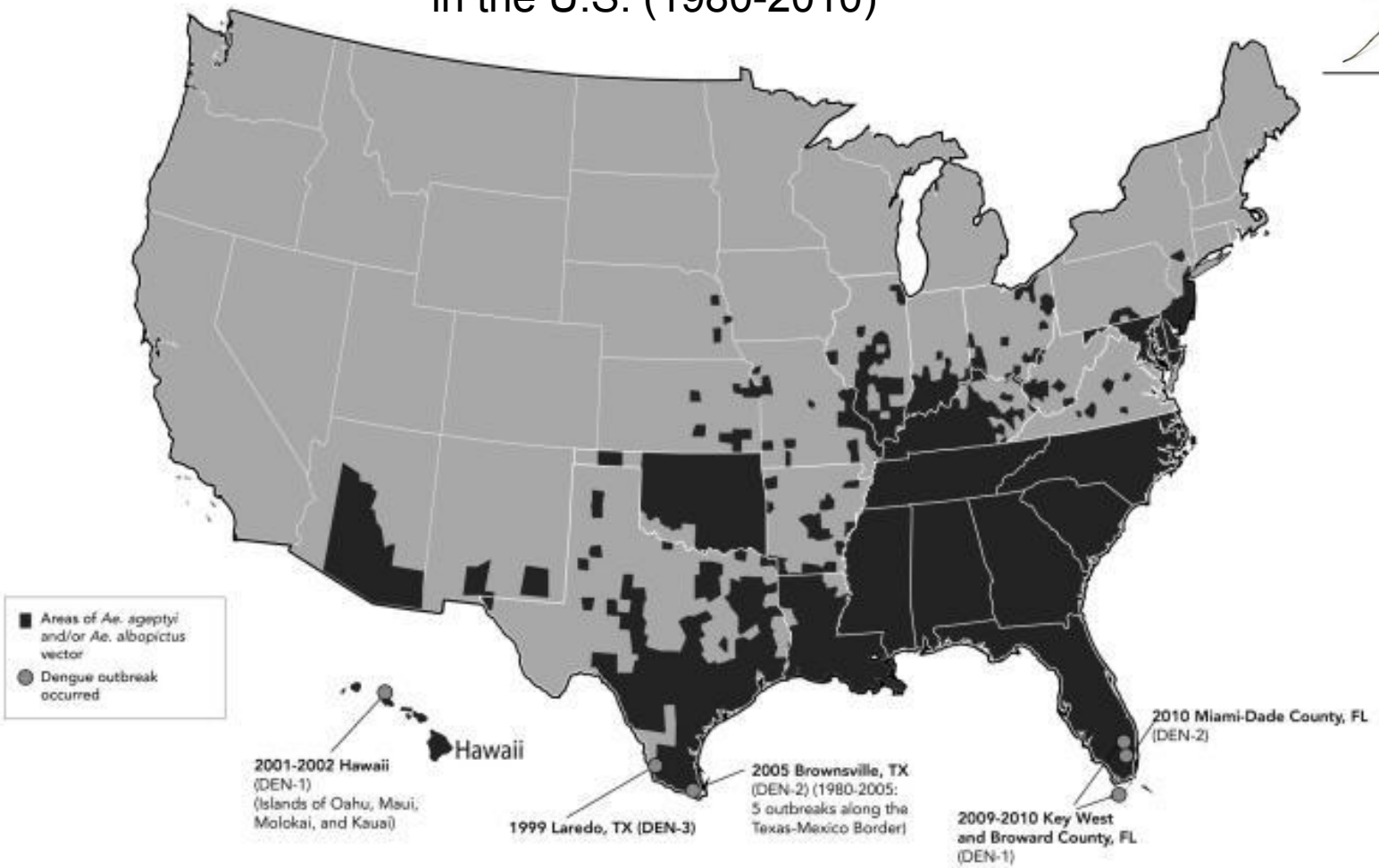
Source: www.cdc.gov (Accessed 7-11-2019)

Average annual incidence of West Nile virus neuroinvasive disease reported to CDC by state, 1999-2018.



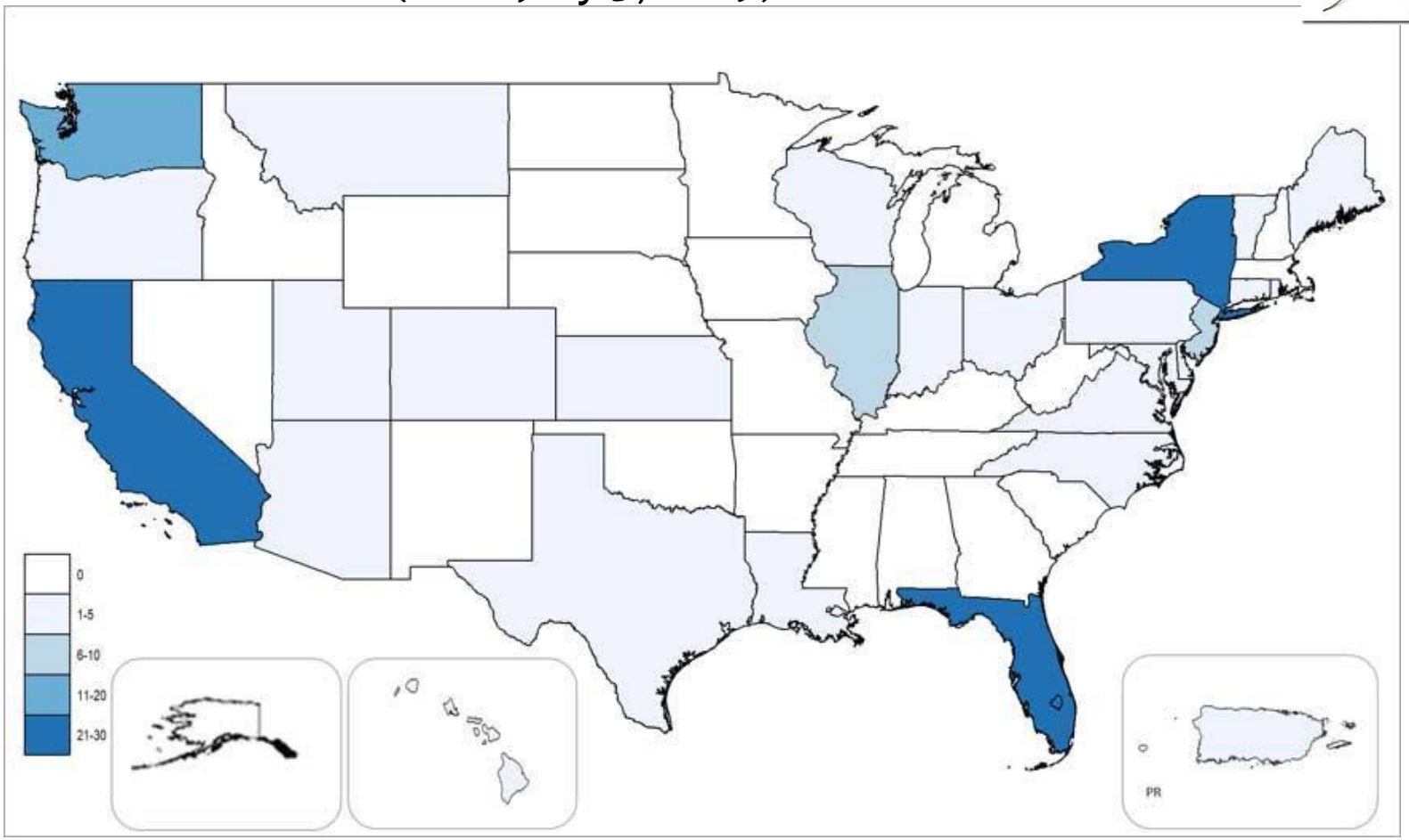
Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention
www.cdc.gov (Accessed 7-11-2019)

Dengue vector populations (2009) & locally acquired disease in the U.S. (1980-2010)



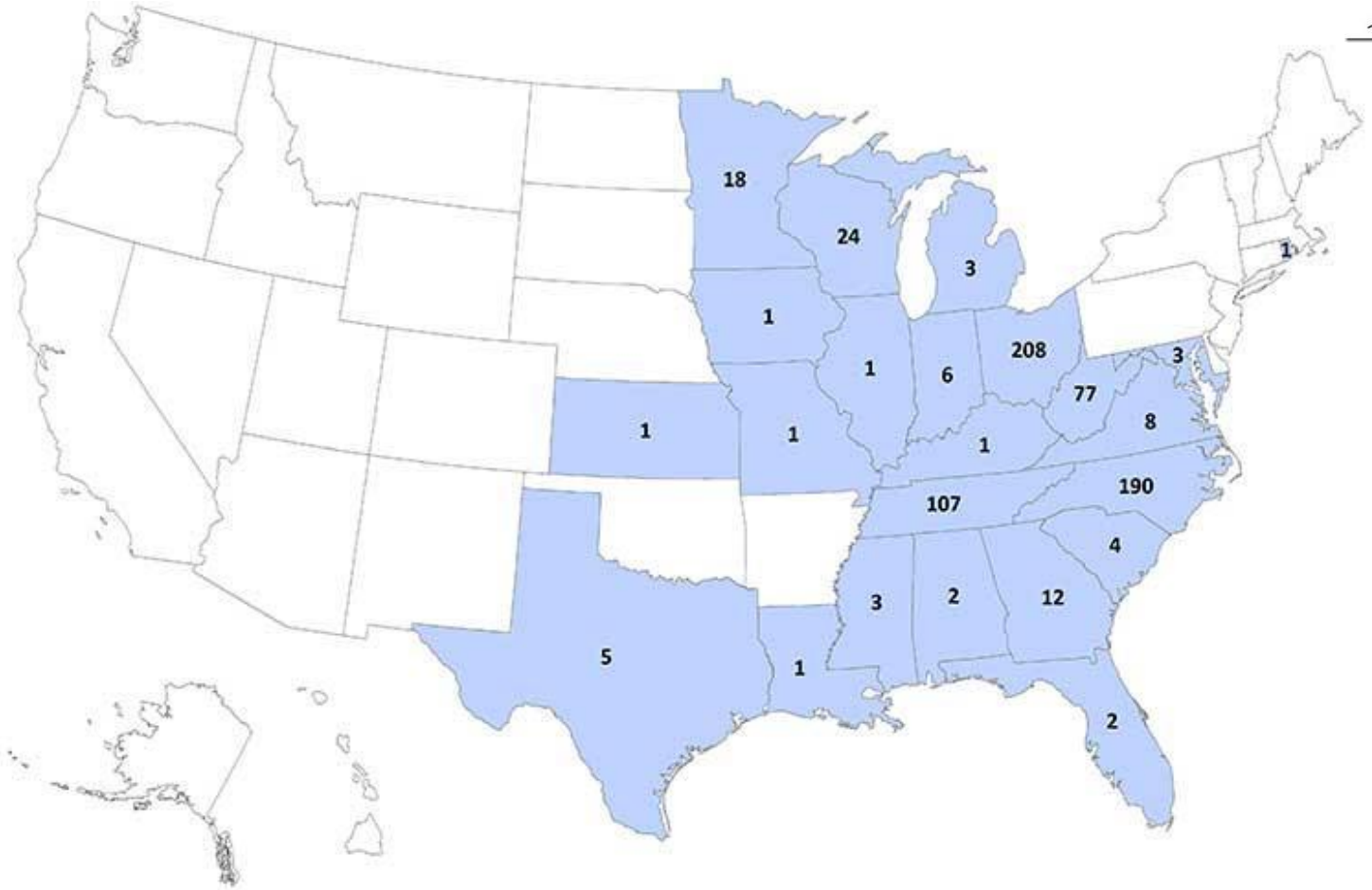
Areas marked in black indicate counties where mosquito surveillance has shown the presence of *Ae. albopictus* and/or *Ae. aegypti*. These areas are vulnerable to dengue outbreaks. Unmarked areas do not necessarily indicate the absence of the vector, as, in some areas, this may be the result of limited surveillance. (Source: Bouri, Nidhi et al. "Return of epidemic dengue in the United States: implications for the public health practitioner." *Public health reports (Washington, D.C. : 1974)* vol. 127,3 (2012): 259-66. doi:10.1177/003335491212700305) (Accessed 7-11-2019)

States and territories reporting dengue cases – United States, 2019
(as of July 3, 2019)



**CDC reports provisional dengue case counts reported to ArboNET for the United States and its territories on the first Thursday of each month. (Accessed 7-11-2019)*

La Crosse virus neuroinvasive disease cases reported by state of residence, 2009-2018

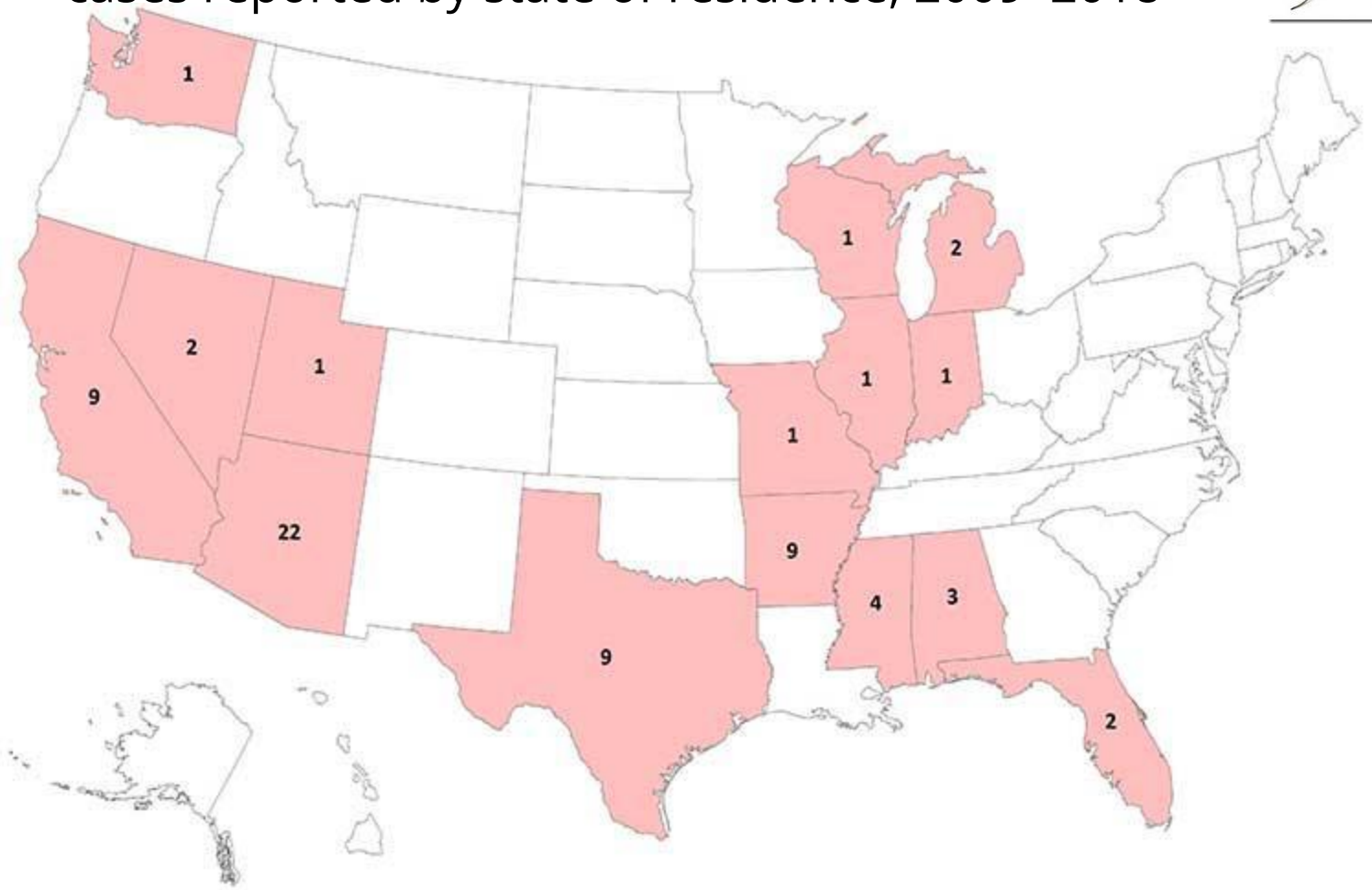


Source: ArboNet, Arboviral Diseases Branch, Centers for Disease Control and Prevention. (Accessed 7-11-2019)

Eastern equine encephalitis virus neuroinvasive disease cases reported by state of residence, 2009–2018

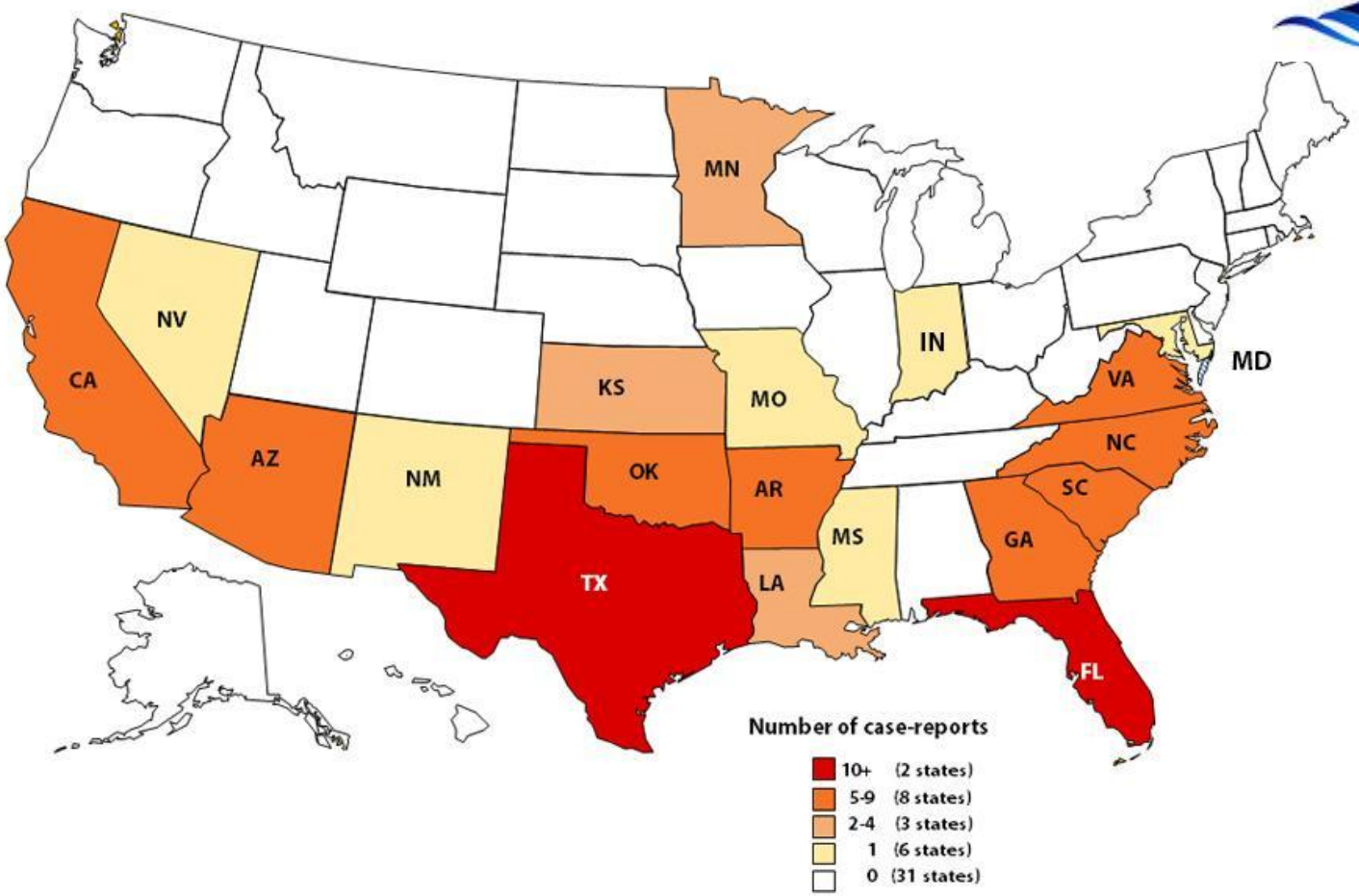
Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention www.cdc.gov (Accessed 7-29-2019)

St. Louis encephalitis virus neuroinvasive disease
cases reported by state of residence, 2009–2018



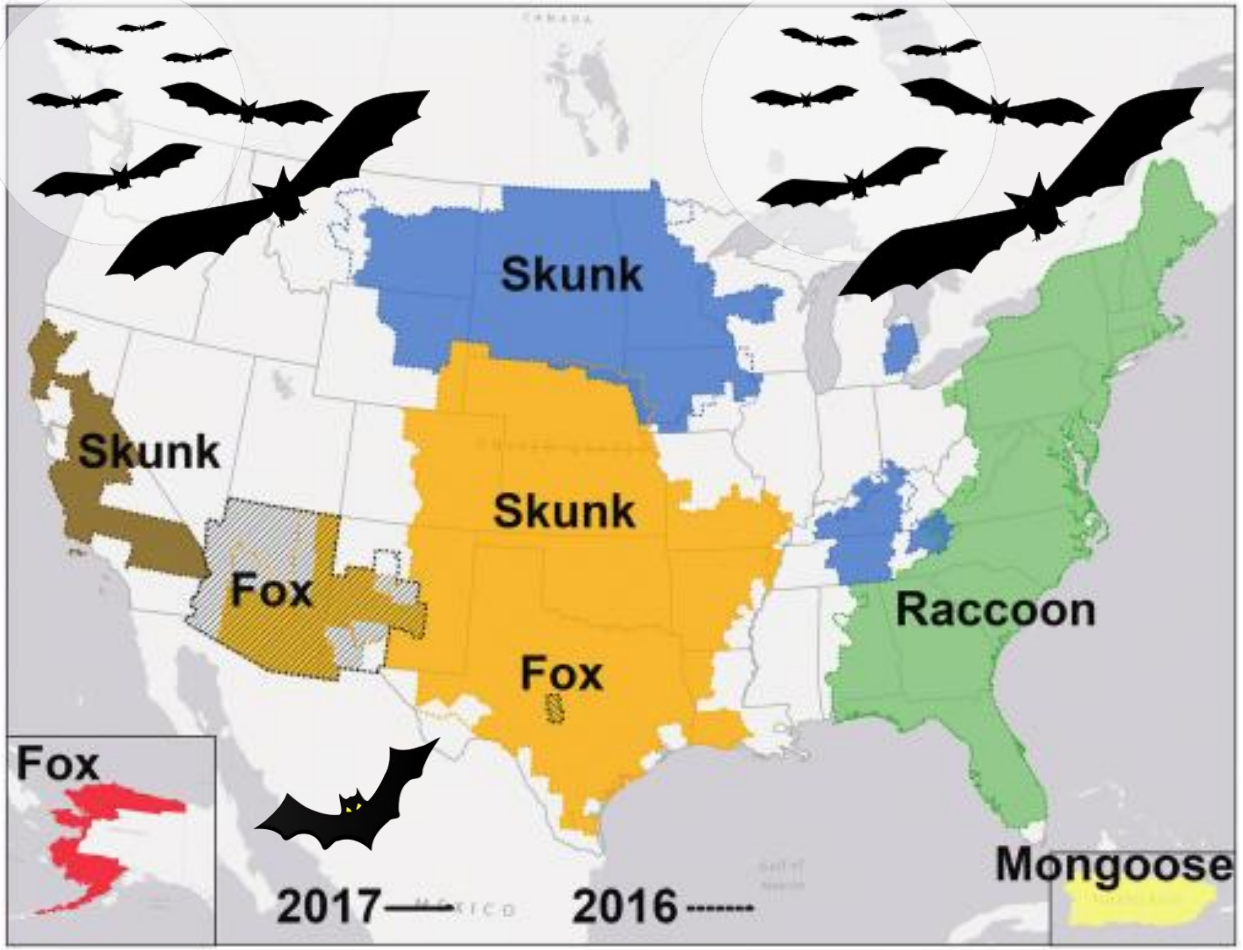
Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention. (Accessed 7-11-2019)

Case-reports of Primary Amebic Meningoencephalitis (PAM) by State of Exposure, 1962–2016



States where cases of *Naegleria fowleri* have occurred. N=145; state of exposure unknown for 4 cases. Map does not picture 1 case from the U.S. Virgin Islands. *Source:* www.cdc.gov *accessed 7-11-19*

Wild mammals serve as reservoirs for rabies virus in the U.S. where bats have become the primary source for human infection…



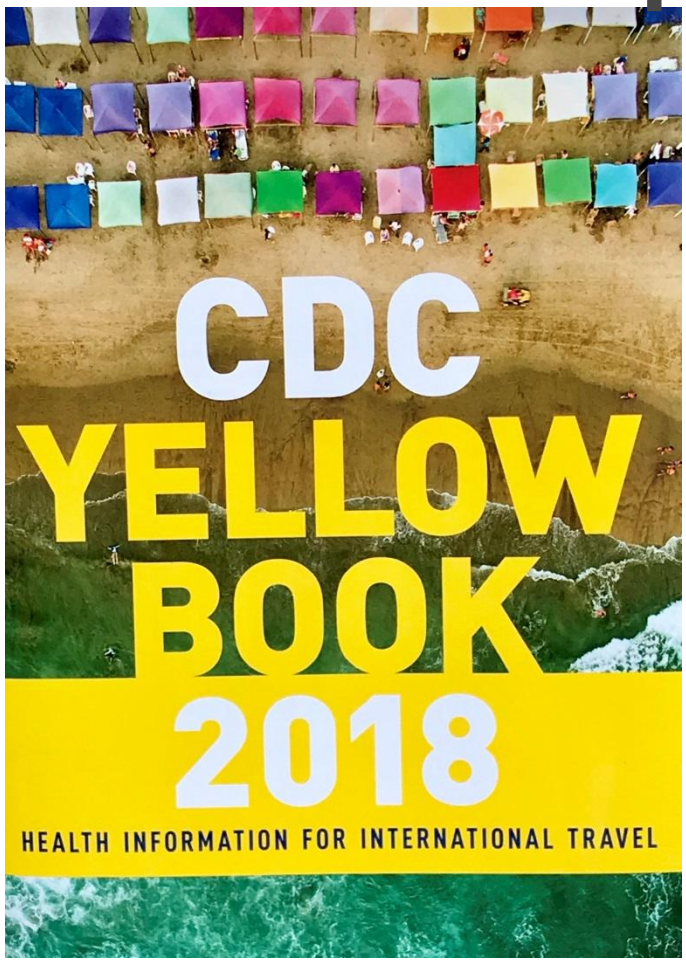
U.S. Subpopulations & I.D. Risk

Activity	Common infectious diseases risks
Daycare centers	Rotavirus, H.influenzae
Primary school	M-M-R, Chickenpox
Middle school	M-M-R, Chickenpox
High school	M-M-R, Chickenpox, Meningitis
College/University	M-M-R, Chickenpox, Meningitis, TBC
Residential facilities	M-M-R, Chickenpox, Hepatitis B, Norovirus, Tuberculosis
Retirement/Nursing homes	Viral Influenza, Norovirus
Cruise ships	Viral Influenza, Norovirus, Legionnaire's
MSM	Hepatitis B, HIV, STI
Injecting drug use	Hepatitis A, B, C; HIV
Blood transfusion	Blood borne pathogens

Bloodbank Bloodborne Pathogen Screen

- Babesiosis
- Chagas
- Hepatitis B, C
- HIV
- West Nile Virus
- Zika

The CDC Yellow Book – Health Information for International Travel



- Sets the standard of care for the practice of travel medicine in the U.S.
- Contains maps showing geographic distribution of health risks
- Provides detailed clinical guidance on travel health issues country-by-country

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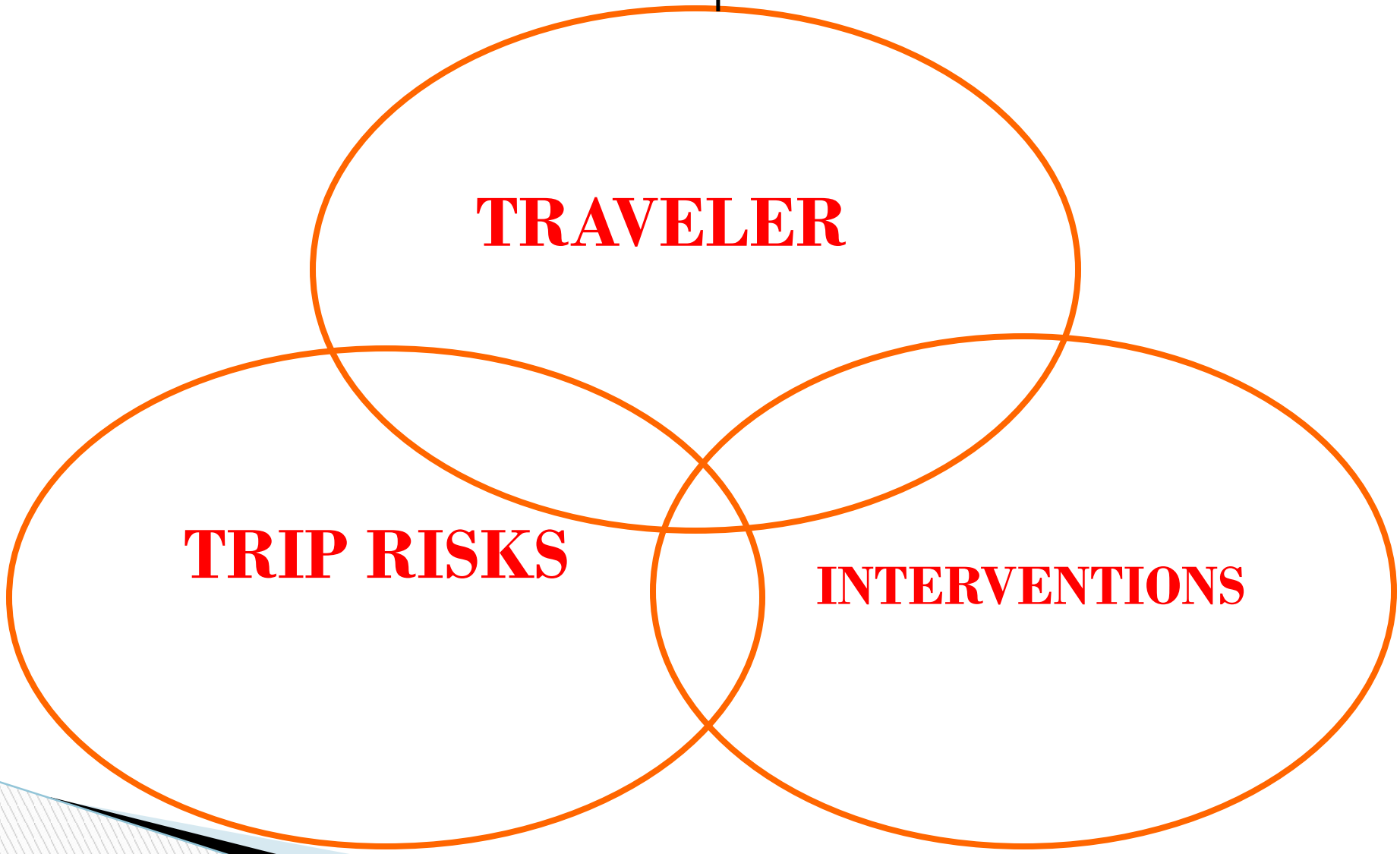
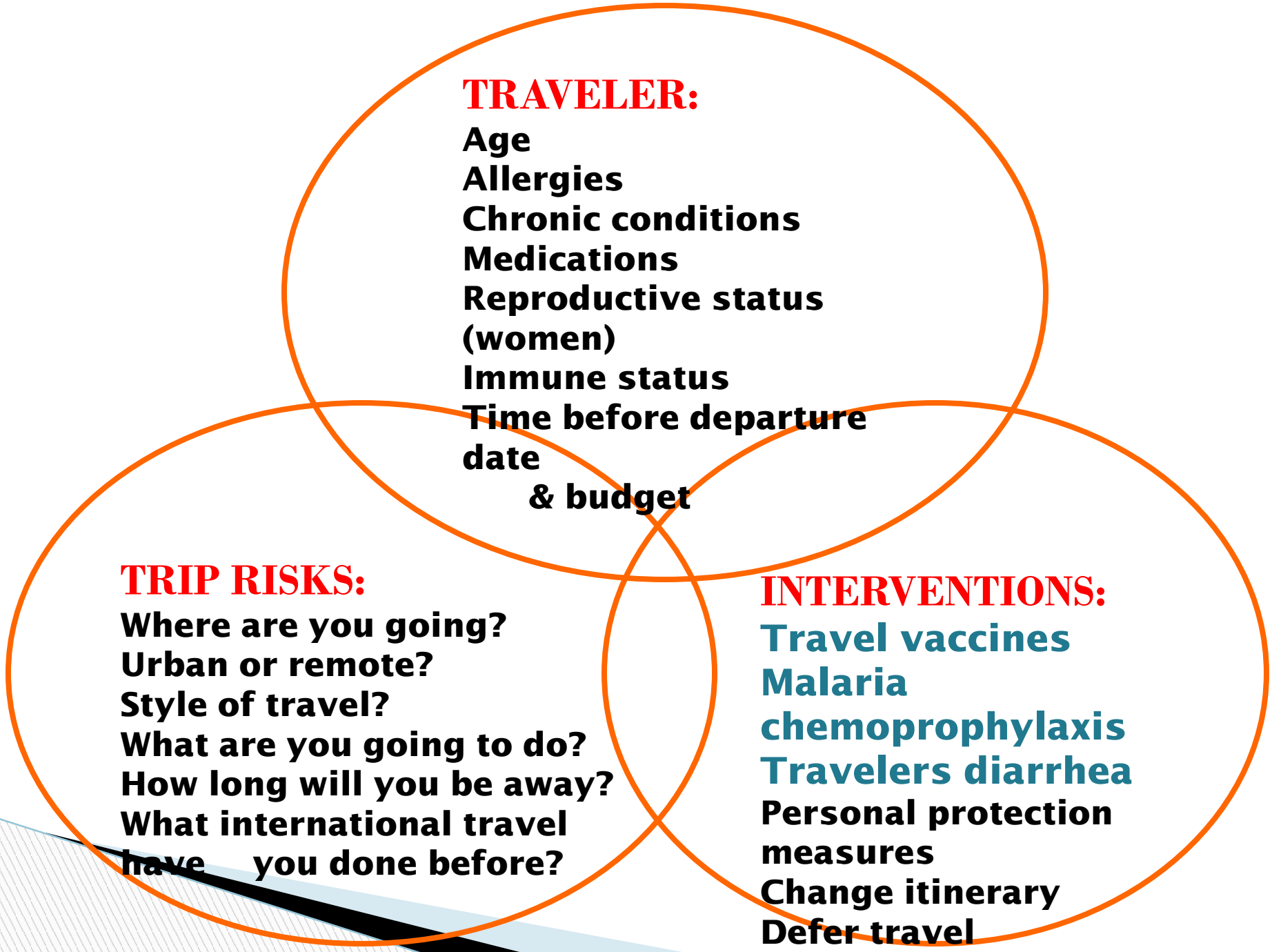
Print version published every 2 years by the Centers for Disease Control and Prevention (CDC), Atlanta, GA.

Access the latest alerts and updates online at www.cdc.gov

Clinical Evaluation of the Traveler




TRAVELER:
Age
Allergies
Chronic conditions
Medications
Reproductive status (women)
Immune status
Time before departure date
& budget
TRIP RISKS:
Where are you going?
Urban or remote?
Style of travel?
What are you going to do?
How long will you be away?
What international travel have you done before?
INTERVENTIONS:
Travel vaccines
Malaria chemoprophylaxis
Travelers diarrhea
Personal protection measures
Change itinerary
Defer travel

What shots are needed for travel?

"The 3 R's of Immunization"

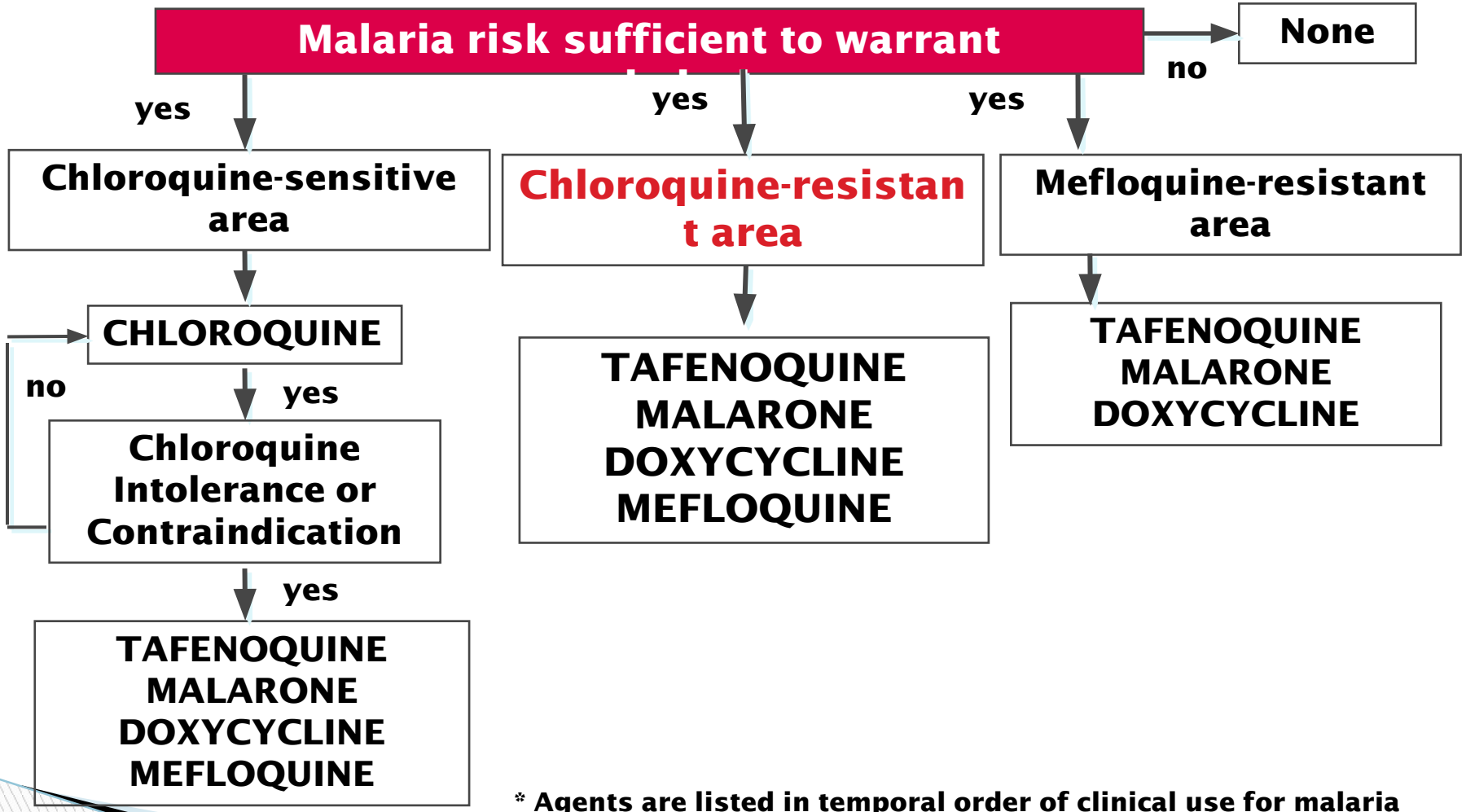
- **ROUTINE OR STANDARD**
  - Childhood immunization programs
  - Age-appropriate updates regardless of travel
- **REQUIRED (W.H.O.)**
  - Yellow Fever
  - Meningococcal A,C,Y,W-135 required for Saudi Arabia during the Hajj
  - **No requirements for Cholera or Smallpox**
- **RECOMMENDED**
  - Based on geographic itinerary & risk of exposure
  - Activities planned during travel
  - Individual traveler's underlying health

"Recommended" Travel Vaccines

Depending on geographic destination & trip-related risk of exposure:

- Influenza (viral)
- Hepatitis A, Hepatitis B, or Hepatitis A+B
- Typhoid
- Rabies
- Japanese encephalitis
- Meningococcal meningitis A,C,Y,W-135
- Cholera
- Tickborne encephalitis
  - (available in Europe, Canada)

Approach to Drug Selection for *P. falciparum* Malaria Chemoprophylaxis*



* Agents are listed in temporal order of clinical use for malaria prophylaxis, newest to oldest. Adapted from Connor BA. *J Travel Med.* 2001;8(suppl 3):S57–S64.

Tafenoquine permits a shorter duration of use for prevention of *P. falciparum* malaria

Antimalarial Drug	Pre-travel Dosing	During Travel	Post-travel
[1]TAFENOQUINE	1 dose daily x3 days	1 dose weekly	1 dose at 1 week
[2]ATOVAQUONE/ PROGUANIL	1 dose daily x1-2 days	1 dose daily	1 dose daily x7d
[3]DOXYCYCLINE	1dose daily x1-2 days	1 dose daily	1 dose daily x4w
[4]MEFLOQUINE	1 dose weekly x3 weeks	1 dose weekly	1 dose weekly x4w

[1]Arakoda* Product Information. Six tyDegrees, Washington, DC, 2019.
[2]Malarone® Product Information. GlaxoSmithKline. Research Triangle Park, NC; 2002.
[3]Vibramycin® Product Information. Pfizer Inc. New York, NY; 2001.
[4]La[illegible]m® Product Information. Roche Pharmaceuticals. Nutley, NJ; 1999.

Malaria Chemoprophylaxis - Adults

Antimalarial Drug	Dosing Regimen	Notes
Chloroquine phosphate (Aralen) 500mg (300mg base)	1 tab p.o. once weekly; 1 week before, every week during travel & 4 weeks after	For P.vivax, not CRPF; safe in pregnancy; may exacerbate psoriasis
Atovaquone-proguanil (Malarone) 250mg/100mg	1tab p.o. 1-2 days before, every day during travel & daily for 7 days after	For P.vivax & CRPF; not for pregnant or breastfeeding women, or infants <5 kg
Doxycycline 100mg	1 tab p.o. 1-2 days before, every day during travel & daily for 4 weeks after	For P.vivax & CRPF; not for pregnant women or children<8 yrs; sun-yeast-GERD
Mefloquine (Lariam) 250mg	1 tab p.o. 2 weeks before, once weekly during travel & once weekly 4 weeks after	For P.vivax & CRPF; safe in pregnancy; not for some neuropsych or cardiac conduction disorders.
Tafenoquine (Arakoda) 100 mg tablets	2 tab p.o. once daily for 3 days before, 2 tabs once weekly starting 7 days after the last loading dose during travel & 2 tabs 1 week after	For P.vivax & CRPF; test G6PD level before use; not for pregnant or breastfeeding women, or children<18 yrs.

Management of Travelers' Diarrhea

- **Self-Management**
  - Fluid replacement
  - Anti-motility agents
    - natural opiates (paregoric, codeine)
    - synthetic opiates (diphenoxylate, loperamide)
- **Treatment**
  - Antibiotics
  - Antiparasitics

Antibiotics for Traveler's Diarrhea

- **TMP/ SX**
  - *widespread resistance*
- **Ciprofloxacin, other quinolone antibiotics**
  - *resistance emerging*
- **Azithromycin**
  - ***u**seful for quinolone-resistant Campylobacter infections*
- **Rifaximin**
  - *non-aminoglycoside, semi-synthetic antibiotic derived from rifamycin; oral dose largely unabsorbed from GI tract; broad spectrum GP and GN bacteria, including anaerobes & aerobes. (approved for use in children ≥12 years)*

Adachi JA, Ericsson CD, Jiang ZD, DuPont MW, Martinez-Sandoval F, Knirsch C, et al. Azithromycin found to be comparable to levofloxacin for the treatment of US travelers with acute diarrhea acquired in Mexico. Clin Infect Dis. 2003;37(9):1165 71.

Single Dose Treatment for T.D.

May consider as initial treatment in adult travelers with onset of acute watery diarrhea and cramps, unaccompanied by bloody stools, fever, or severe abdominal pain:

ANTI-MOTILITY AGENT

- **Loperamide (Imodium) 2 tablets (4 mg)**

plus

ANTIBIOTIC

- **Ciprofloxacin 500 mg orally, OR**
- **Levofloxacin 500 mg orally, OR**
- **Azithromycin 1 gram orally**

Conclusions

- Immigrants may be susceptible to common vaccine-preventable diseases of childhood because of lack of access to comprehensive vaccine programs abroad.
- Immigrants may have latent asymptomatic infections from prior exposures that could reactivate weeks, months, or even years after resettlement in the U.S.
- Immigrants are like travelers to the U.S.—they need advice on how to avoid infectious disease hazards related to geographic regions, exposures, and activities.
- Immigrants returning to their countries of origin to visit family and friends are likely to have a more intense exposure to local residents, vectors, and foods—i.e. endemic communicable diseases—at destination than tourists. Pre-travel health advice is necessary and appropriate, even if they say they're "just going home".