



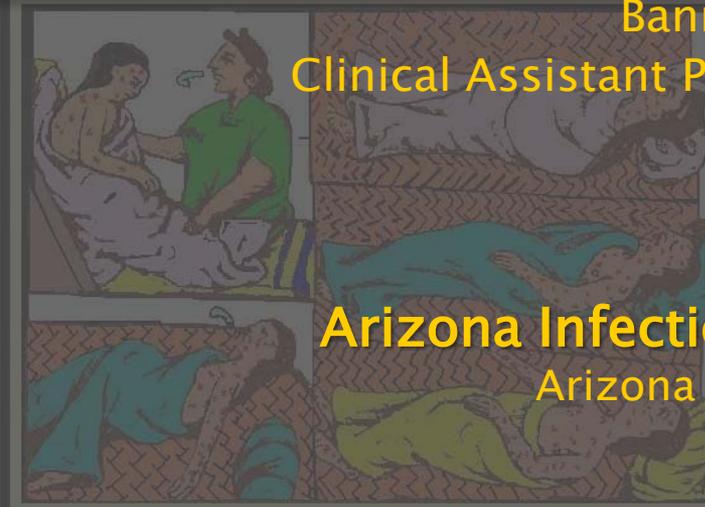
# EMERGING INFECTIOUS DISEASES (EID): The Returning Traveler

**John Leander Po, MSc, MD, PhD**

President, Arizona Infectious Diseases Society (ARIDS)

Chair, Infectious Diseases Section,  
Banner Estrella Medical Center

Clinical Assistant Professor, University of Arizona College of  
Medicine– Phoenix



**Arizona Infectious Disease Training and Exercise**

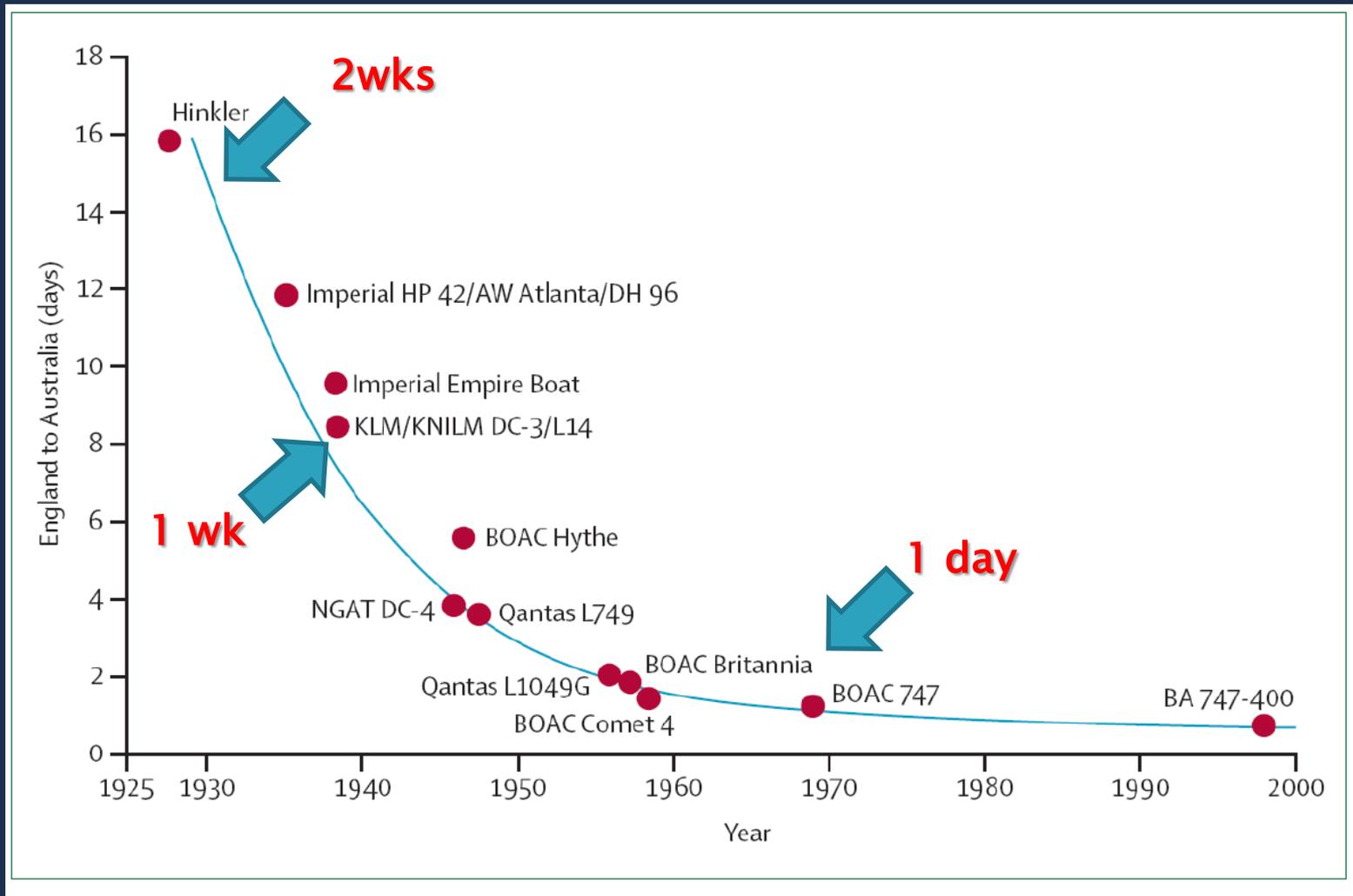
Arizona State University Memorial Union

July 27, 2011

# Objectives

- Acknowledge how global travel has affected the spread of EIDs
- Understand the factors that contribute to the emergence of EIDs
- List the groups of EIDs seen in returning travelers
- Know the trends of diagnoses of EIDs in returning travelers
- Be aware of Internet resources available to the healthcare provider of a returning traveler.

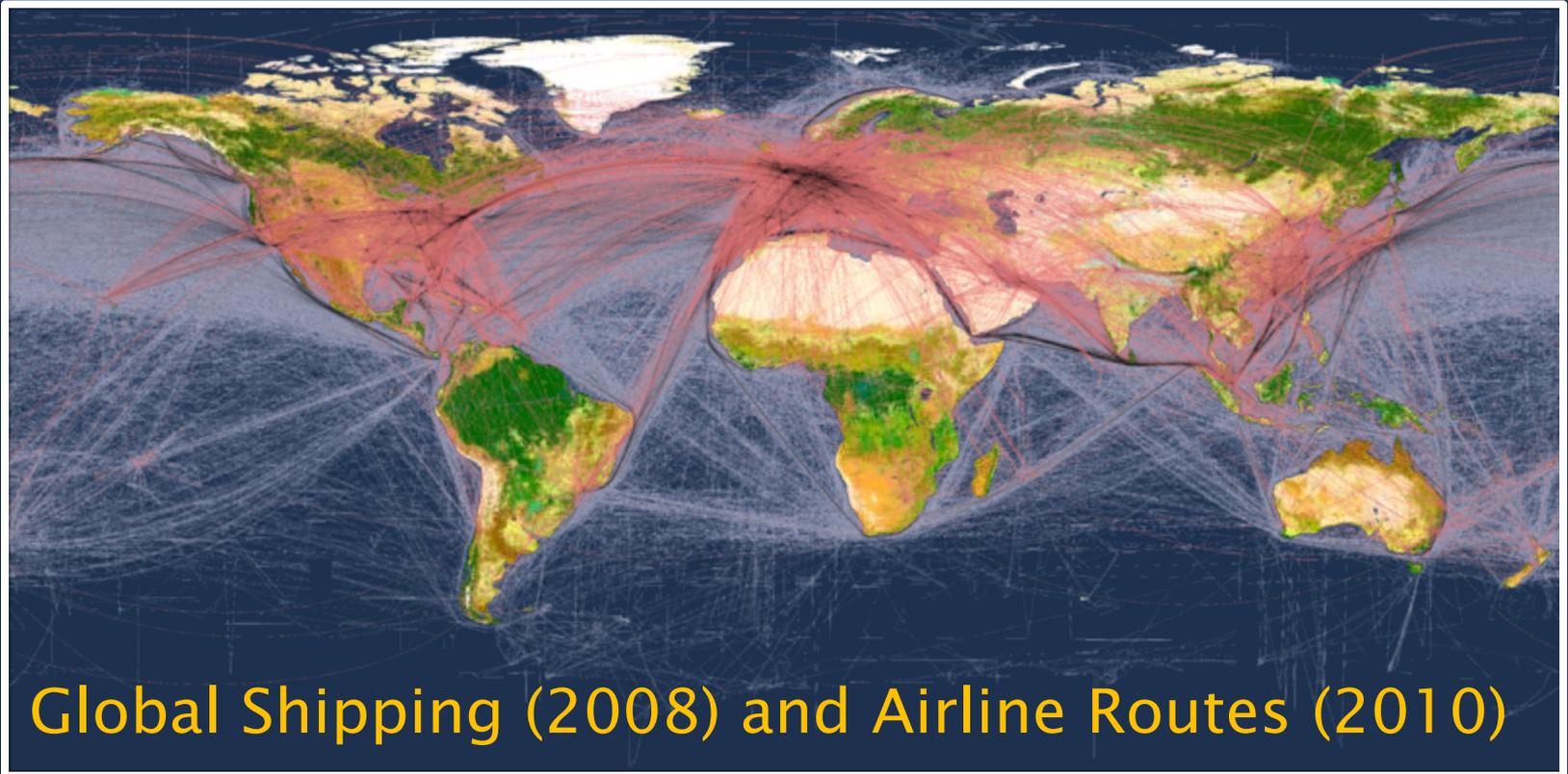
# Longer Distance, Shorter travel time All within the past century!



**Average travel time ,England to Australia 1925–2000**

Morens DM, et al. Lancet Infect Dis. 2008 November ; 8(11): 710–719.

# Diversity of Travel Types



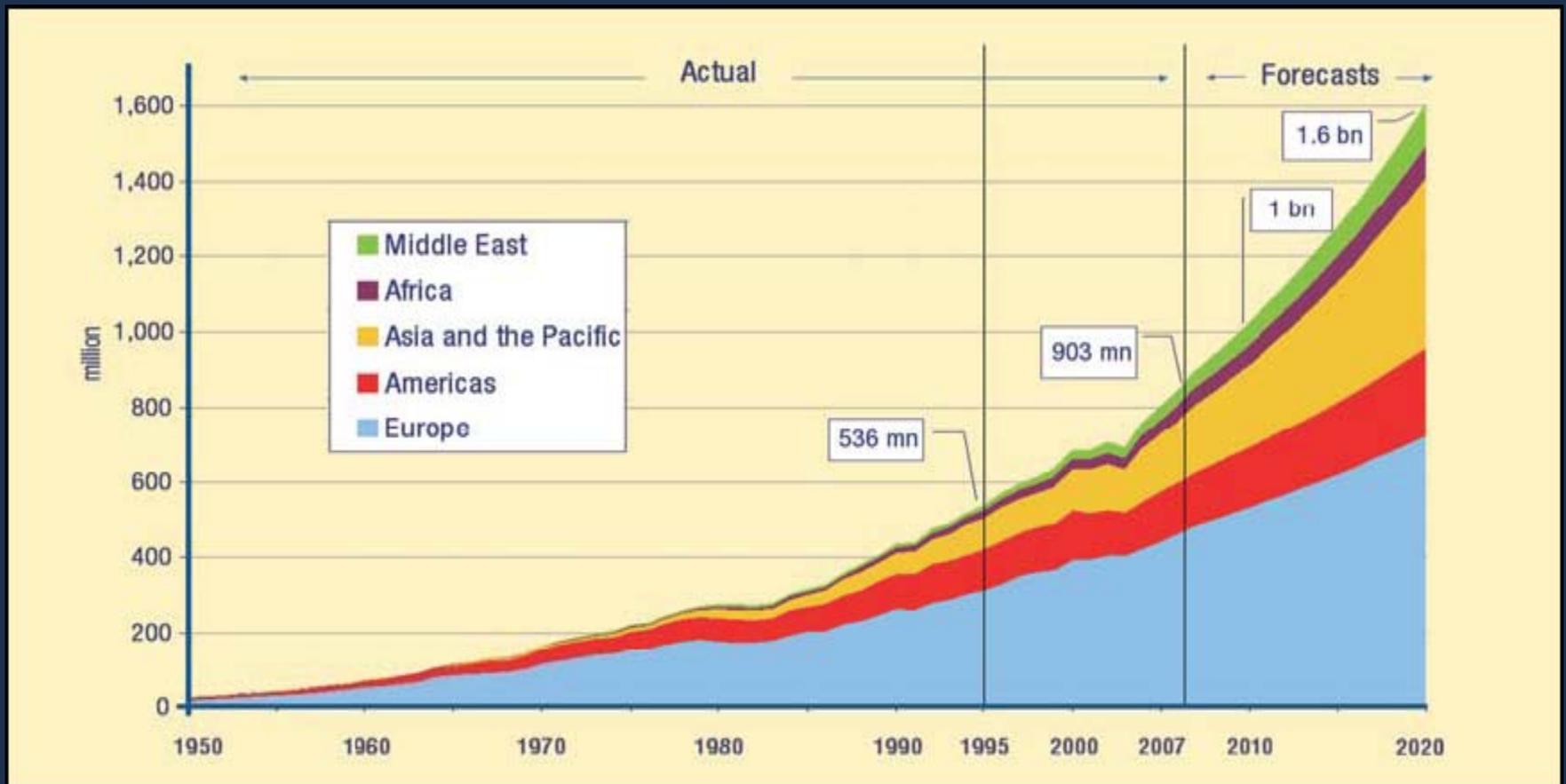
Halpern et al. (2008) Global Map of Human Impacts to Marine Ecosystems. Santa Barbara, National Center for Ecological Analysis and Synthesis.

[http://spatial-analyst.net/wiki/index.php?title=Image:Shipping\\_routes.png](http://spatial-analyst.net/wiki/index.php?title=Image:Shipping_routes.png) Accessed: 17July2011

Distribution of global airports and flight routes accessed from the openflights.org Accessed: 17July2011

<http://spatial-analyst.net/wiki/index.php?title=Image:Airroute.png>

# Increased Number of Travelers Returning to the US Since 1950



**International tourist arrivals by region (in millions)  
1950–2020.**

IOM (Institute of Medicine). 2010. *Infectious disease movement in a borderless world*. Washington, DC: The National Academies Press.

# Global Differences in Health Care Capabilities

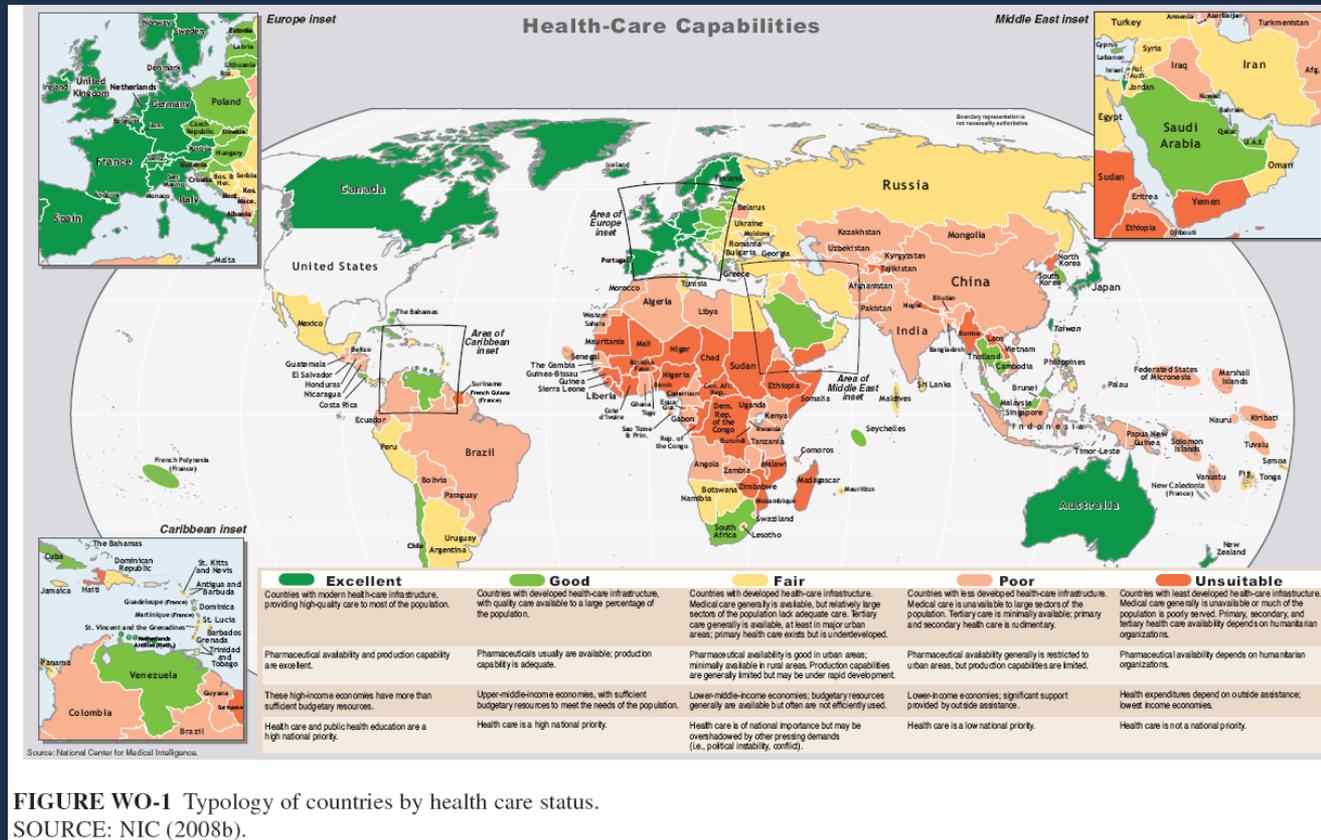
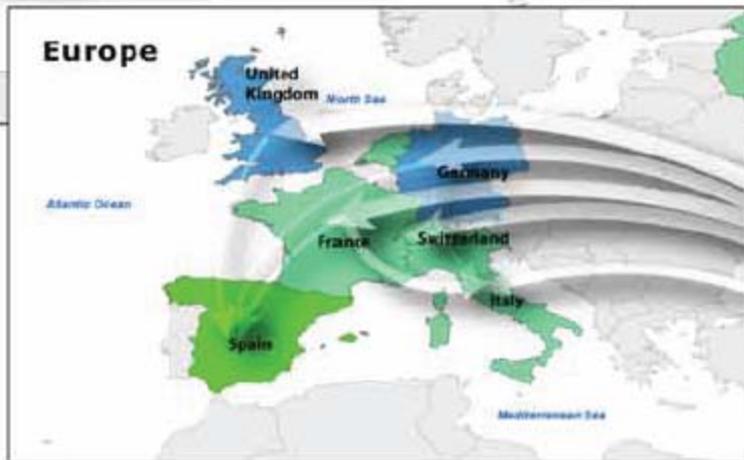
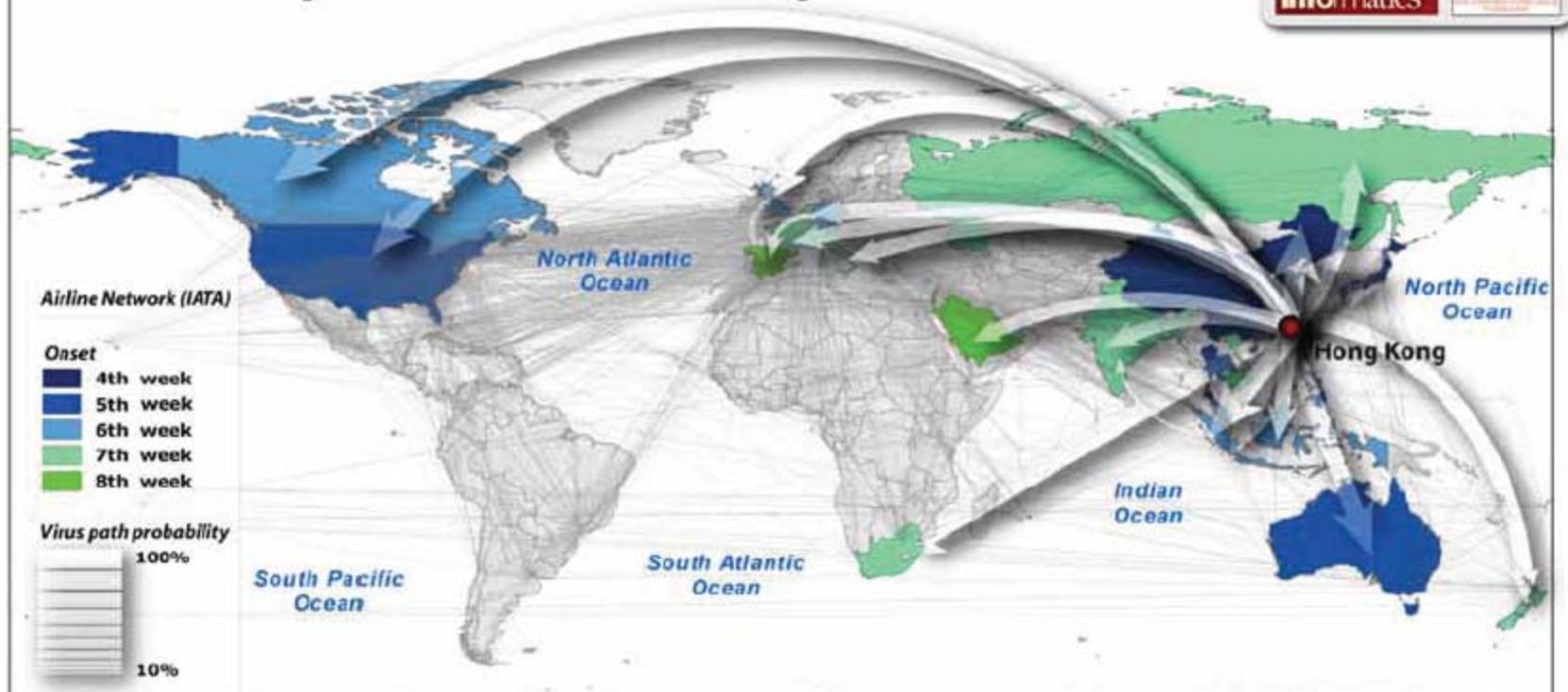


FIGURE WO-1 Typology of countries by health care status.  
SOURCE: NIC (2008b).

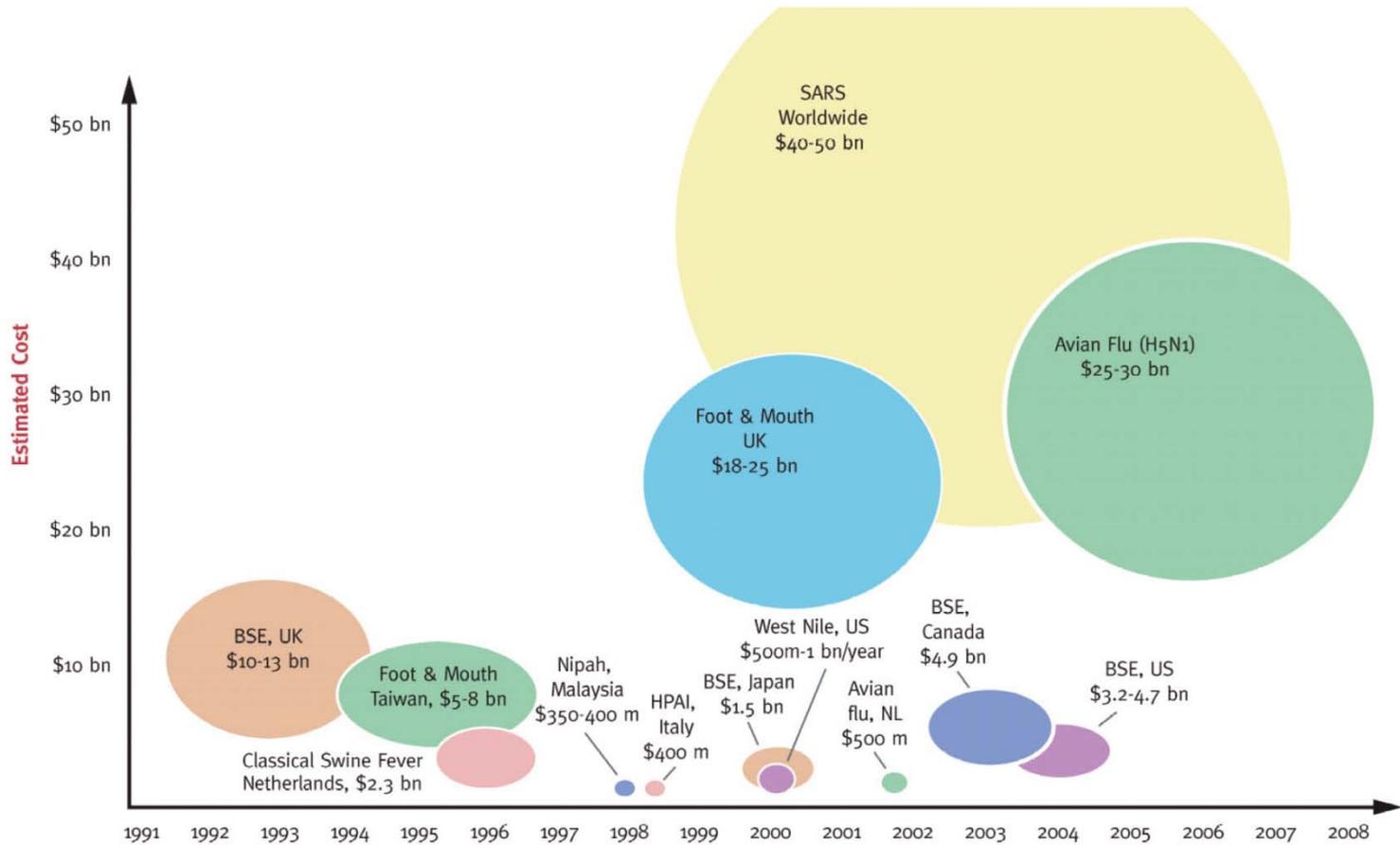
IOM (Institute of Medicine). 2010. *Infectious disease movement in a borderless world*. Washington, DC: The National Academies Press.

# SARS - Epidemic Pathways



Why does it matter?

# Economic Impact Measured in Billions



Figures are estimates and are presented as relative size.

**FIGURE 5-17** Economic impacts of selected emerging infectious diseases.

SOURCE: Figure courtesy of BioEra.

# Scenario

- 28 year old businessman presents to the ED with 4 days of fever, loose stool, dysuria and an erythematous rash...
  - 1 week after returning from India
  - New Delhi Sheraton, 2 weeks (seminar)
  - Immigrated to the US as a teenager
  - Saw parent in a large New Delhi medical center
  - Visited family in a village in rural province
  - No PPX for malaria

Where does one start?  
What does this case highlight?

Factors in the emergence of EIDs

## Factors Involved in Infectious Disease Emergence

- International trade and commerce
- Human demographics and behavior
- Human susceptibility to infection
- Poverty and social inequality
- War and famine
- Breakdown of public health measures
- Technology and industry
- Changing ecosystems
- Climate and weather
- Intent to harm
- Lack of political will
- Microbial adaptation and change
- Economic development and land use

BLAH-

BLAH-

BLAH....

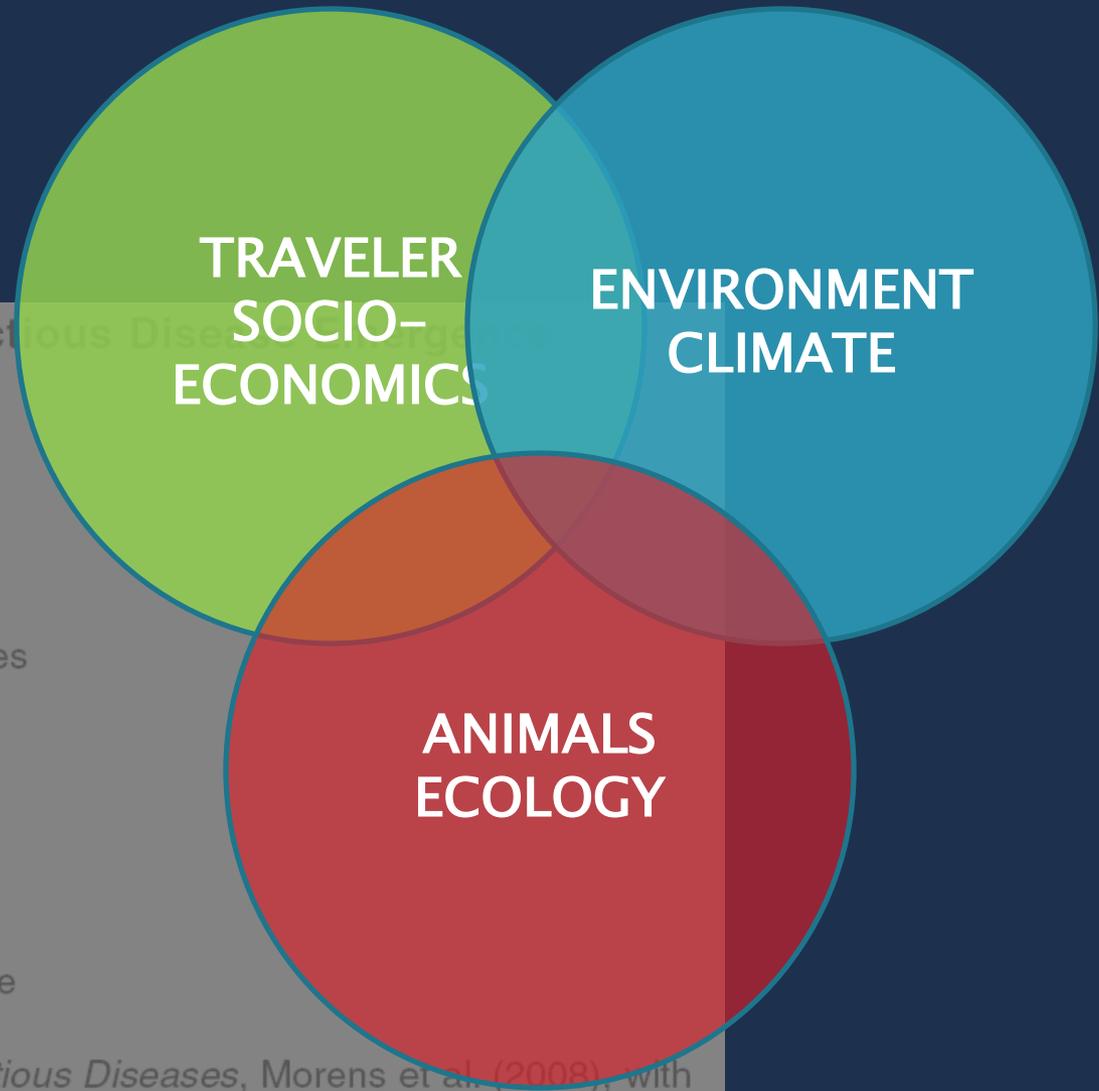
SOURCE: Reprinted from *Lancet Infectious Diseases*, Morens et al. (2008), with permission from Elsevier.

# EIDs from the returning traveler:

## Convergence of Systems

### Factors Involved in Infectious Disease

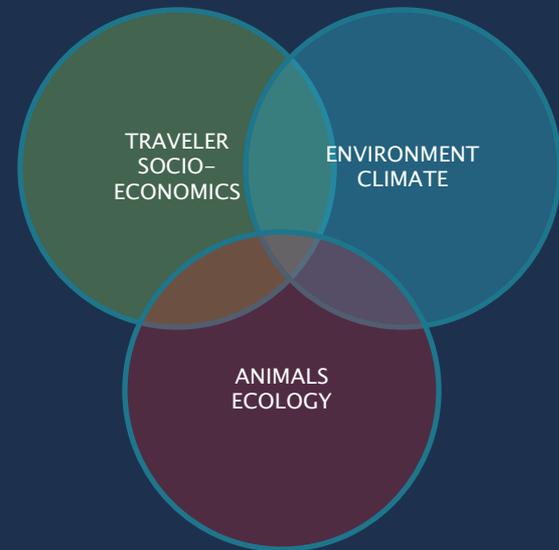
- International trade and commerce
- Human demographics and behavior
- Human susceptibility to infection
- Poverty and social inequality
- War and famine
- Breakdown of public health measures
- Technology and industry
- Changing ecosystems
- Climate and weather
- Intent to harm
- Lack of political will
- Microbial adaptation and change
- Economic development and land use



SOURCE: Reprinted from *Lancet Infectious Diseases*, Morens et al. (2008), with permission from Elsevier.

# “The Returning Traveler” ... from where?

- Maricopa County?
- Arizona?
- Southwestern US?
- US?
- North America?
- Sub-Saharan Africa?
- United Kingdom?



**TABLE 5-1** New Opportunities for Pathogens: Ecological Changes

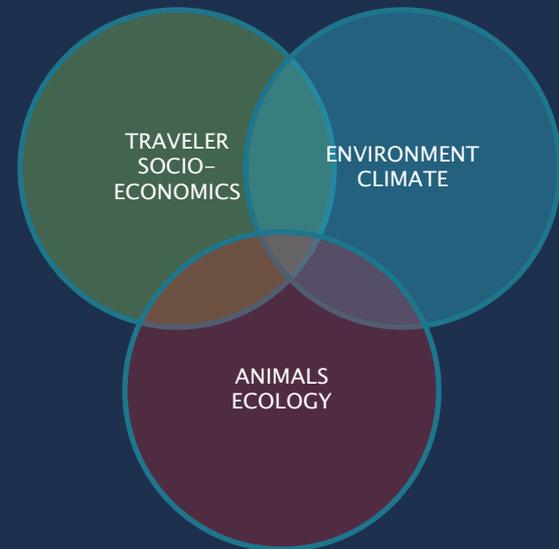
---

Agriculture	Hantaan, Argentine hemorrhagic fever, Nipah, West Nile (Israel), possibly pandemic influenza
Food-handling practices	SARS, H5N1 influenza, HIV?, enteropathogenic <i>E. coli</i>
Dams, changes in water ecosystems	Rift Valley fever, other vectorborne diseases, Schistosomiasis
Deforestation, reforestation	Kyasanur Forest, Lyme disease
Climate changes	Hantavirus pulmonary syndrome (HPS), vectorborne diseases

---

# “The Returning Traveler” ... from what?

- Business trip?
- Safari?
- Ecotour?
- Missionary work?
- Family reunion?
- Sex tour?

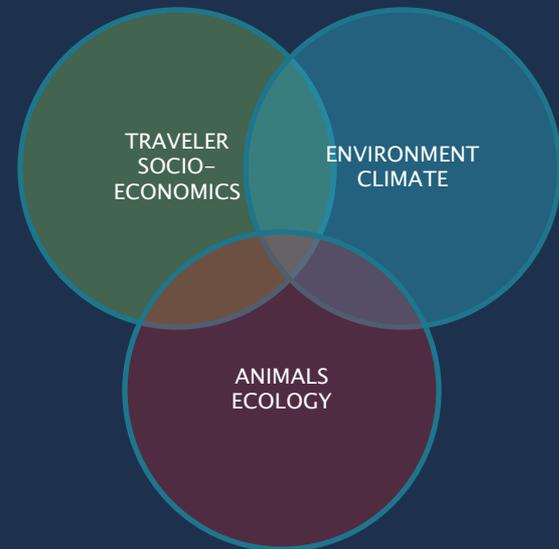


# Factors to Consider: Risk in Returning Travelers

- Consumption
  - Potable water safety
  - Food types (raw, cooked)
- Activities
  - Activities in fresh water
  - Adventure travel, including spelunking
  - Sexual contacts, tattoos, body piercing
- Exposures:
  - Insect and arthropod bites (mosquito, tick, other)
  - Animal bites and scratches
  - Hospitalizations and other medical care

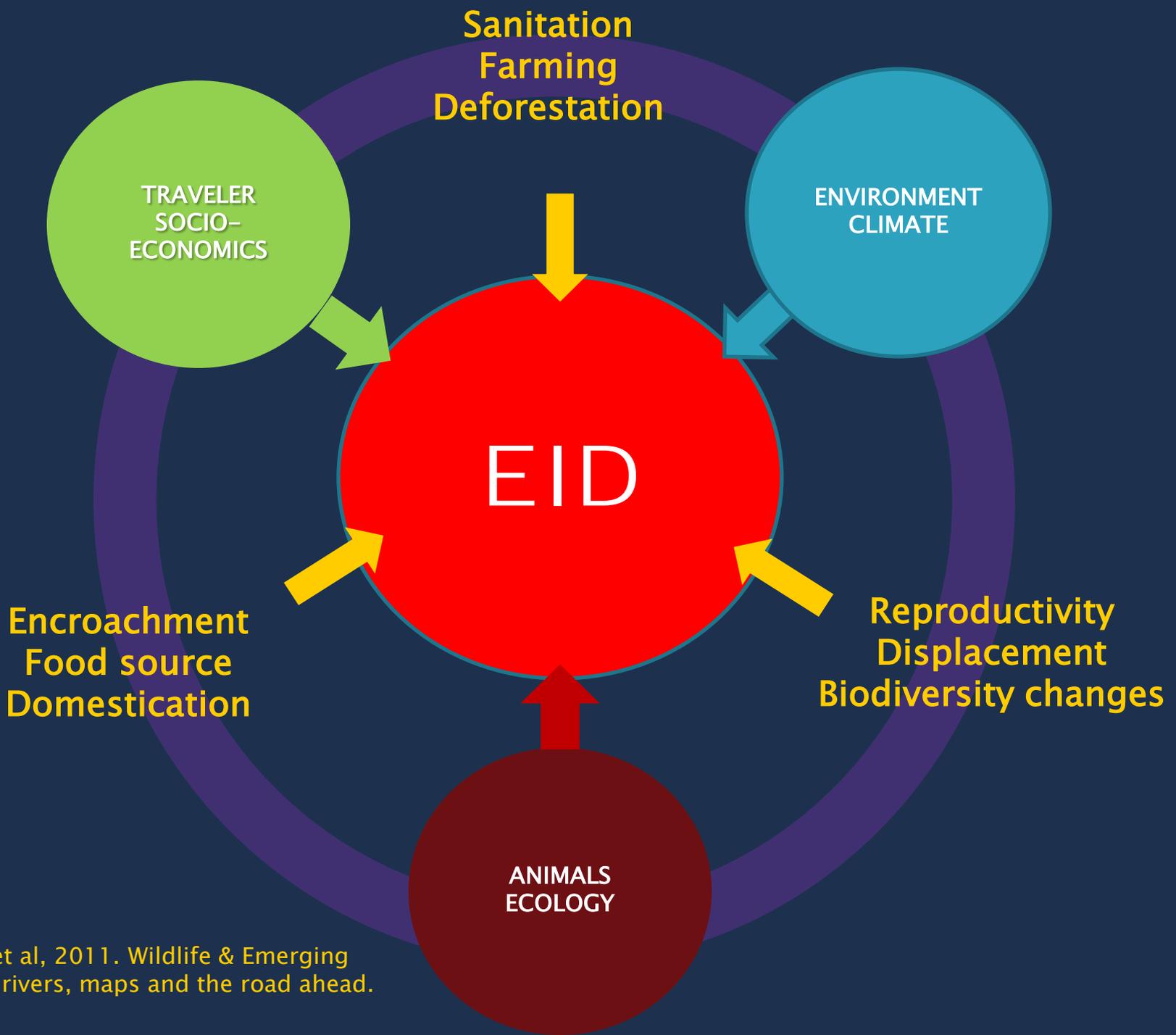
# “The Returning Traveler” ... “in what state?”

- Immunocompromised?
- Vaccinated?
- Aware of risks?
- Medications?



# Factors to Consider: Preparation

- Past medical history and medications
- Travel purpose, itinerary (duration)
  - Association with mass gathering (Hajj, for example)
- Type of accommodation
  - Use of bed nets and insect repellents
- Pre-travel prophylaxis
  - immunization history
  - Adherence to malaria chemoprophylaxis (before, during, and after travel)



P. Daszak et al, 2011. Wildlife & Emerging Diseases: drivers, maps and the road ahead.

3. GLOBAL EMERGENCE: PANDEMIC

- Influenza
- HIV/AIDS
- SARS
- West Nile virus



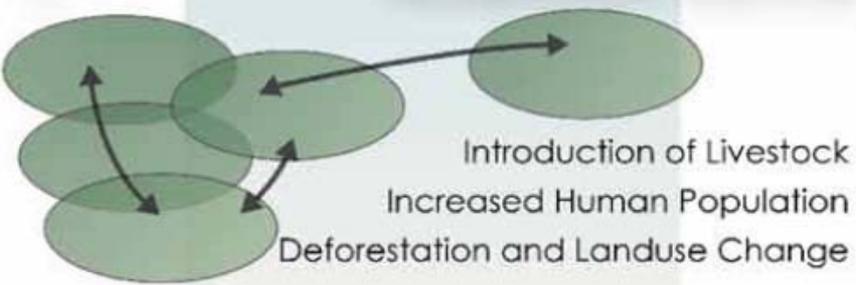
2. LOCALIZED EMERGENCE

- Nipah virus
- Ebola virus
- Undiagnosed outbreaks
- New human infections



1. PRE-EMERGENCE: 'SPILL-OVER'

- Wildlife die-offs
- Silent human infections
- Unknown pathogens



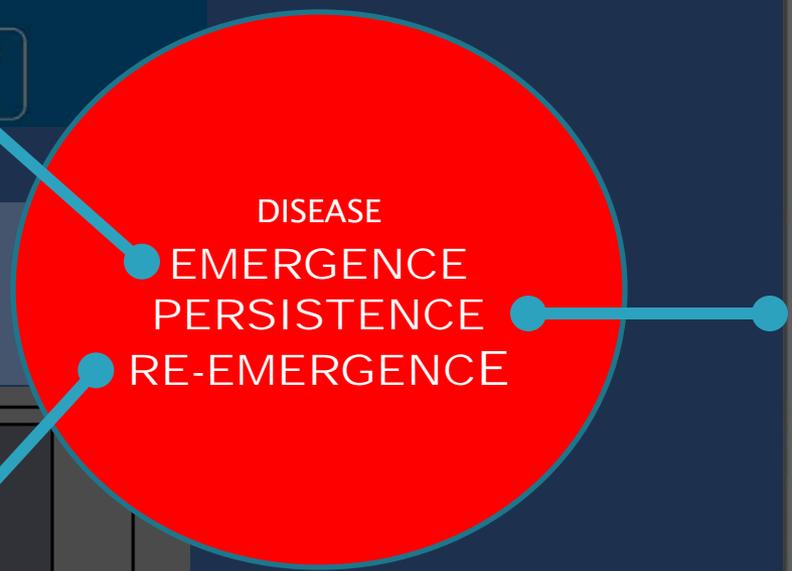
# Spectrum of Disease

## The Returning Traveler

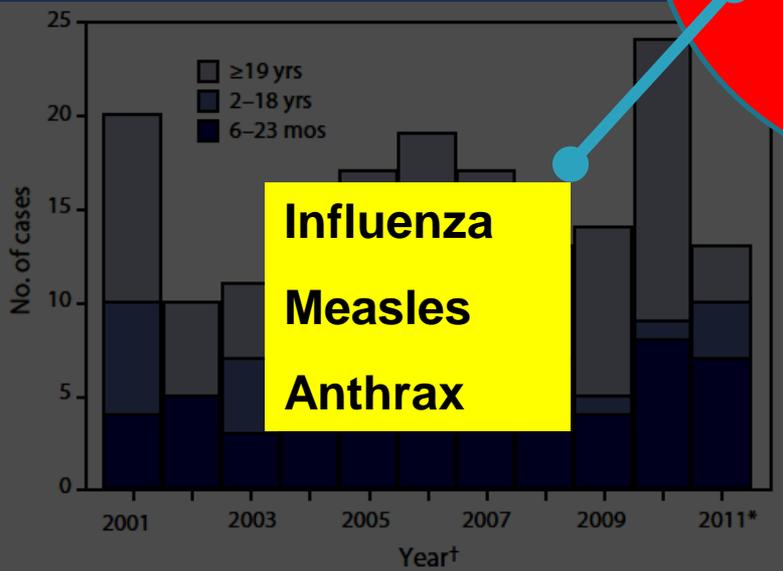


**Dengue**  
**Chikungunya**  
**Duvenhage virus**

Imported residents  
 January 2001–February 2011  
 (N = 172) by age group



**Influenza**  
**Measles**  
**Anthrax**



**NDM-1 superbugs**  
 Experts have warned that a new type of drug-resistant superbug is emerging in British hospitals. *New Delhi metallo-β-lactamase-1*, or NDM-1, is an enzyme that can break down many types of antibiotics used to treat bacteria.

**XDR M. tuberculosis**  
**NDM-1 E. coli**  
**MDR Gonorrhoea**

**Origin:** Widespread in India, Pakistan and Bangladesh. NDM-1 has now reached Britain, U.S., Canada, Australia and Netherlands

**Hosts:** NDM-1 has been found in two types of bacteria – gut bacterium *E.coli* and *Klebsiella*, a strain that can invade lungs

**Risk:** Enzyme could spread to more dangerous infections making them almost impossible to treat.

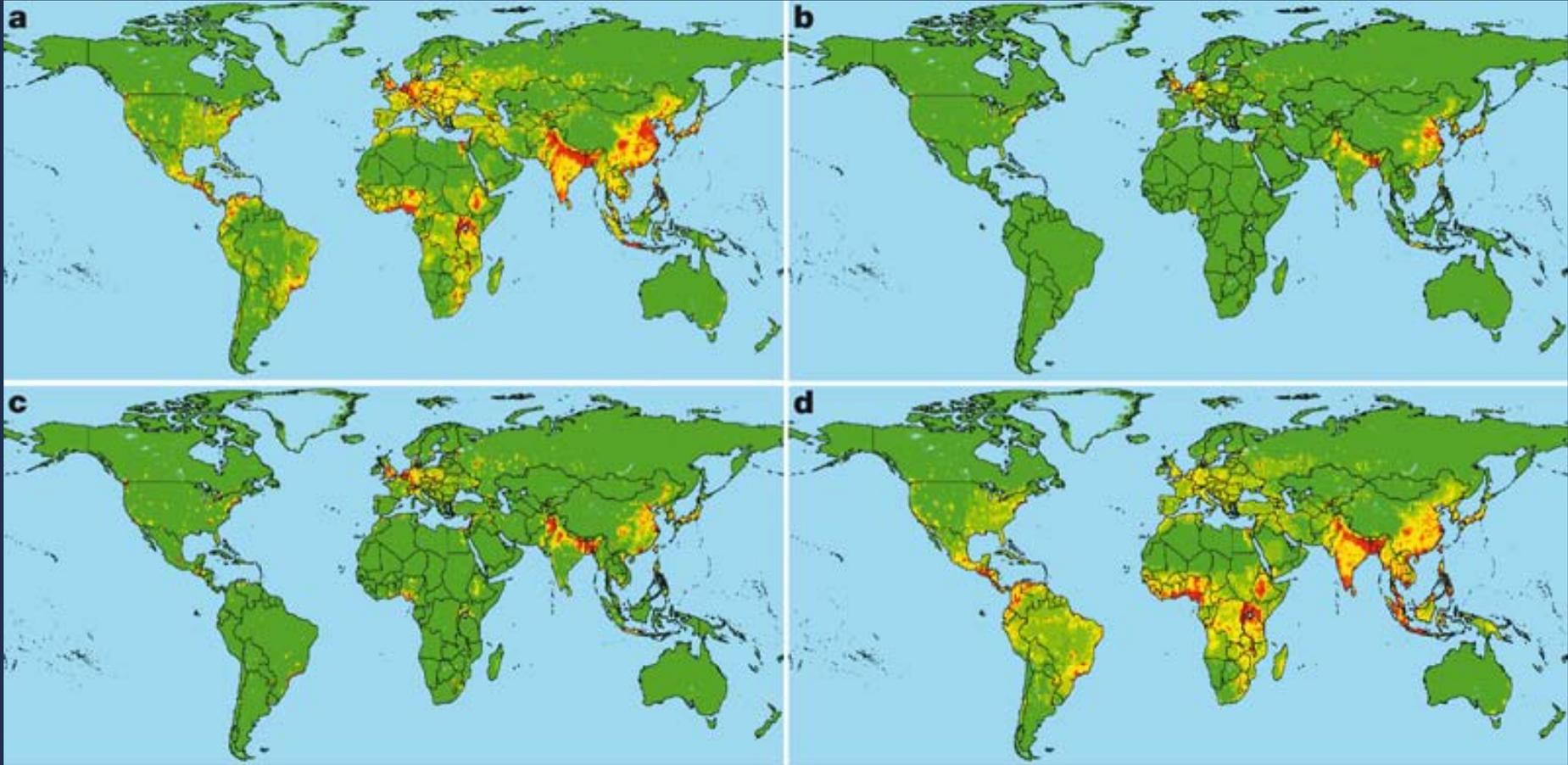
# EID HOTSPOTS

- Jones et al (2008)\_ 335 EID events from 1940–2004
  - Non-random pattern
  - Reporting bias: trend continues to hold despite factoring into data
- Distribution of EIDs
  - 60.3% Zoonoses (72% wildlife)
  - 54.3% Bacterial or Rickettsial
- World “hotspots”
  - Socio-economics
  - Environment
  - Ecology



## ZOONOTIC, WILDLIFE

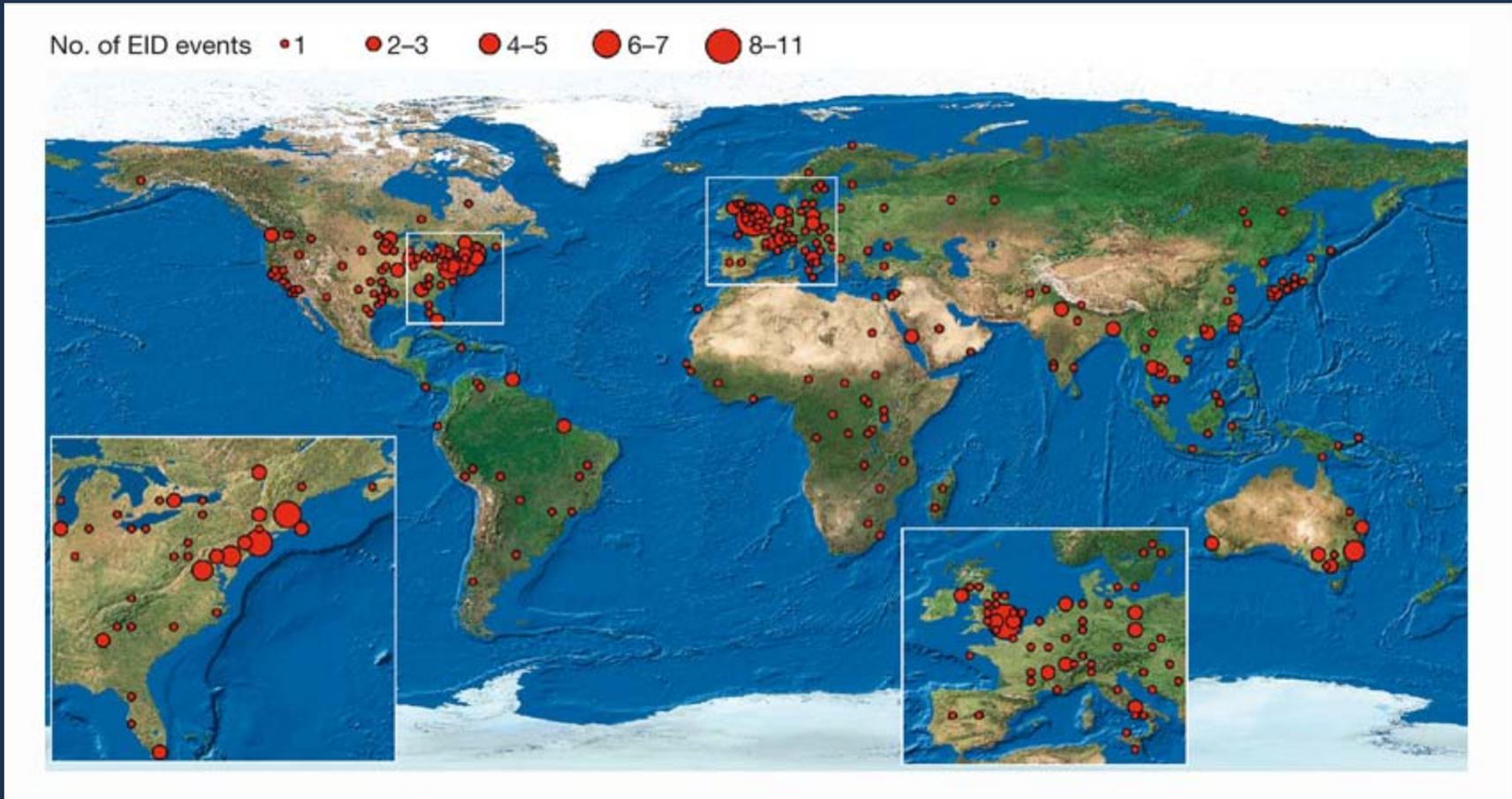
## ZOONOTIC, NON-WILDLIFE

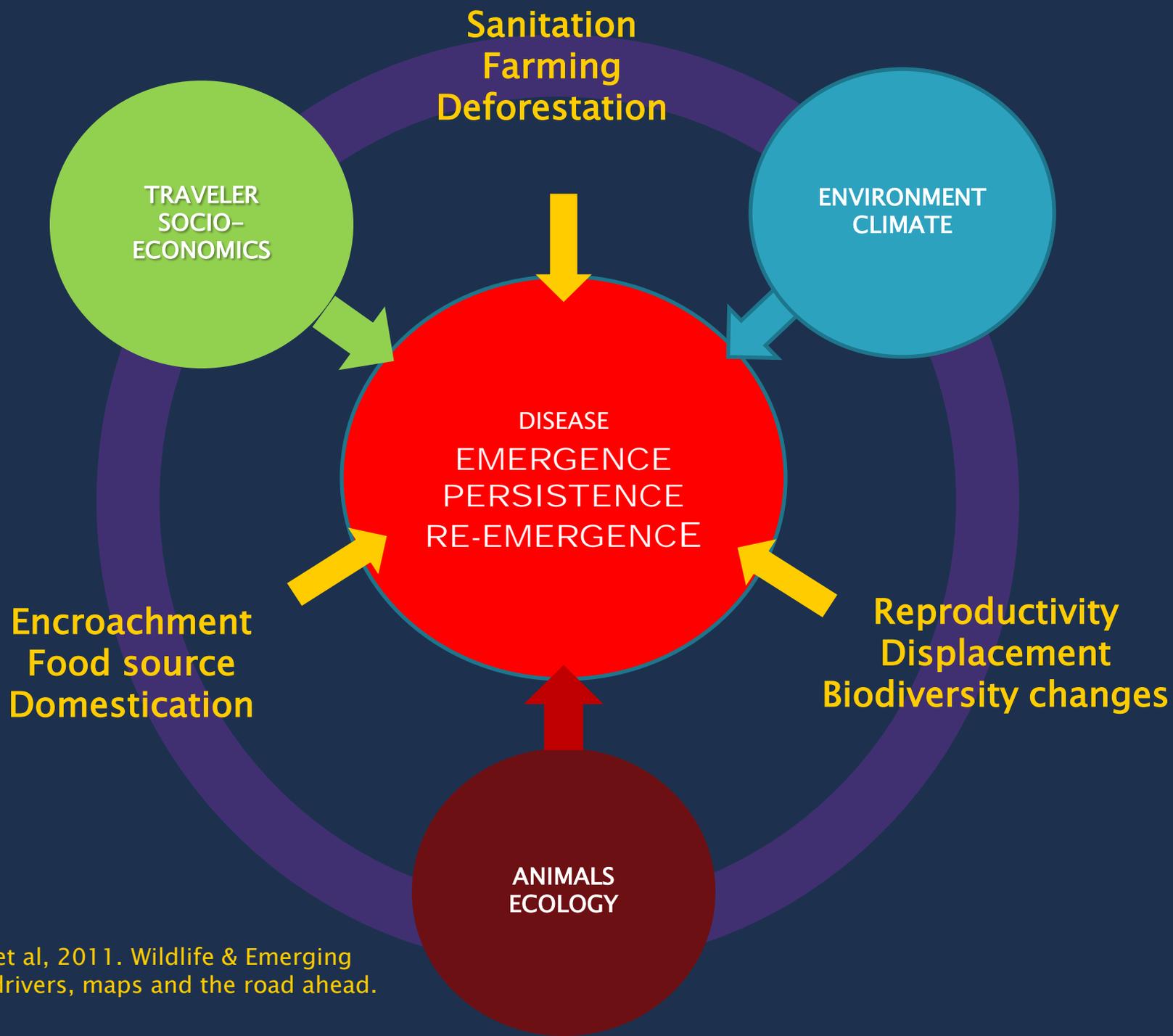


## DRUG RESISTANT PATHOGENS

## VECTOR-BORNE

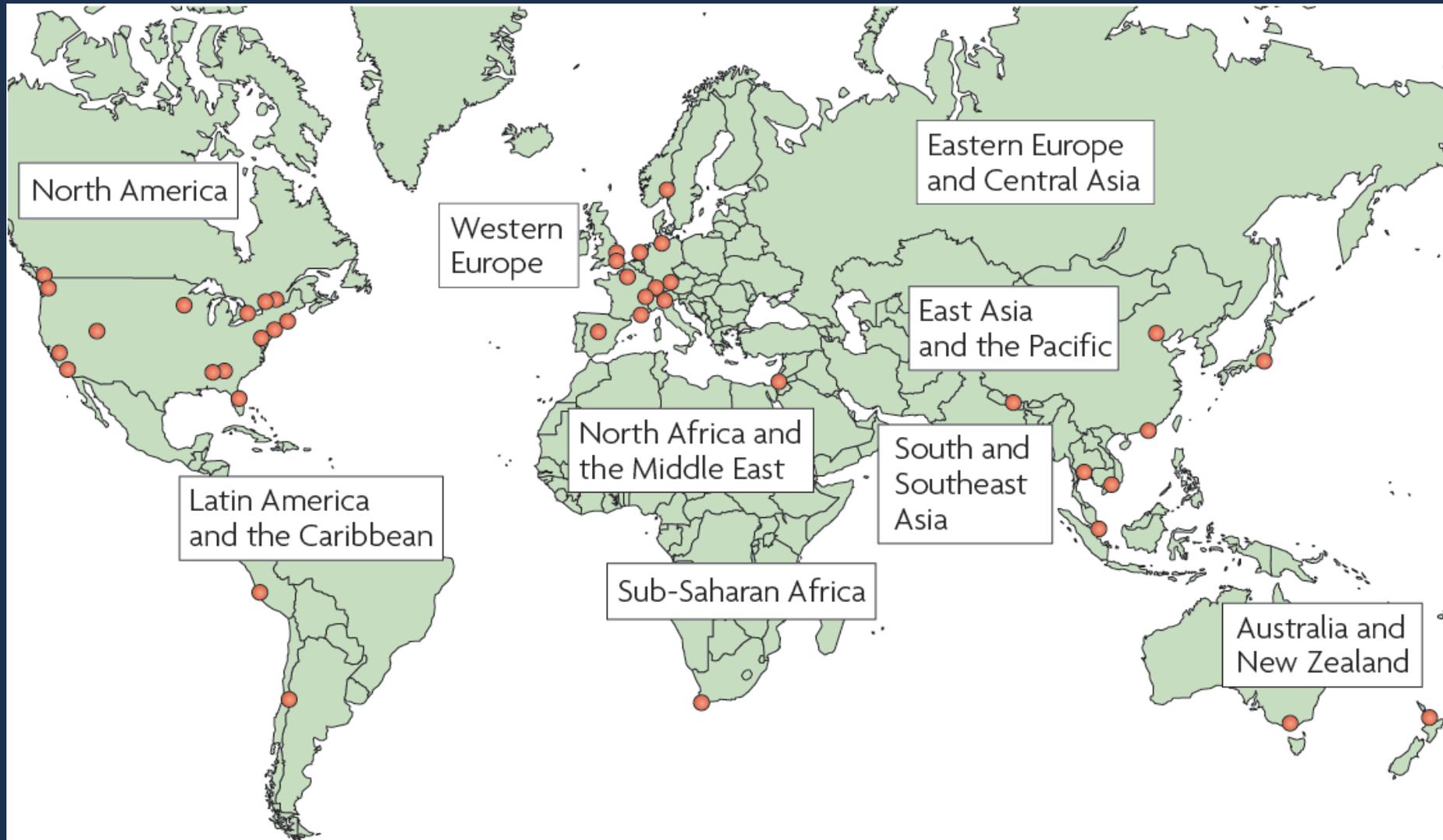
# EID events from 1940 2004





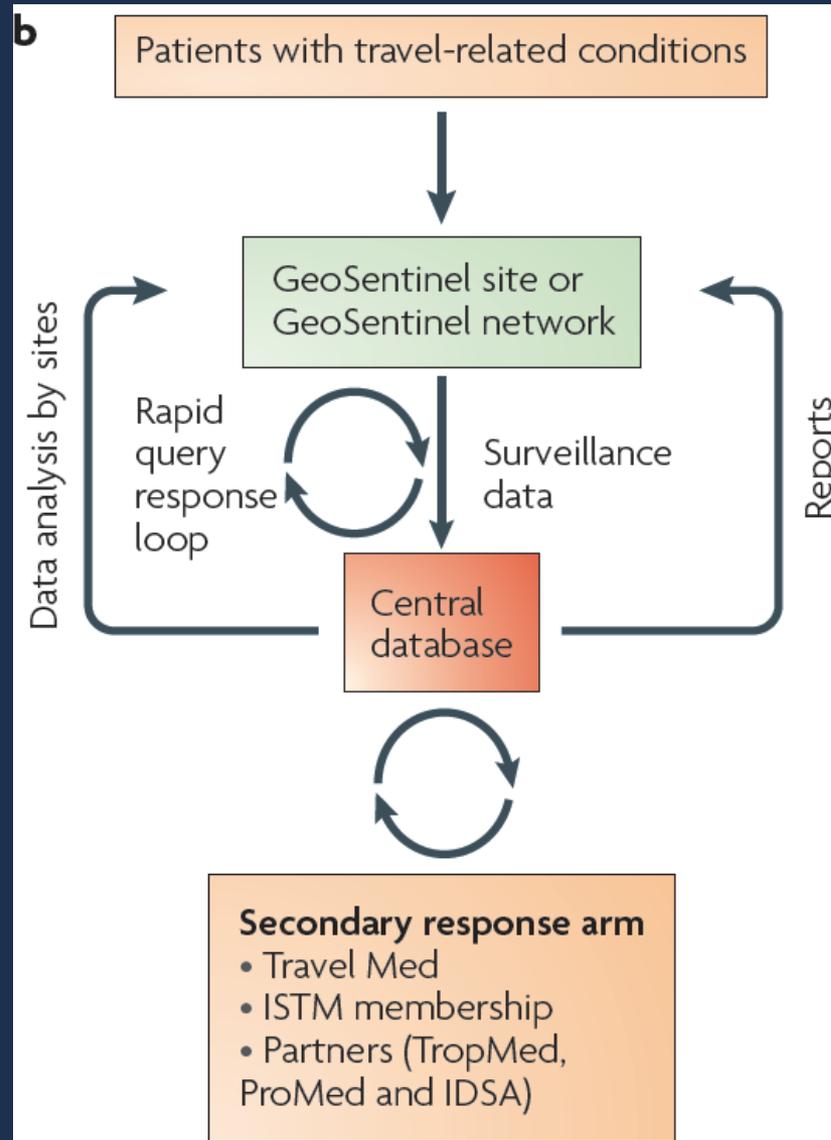
# Trends in Diagnoses of EIDs: The Returning Traveler

# GeoSentinel network



Joseph Torresi & Karin Leder, *Nature Reviews Microbiology* 7, 895–901

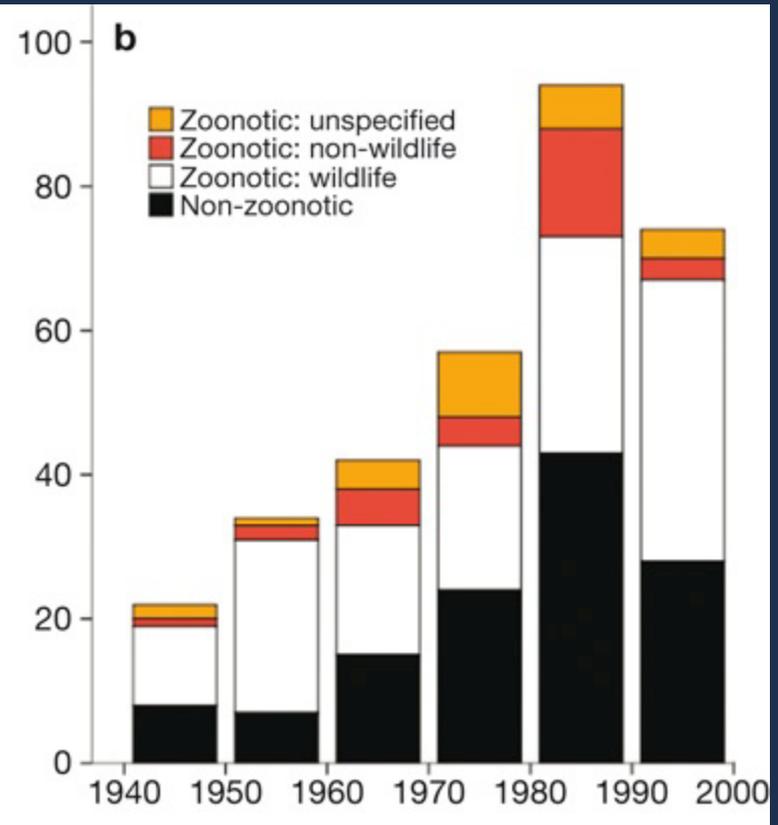
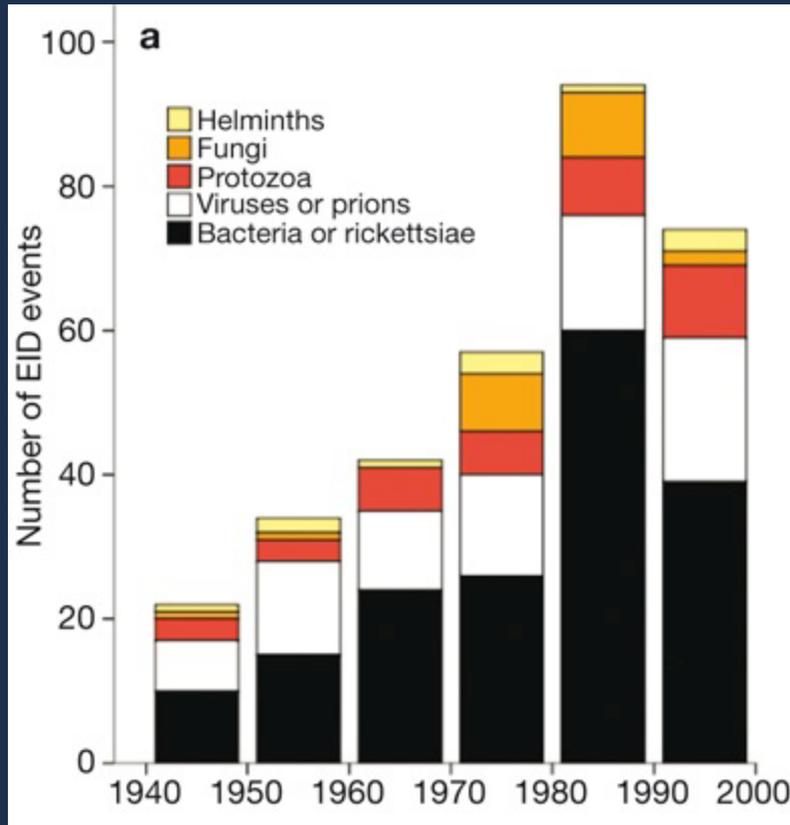
# GeoSentinel network and reporting structure.



# Number of EID events per decade.

Mainly Bacterial  
Increased viruses & prions

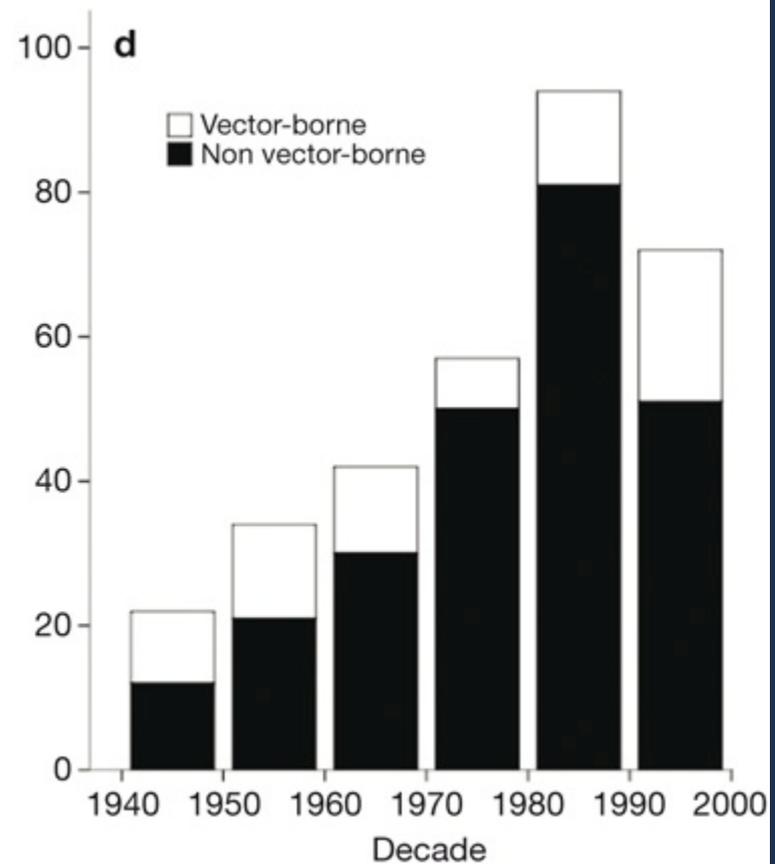
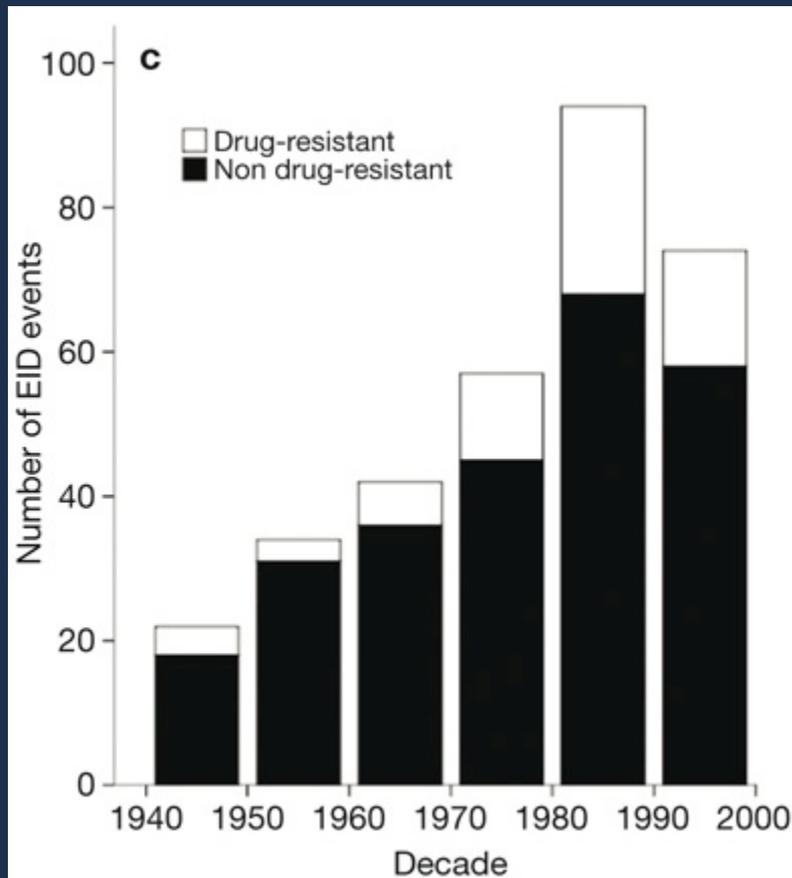
Increased  
Zoonotic Transmission



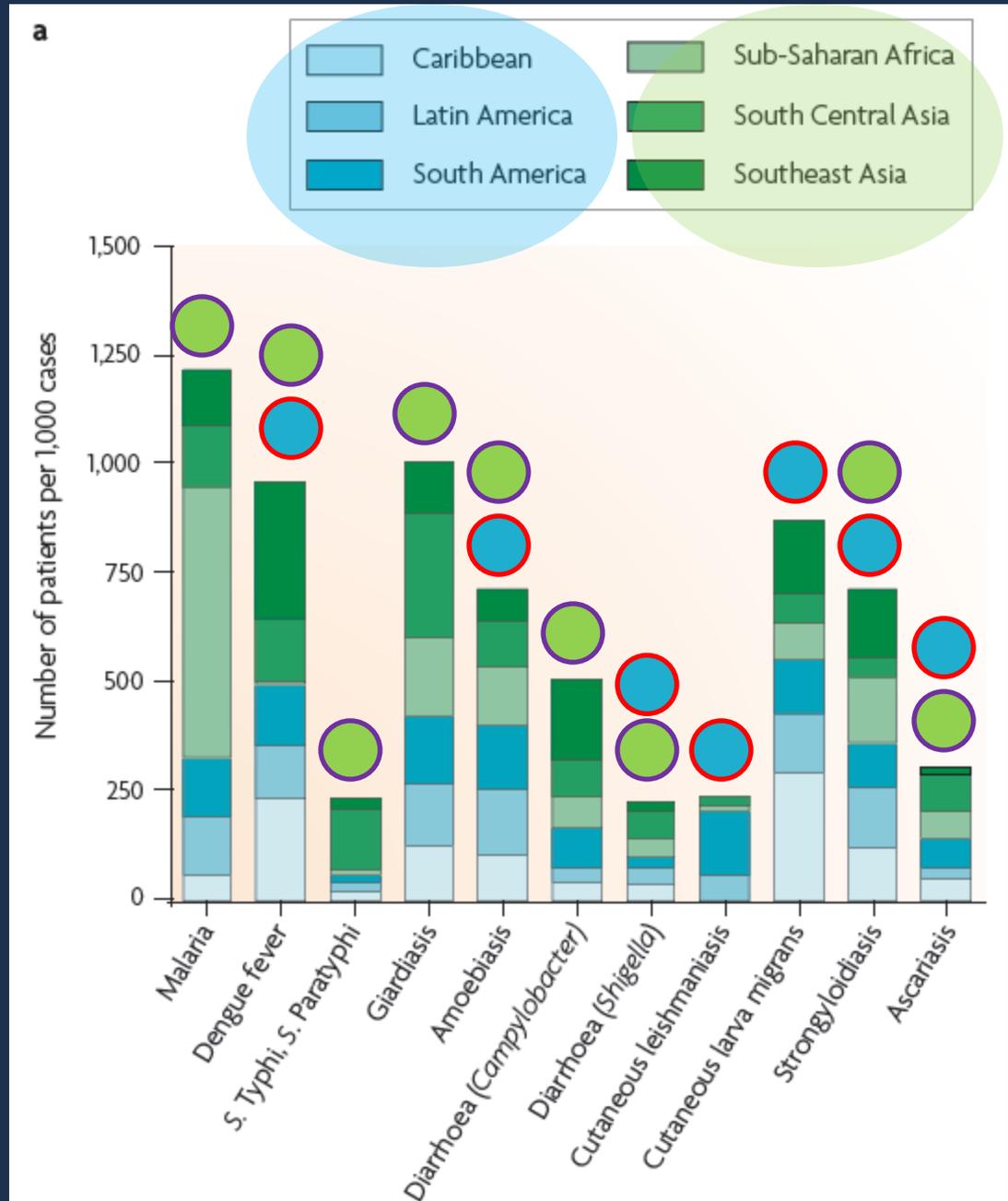
# Number of EID events per decade.

Increased drug  
resistance

Increased  
Non-vector-borne  
transmission



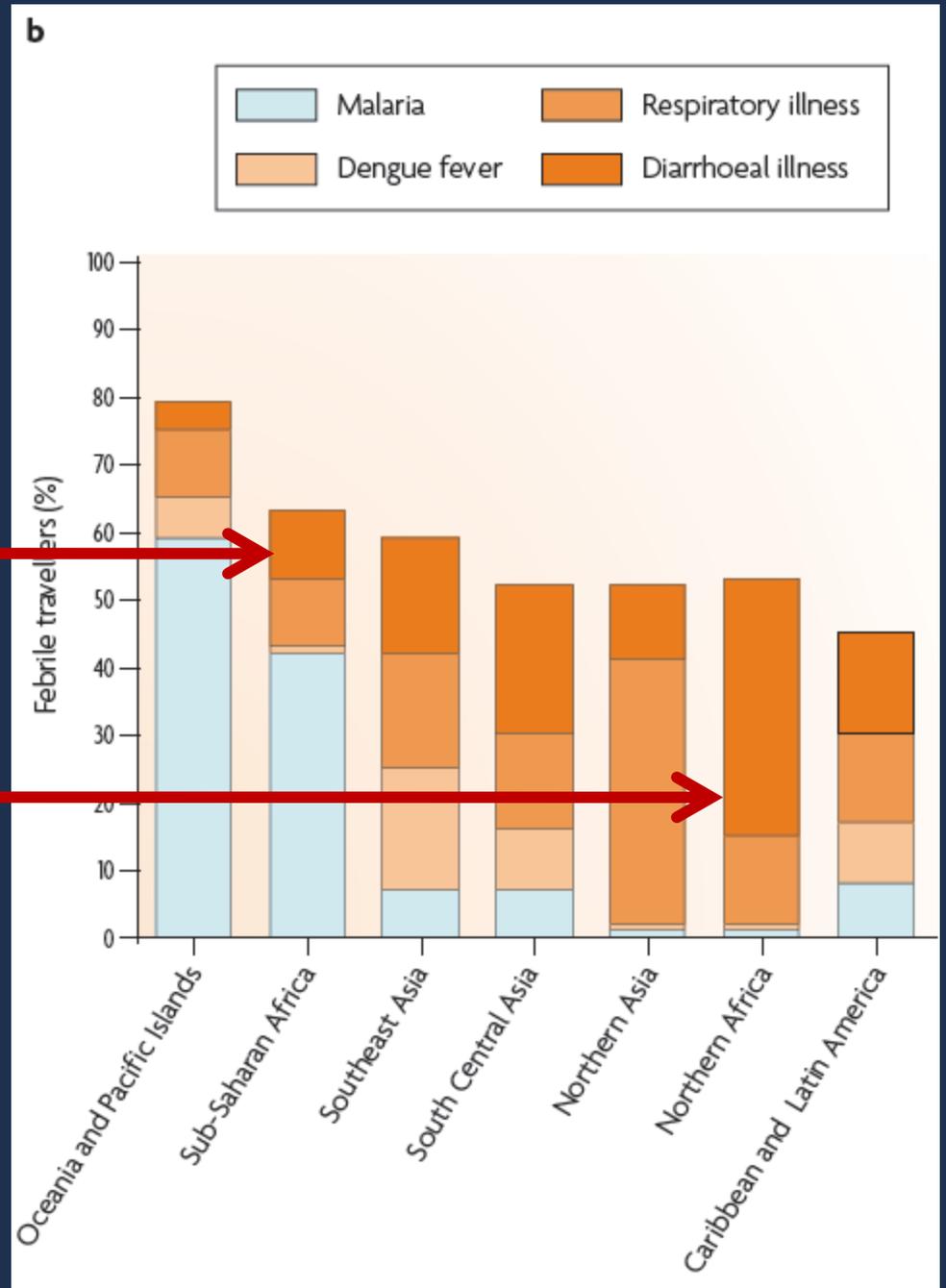
# Common Diseases in Travelers Reporting to the GeoSentinel Network.



# % Febrile Travelers Dx with More Common Infectious Diseases, (Region of Travel)

Sub-saharan Africa: Malaria, Respiratory, Diarrhea

Northern Africa: Diarrhea, Respiratory, Malaria



# Returning Traveler: General trends

- Malaria within the top 3 dx from every region
- Febrile illness: likely from Africa & Southeast Asia
  - Sub-Saharan Africa: 1) Malaria 2) Rickettsial disease
- Most common febrile illness from every region outside sub-Saharan Africa: Dengue (past 10 yrs)
- Southeast Asia: Respiratory disease most likely
- Southcentral Asia: Acute diarrhea disproportionately in travelers

# Selected emerging diseases 430 B.C. to 1981 A.D.

MDR = multidrug-resistant; SARS = severe acute respiratory syndrome;  
vCJD = variant Creutzfeldt-Jakob disease; XDR = extensively drug-resistant.

B

- ✳ The French pox (syphilis), 1494
- ⬡ The American plague (yellow fever), 1793
- Hueyatzuatl (smallpox), 1520†
- Anthrax, 1770†
- ◆ Cholera, 1832
- ▲ HIV/AIDS, circa 1930
- ✚ Spanish influenza, 1918
- Measles, 1875
- The Black Death (plague), 1347–50
- ◆ The Plague of Athens (unidentified disease), 430 BC



Newly emerging

Re-emerging

Deliberately emerging†

# Selected emerging diseases 1977–2007 (representative examples of where epidemics occurred)

A

- Human African trypanosomiasis
- Cholera
- ◆ Marburg haemorrhagic fever
- ▲ MDR/XDR tuberculosis
- ⊕ Plague
- ✱ Human monkeypox
- Chikungunya fever
- Enterovirus 71
- Hendra virus
- ◆ Nipah virus
- ▲ Vancomycin-resistant Staphylococcus aureus
- ⊕ H5N1 influenza
- ✱ Escherichia coli O157:H7
- SARS
- Typhoid fever
- Rift Valley fever
- ◆ Diphtheria
- ▲ Drug-resistant malaria
- ⊕ Ebola haemorrhagic fever
- ✱ Cryptosporidiosis
- West Nile virus
- Cyclosporiasis
- ◆ Anthrax bioterrorism†
- ⊕ Hantavirus pulmonary syndrome
- Dengue
- ✱ Yellow fever
- HIV
- Lassa fever
- ◆ Lyme disease
- ▲ Hepatitis C
- ⊕ vCJD



Newly emerging

Re-emerging

Deliberately emerging†

# New and ongoing outbreaks since June 16, 2011



<http://www.healthmap.org/predict/>

# Scenario

- 28 year old businessman presents to the ED with 4 days of fever, loose stool, dysuria and an erythematous rash...
  - 1 week after returning from India
  - New Delhi Sheraton, 2 weeks (seminar)
  - Immigrated to the US as a teenager
  - Saw parent in a large New Delhi medical center
  - Visited family in a village in rural province
  - No PPX for malaria

# DISPROPORTIONATE INFECTIOUS DISEASE RISKS IN VFRS\*

\*Immigrants Returning Home to Visit Friends & Relatives

- **Lack of awareness of risk (over-confidence)**
  - Lower rates of vaccination (HAV, Typhoid)
  - Infrequent use of malaria chemoprophylaxis
  - Less mosquito netting use; food/water use
- **Pre-travel health care barriers**
  - ≤30% have a clinic visit
  - Financial barrier
  - Clinics are not geographically convenient
- **Cultural and language barriers**
  - Lack of trust in the medical system
- **Higher-risk destinations**
  - Longer stays
  - Last minute planning

# CDC Travelers' Health

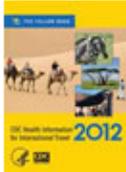
## http://wwwnc.cdc.gov/travel/

Internet Explorer browser window showing the CDC Travelers' Health website. The address bar displays <http://wwwnc.cdc.gov/travel/>. The page title is "CDC Travelers' Health - CDC".

The website header includes the CDC logo and the text "Centers for Disease Control and Prevention. CDC 24/7: Saving Lives. Protecting People. Saving Money Through Prevention." Navigation options include "Travelers' Health" and "All CDC Topics". A search bar is present with the text "Choose a topic above" and a "SEARCH" button.

A navigation bar contains an "A-Z Index" and a list of letters from A to Z, along with a hash symbol (#).

### Travelers' Health



Hot off the press! Explore Travel Health with the new [2012 Yellow Book!](#)

#### Destinations



#### Yellow Book

Select your destination below to view related travel health information:

Text size: **S** M L X

- Email page
- Print page
- Bookmark and share
- Get email updates

See Travelers' Health [site FAQ](#) and [Useful Links](#).

### Travelers' Health Topics

<h4><a href="#">Destinations</a></h4> <p>Health information for travel to over 200 international destinations</p>	<h4><a href="#">New! Yellow Book 2012</a></h4> <p>Travel health reference, includes updates to the online edition</p>
---	---

### Travel Notices

**Please Note** [Travel Notice Definitions](#)

#### Travel Health Precautions

- [Cholera in Haiti](#)

#### Contact Us:

- Centers for Disease Control and Prevention  
1600 Clifton Rd  
Atlanta, GA 30333
- 800-CDC-INFO (800-232-4636)  
TTY: (888) 232-6342  
24 Hours/Every Day
- [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

# Promedmail.org

## http://www.promedmail.org

The screenshot shows a web browser window with the address bar displaying <http://www.promedmail.org/pls/apex/f?p=2400:1000>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. A Favorites bar shows a star icon and the text "Web Slice Gallery". The browser's address bar shows a tab titled "Main ProMED-mail" with a tooltip that reads "Main ProMED-mail" and the same URL.

The website content includes a navigation menu with links for [about ISID](#), [membership](#), [programs](#), [publications](#), [resources](#), [14th ICID](#), and [site map](#). The main header features the logo of the International Society for Infectious Diseases (ISID) and the ProMED-mail logo. The ProMED-mail logo consists of a globe icon and the text "ProMED-mail".

The main content area contains the following text:

The global electronic reporting system for outbreaks of emerging infectious diseases & toxins, open to all sources. ProMED-mail, the Program for Monitoring Emerging Diseases, is a program of the International Society for Infectious Diseases.

A navigation sidebar on the left lists the following items:

- Navigation
- Home
- Subscribe/Unsubscribe
- Search Archives
- Announcements
- Recalls/Alerts
- Calendar of Events
- Maps of Outbreaks

A central notice box contains the following text:

**\*\* Notice \*\***  
The ProMEDmail website will be unavailable on Friday, July 29th beginning at 6pm pacific time for approximately 6 hours for a software upgrade. Please plan accordingly.

Below the notice box, a section titled "Today on ProMED-mail" lists the following items:

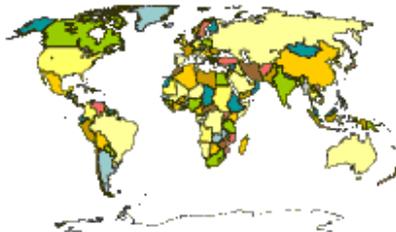
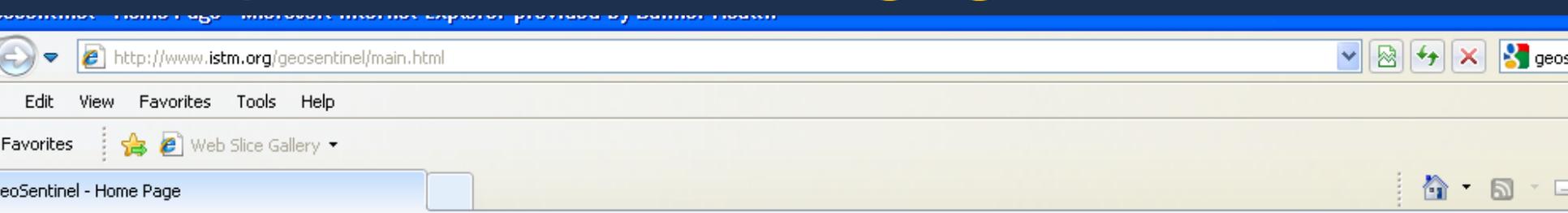
- July 27, 2011**  
No Reports yet today.
- July 26, 2011**  
[PRO/AH/EDR> Rabies - India \(15\): \(AP\), human, vaccine failure](#)  
[PRO> Tuberculosis, inaccurate blood tests, WHO statement \(03\)](#)

On the right side of the page, there are two language-specific logos:

- ProMED-PORT, Português (with a Portuguese flag icon)
- ProMED-ESP, Español (with a Spanish flag icon)

# Geosentinel

<http://www.istm.org/geosentinel/>



## GeoSentinel

The Global Surveillance Network  
of the ISTM and CDC

a worldwide communications & data collection  
network of travel/tropical medicine clinics

[GeoSentinel Home](#) | [Objectives](#) | [Surveillance Strategy](#) | [Historical Timeline](#) | [Project Staff](#)  
[Current Advisory](#) | [Data Highlight](#) | [Site Directory](#) | [Network Members](#) | [Publications & Presentations](#)

**GeoSentinel** is a worldwide communication and data collection network for the surveillance of travel related morbidity. It was initiated in 1995 by the International Society of Travel Medicine (ISTM) and the Centers for Disease Control (CDC) as a network of ISTM member travel/tropical medicine clinics. GeoSentinel is based on the concept that these clinics are ideally situated to effectively detect geographic and temporal trends in morbidity among travelers, immigrants and refugees.

Current activities include:

### GeoSentinel Surveillance Sites

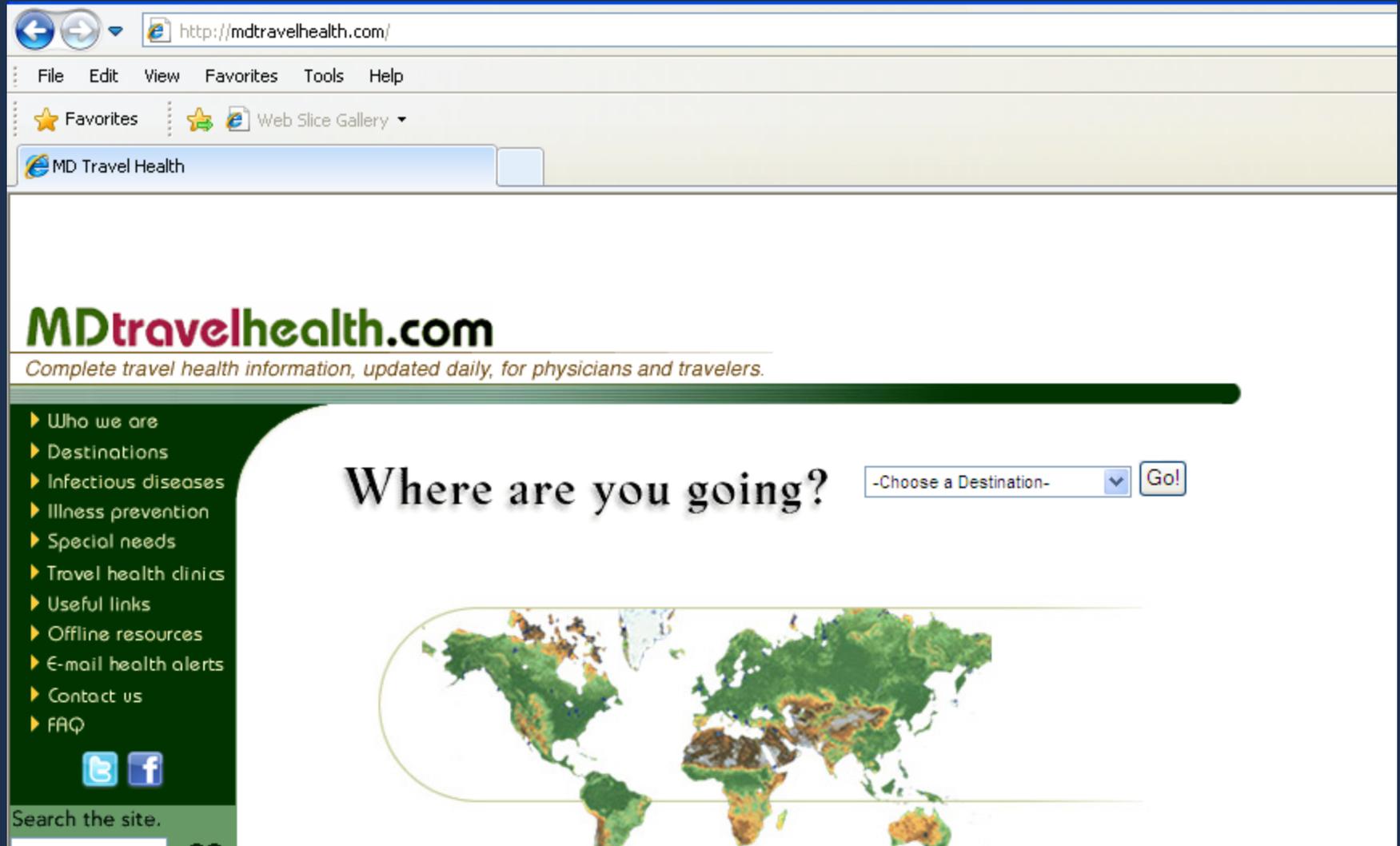
GeoSentinel Sites participate in **surveillance and monitoring of all travel related illnesses** seen in their clinics. Aggregation of this data across the network of 54 globally dispersed medicine clinics on all continents (17 in the United States and 37 in other countries) allows linking of final diagnoses in migrating populations with similar geographic

### GeoSentinel Network Members

GeoSentinel Network Members are ISTM provider clinics that **informally provide leads and contacts** when they encounter any patient having a pre-defined alarming diagnosis or unusual event. Network Members also participate in brief e-mail queries for enhanced surveillance and response in potential outbreak situations. This program allows large

# MD Travel Health

## <http://mdtravelhealth.com/>



The image shows a screenshot of a web browser displaying the MD Travel Health website. The browser's address bar shows the URL <http://mdtravelhealth.com/>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The Favorites bar shows a star icon and the text "MD Travel Health".

The website's header features the logo "MDtravelhealth.com" in green and red, with the tagline "Complete travel health information, updated daily, for physicians and travelers." below it.

On the left side, there is a dark green sidebar with a list of navigation links, each preceded by a right-pointing triangle:

- ▶ Who we are
- ▶ Destinations
- ▶ Infectious diseases
- ▶ Illness prevention
- ▶ Special needs
- ▶ Travel health clinics
- ▶ Useful links
- ▶ Offline resources
- ▶ E-mail health alerts
- ▶ Contact us
- ▶ FAQ

At the bottom of the sidebar are social media icons for Twitter and Facebook, and a search bar with the text "Search the site." and a "GO" button.

The main content area has a white background with the heading "Where are you going?" in a large, black, serif font. To the right of the heading is a search form consisting of a dropdown menu with the text "-Choose a Destination-" and a "Go!" button.

Below the heading and search form is a world map showing various regions highlighted in different colors (green, yellow, orange, red, brown), indicating travel health information for those areas.

# JULY 18, 2011

CDC Home

 **Centers for Disease Control and Prevention**  
CDC 24/7: Saving Lives. Protecting People. Saving Money Through Prevention.

Travelers' Health  
 All CDC Topics  
Choose a topic above

A-Z Index [A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#) <#>

## Travelers' Health

- Home
- Destinations
- Vaccinations
- News & Announcements
- Travel Notices**
- Diseases
- Yellow Book
- Find a Clinic
- Specific Groups & Settings
- Stay Healthy & Safe
- Illness & Injury Abroad
- Resources & Training
- Travel Podcasts
- RSS Feeds

[Home](#)

## Travel Notices

There are no Travel Health Warnings currently in effect.

### Travel Health Precautions

- [Cholera in Haiti](#)  
Updated December 21, 2010

### Outbreaks

- New!** [Polio Outbreak in Tajikistan, Cases in Russia, Risk of Spread to other Central Asian Countries](#)  
Updated June 30, 2011
- New!** [Shiga toxin-producing E. coli O104:H4 infections in Germany](#)  
Updated June 23, 2011
- New!** [Rabies in Bali, Indonesia](#)  
Updated June 20, 2011
- [Dengue in Tropics & Subtropics](#)  
Updated May 02, 2011
- [Yellow Fever in Côte d'Ivoire](#)  
Released February 22, 2011
- [Yellow Fever in Uganda](#)  
Released January 06, 2011
- [Cholera in the Dominican Republic](#)  
Updated December 18, 2010

This is an official  
**CDC Health Advisory**

Distributed via Health Alert Network  
June 3, 2011, 9:30 a.m. EST  
CDCHAN-00322-ADV-N

**Notice to Health Care Providers — Shiga Toxin-producing *E. coli* O104 (STEC O104:H4) Infections in U.S. Travelers Returning from Germany**

CDC is monitoring a large outbreak of Shiga toxin-producing *Escherichia coli* O104:H4 (STEC O104:H4) infections ongoing in Germany. The responsible strain shares virulence characteristics with enteroaggregative *E. coli* (EAEC). As of May 31, 2011, the Robert Koch Institute (RKI) reported 470 patients with hemolytic uremic syndrome, or HUS (a severe condition associated with STEC infection that can lead to kidney failure), and nine deaths. The strain of STEC that is causing this illness, STEC O104:H4 is very rare. The illness that it causes is similar to that caused by *E. coli* O157:H7 or STEC O157:H7, which is also a Shiga toxin-producing *E. coli*.

CDC is not aware of any cases of STEC O104:H4 infection ever being previously reported in the United States. However, as of May 31, 2011, three cases of HUS in the United States have been reported in persons who recently traveled to Hamburg, Germany. CDC is working with state health departments to learn more about these suspected cases and obtain bacterial isolates for further characterization.

CDC has recommended that any person who has recently traveled to Germany and has symptoms of STEC infection, or HUS, should seek medical care and let the health care provider know about the outbreak of STEC infections in Germany and the importance of being tested.



**RABIES BITES**

Be careful! Don't get bitten!  
But if you do... you must treat the wound and seek medical help immediately.

**WHAT TO DO IF YOU ARE BITTEN:**

- Immediately wash the wound with running water and detergent for at least 15 minutes.
- Apply iodine or alcohol.
- Go directly to Sanglah Hospital or a medical clinic
- You may require urgent vaccination and immunoglobulin depending on the category of bite and the severity of the wound.
- Call the Bali Animal Welfare Association hotline at 0811 389004 and they will pick up the dog for observation.
- By following World Health Organization protocol ([www.who.int](http://www.who.int)) – rabies is preventable.

**RABIES SYMPTOMS**

Even when a dog has been vaccinated, it may be already incubating the rabies virus, therefore it may still get rabies.

If a dog displays any of the following symptoms, call BAWA immediately. Any behaviour out of the ordinary is potentially a symptom of rabies:

- Vicious biting for no reason
- Barking with a strange sound
- Difficulty swallowing
- Seizures
- Dr drooping of lower jaw
- Seeking dark places
- Foaming at the mouth
- Paralysis

Not all dogs have the same symptoms - if you notice anything out of the ordinary, please phone BAWA. If you get bitten follow World Health Organization ([www.who.int](http://www.who.int)) protocols.

Wash wound for 20 minutes.

- Seek medical advice

2006

Four remaining polio-endemic countries – Afghanistan, India, Nigeria, Pakistan  
Goal: to stop transmission of poliovirus by end-2012

**Polio Outbreak in Tajikistan, Cases in Russia, and Other Central Asian Countries**

July 18, 2011 at 18:05 EDT



**FOODCONSUMER**

Nutrition | Avoiding Illness | Safety | Environment | Food Chemicals | Cooking & Dining | Shopping | Science

Home | Non-food | Disease | Update: Cholera Outbreak --- Haiti

**Update: Cholera Outbreak --- Haiti**

admin

11/23/2010 00:10:00

Font size: - +

**Update: Cholera Outbreak --- Haiti, 2010**

*Morbidity and Mortality Weekly Report (MMWR)*

November 19, 2010 / 59(45);1473-1479

On October 19, 2010, the Haitian Ministry of Public Health and Population (MSPP) was notified of unusually high numbers of patients from Artibonite and Centre departments who had acute watery diarrhea and dehydration, in some cases leading to death. Within 4 days, the National Public Health Laboratory (LNSP) in Haiti isolated *Vibrio cholerae* serogroup O1, serotype Ogawa, from stool specimens obtained from patients in the affected areas by an investigation team from MSPP and CDC Haiti. This report describes the investigation of the initial cases, the ongoing outbreak of cholera in Haiti, and initial control measures. Since the initial identification of cholera, the outbreak has expanded to include cases in seven of Haiti's 10 departments and the capital city of Port-au-Prince. As of November 13, MSPP had reported 16,111 persons hospitalized with acute watery diarrhea and 992 cholera deaths, 620 of which occurred among hospitalized patients. Prevention and control measures implemented by MSPP with assistance from governmental and nongovernmental partners include 1) chlorination of water supply systems, distribution of oral rehydration salts, and distribution of

<http://www.polioeradica>

BAWA is a non-profit organization working hard for the health and welfare of Bali's animals

