NECOEM Annual Conference 2018

William B. Patterson Memorial Lecture

Public Health, Occupational Health, and Infectious Diseases The Future is Now!

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Presenter Disclosure Information
Alfred DeMaria, Jr., M.D.

Consultant	**No relevant conflicts of interest to declare**
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Speaker's Bureau	**No relevant conflicts of interest to declare**
Major Stockholder	**No relevant conflicts of interest to declare**
Other Financial or Material Interest	**No relevant conflicts of interest to declare**

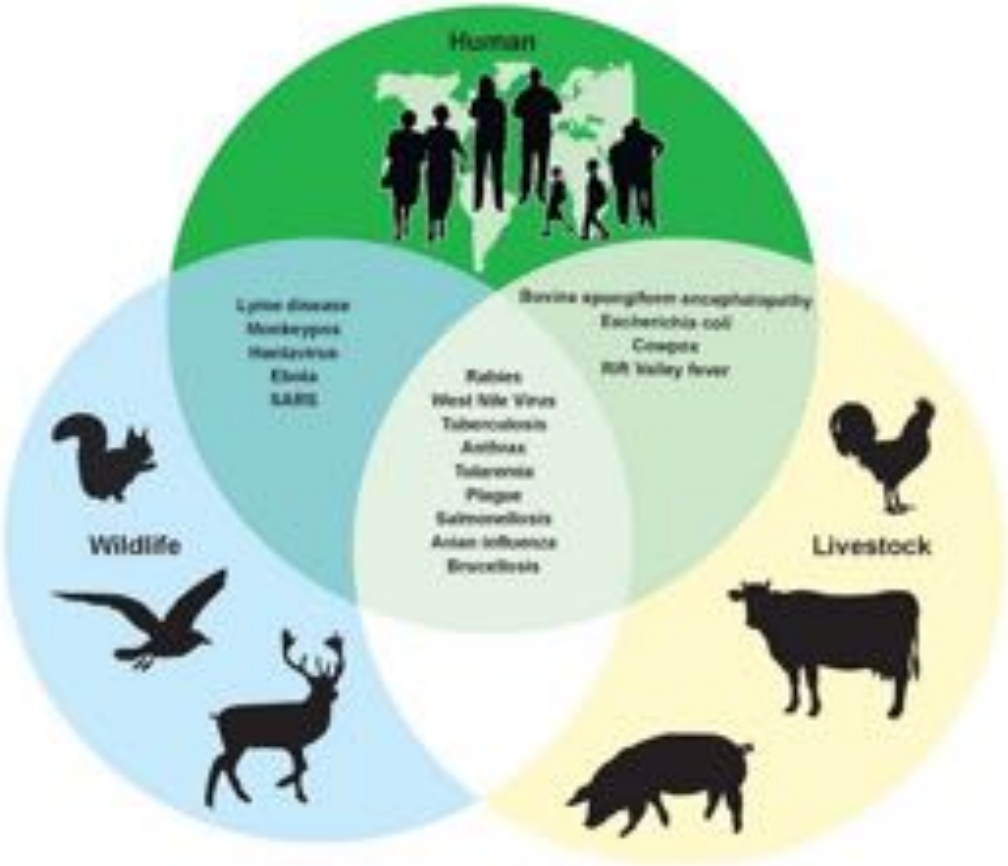
Global map of significant and new emerging infections: spread to new areas since 1997

www.gov.uk

Some Factors Related to Emerging Infections in the 21st Century

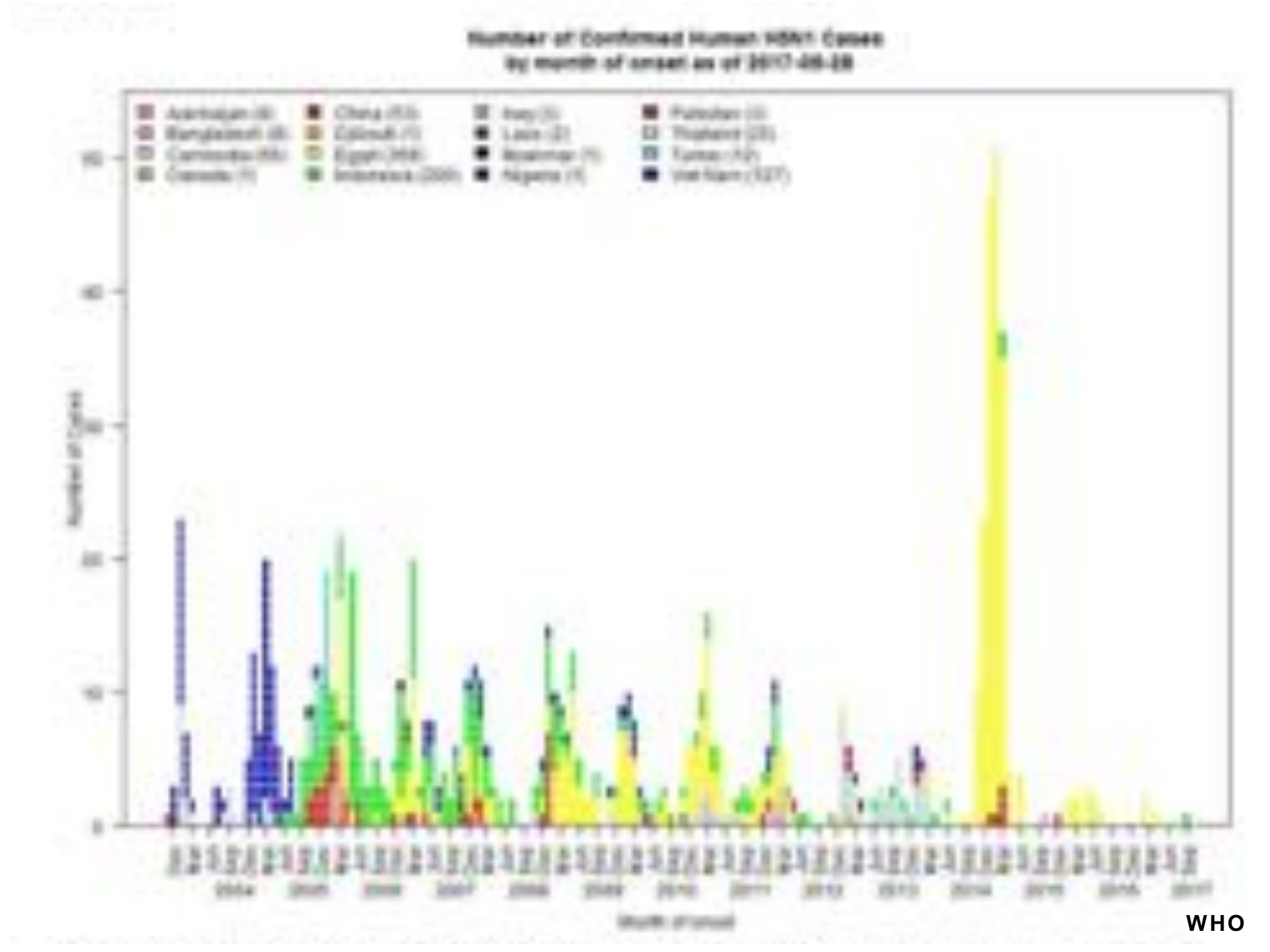
- Globalization
- Rapid travel
- Population growth
- Population density
- Urbanization
- Socioeconomic disparity
- Industrialization
- Global climate change
- Breakdowns in established public health
- Public education
- Day care
- New occupations
- Altered life style
- Changes in the healthcare delivery system
- Immunosuppression
- Transplants
- Recreation
- Changes in agriculture
- Changes in food processing
- Exotic foods and food sources
- Pets
- Public works
- Altered landscapes
- Microbial factors

Hufnagel et al, Proc Natl Acad Sci U S A. 2004



humans • animals • environment

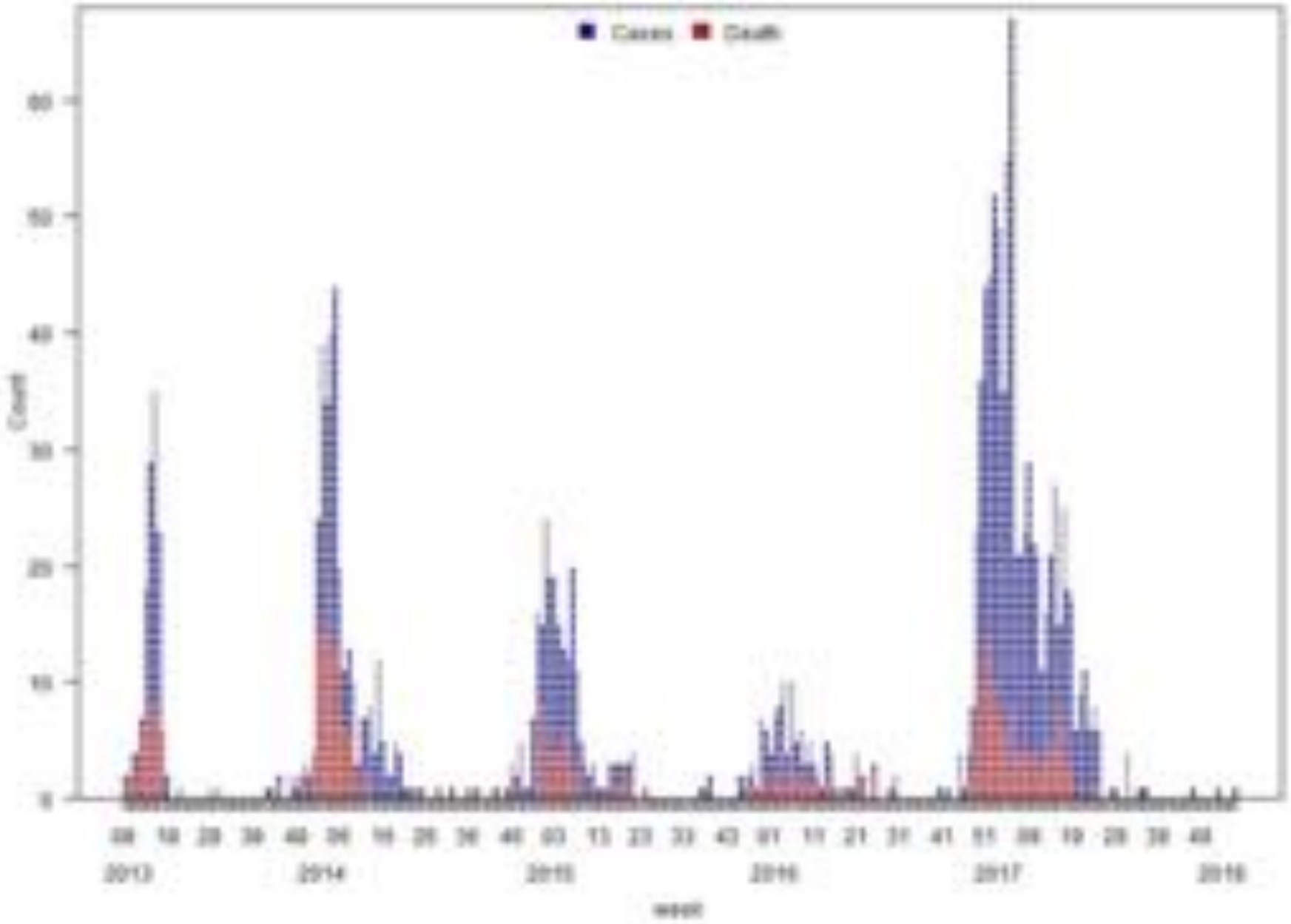
ONE HEALTH INITIATIVE

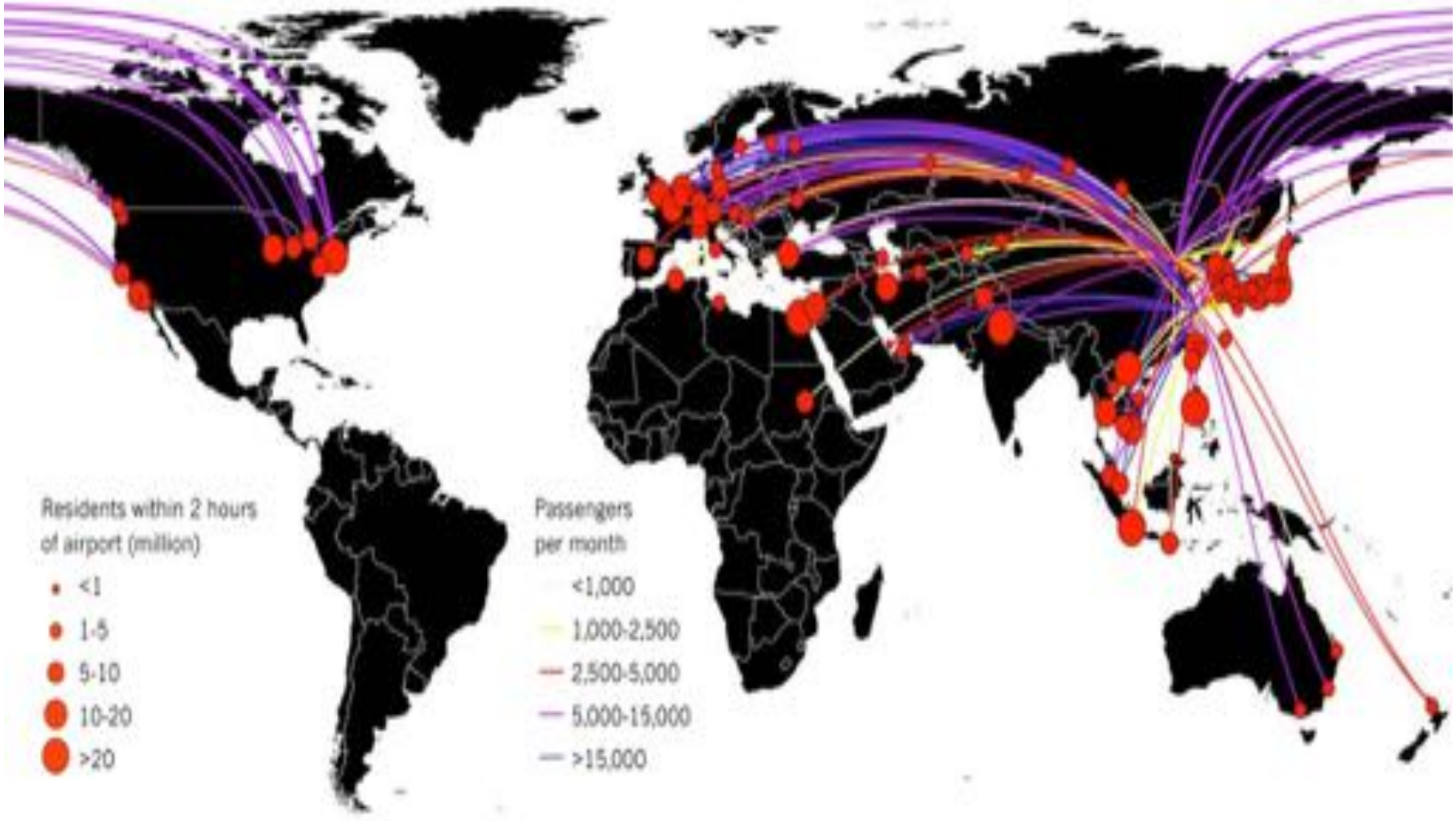

Number of Confirmed Human H5N1 Cases
by month of onset as of 2017-09-28
Azerbaijan (8)
Bangladesh (8)
Cambodia (56)
Canada (1)
China (53)
Djibouti (1)
Egypt (359)
Indonesia (200)
Iraq (3)
Laos (2)
Myanmar (1)
Nigeria (1)
Pakistan (3)
Thailand (25)
Turkey (12)
Viet Nam (127)
Number of Cases
Month of onset
WHO


H7N9禽流感
病例统计
4
6
3
1


P3
蘇記龍崗
芝麻
雞

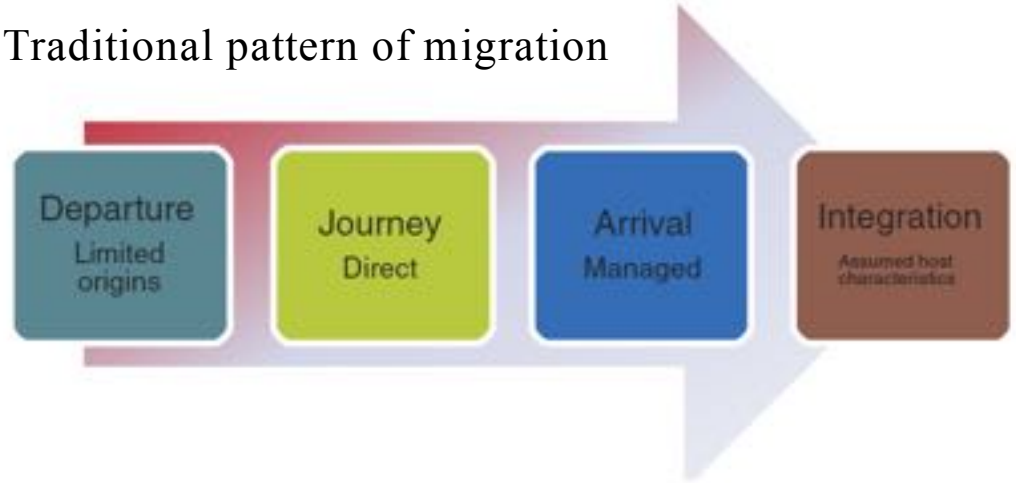
Epidemiological curve of avian influenza A(H7N9) cases in humans by week of onset, 2013-2018



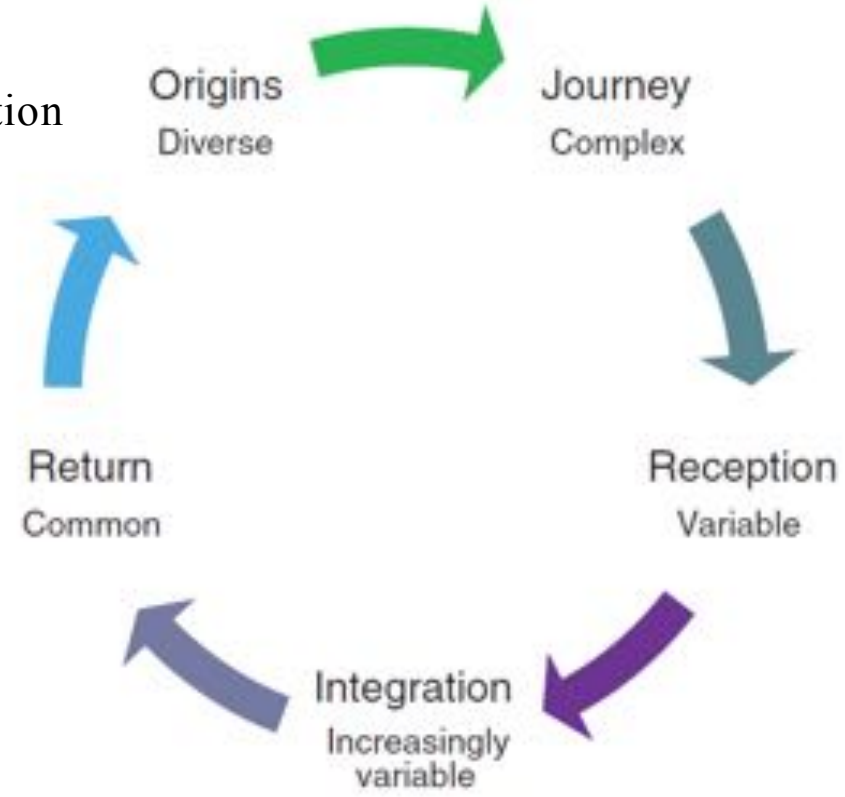

Residents within 2 hours of airport (million)
<1
1-5
5-10
10-20
>20
Passengers per month
<1,000
1,000-2,500
2,500-5,000
5,000-15,000
>15,000

Source: U.S. Department of Commerce (OTTI), GBTA Foundation, Rockport Analytics

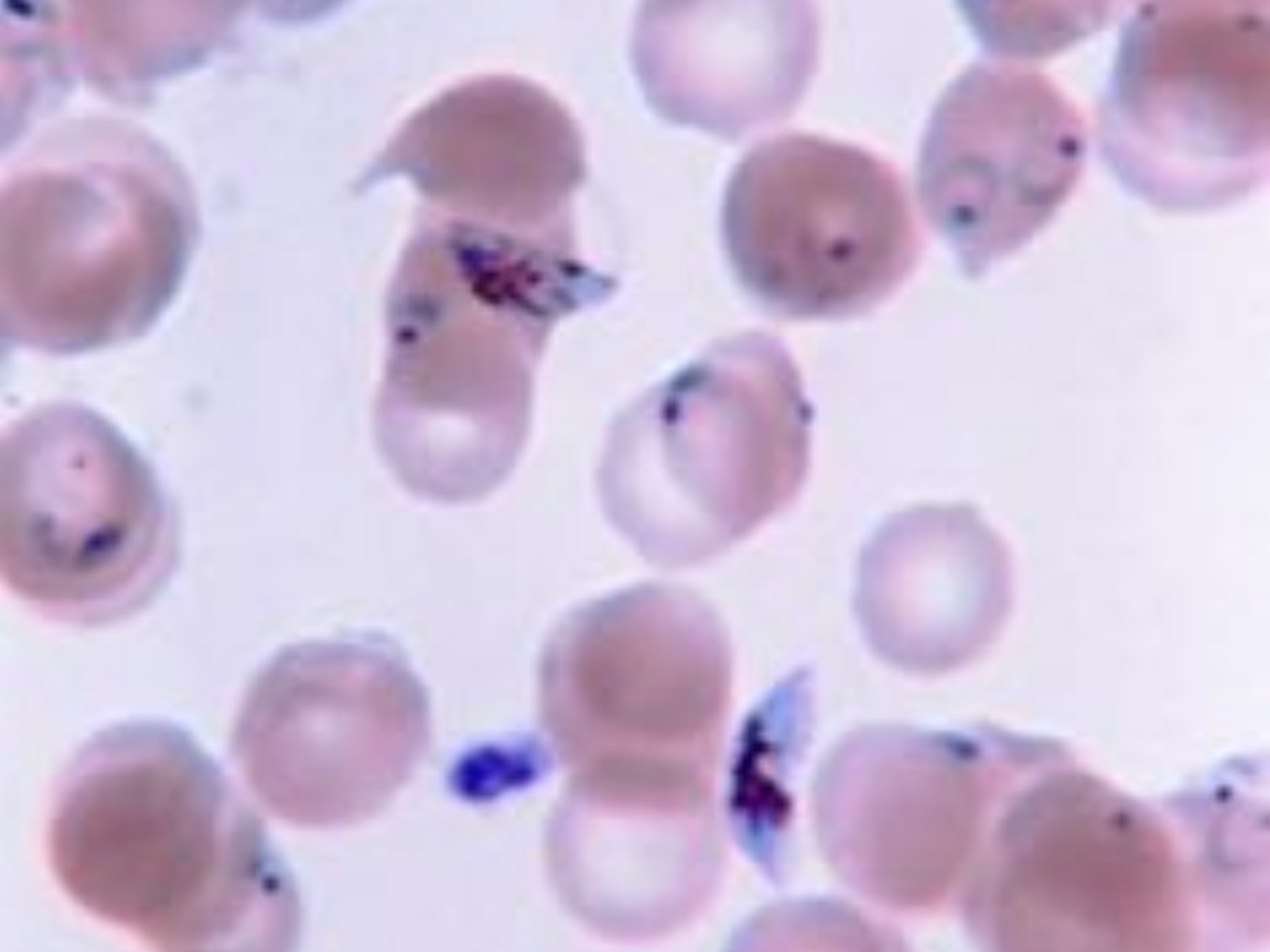
Traditional pattern of migration



Modern patterns of migration

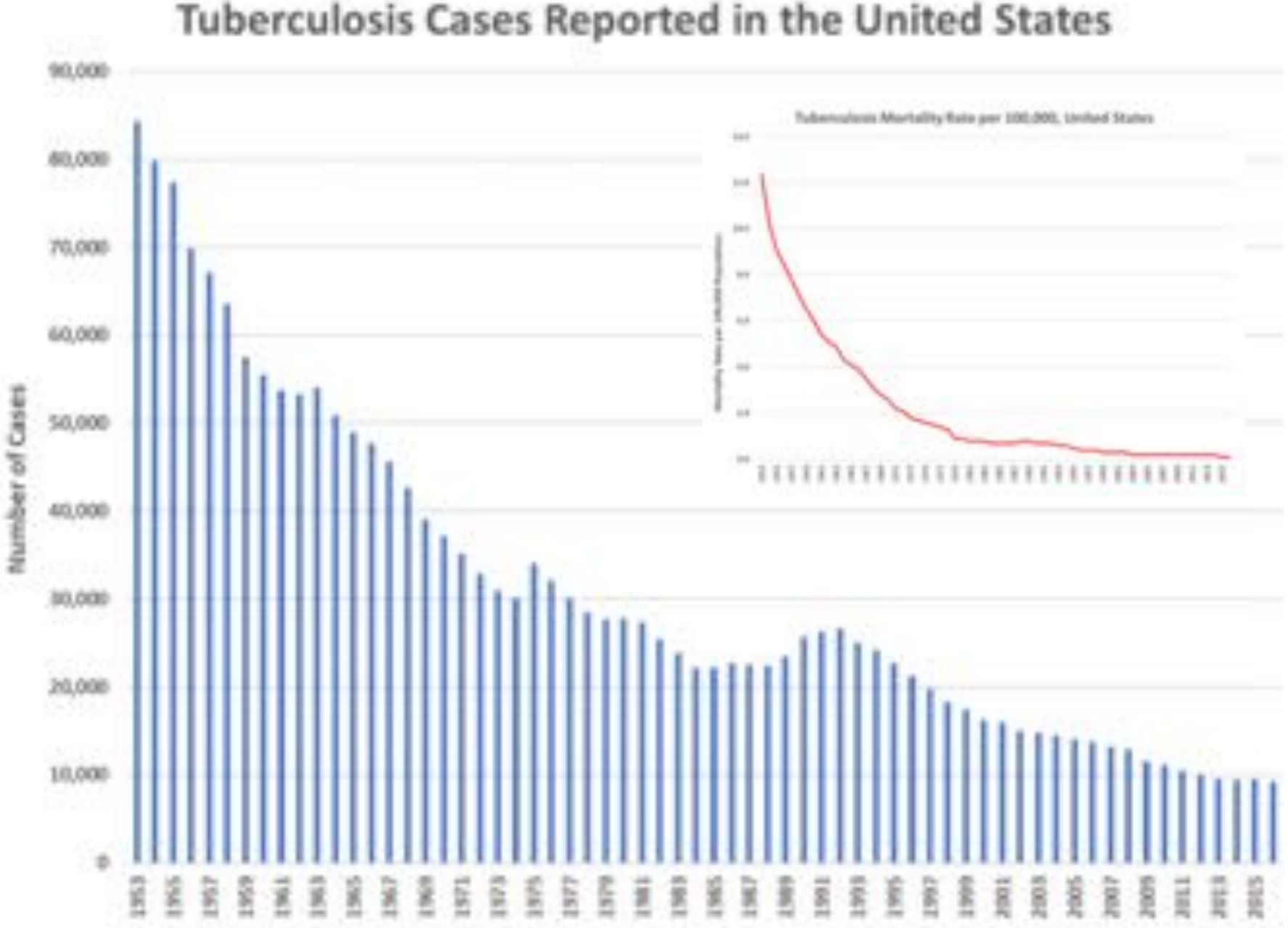


National Academy of Sciences, based on data in Gushulak and MacPherson (2004)

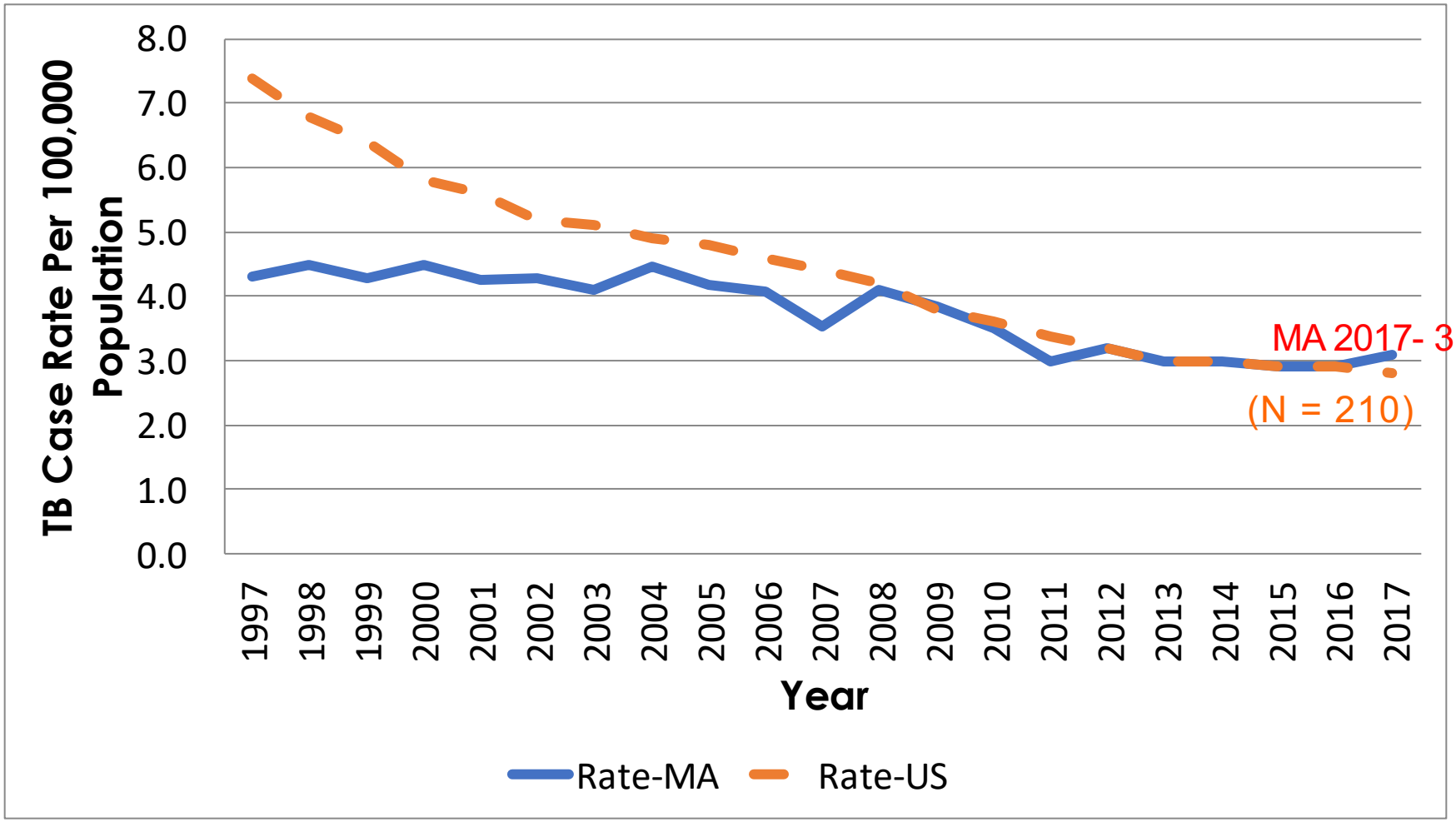


Malaria Cases Reported in Massachusetts, 2012-2016, Presumed World Region of Exposure

Africa	**223**	**Asia**	**22**
Nigeria	51	India	17
Ghana	29	5 other countries	5
Uganda	23		
Liberia	21	**Caribbean**	**12**
Cameroon	17	Haiti	10
Sierra Leone	12	Dominican Republic	2
Congo/DRC	12		
Tanzania	8	**Central and South America**	**4**
Cote d'Ivoire	7		
Kenya	7		
22 other countries	36		


Tuberculosis Cases Reported in the United States
Number of Cases
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
Tuberculosis Mortality Rate per 100,000, United States

Rate of Tuberculosis Cases, United States and Massachusetts, 1997-2017



Data current as of 1 Sept 2018
Data gathered from Massachusetts Virtual Epidemiologic Network

Number and Percentage of Tuberculosis Cases by Select Characteristics, Massachusetts, 2017

Risk Factor	Number of Cases	Percent of Total Population
Non- US Born	184	88 %
Elderly >65+	46	22 %
Substance Abuse	8	4 %
Co-Infected HIV	13	6 %
Homeless	8	4 %
Prison/Jail	1	<1 %
Children < 15	11	7 %

***Categories are not mutually exclusive**

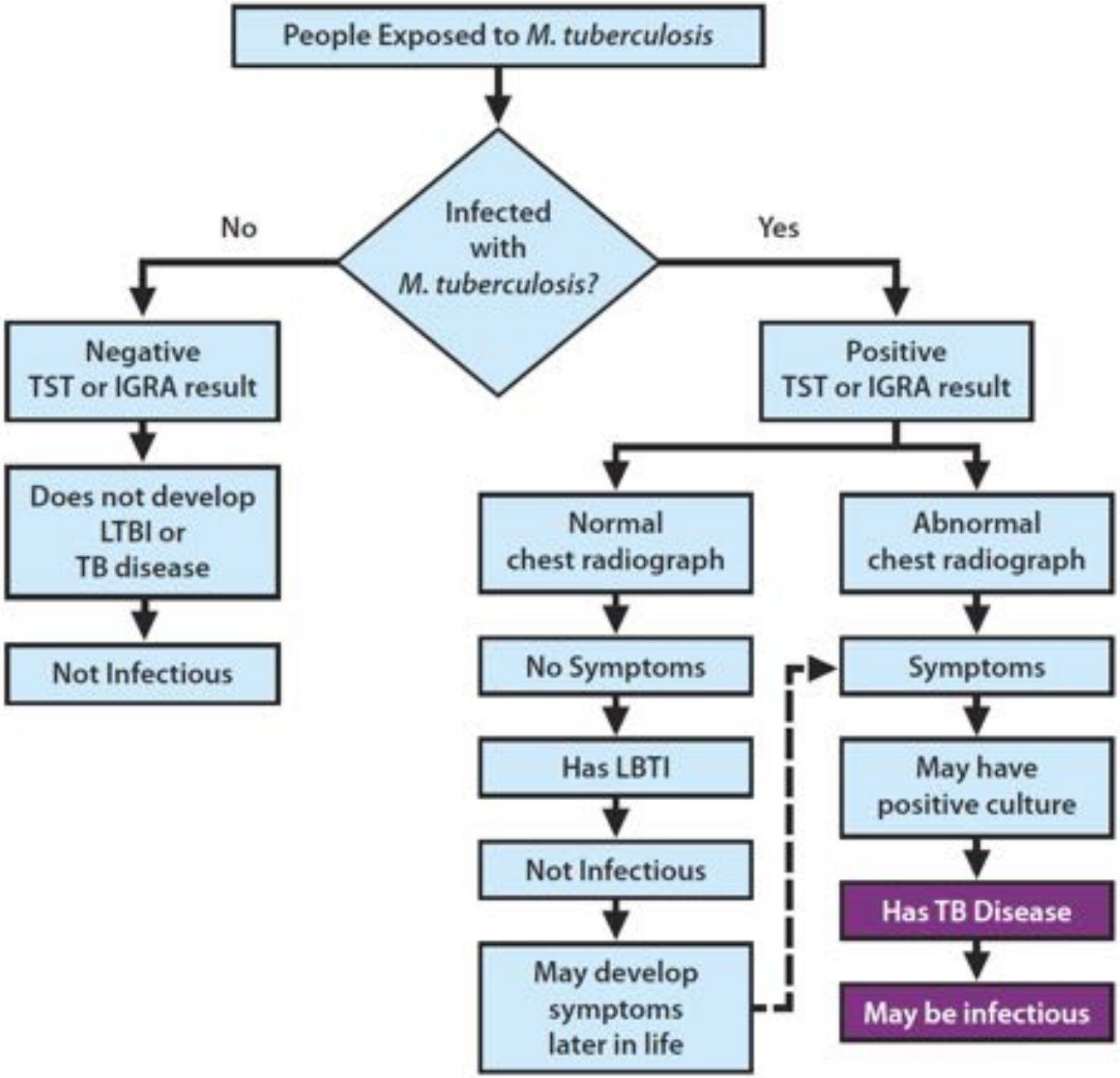
Data current as of 1 Sept 2018
Data gathered from Massachusetts Virtual Epidemiologic Network

Country of Origin for Tuberculosis Cases Massachusetts, 2017

Country	Number of Cases	Percent of Cases
United States	26	12%
India	25	12%
Vietnam	22	10%
Haiti	16	8%
Cambodia	12	6%
China	12	6%
Dominican Republic	10	5%
Philippines	7	3%
Guatemala	6	3%
Cape Verde	5	2%
Ethiopia	5	2%
Kenya	5	2%

(N=210)

Data current as of 1 Sept 2018
Data gathered from Massachusetts Virtual Epidemiologic Network


People Exposed to M. tuberculosis
Infected with M. tuberculosis?
No
Yes
Negative TST or IGRA result
Does not develop LTBI or TB disease
Not Infectious
Positive TST or IGRA result
Normal chest radiograph
No Symptoms
Has LBTI
Not Infectious
May develop symptoms later in life
Abnormal chest radiograph
Symptoms
May have positive culture
Has TB Disease
May be infectious

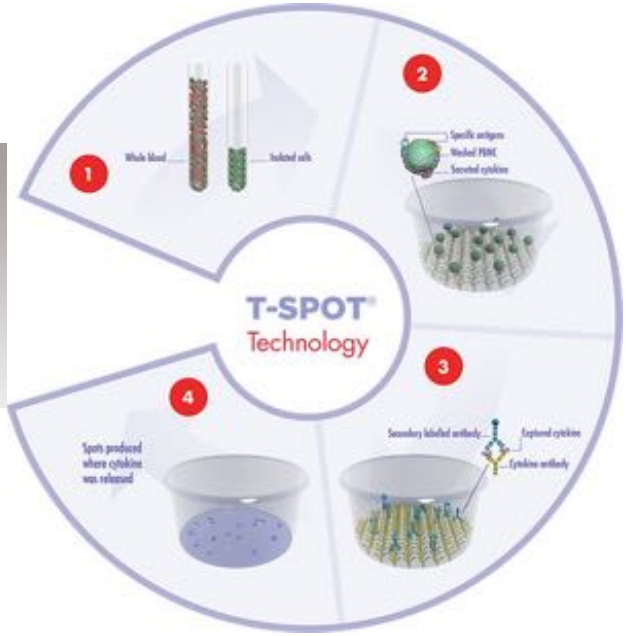
Testing for Latent TB Infection

- **Who?**
  - **Anyone with signs and symptoms consistent with TB**
  - **Anyone with a risk for exposure to TB**
  - **Anyone to be treated with biologic and other immunosuppressive therapy**
  - **To establish a baseline pre-exposure**
- **How?**
  - **Tuberculin skin test – Mantoux, PPD 5 TU, intra-dermal, read at 48-72 hours**
  - **Interferon-gamma release assay**
    - **QuantiFERON-TB Gold/Gold Plus**
    - **T-Spot.TB**


QuantiFERON®-TB
Gold
PACKAGE
INSERT


Tuberculin Skin Tes
2. Palpate
1. Mark


T-SPOT.TB
T-SPOT.TB
Oxford Immunotec


1
Whole blood
Isolated cells
2
Specific antigen
Washed PBMC
Secreted cytokine
T-SPOT®
Technology
3
Secondary labelled antibody
Captured cytokine
Cytokine antibody
4
Spots produced where cytokine was released

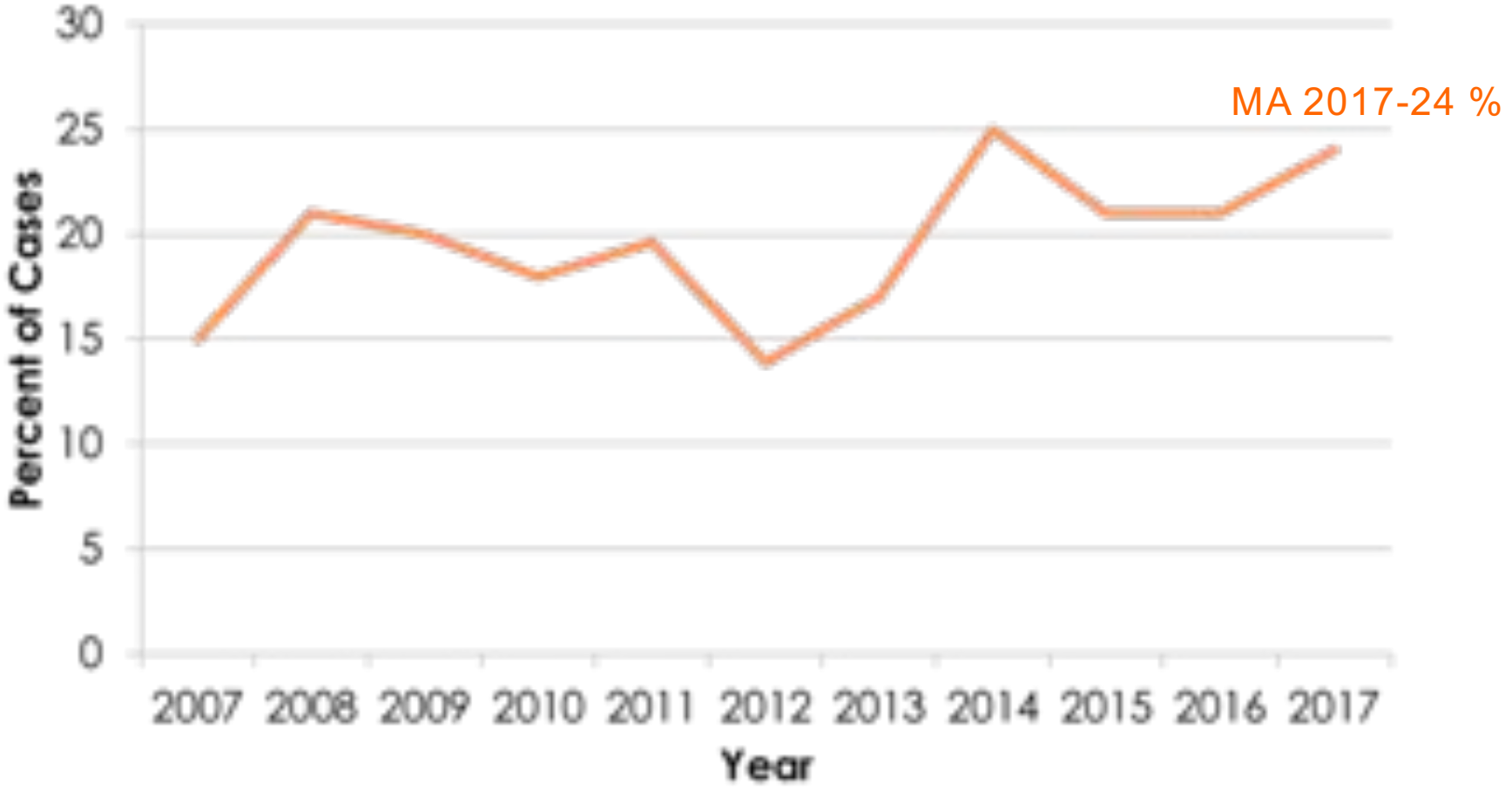
Latent TB Treatment Regimens

Drugs	Duration	Interval	Comments
Isoniazid and Rifapentine	3 months	Once weekly (DOT or self-administered)	Not recommended: •Less than 2 years old •Living with HIV/AIDS on antiretroviral medications with potential drug interactions with rifapentine •Presumed INH- or RIF-resistant *M. tuberculosis* •Pregnant or expect to become pregnant within the 12 week regimen
Rifampin	4 months	Daily	Not recommended: •Living with HIV/AIDS on antiretroviral medications with potential drug interactions with rifampin (rifabutin may be used as a substitute) •Presumed RIF-resistant *M. tuberculosis* Pregnant or expect to become pregnant within the 12 week regimen
Isoniazid	6 months	Daily	Not recommended for presumed INH-resistant *M. tuberculosis*
		Twice weekly (DOT)	Not recommended for presumed INH-resistant *M. tuberculosis*
Isoniazid	9 months	Daily	Not recommended for presumed INH-resistant *M. tuberculosis* Preferred for: •Persons living with HIV AIDS and taking antiretroviral medications •Pregnant women (with pyridoxine/vitamin B6 supplements)
		Twice weekly (DOT)	Not recommended for presumed INH-resistant *M. tuberculosis* Preferred for pregnant women (with pyridoxine/vitamin B6 supplements)

Summary of Massachusetts TB Law and Regulation

- **105 CMR 300: TB infection and disease are reportable**
- **105 CMR 365: Standards of management of TB outside hospitals**
  - **365.200: Case management**
  - **365.600: Discharge planning from hospital into out-patient setting**
- **MGL Chapter 111 Section 94A-C: Compulsory hospitalization of person with infectious TB**

Trends in the Percentage of Bacteriologically Confirmed Tuberculosis Cases with any Drug Resistance, Massachusetts, 2007–2017



*TB cases with either a positive sputum culture or a positive culture of tissue/other body fluids

Data current as of 1 Sept 2018
Data gathered from Massachusetts Virtual Epidemiologic Network

Drug-resistant TB sweeps India

Country, China Account For 50% Of Disease

Kaustaya Sinha | TNN

New Delhi: Drug-resistant TB, which does not respond to the most effective drugs, is fast sweeping through the world. What's worse, India and China are home to 50% of the globe's multi-drug re-

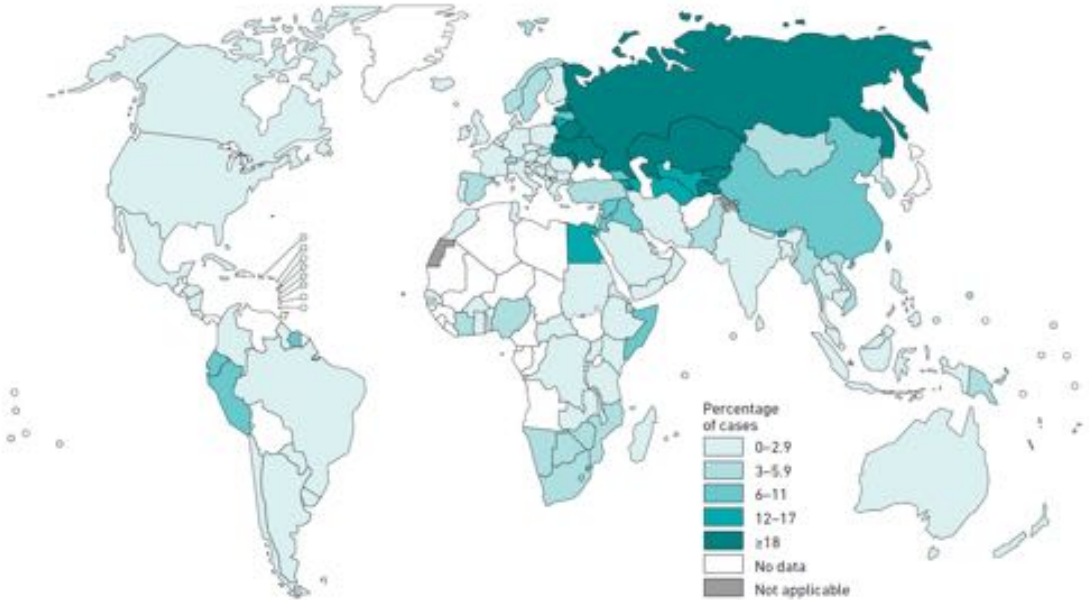
Medical Menace

- **3% of all new TB cases** in India can't be treated with standard drug regimens
- While normal TB can be treated in 6 months, **multi-drug resistant TB takes over 2 yrs** with drugs less potent and more toxic
- Standard TB drugs cost $20; **MDR TB medici[illegible]** cost up to **$5,000**

resistant TB—the extreme type referred to as XDR—is also raising its head much more frequently. WHO estimates there may be around 25,000 XDR TB cases a year with most proving fatal. Since XDR TB was first defined in 2006, a total of 58 countries have reported at least one case of this strain till 2008.

WHO also pointed to the

Percentage of new TB cases with MDR/RR-TB[a]

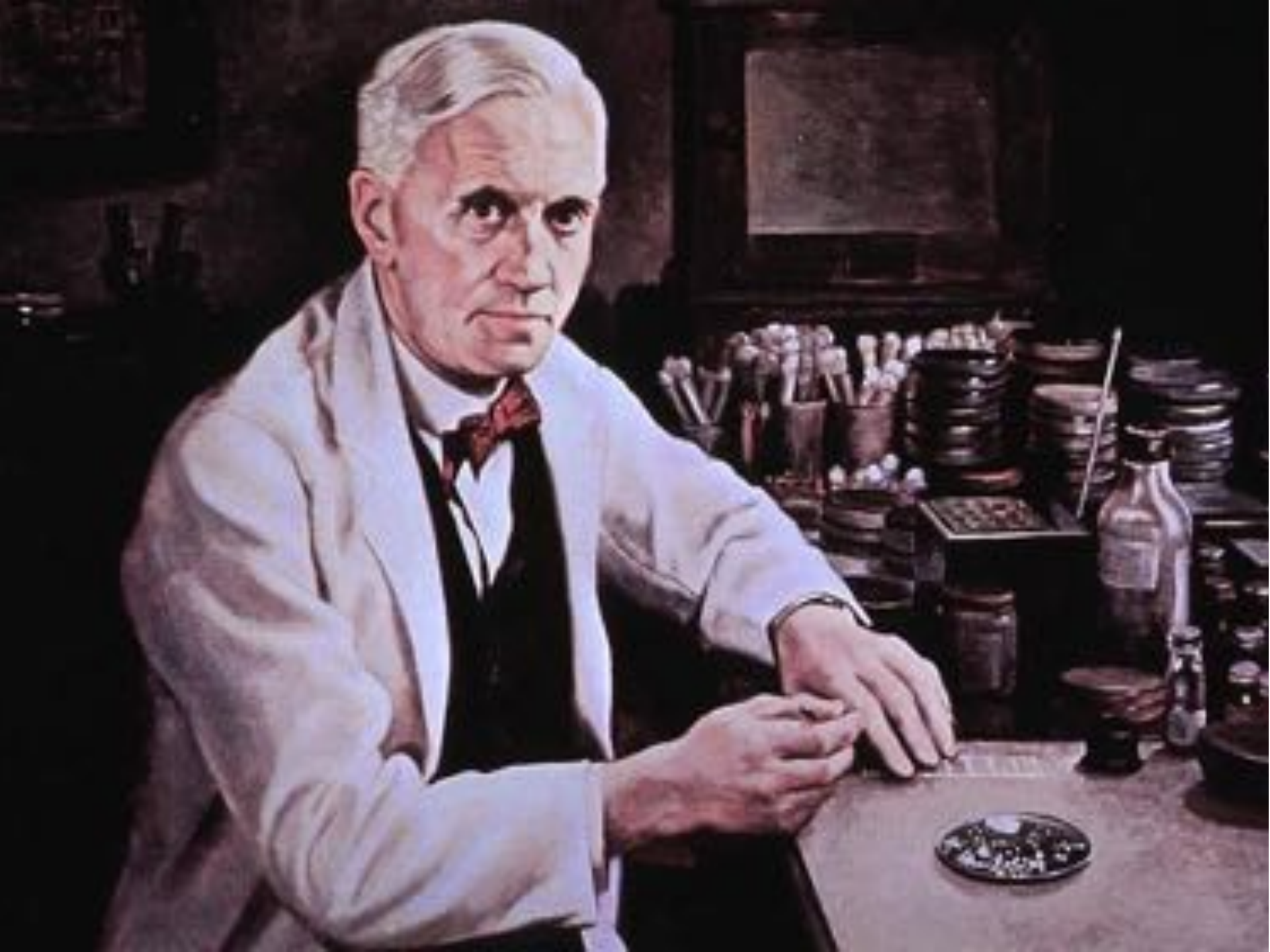


Antimicrobials

The only medications that affect the patient being treated

<u>and</u>

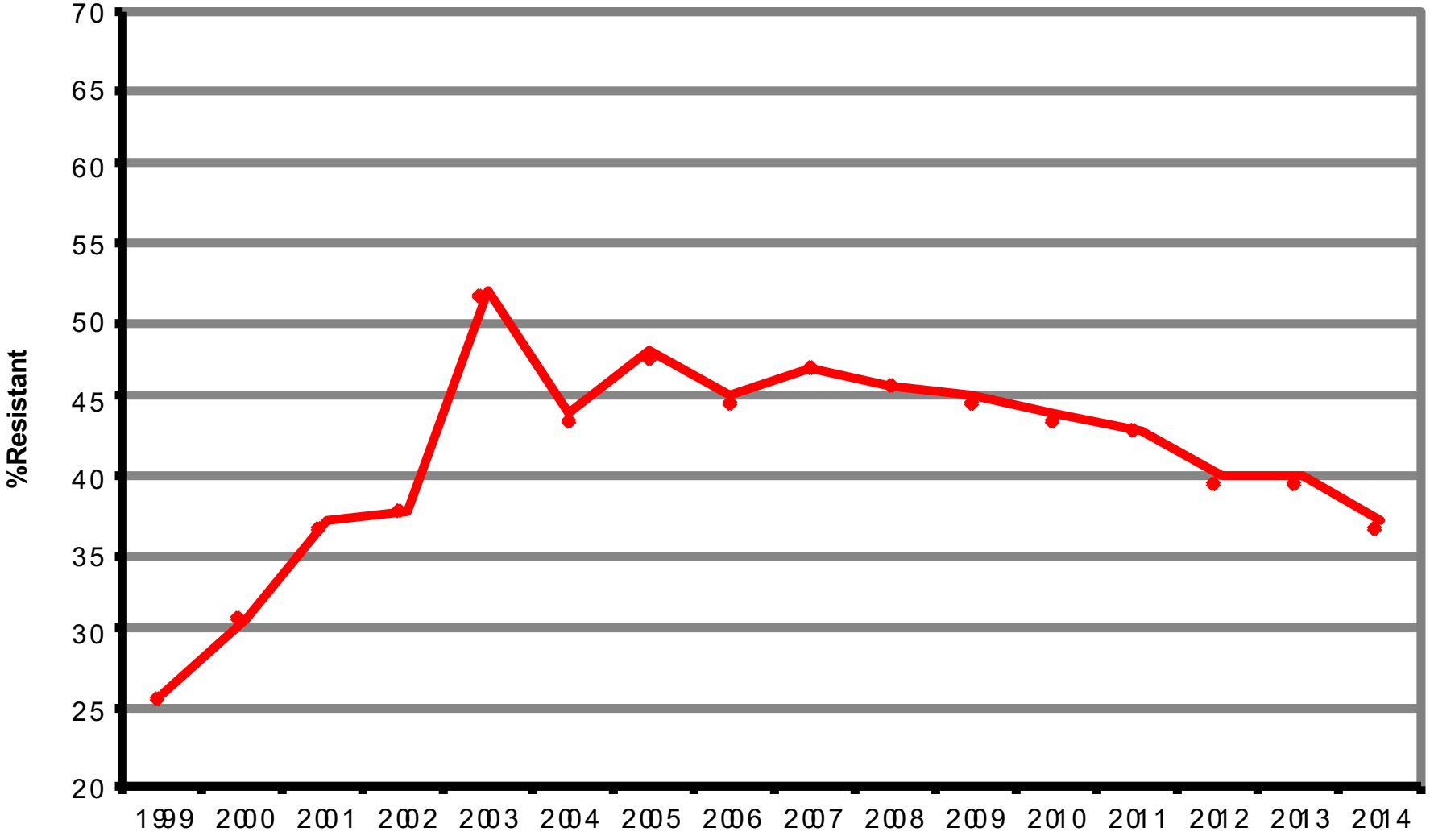
other people at present and in the future.



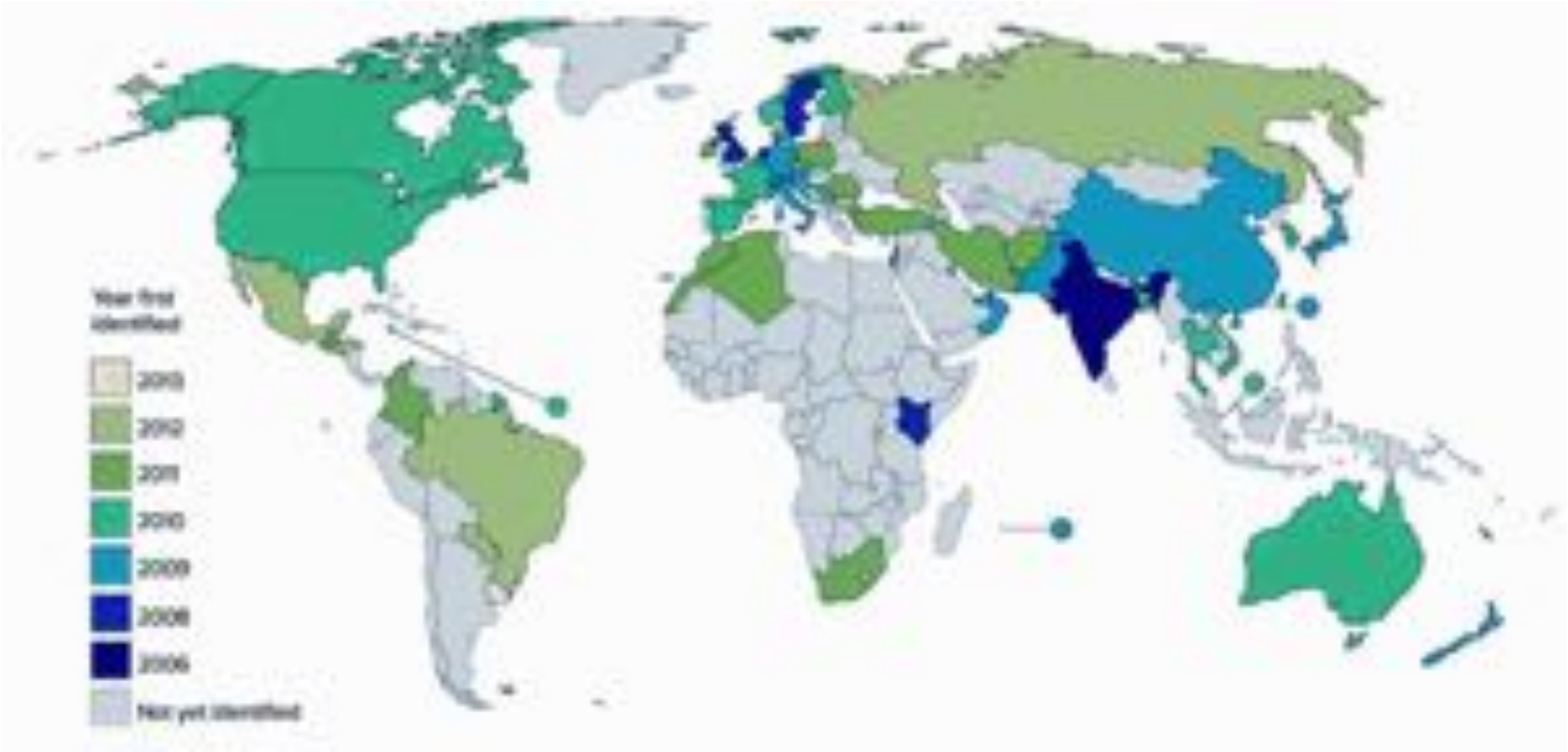
"… the greatest possibility of evil in self-medication is the use of too small doses so that instead of clearing up infection, the microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out which can be passed to other individuals and from them to others until they reach someone who gets a septicemia or a pneumonia which penicillin cannot save."

- Sir Alexander Fleming, 1945

How does antibiotic resistance occur?

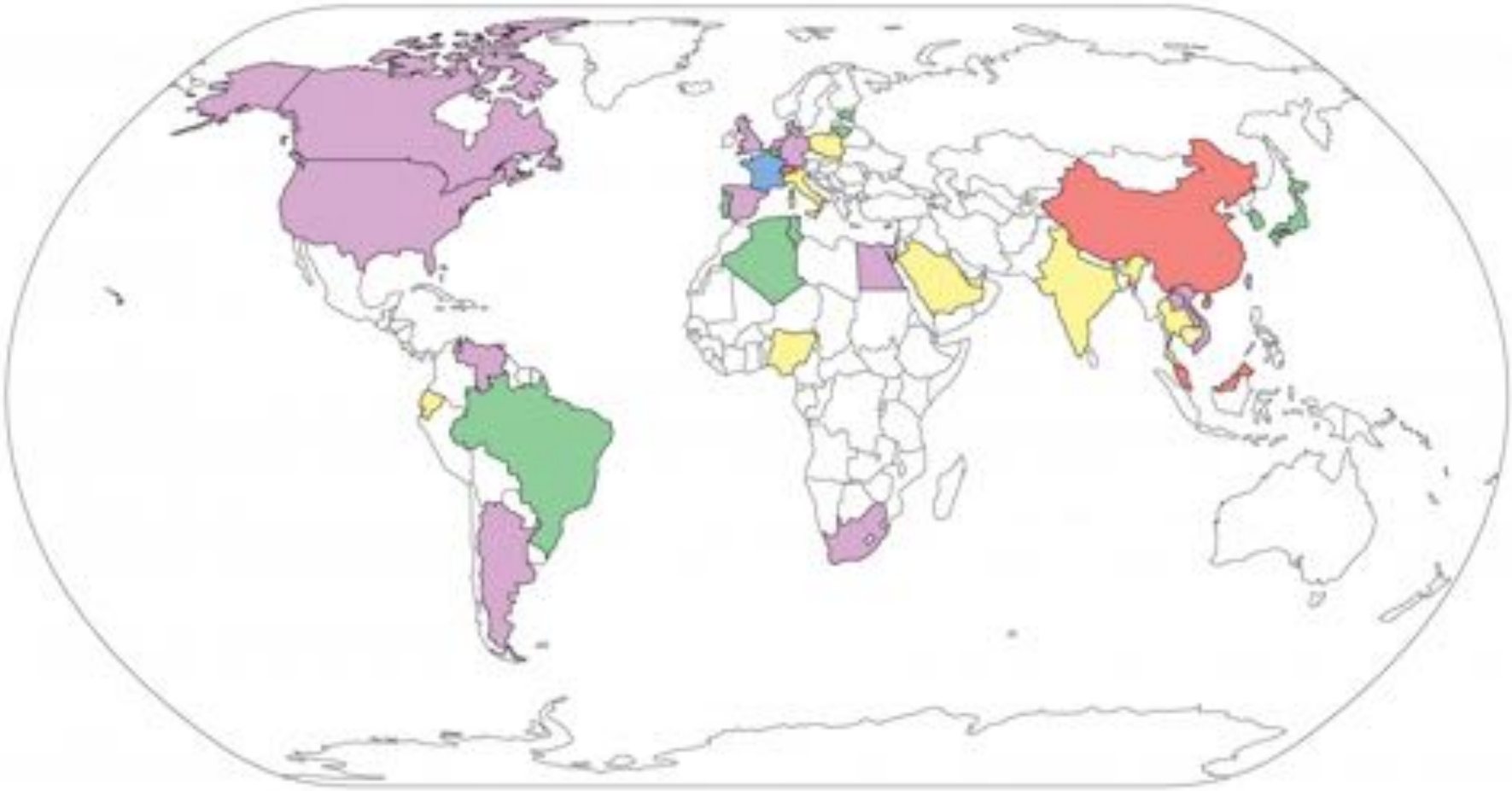

Percent of Staphylococcus aureus Isolates Resistant to Oxacillin in Massachusetts Acute Care Hospitals
%Resistant
70
65
60
55
50
45
40
35
30
25
20
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Spread of New Delhi Metallo-beta-lactamase-1: First Detection



CDDEP 2015

Countries reporting plasmid-mediated colistin resistance encoded by *mcr-1*



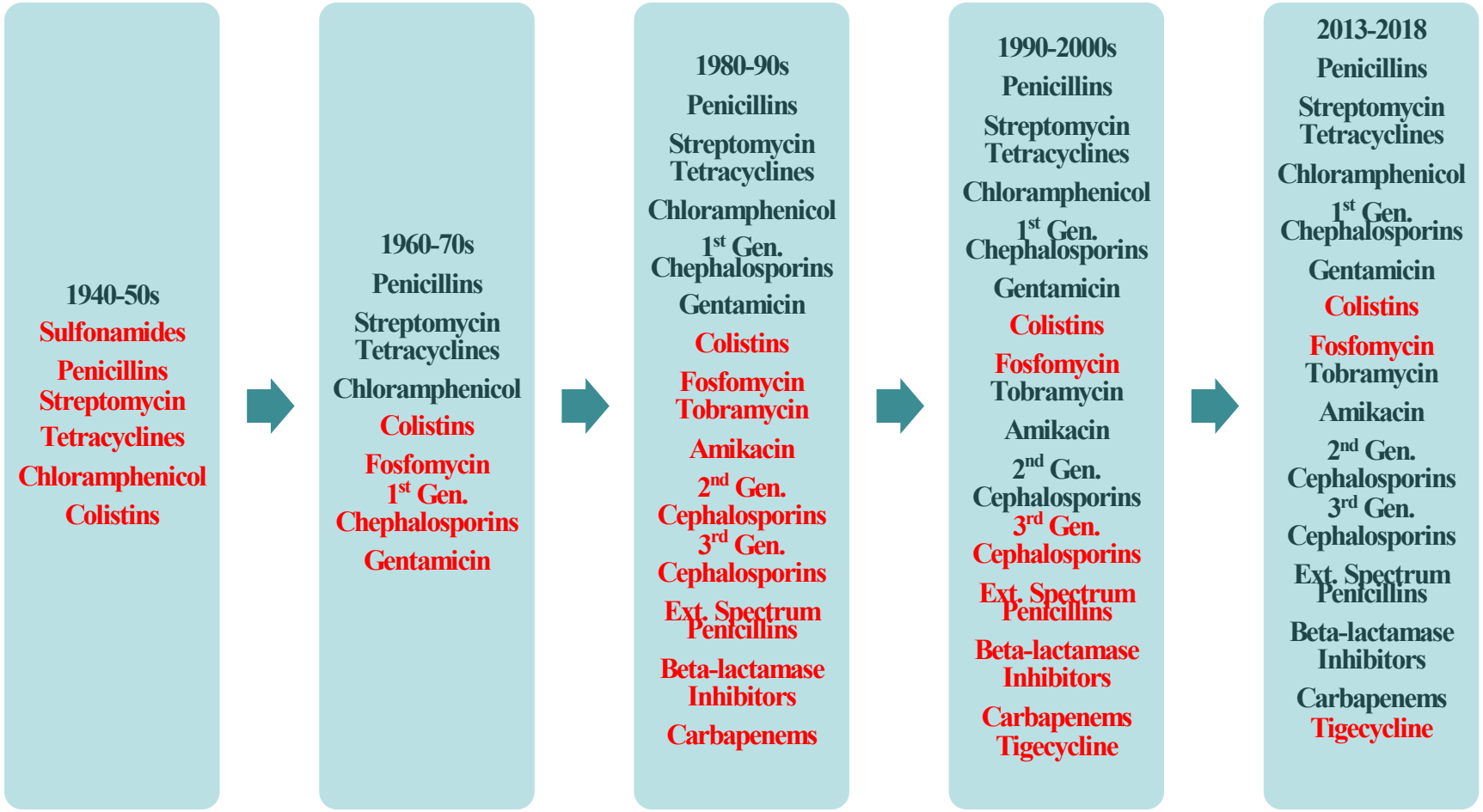
Isolate source[s]:

- Animals
- Humans
- Animals and humans
- Animals and environment
- Animals, humans and environment

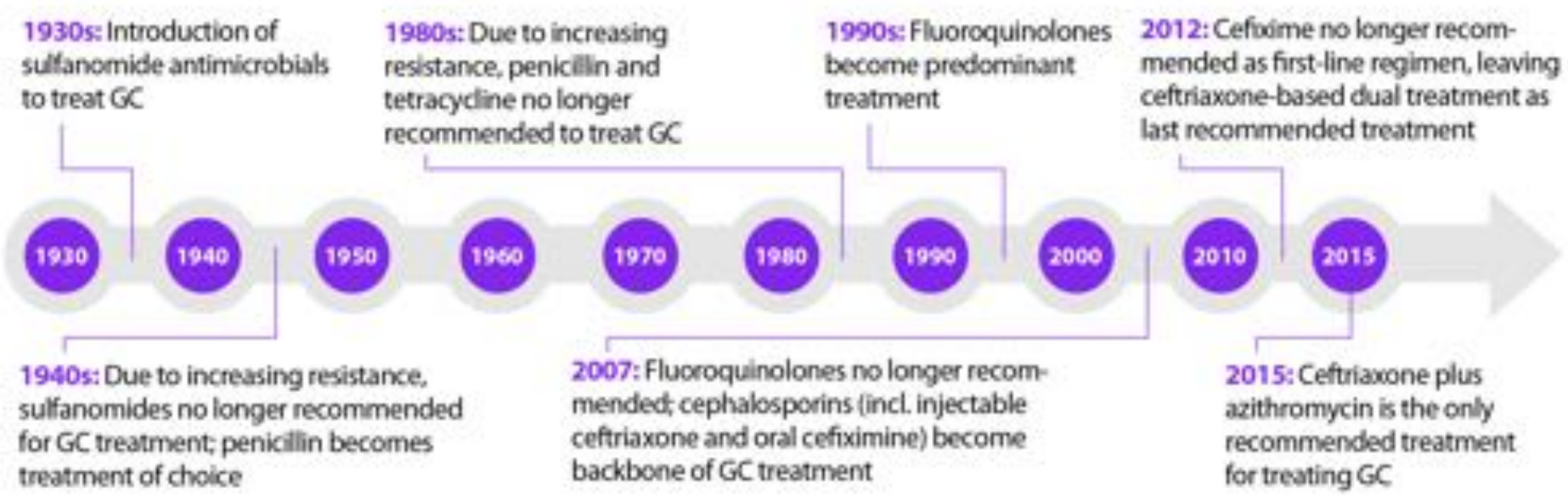
Data source: Al-Tawfiq, J. A., Laxminarayan, R. & Mendelson, M. How should we respond to the emergence of plasmid-mediated colistin resistance in humans and animals? Int. J. Infect. Dis. (2016). doi:10.1016/j.ijid.2016.11.415

CDDEP The Center for Disease Dynamics, Economics & Policy

Antibiotics Available, and the Ones That Worked Against Resistant Gram-Negative Bacilli in Each Time Period



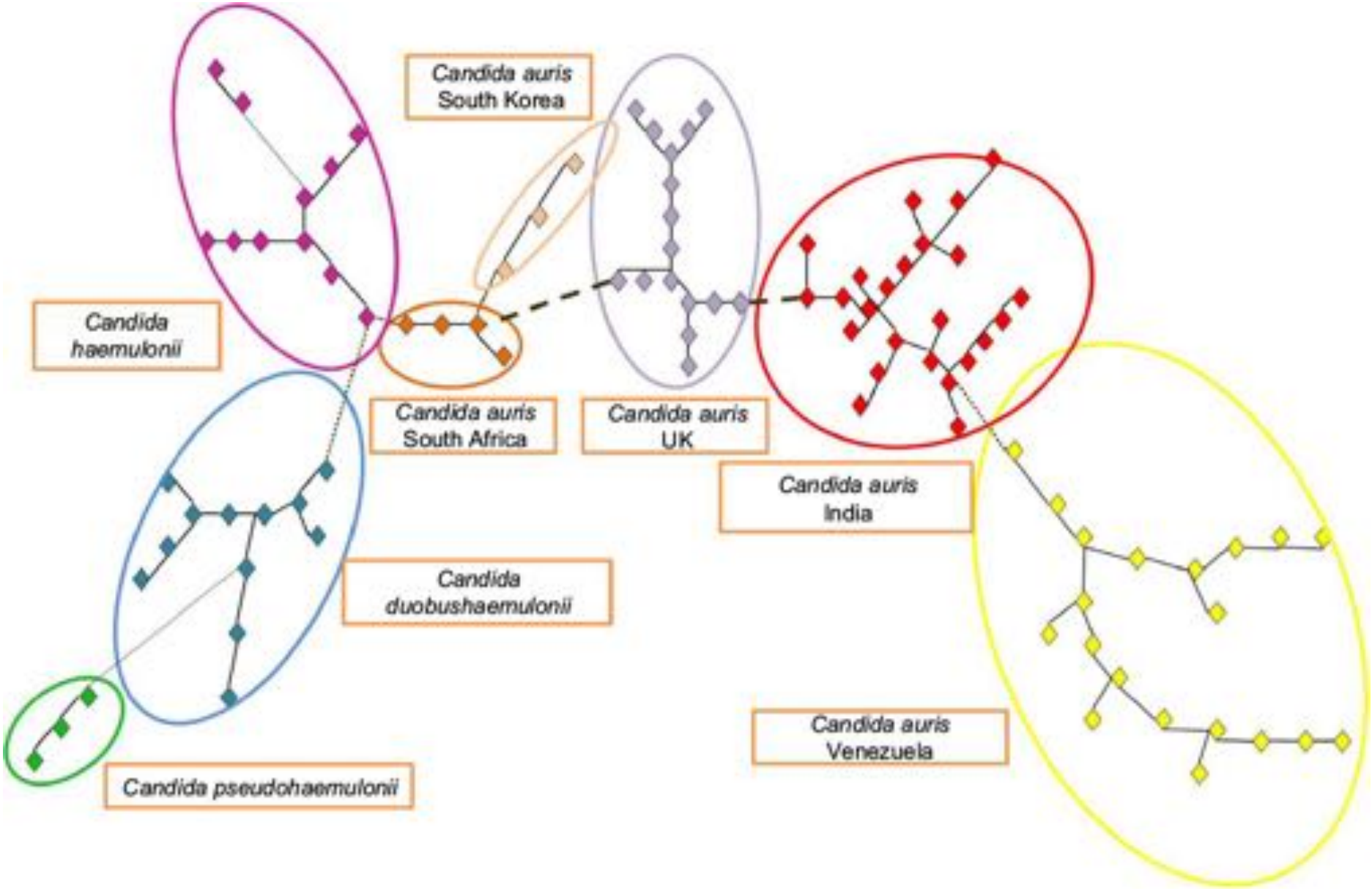
Antibiotic Resistance in the Gonococcus



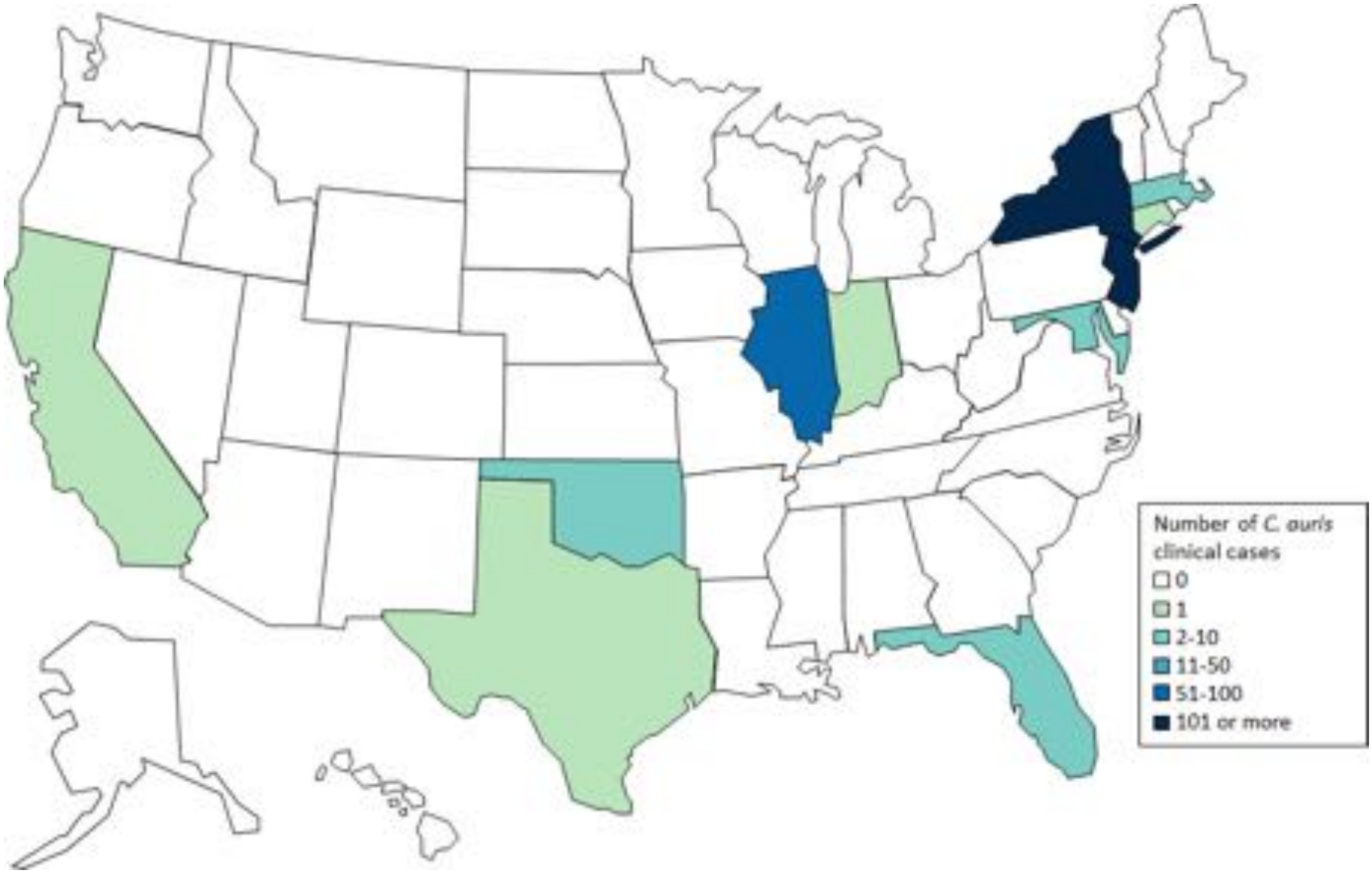
CDC

Candida auris

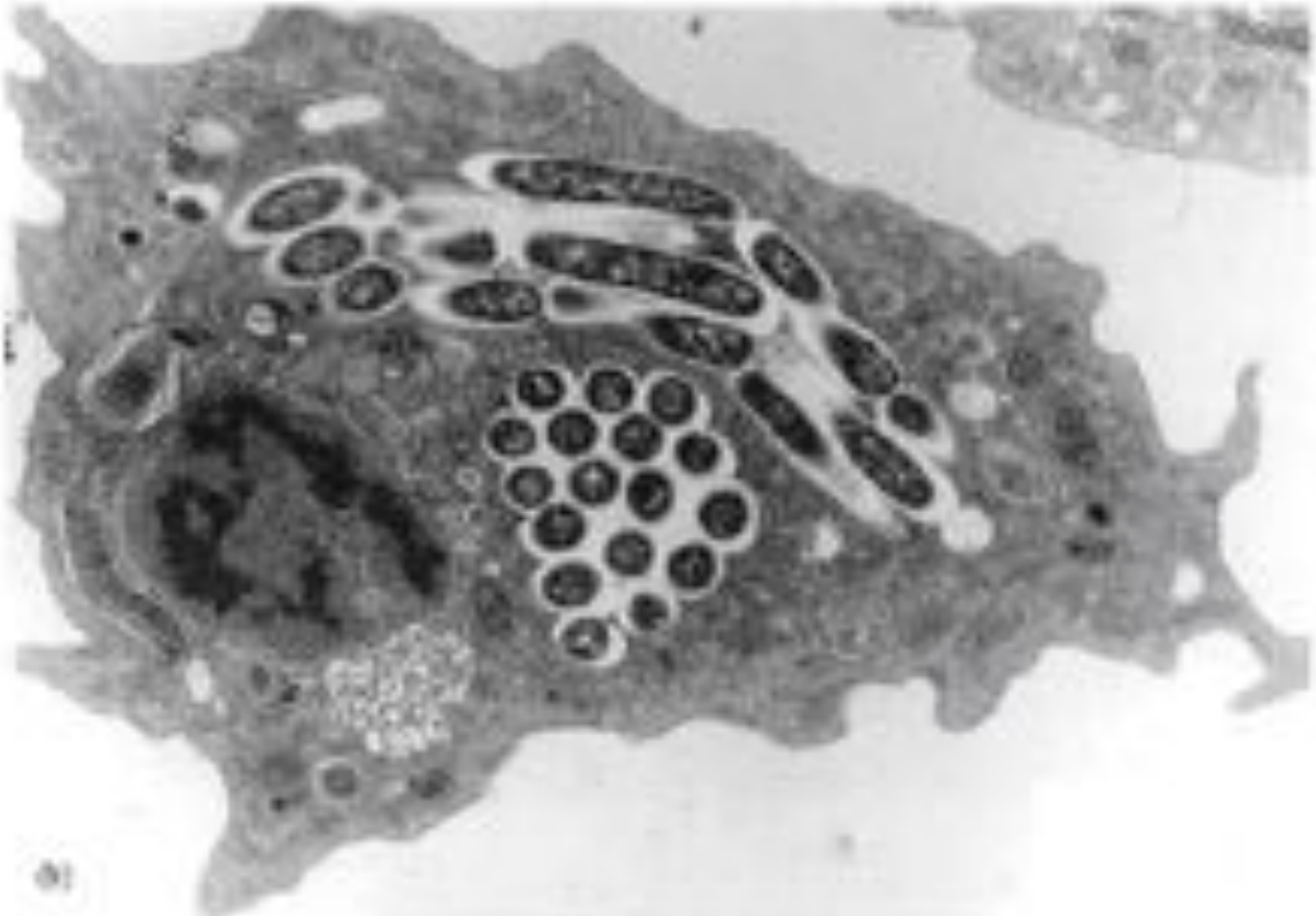
Countries from which *Candida auris* cases have been reported, as of August 31, 2018

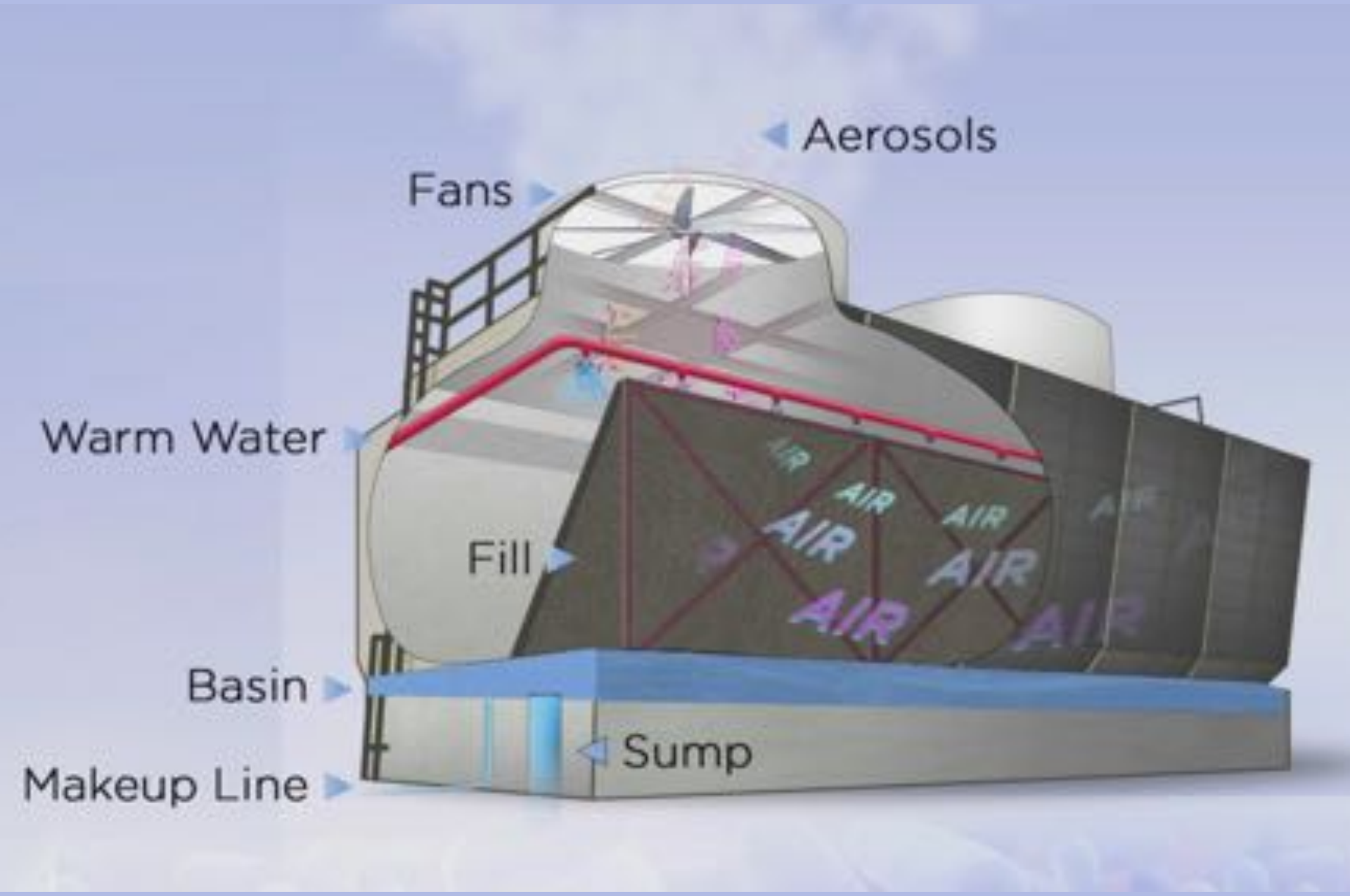

Candida auris
South Korea
Candida
haemulonii
Candida auris
South Africa
Candida auris
UK
Candida auris
India
Candida
duobushaemulonii
Candida auris
Venezuela
Candida pseudohaemulonii

Clinical cases of *Candida auris* reported by state, United States, as of August 31, 2018




GET
SMART
Know When Antibiotics Work




Aerosols
Fans
Warm Water
Fill
AIR
AIR
AIR
AIR
AIR
AIR
Basin
Sump
Makeup Line

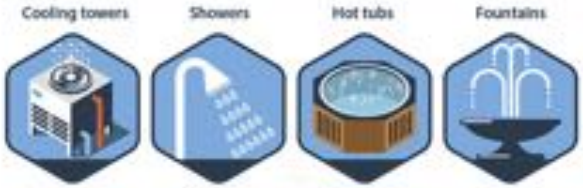
http://www.kirbylab.org/legionella-pneumophila.html

How *Legionella* affects building water systems and people

1. Internal and external factors can lead to *Legionella* growth in building water systems.

2. *Legionella* grows best in large, complex water systems that are not adequately maintained.

3. Water containing *Legionella* is aerosolized through devices.



4. People can get Legionnaires' disease when they breathe in mist or accidentally swallow water into the lungs containing *Legionella*. Those at increased risk are adults 50 years or older, current or former smokers, and people with a weakened immune system or chronic disease.

CDC

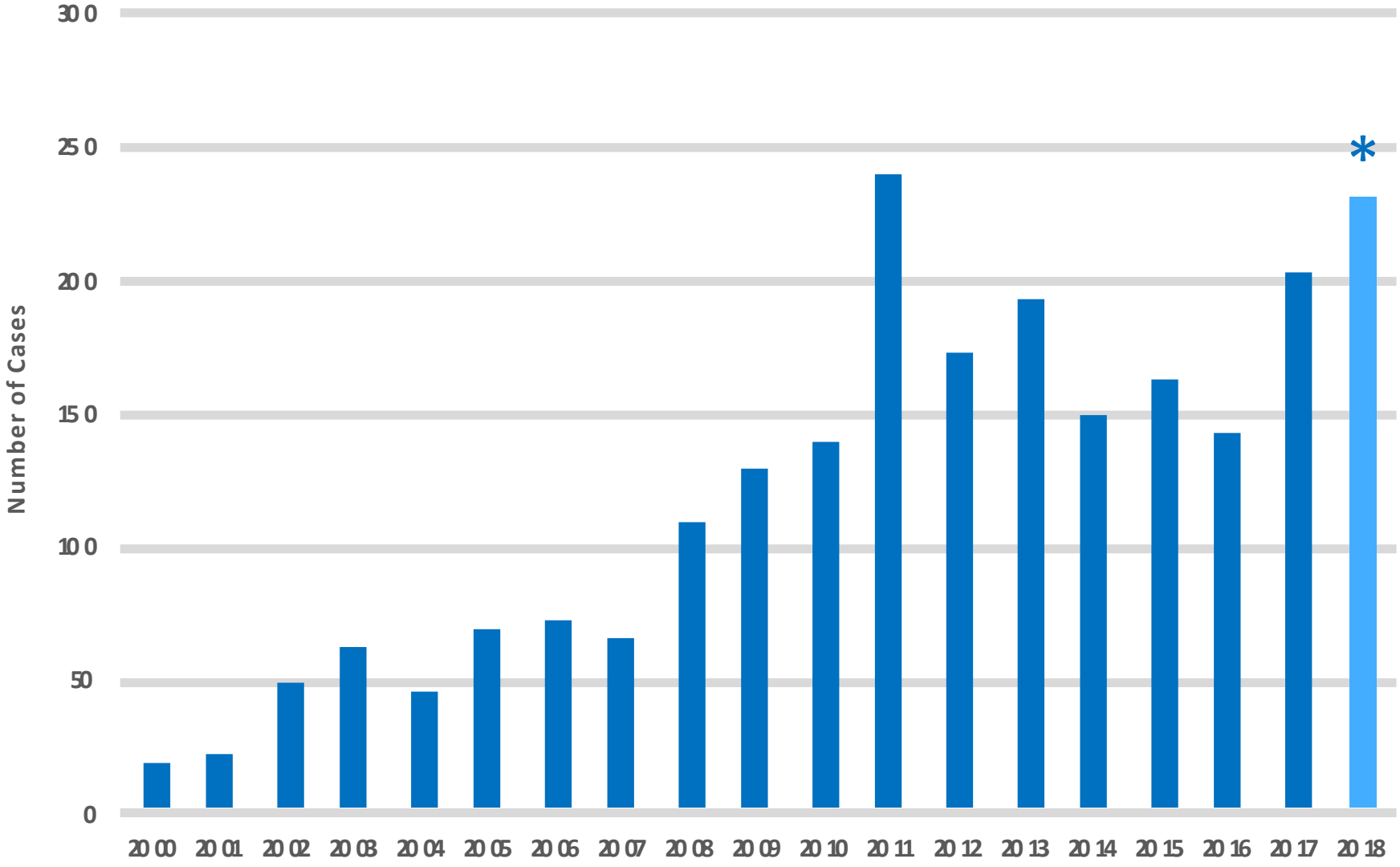
www.cdc.gov/legionella

01/12/2018

Legionnaires' Disease Is On The Rise 2000—2016*

*National Notifiable Diseases Surveillance System

Cases of Confirmed Legionellosis Reported in Massachusetts

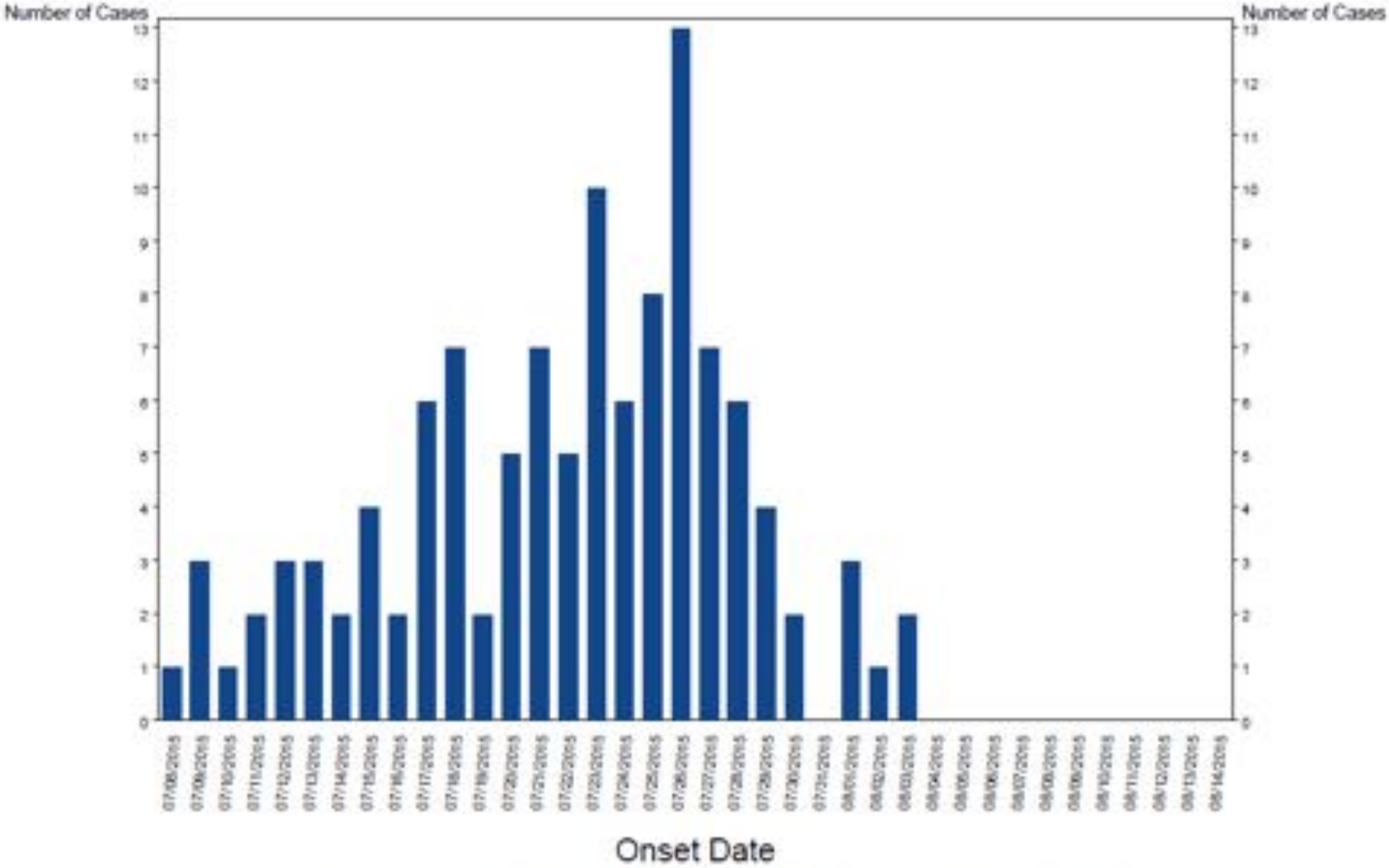


(as of October 21, 2018)*

MDPH Office of Integrated Surveillance and Informatics Services

Legionellosis Cluster in the South Bronx

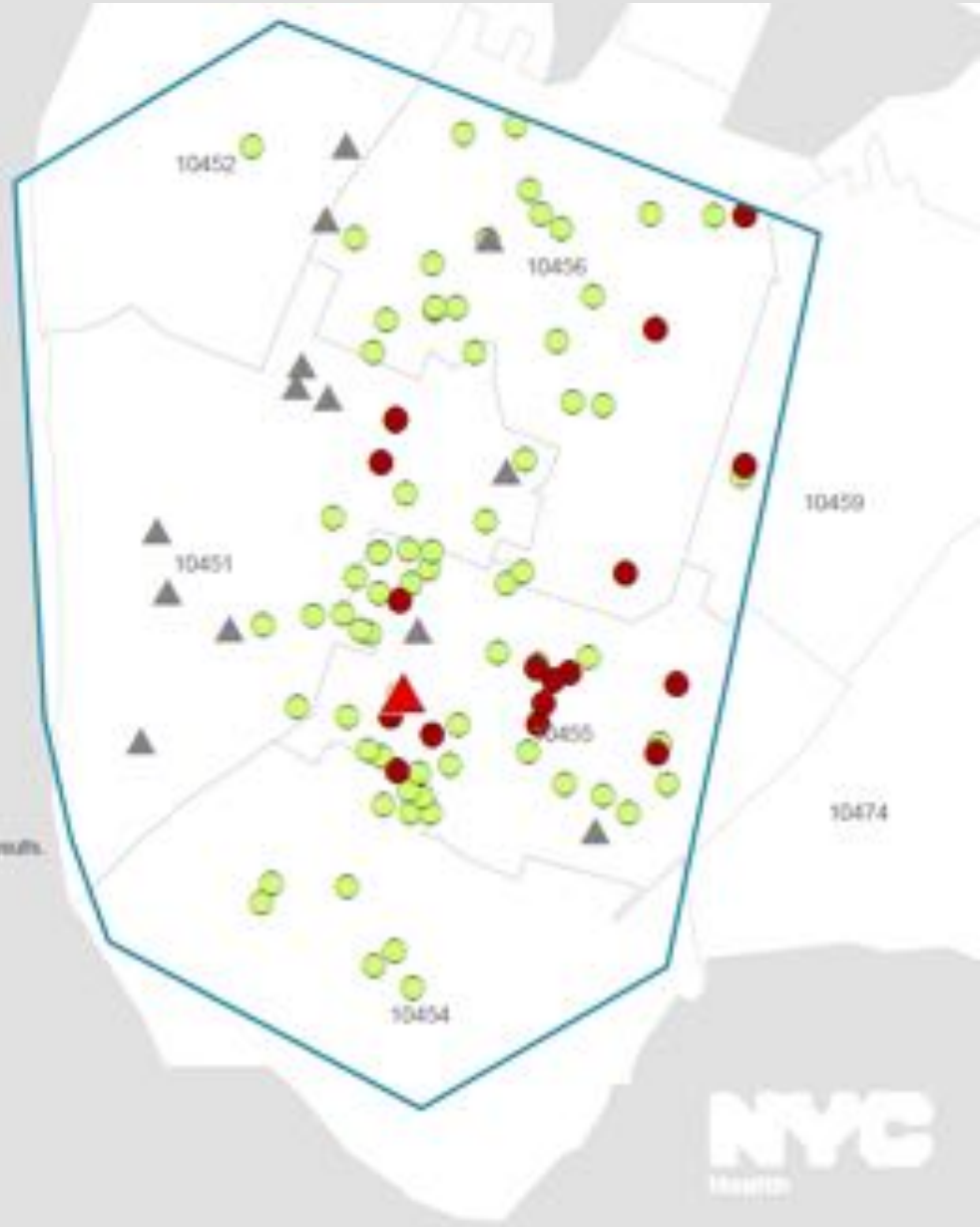
07/08/2015 - 08/14/2015, by day
Last updated 08/15/2015



Date of symptom onset obtained from patient interviews. Reporting lags may exist due to patient availability.
Case was not shown if patient was unable to be interviewed or refused.

Finding the Source

Linking Cooling Towers and Patients by DNA



Affected Area

Outbreak Pattern Found

- Opera House Hotel Cooling Tower
- Patients (with *Legionella* DNA results)*

Outbreak Pattern Not Found

- Cooling Towers†
- Patients (without *Legionella* DNA results)

*As of last update, all patient results match the outbreak pattern.

†Includes cooling towers in which the outbreak pattern could not be determined and those with pending results.

Map updated on August 20, 2015

Bronx, New York Highlighting
Affected Zip Codes

Figure 1

Confirmed cases of Legionnaires' disease by date of symptom onset, Vila Franca de Xira, Portugal, 14 October – 24 November 2014 (n = 334)

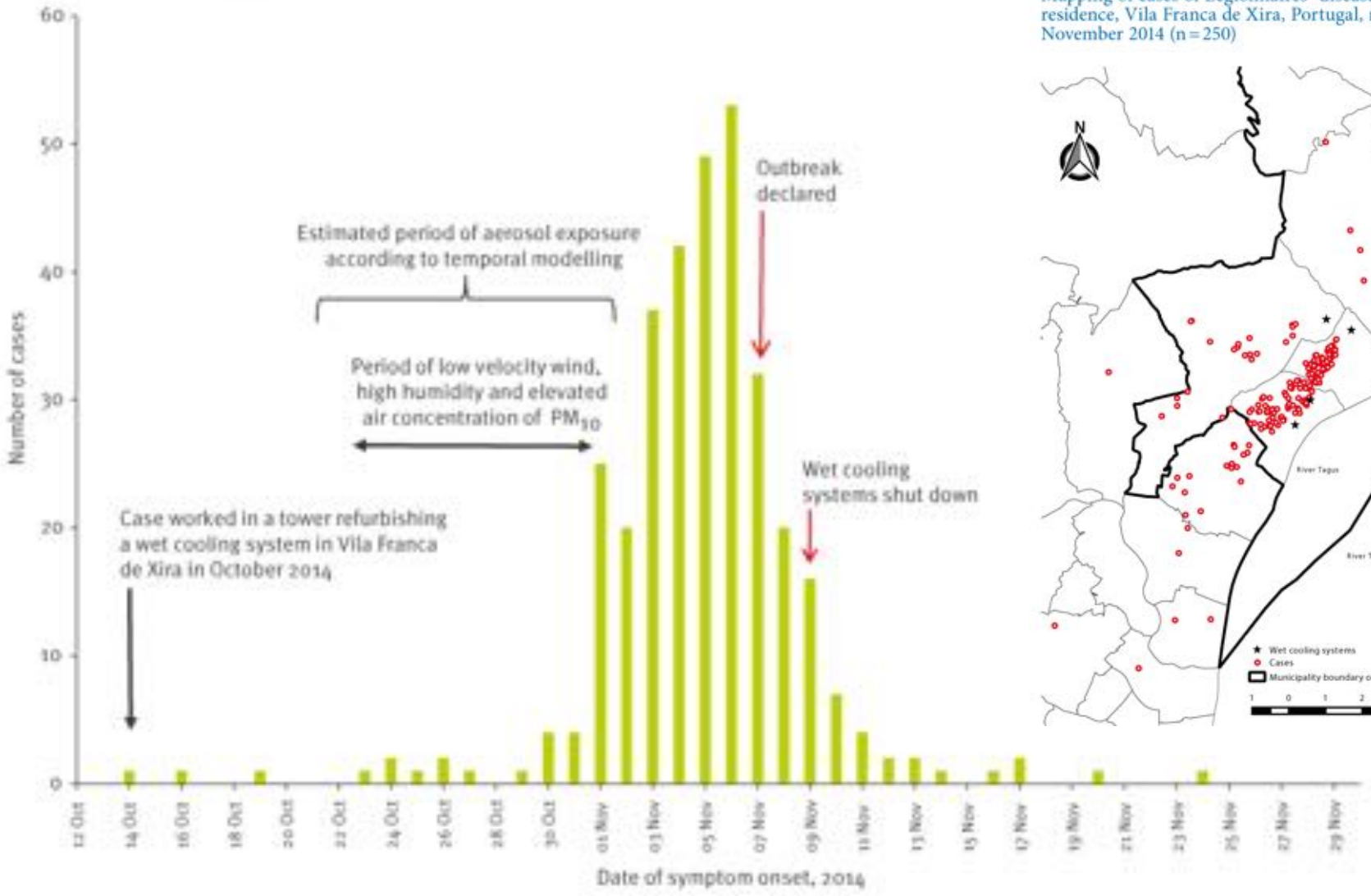
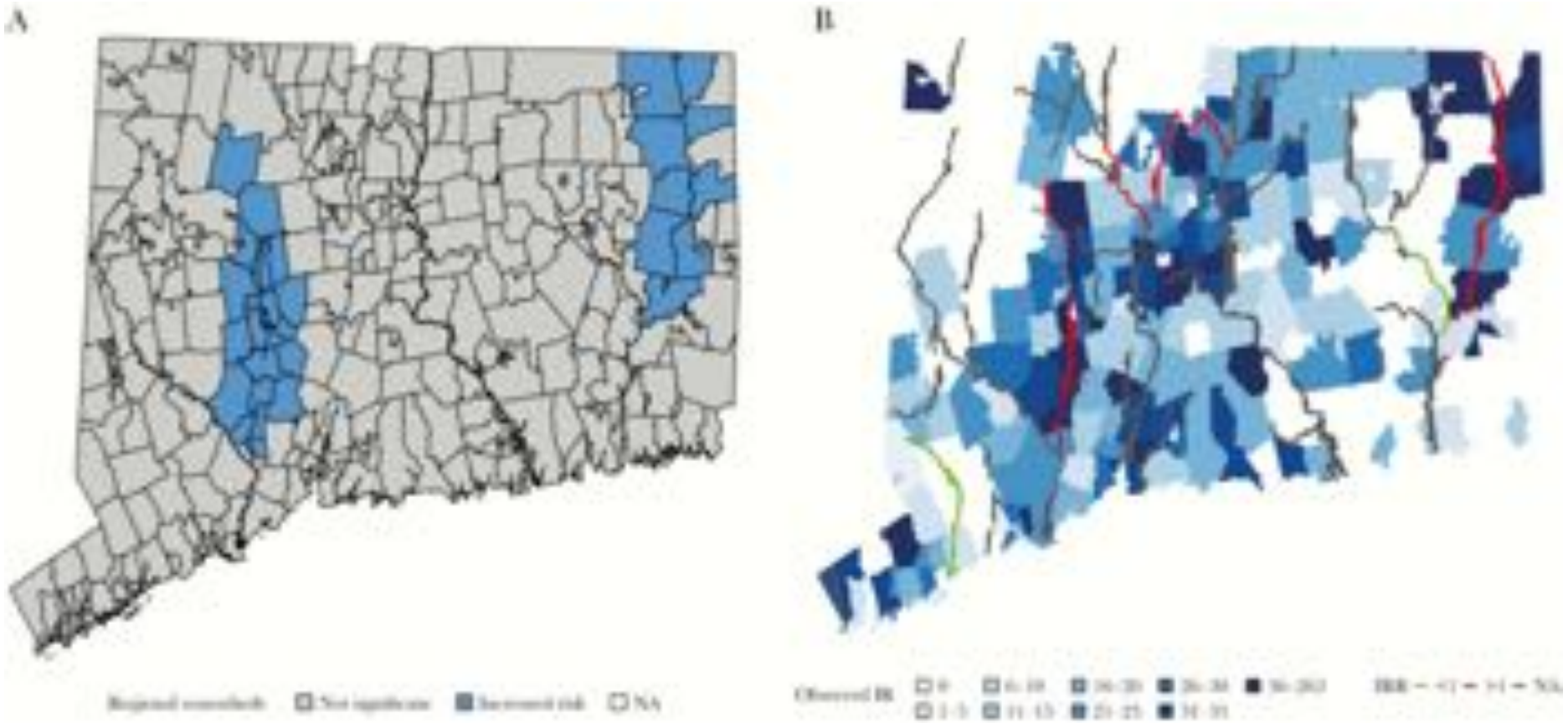


Figure 2

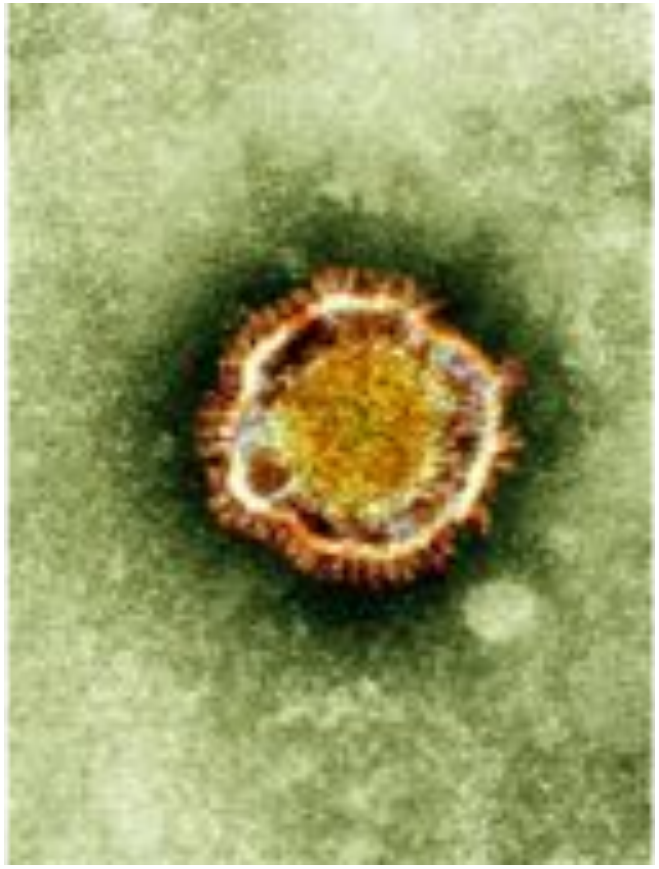
Mapping of cases of Legionnaires' disease by place of residence, Vila Franca de Xira, Portugal, notified by 14 November 2014 (n = 250)



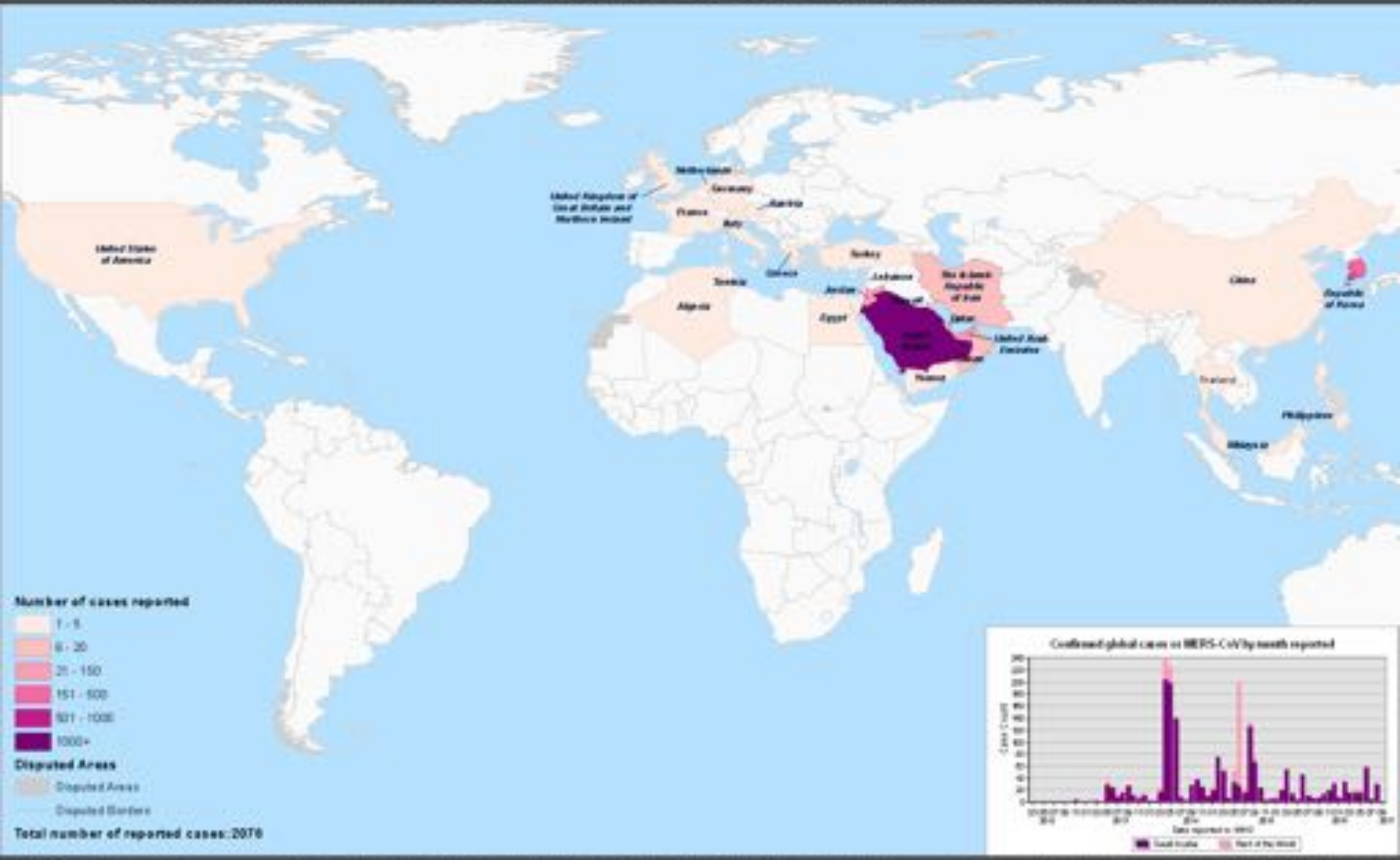
From: Association Between Sporadic Legionellosis and River Systems in Connecticut
J Infect Dis. 2017;217(2):179-187. doi:10.1093/infdis/jix531

Middle East Respiratory Syndrome

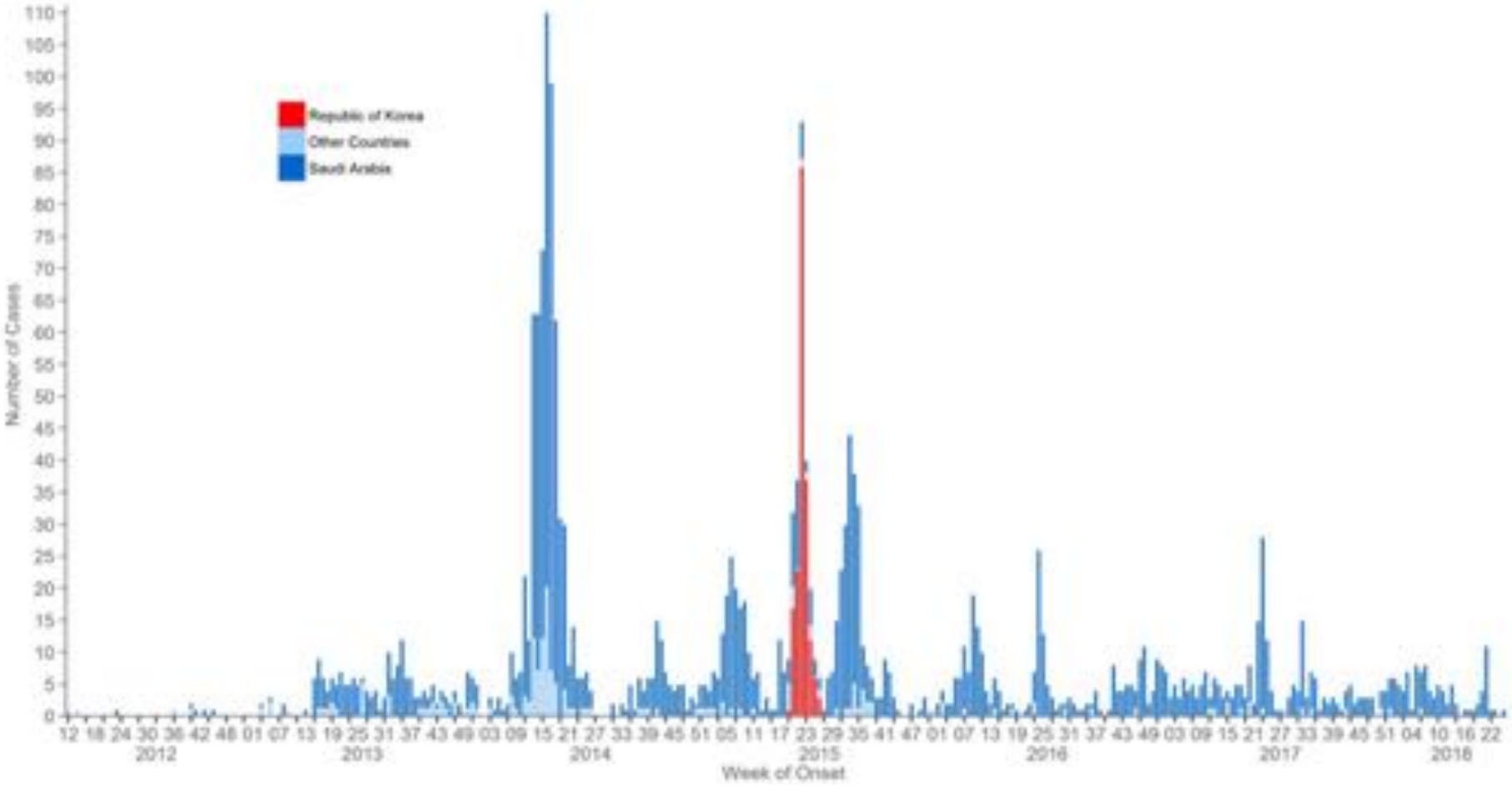
- Incubation period 5 days (2-15)
- Fever, cough, weakness, fatigue
- Pneumonia, ARDS
- Diarrhea in many cases
- Serial interval 7-8 days
- Virus in stool, vomitus and urine (~2 weeks)

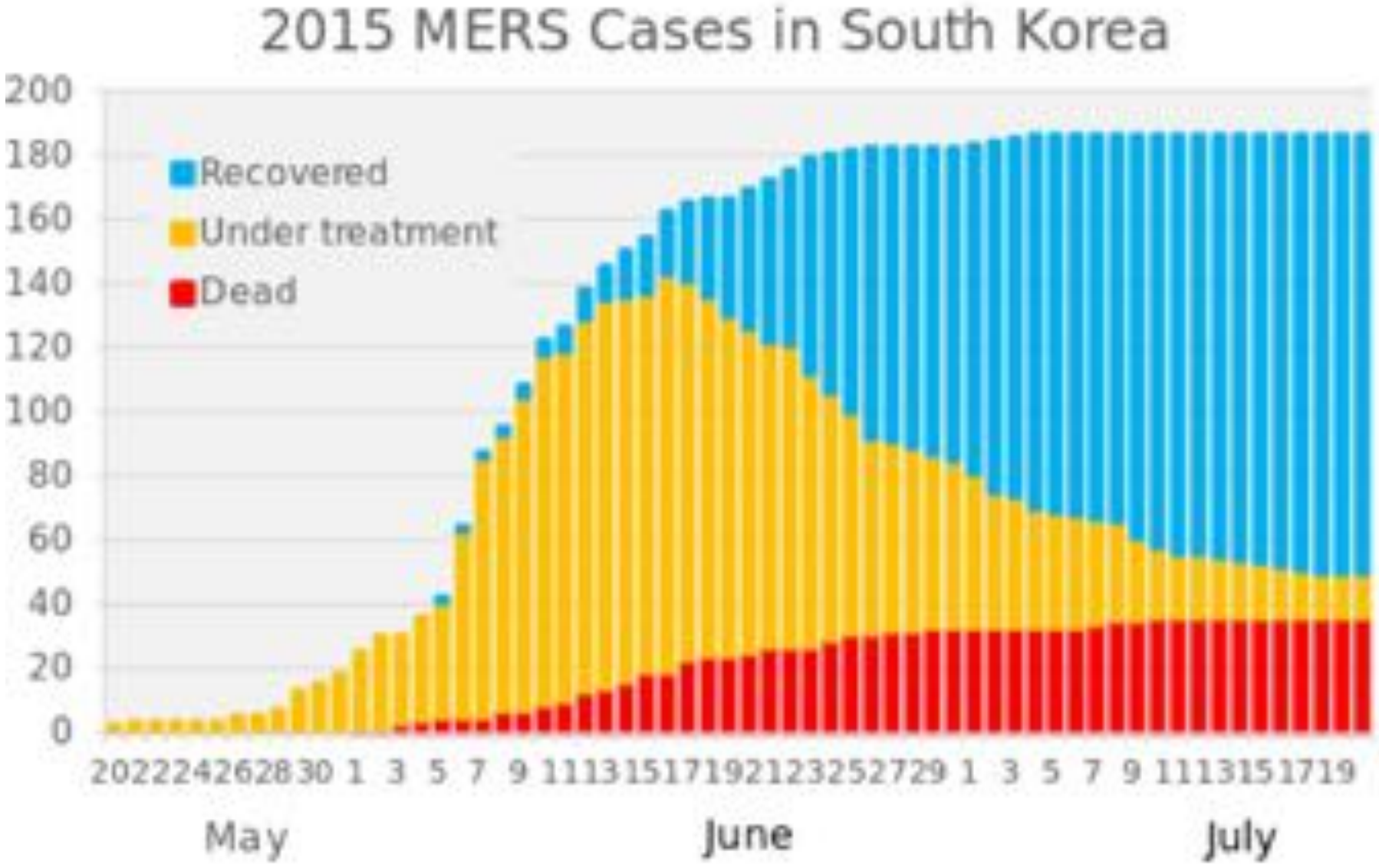


CONFIRMED GLOBAL CASES OF MERS-COV 2012 - 2017



Confirmed Global Cases of MERS-CoV (as of August 2018)

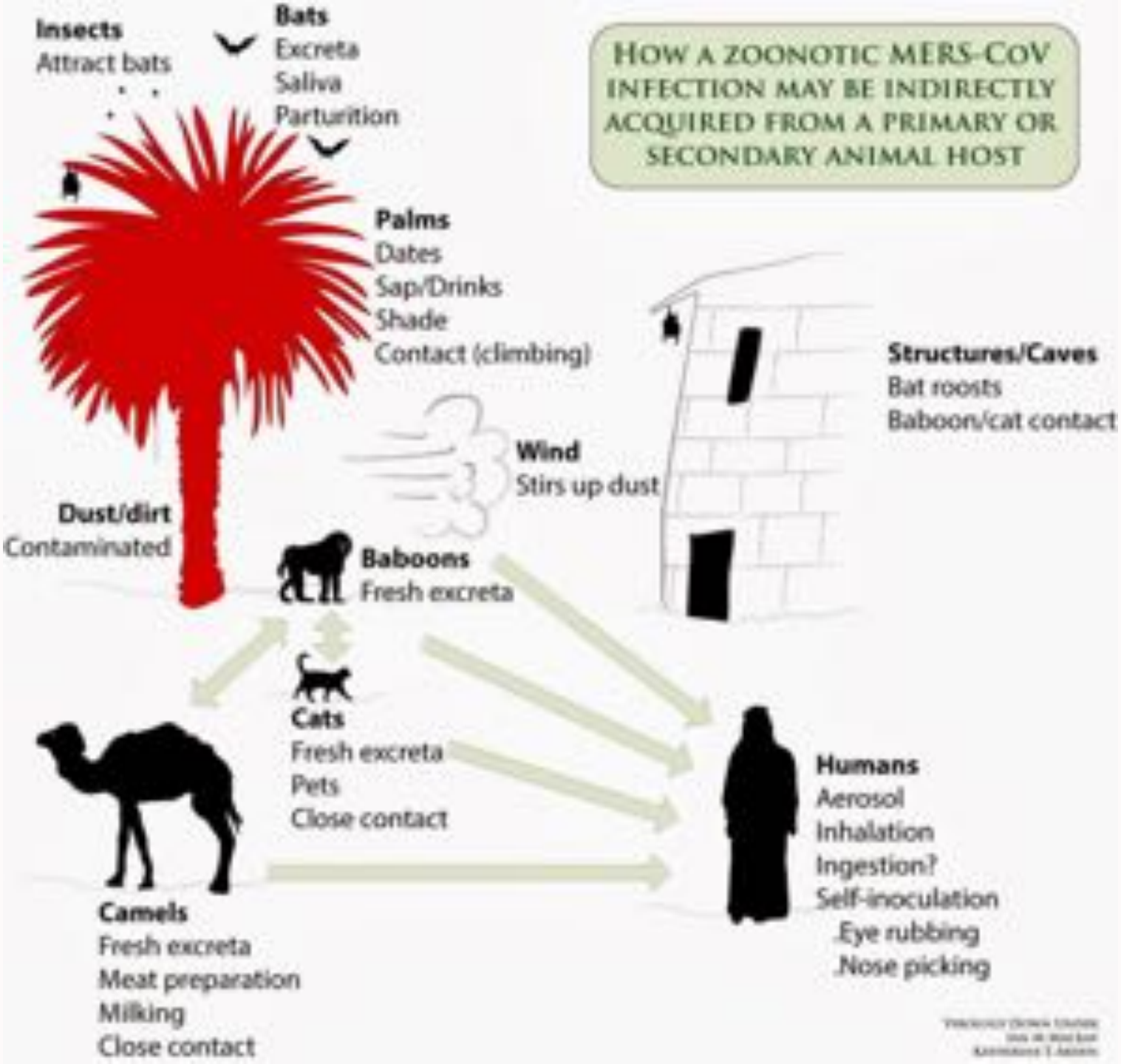



2015 MERS Cases in South Korea
200
180
160
140
120
100
80
60
40
20
0
Recovered
Under treatment
Dead
20 22 24 26 28 30 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 1 3 5 7 9 11 13 15 17 19
May
June
July

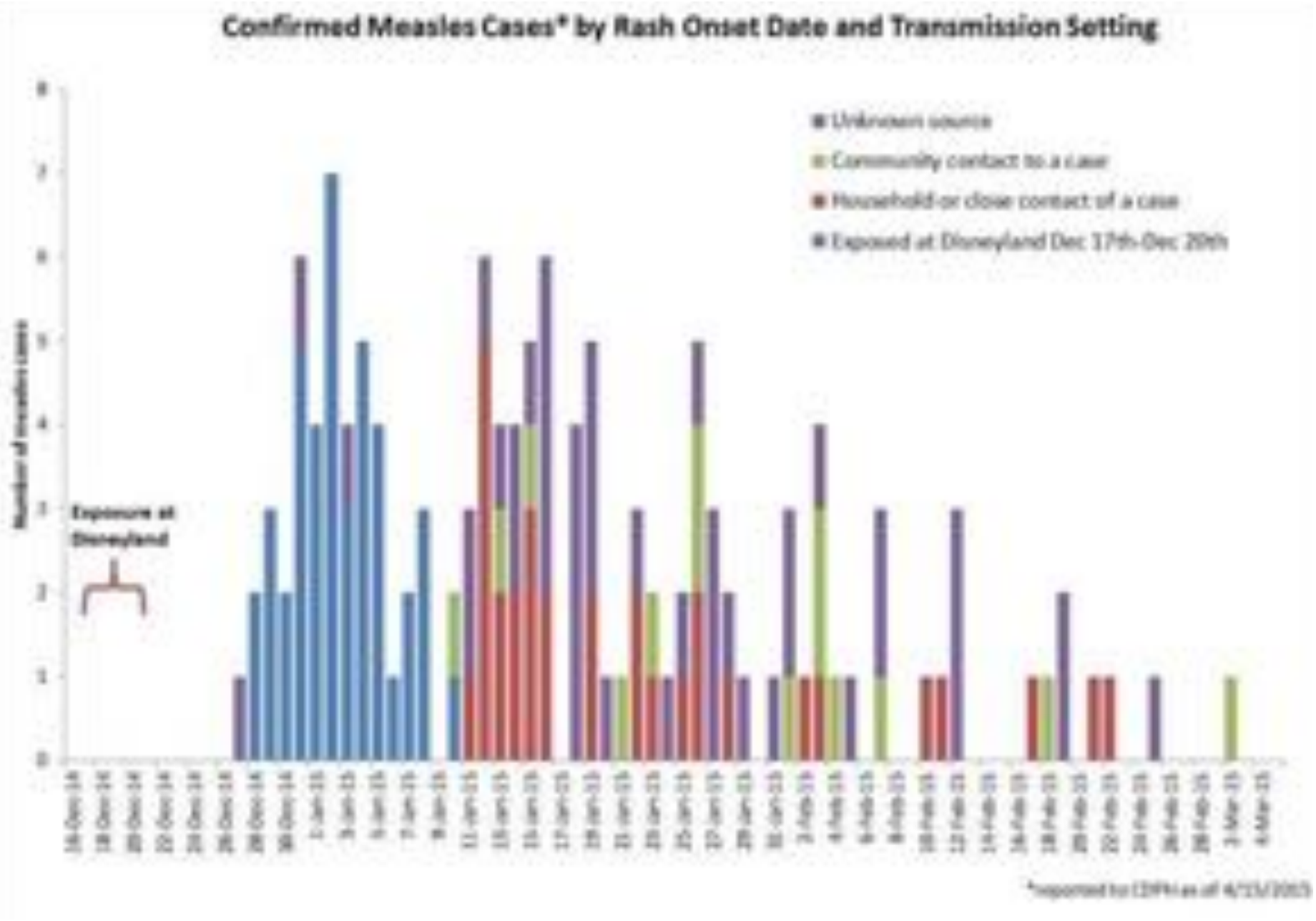

The MERS virus
If you have s
put on a
get to a
Fever AND symptoms of respiratory illness
Fever OR symptoms of respiratory illness
with a confirmed MERS case while the case
서울대학교병원
DANGER


ADVANCED
MEDICAL
POST


MERS CoV and closely related strains isolated in Africa, Europe, South America and East Asia, as well as in the Middle East

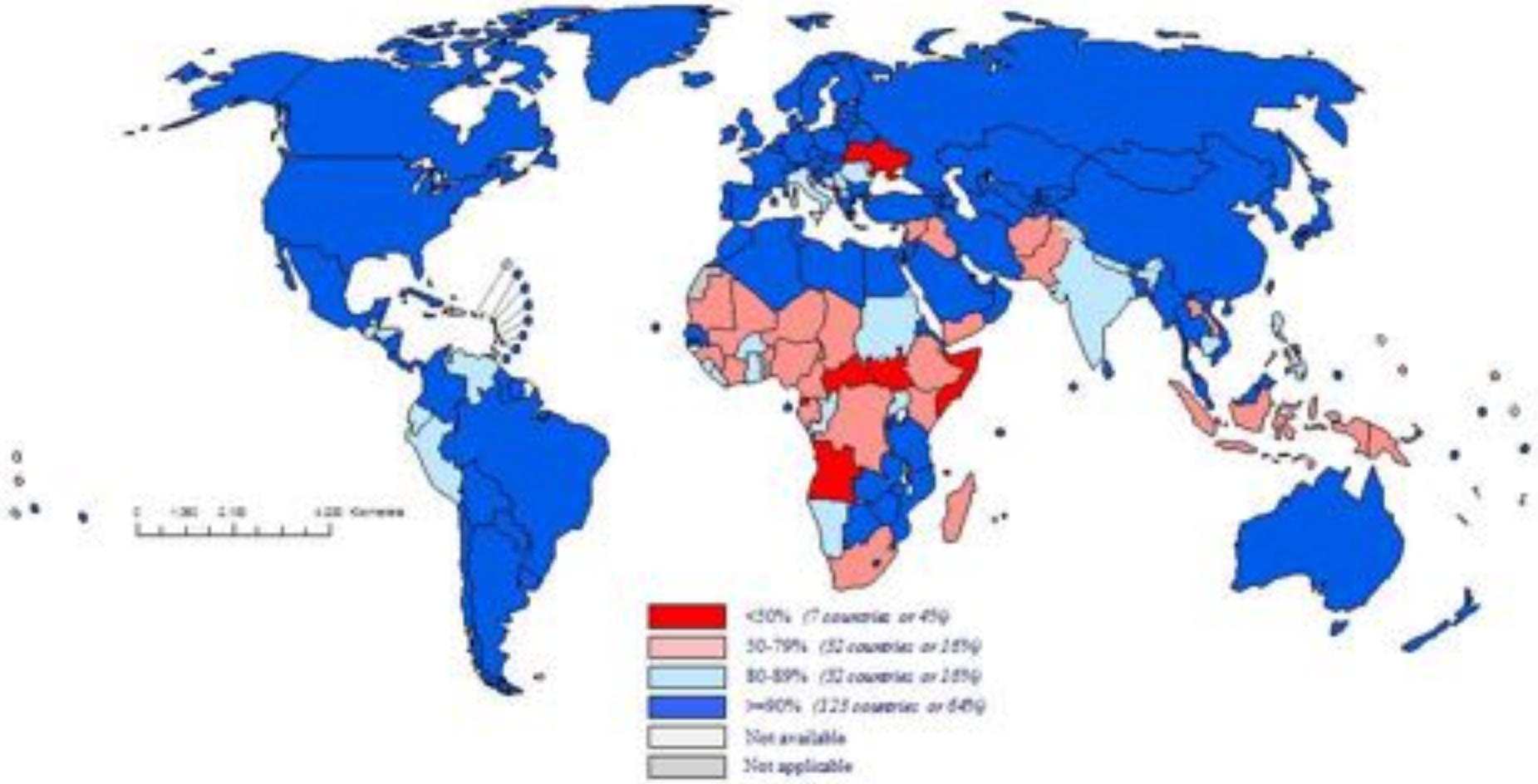

How a zoonotic MERS-CoV infection may be indirectly acquired from a primary or secondary animal host
Insects
Attract bats
Bats
Excreta
Saliva
Parturition
Palms
Dates
Sap/Drinks
Shade
Contact (climbing)
Structures/Caves
Bat roosts
Baboon/cat contact
Wind
Stirs up dust
Dust/dirt
Contaminated
Baboons
Fresh excreta
Cats
Fresh excreta
Pets
Close contact
Humans
Aerosol
Inhalation
Ingestion?
Self-inoculation
Eye rubbing
Nose picking
Camels
Fresh excreta
Meat preparation
Milking
Close contact


CNN
News Video TV Opinions More...
DISNEYLAND MEASLES OUTBREAK SPREADS
Washington
Oregon
Nevada
California
Utah
Colorado
Nebraska
Arizona
MEXICO
MEASLES OUTBREAK
DEADLY VIRUS BLAMED ON ANTI-VACCINE MOVEMENT
CNN
OUTFRONT


Confirmed Measles Cases* by Rash Onset Date and Transmission Setting
Unknown source
Community contact to a case
Household or close contact of a case
Exposed at Disneyland Dec 17th-Dec 20th
Exposure at Disneyland
*reported to CDPH as of 4/21/2015


NJ
DE
DC
Non-Disney import-associated (n = 43)
Disney import-associated (n = 111)
Unknown source (n = 5)

Immunization coverage with 1st dose of measles containing vaccines in infants, 2016



Source: WHO/UNICEF coverage estimates 2016 revision, July 2017.
Map production: Immunization, Vaccines and Biologicals, (IVB), World Health Organization. 194 WHO Member States.
Date of slide: 19 July 2017

Factors in U.S. Measles Introduction and Transmission

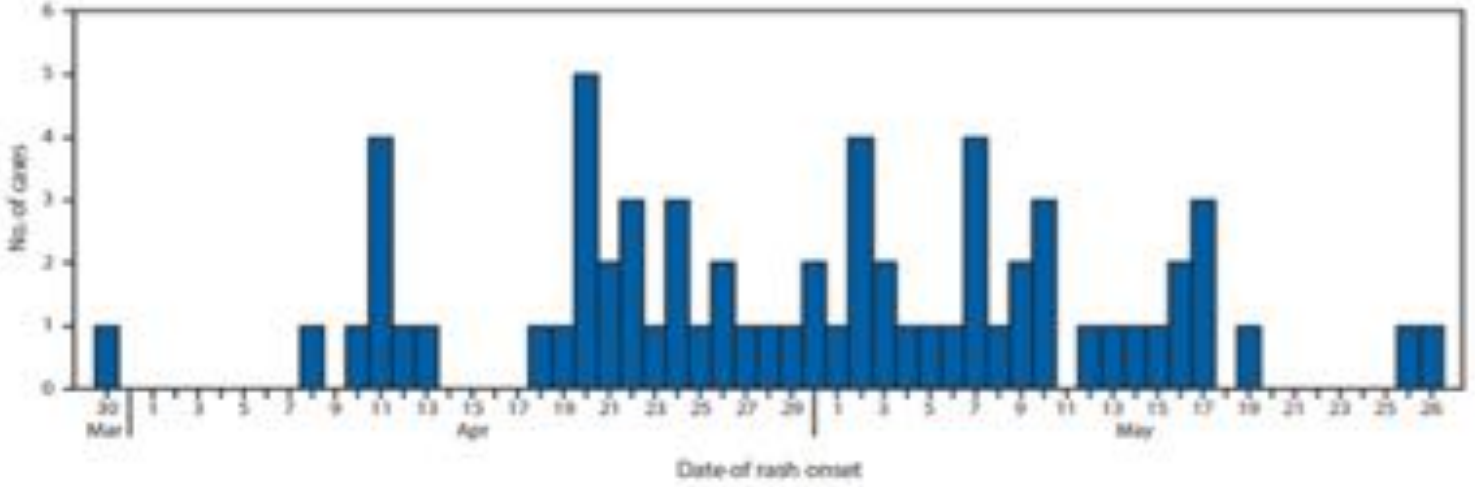
- The majority of people who got measles were unvaccinated
- Measles is still common in many parts of the world including some countries in Europe, Asia, the Pacific, and Africa
- Travelers with measles continue to bring the disease into the U.S.
- Measles can spread when it reaches a community in the U.S. where groups of people are unvaccinated

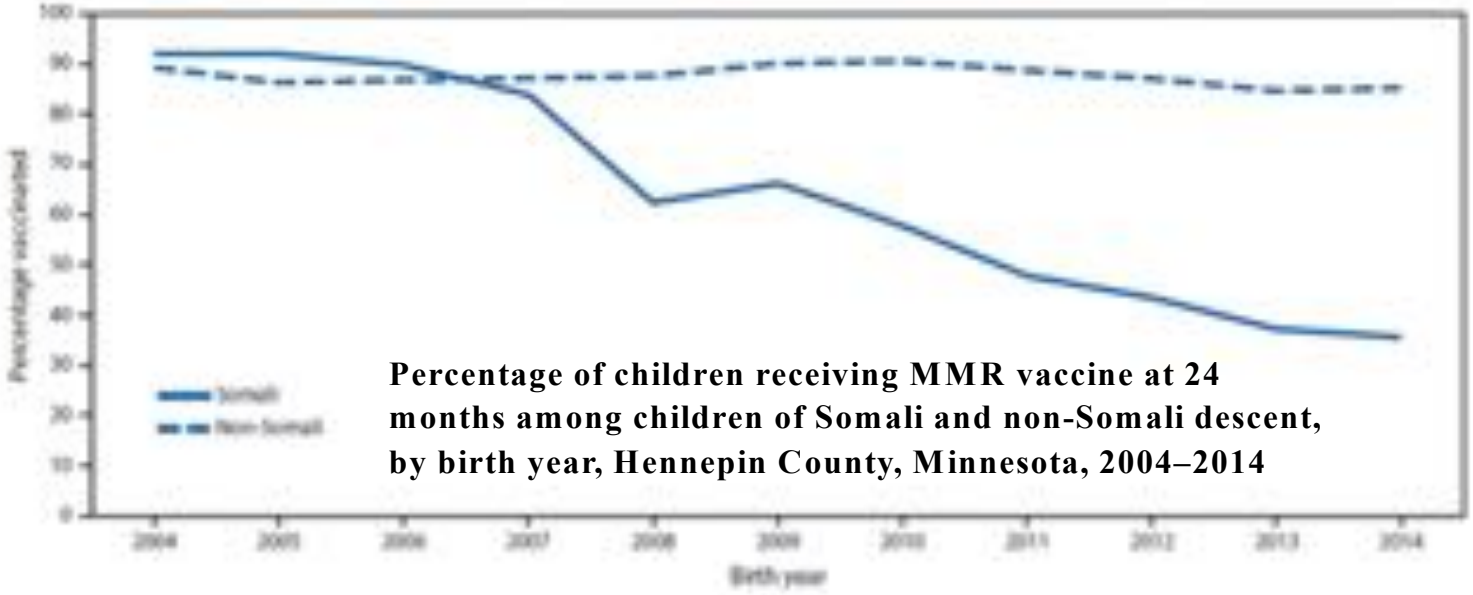
Measles Outbreak, Minnesota April–May 2017

Number of measles cases (N = 65) by date of rash onset

Sixty-two (95%) cases were identified in unvaccinated persons, including 50 (77%) in children aged ≥12 months

U.S.-born children of Somali descent (Somali children) accounted for 55 (85%) of the cases

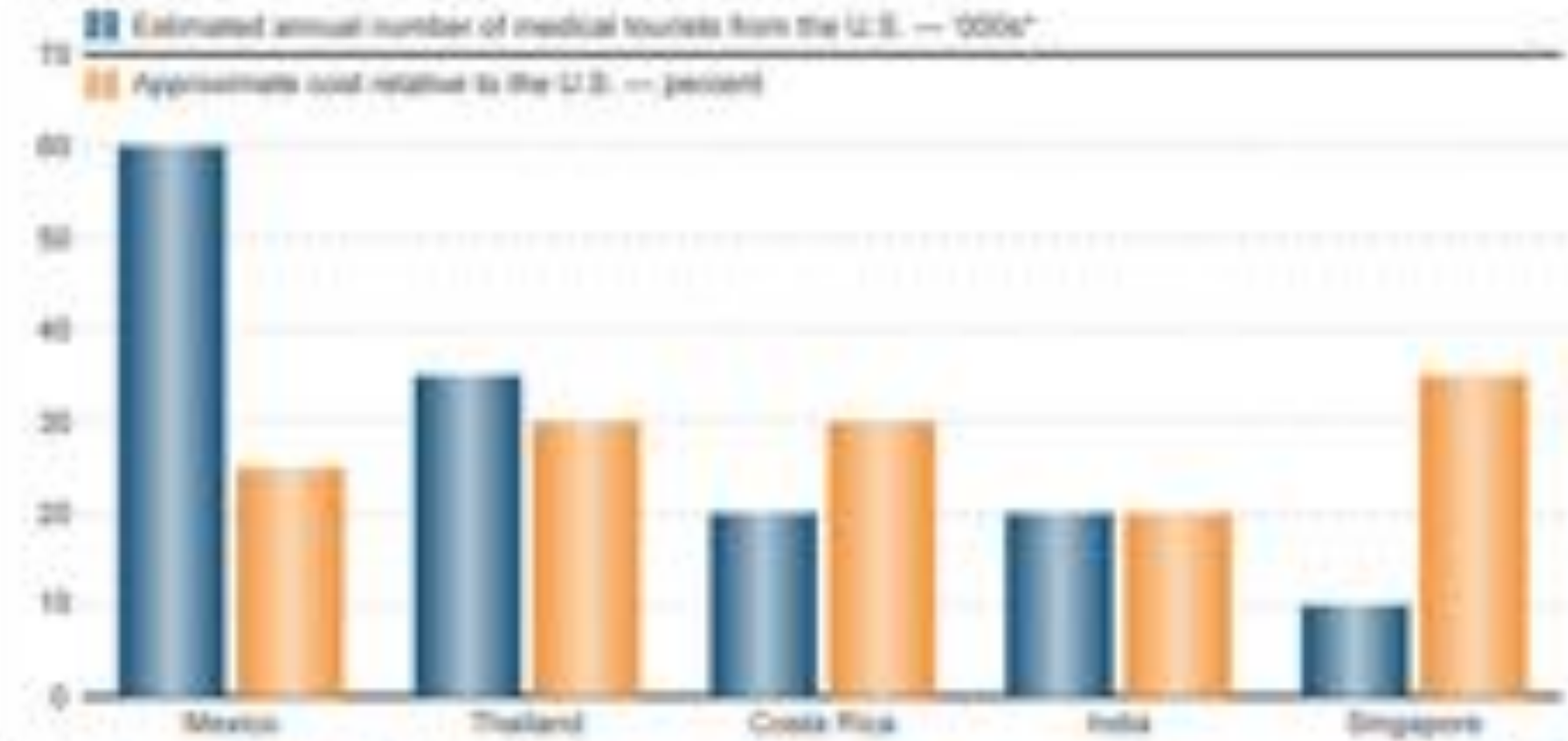




Percentage of children receiving MMR vaccine at 24 months among children of Somali and non-Somali descent, by birth year, Hennepin County, Minnesota, 2004–2014

Medical tourism by country

Five of the countries visited most often for medical treatment

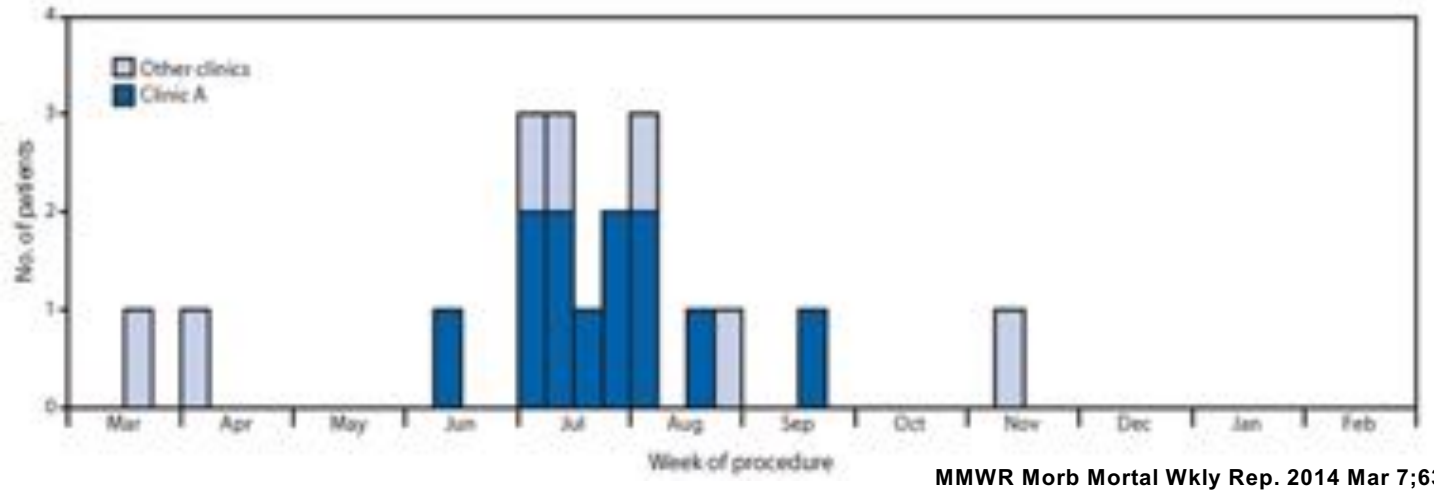


* Estimates are rough; most patients are not tracked

Sources: Deloitte, Josef Woodman (consultant and author of Patients Without Borders)

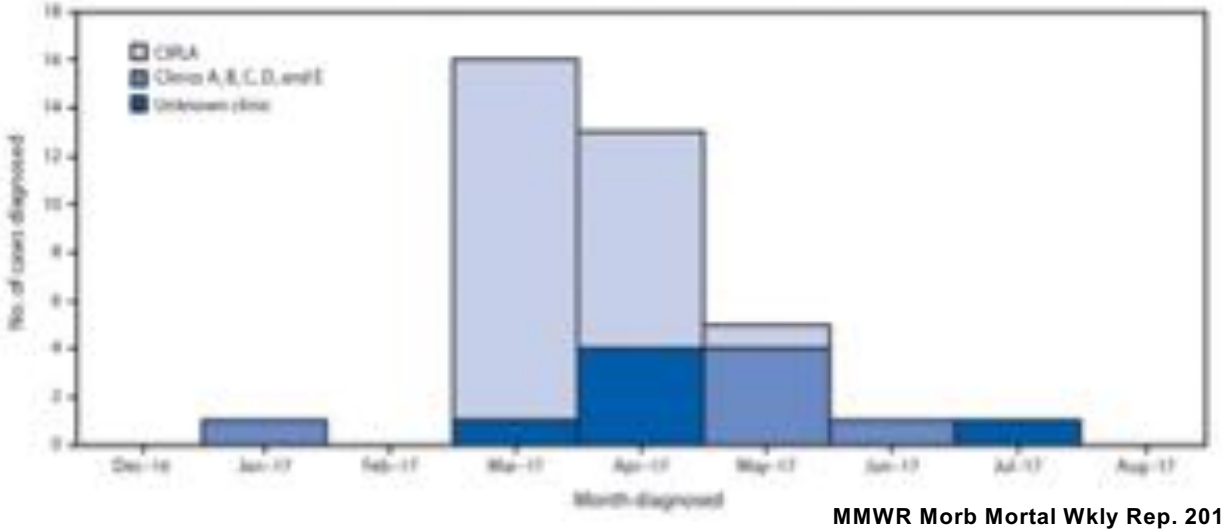
REUTERS

U.S. patients with rapidly growing nontuberculous *Mycobacterium* infections associated with cosmetic surgery in the Dominican Republic, 2013–2014

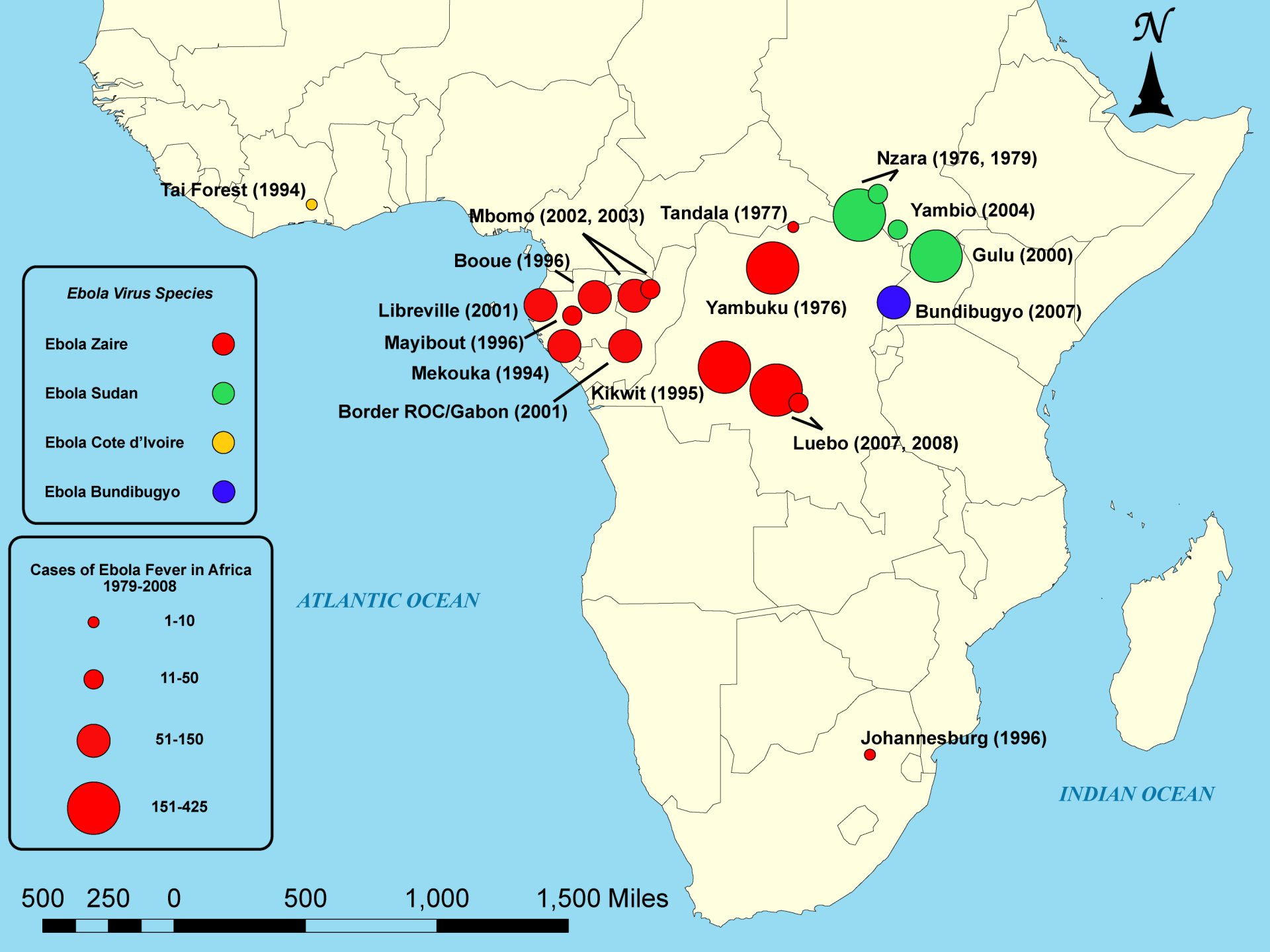


MMWR Morb Mortal Wkly Rep. 2014 Mar 7;63(9):201-2.

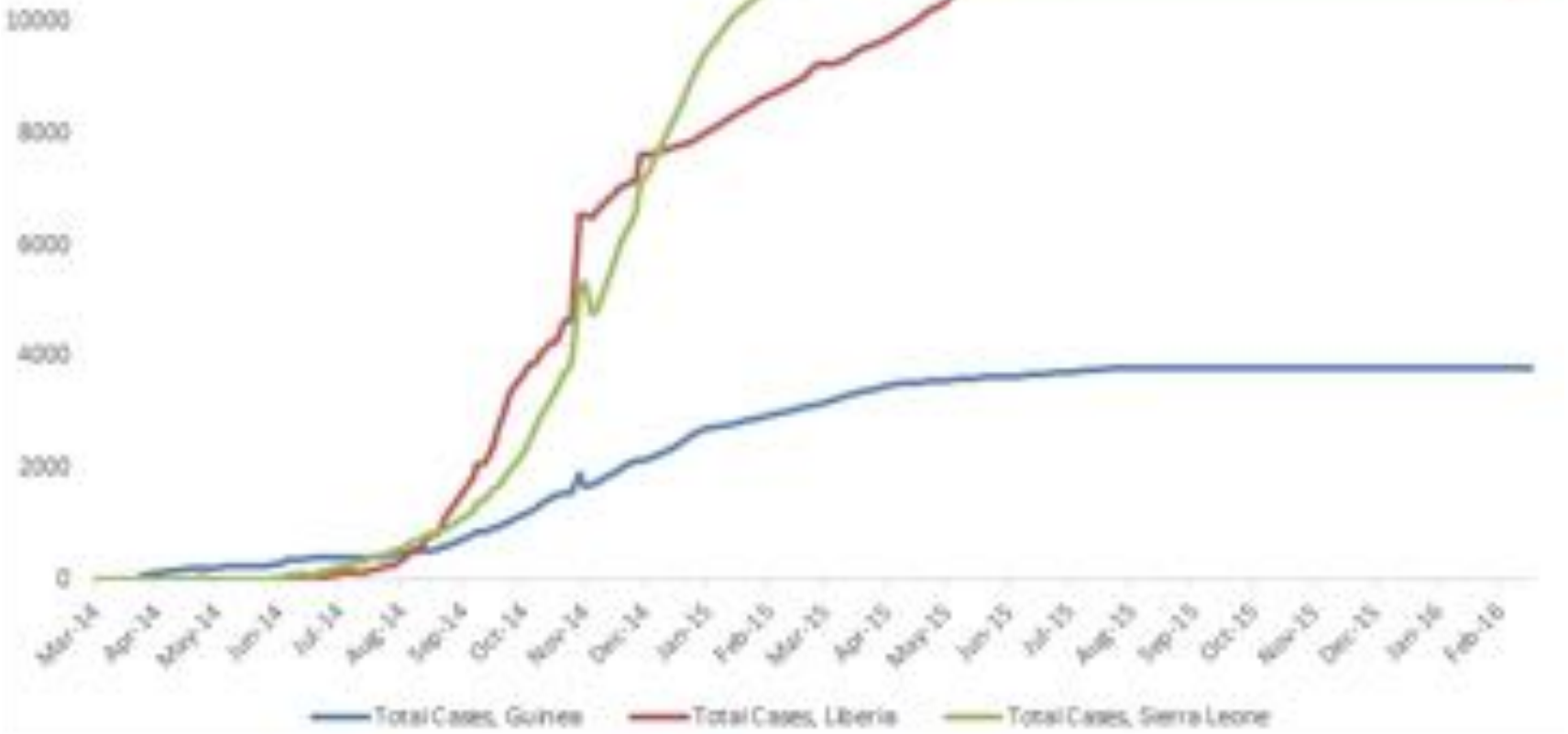
Nontuberculous mycobacteria infections associated with cosmetic surgery among U.S. medical tourists, by clinic and month of procedure — Dominican Republic, January–July 2017



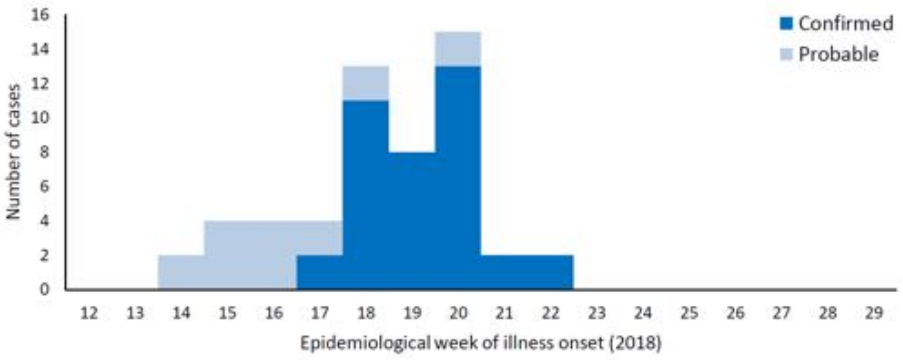
MMWR Morb Mortal Wkly Rep. 2018 Mar 30;67(12);369–370.


N
Nzara (1976, 1979)
Tai Forest (1994)
Mbomo (2002, 2003)
Tandala (1977)
Yambio (2004)
Booue (1996)
Gulu (2000)
Libreville (2001)
Yambuku (1976)
Bundibugyo (2007)
Mayibout (1996)
Mekouka (1994)
Kikwit (1995)
Border ROC/Gabon (2001)
Luebo (2007, 2008)
Johannesburg (1996)
ATLANTIC OCEAN
INDIAN OCEAN
Ebola Virus Species
Ebola Zaire
Ebola Sudan
Ebola Cote d'Ivoire
Ebola Bundibugyo
Cases of Ebola Fever in Africa 1979-2008
1-10
11-50
51-150
151-425
500 250 0 500 1,000 1,500 Miles

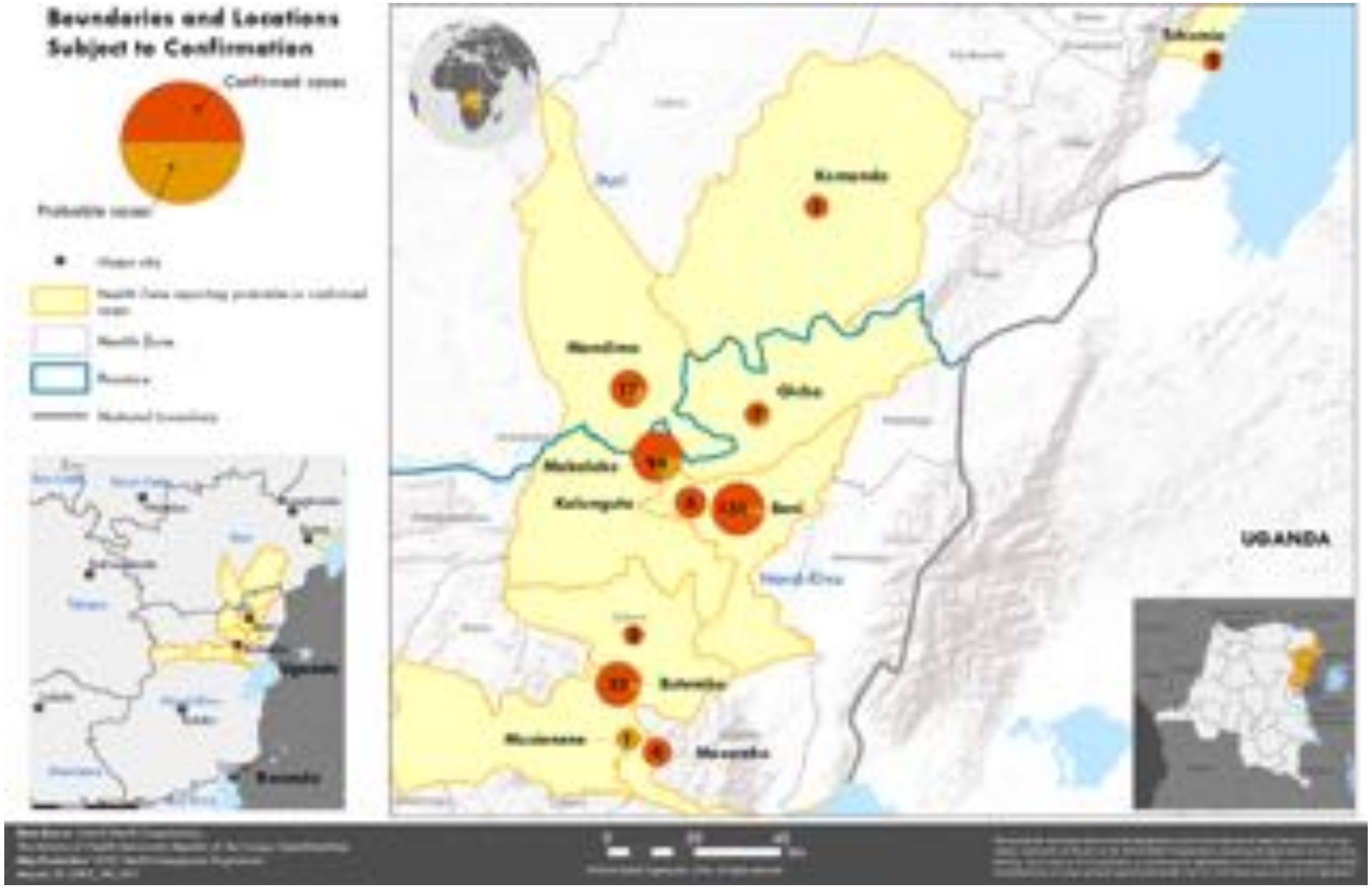

Guinea-Bissau
Guinea
Mali
Sierra Leone
Côte d'Ivoire
Liberia


10000
8000
6000
4000
2000
0
Mar-14
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Total Cases, Guinea
Total Cases, Liberia
Total Cases, Sierra Leone

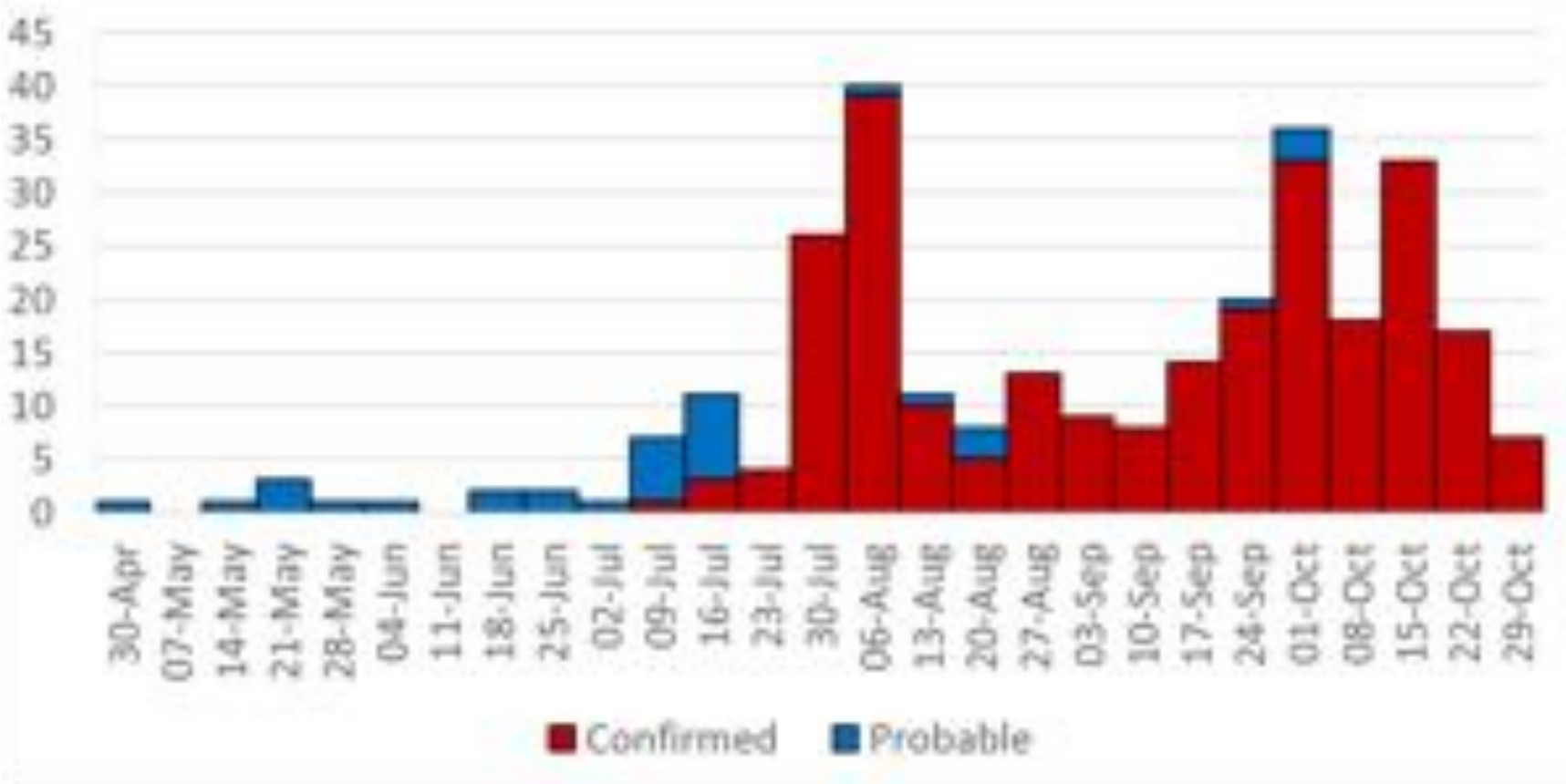
Ebola, Équateur Province, Democratic Republic of the Congo, April-July 2018



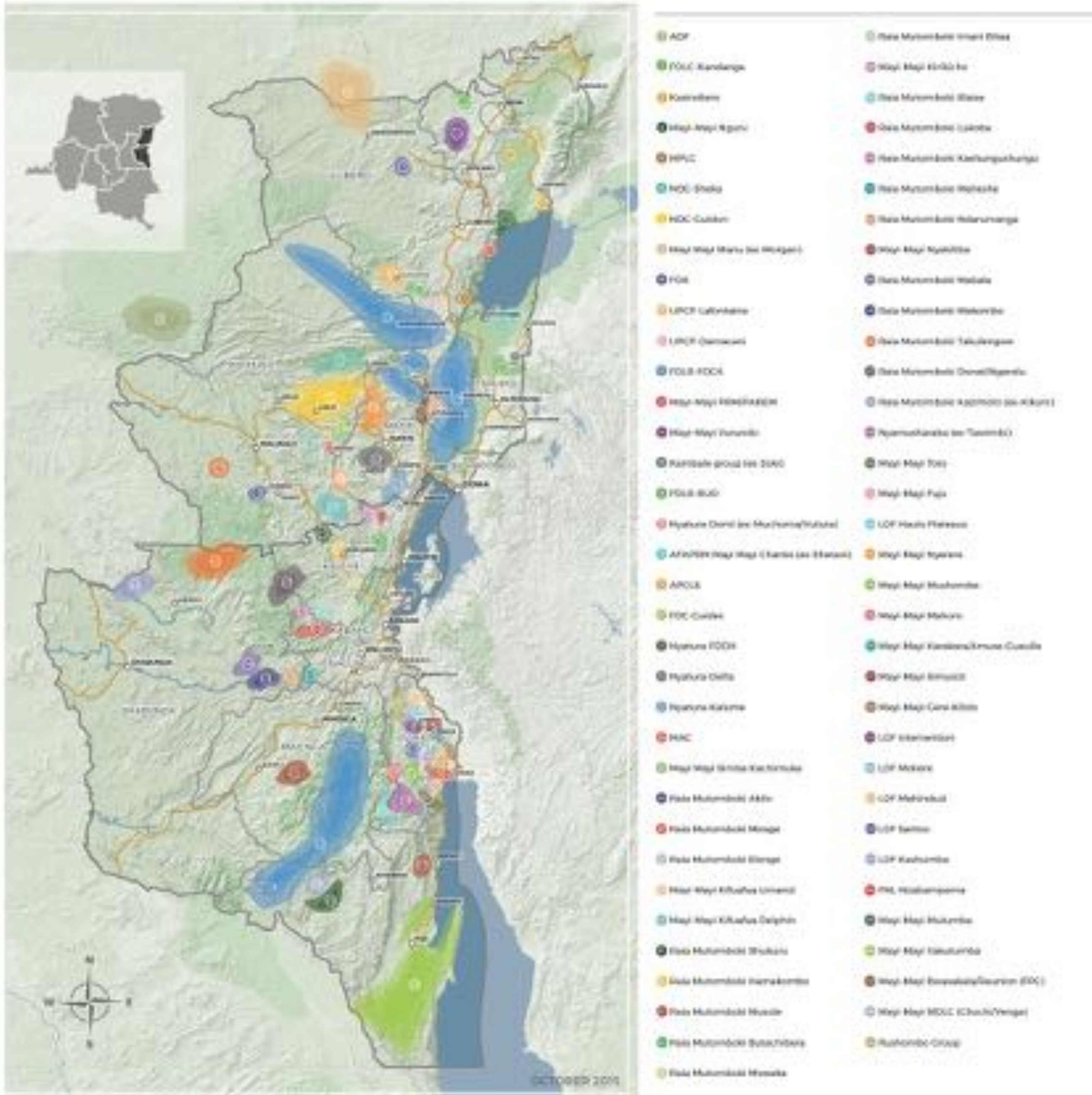
Cases	Deaths	CFR
54	33	61%


Boundaries and Locations
Subject to Confirmation
Confirmed cases
Probable cases
Kamonda
Mandima
Oicha
Mutwanga
Kalunguta
Beni
Butembo
Musienene
Mangurejipa
Uganda
Rwanda
UGANDA

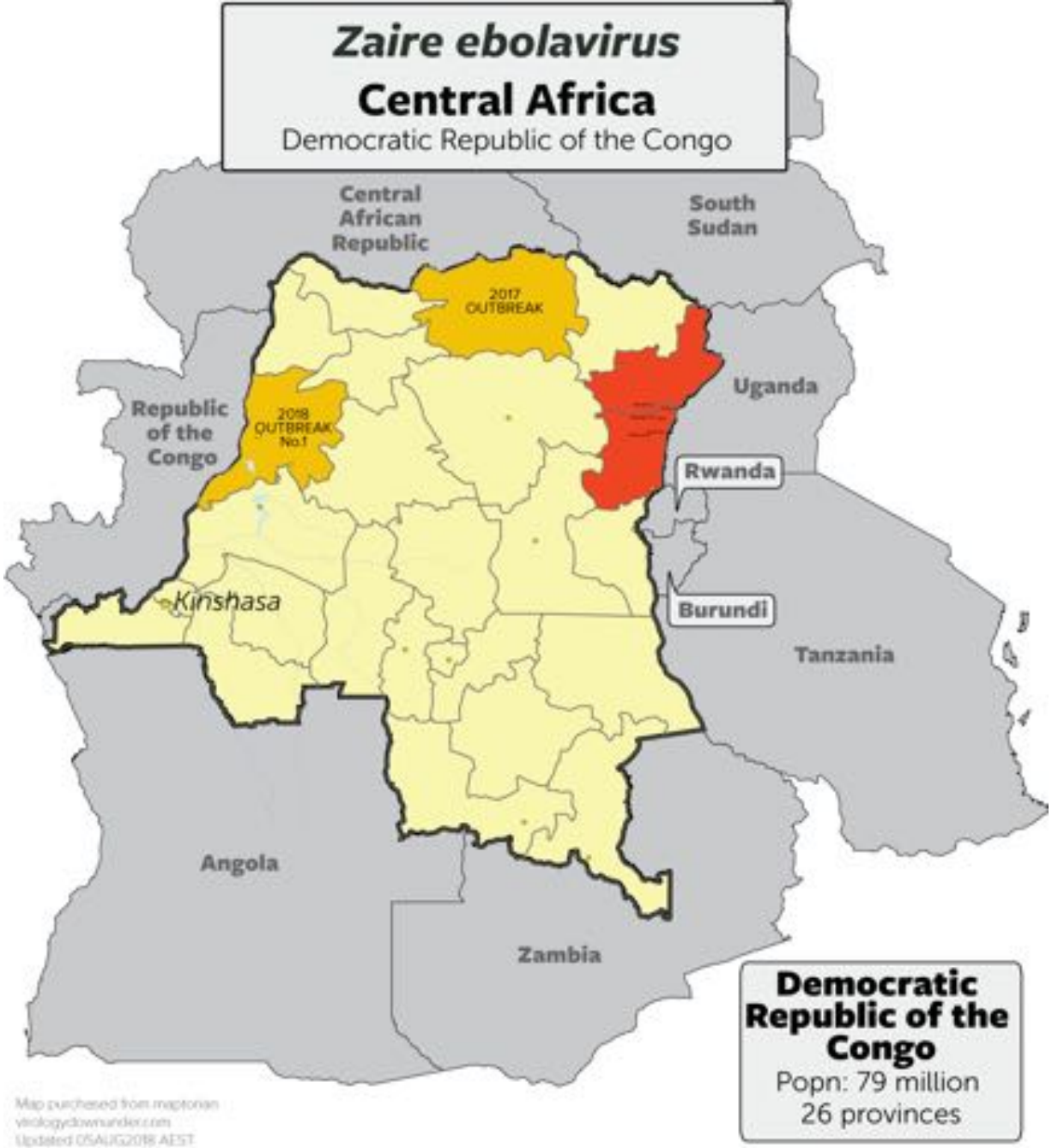
Confirmed and probable Ebola virus disease cases, North Kivu, by week of illness onset, data as of 4 November 2018 (n=294) - WHO



ARMED GROUPS IN NORTH AND SOUTH KIVU



An essay explaining key trends in armed mobilization and our methodology can be found at www.congoresearchgroup.org and www.christophvogel.net


Zaire ebolavirus
Central Africa
Democratic Republic of the Congo
Central African Republic
South Sudan
2017 OUTBREAK
Uganda
Republic of the Congo
2018 OUTBREAK No.1
Rwanda
Kinshasa
Burundi
Tanzania
Angola
Zambia
Democratic Republic of the Congo
Popn: 79 million
26 provinces
Map purchased from maptonian
virologydownunder.com
Updated 05AUG2018 AEST
Ian M Mackay, PhD

Ebolavirus Ecology

Enzootic Cycle

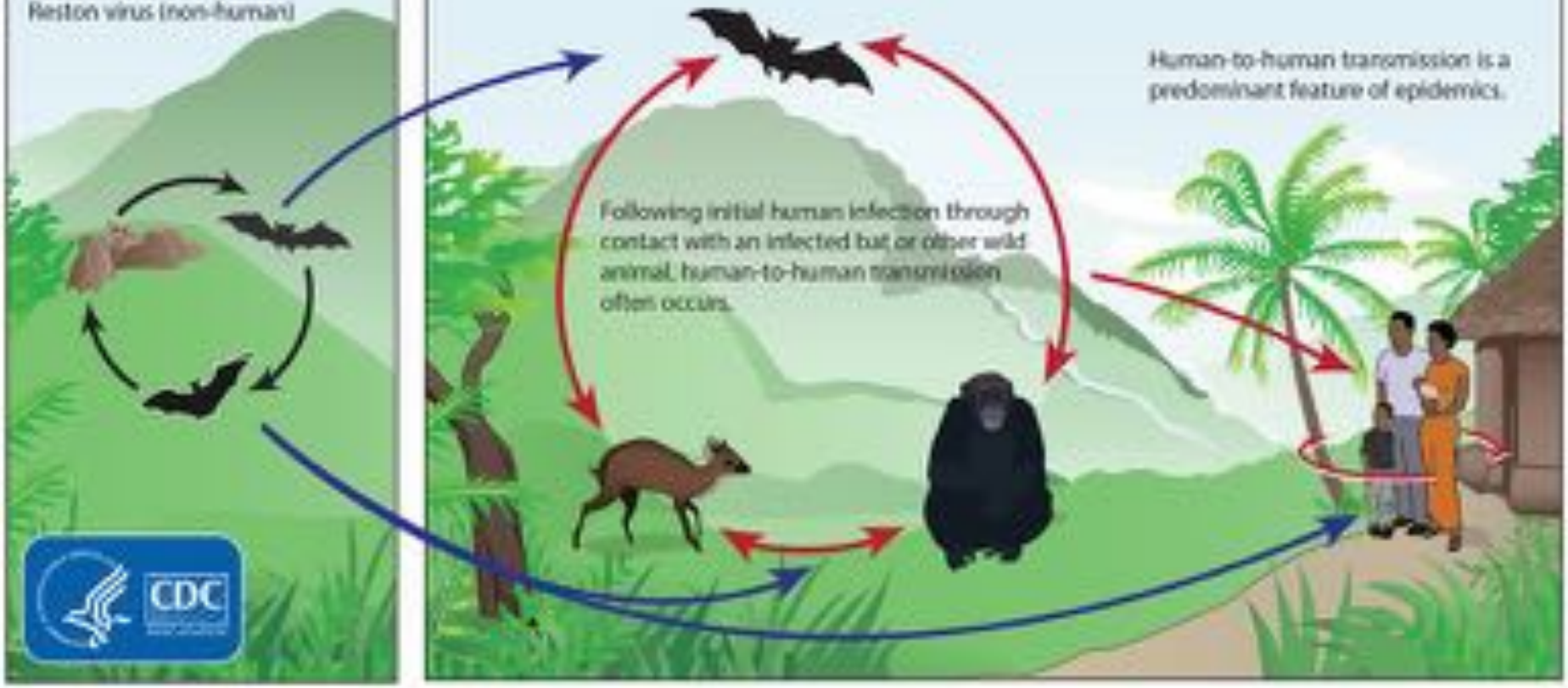
New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintainance and transmission of the virus within bat populations remain unknown.

Ebolaviruses:

Ebola virus (formerly Zaire virus)
Sudan virus
Tai Forest virus
Bundibugyo virus
Reston virus (non-human)

Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.



Hierarchy of Controls


Belgium
Netherlands
Switzerland
Portugal
France
Spain
Germany
Italy
Eastern Europe
United States
India
China
China Part 2
UK
Japan


GUINEA
SIERRA LEONE
LIBERIA
NO EBOLA
NO EBOLA

Emergence of Monkeypox — West and Central Africa, 1970–2017

Kara N. Durski, MPH[1]; Andrea M. McCollum, PhD[2]; Yoshinori Nakazawa, PhD[2]; Brett W. Petersen, MD[2]; Mary G. Reynolds, PhD[2]; Sylvie Briand, MD, PhD[3]; Mamoudou Harouna Djingarey, MD[3]; Victoria Olson, PhD[2]; Inger K. Damon, MD, PhD[2]; Ashraful Khalakdina, PhD[3]

The recent apparent increase in human monkeypox cases across a wide geographic area, the potential for further spread, and the lack of reliable surveillance have raised the level of concern for this emerging zoonosis. In November 2017, the World Health Organization (WHO), in collaboration with CDC, hosted an informal consultation on monkeypox with researchers, global health partners, ministries of health, and orthopoxvirus experts to review and discuss human monkeypox in African countries where cases have been recently detected and also identify components of surveillance and response that need improvement. Endemic human monkeypox has been reported from more countries in the past decade than during the previous 40 years. Since 2016, confirmed cases of monkeypox have occurred in Central African Republic, Democratic Republic of the Congo, Liberia, Nigeria, Republic of the Congo, and Sierra Leone and in captive chimpanzees in Cameroon. Many countries with endemic monkeypox lack recent experience and specific knowledge about the disease to detect cases, treat patients, and prevent further spread of the virus. Specific improvements in surveillance capacity, laboratory diagnostics, and infection control measures are needed to launch an efficient response. Further, gaps in knowledge about the epidemiology and ecology of the virus need to be addressed to design, recommend, and imple-

Monkeypox is a zoonotic orthopoxvirus with a similar disease presentation to smallpox in humans, with the additional distinguishing symptom of lymphadenopathy. After an initial febrile prodrome, a centrifugally distributed maculopapular rash develops, with lesions often present on the palms of the hands and soles of the feet. The infection can last up to 4 weeks, until crusts separate and a fresh layer of skin is formed. Sequelae include secondary bacterial infections, respiratory distress, bronchopneumonia, gastrointestinal involvement, dehydration, encephalitis, and ocular infections, which can result in permanent corneal scarring. No specific treatment for a monkeypox virus infection currently exists, and patients are managed with supportive care and symptomatic treatment. In persons who have not been vaccinated against smallpox, which offers cross-protection, the case fatality rate is 11%. Human-to-human transmission occurs via respiratory droplets and contact with lesions that contain the virus (*1*).

Monkeypox primarily occurs in the rain forests in West Africa and Central Africa. Although antibodies have been detected in a range of small mammal species (*2*), the reservoir species of monkeypox remains unknown, and the virus has been isolated only twice from wild animals, once from a rope squirrel (*Funisciurus anerythrus*) in DRC and once from a sooty

Health

Medic becomes third person infected with monkeypox in England

Virus appeared for first time this month, with trio now being treated in isolation units

It is thought the virus was passed on the latest patient from an individual who contracted it after travelling to Nigeria. Photograph: Peter Byrne/PA

A medical worker has become the third person diagnosed with monkeypox in England, less than a month after the infection first appeared in the country.

The person had cared for a patient at Blackpool Victoria hospital who was

most viewed in US

Distracted boyfriend meme is sexist, rules Swedish ad watchdog

Brett Kavanaugh third woman accuses supreme court nominee of sexual misconduct

Yayoi Kusama: the world's favourite artist?

1,600-men voice support for Christine Blasey Ford in New York Times ad


GEOSENTINEL
The Global Surveillance Network of the ISTM and CDC
CDC


ProMED
INTERNATIONAL SOCIETY
FOR INFECTIOUS DISEASES
ProMED-mail
Most Recent Alert

Planning A Trip?

Get Advice

TRIP

PREP

Health advice for safe travel based on the recommendations of the U.S. Centers for Disease Control and Prevention

An interactive tool that guides you through preparing a U.S. traveler for a safe and healthy international trip.

Heading Home Healthy is a program supported by Global TravelEd, Massachusetts General Hospital and the Centers For Disease Control and Prevention. Our goal is to help travelers stay healthy when they are returning home to visit friends and relatives. We also are working with travel agents and clinicians to help them prepare international travelers to stay healthy.

Evidence-Based References

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