RESPONDING TO EMERGING INFECTIOUS DISEASES: FOCUS ON HIGHLY COMMUNICABLE CONTACT AND RESPIRATORY TRANSMITTED INFECTIOUS DISEASES

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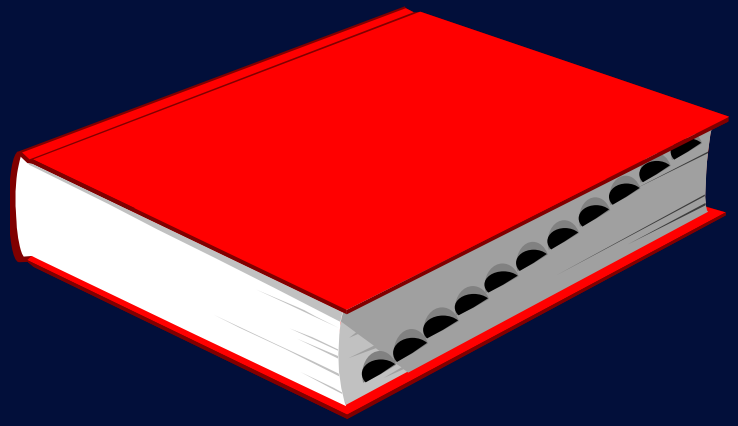
LECTURE TOPICS & GOALS

- Lecture topics
  - Emerging viral pathogens: Definitions and driving factors
  - Lessons learned from emerging diseases in the UC
  - Droplet/airborne (contact) transmitted diseases: SARS-CoV, MERS-CoV, avian flu
  - Highly communicable contact transmitted diseases: Ebola, hemorrhagic fever viruses
- Lecture goals
  - Understand the driving factors for emerging infectious diseases
  - Understand the epidemiology and clinical features of emerging viral diseases including Zika and MERS-CoV
  - Understand the key infection control issues in care for patients with highly communicable diseases

No conflicts

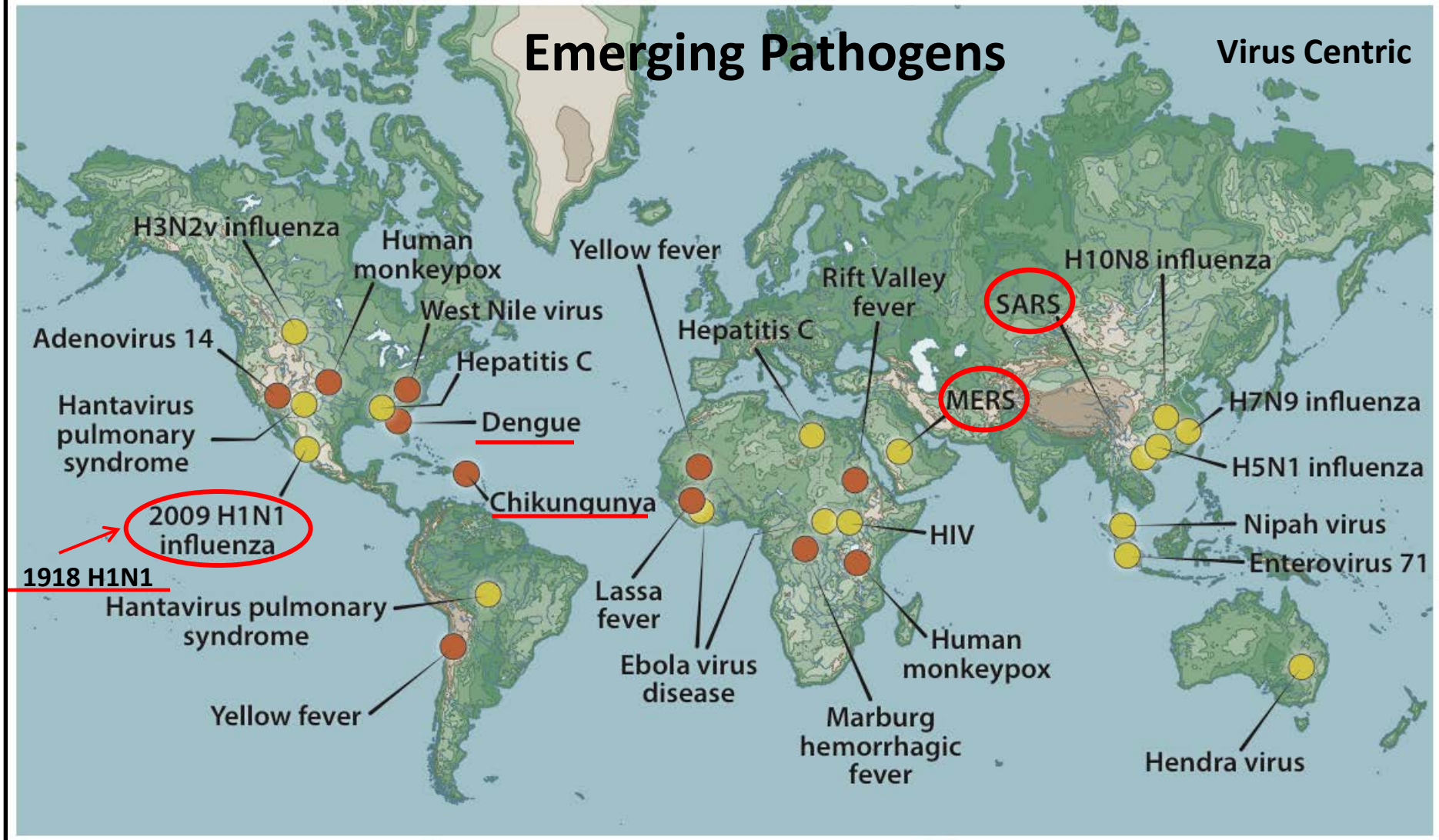
EMERGING INFECTIOUS DISEASES: DEFINITION

- Emerging infectious diseases can be defined as infections that have newly appeared in the population, or have existed but are rapidly increasing in incidence or geographic range



Emerging Pathogens

Virus Centric



Newly emerging

Re-emerging

>300 Emerging Pathogens Since ~1950, accelerating pattern

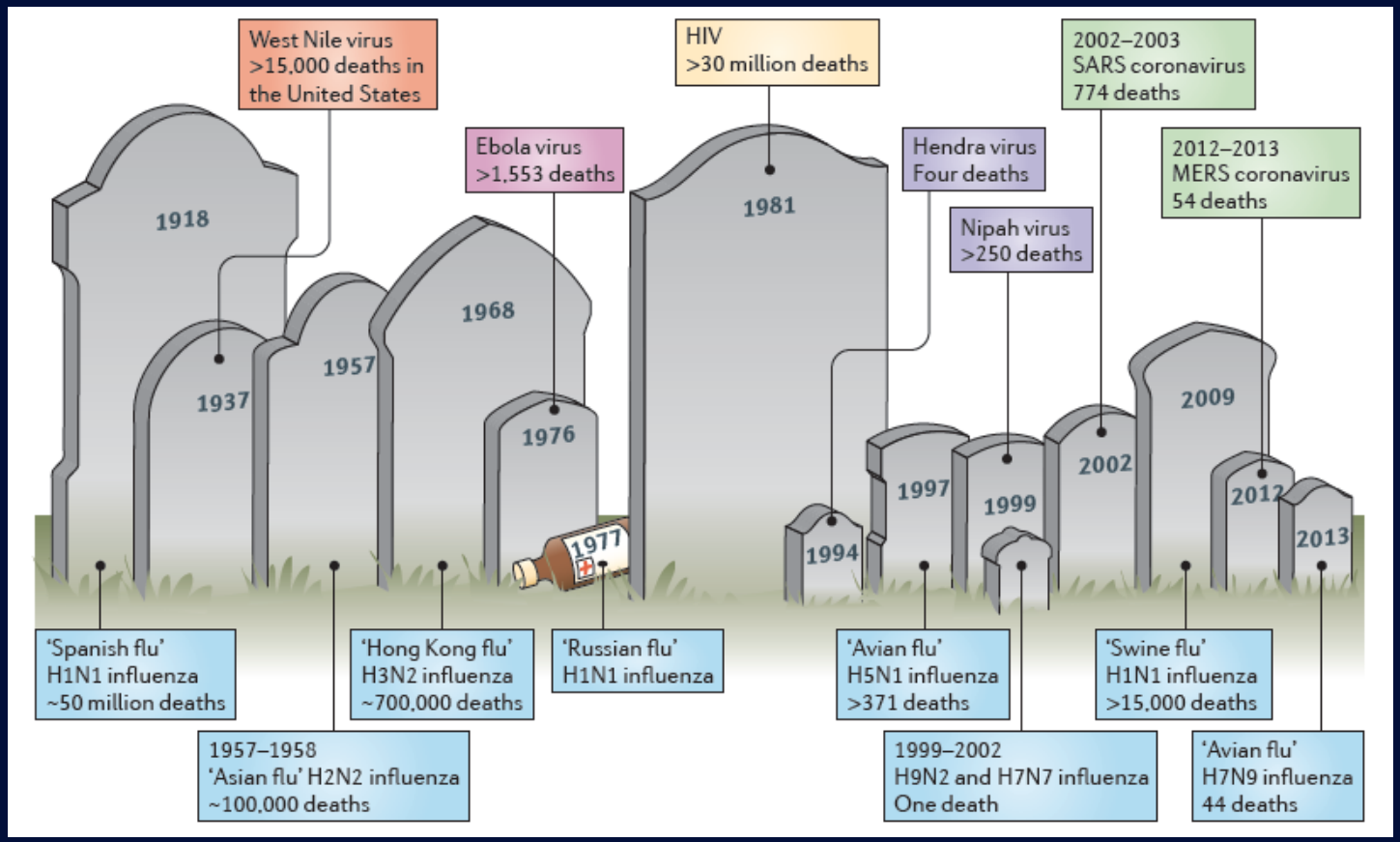
Developments facilitating spread

- Commercial air travel
- Global trade
- Urbanization
- Unchecked population growth
- Climate change

Advances facilitating control

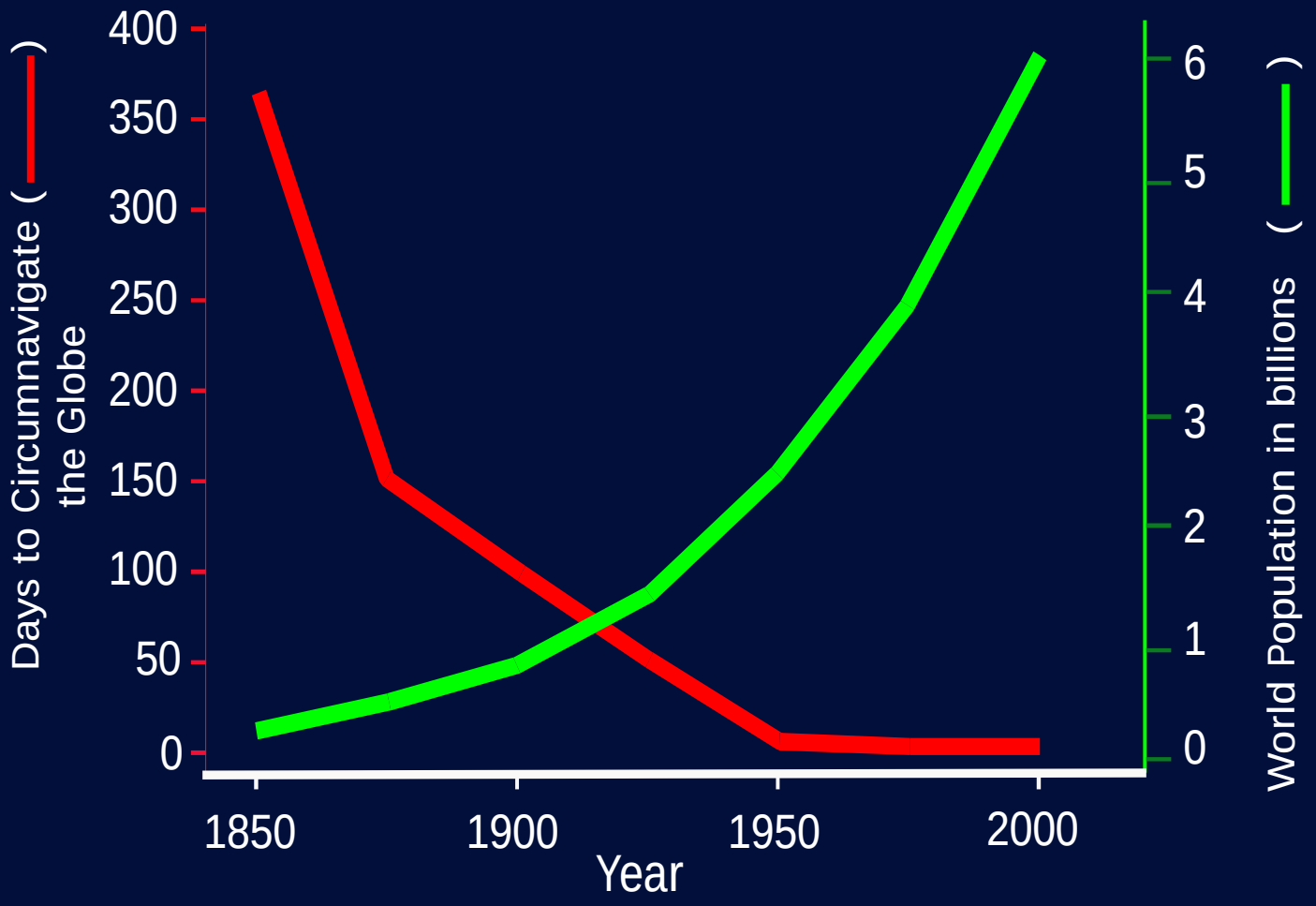
- Genome sequencing to identify emerging viruses
- Global communication networks
- Rapid diagnostics
- New approaches to vaccine and therapeutic design

EMERGING ZOONOSES



Bean A, et al. Nature Rev 2013;13:851-61

Speed of Global Travel in Relation to World Population Growth

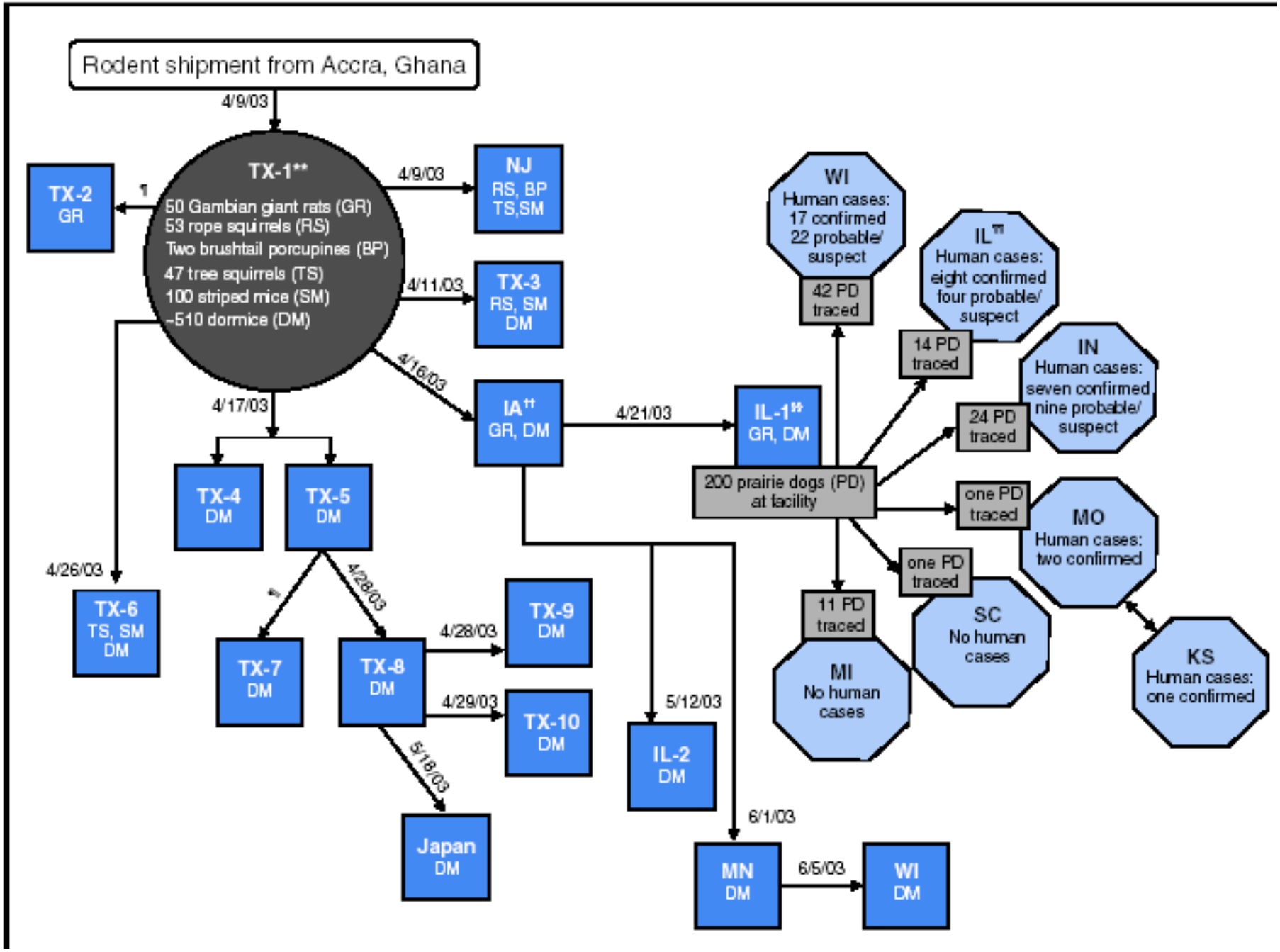


From: Murphy and Nathanson Sems. Virol. 5, 87, 1994

VISITOR ARRIVALS, HONG, KONG

居住國家／地區	Country / Territory of Residence	2015 年 12 月 Dec 2015 人次 No.	2016 年 12 月 Dec 2016 人次 No.		增長率 % Growth	2015 年 1 至 12 月 Jan - Dec 2015 人次 No.	2016 年 1 至 12 月 Jan - Dec 2016 人次 No.		增長率 % Growth
合計	**TOTAL**	**5,061,064**	**5,336,027**	+	**5.4**	**59,307,596**	**56,654,903**	-	**4.5**
中國內地	**Mainland China**	**3,721,049**	**3,948,482**	+	**6.1**	**45,842,360**	**42,778,145**	-	**6.7**
非中國內地	**Non-Mainland China**	**1,340,015**	**1,387,545**	+	**3.5**	**13,465,236**	**13,876,758**	+	**3.1**
短途地區市場 (不包括中國內地)	**Short Haul Markets (Exclude Mainland China)**	**894,532**	**935,736**	+	**4.6**	**8,298,122**	**8,652,570**	+	**4.3**
台灣	Taiwan	179,937	181,149	+	0.7	2,015,797	2,011,428	-	0.2
日本	Japan	100,783	111,163	+	10.3	1,049,272	1,092,329	+	4.1
南韓	South Korea	119,238	132,878	+	11.4	1,243,293	1,392,367	+	12.0
印尼	Indonesia	47,337	54,726	+	15.6	413,568	464,406	+	12.3
馬來西亞	Malaysia	77,092	79,237	+	2.8	544,688	535,542	-	1.7
菲律賓	Philippines	80,918	89,875	+	11.1	704,082	791,171	+	12.4
新加坡	Singapore	95,808	92,996	-	2.9	675,411	674,006	-	0.2
泰國	Thailand	74,373	68,898	-	7.4	529,410	594,615	+	12.3
其他	Others	119,046	124,814	+	4.8	1,122,601	1,096,706	-	2.3
長途地區市場	**Long Haul Markets**	**370,645**	**384,895**	+	**3.8**	**4,284,287**	**4,395,459**	+	**2.6**
美國	USA	102,209	112,273	+	9.8	1,181,024	1,211,539	+	2.6
加拿大	Canada	33,309	35,001	+	5.1	358,448	369,363	+	3.0
英國	United Kingdom	42,415	44,918	+	5.9	529,505	551,930	+	4.2
法國	France	17,372	17,750	+	2.2	209,825	213,641	+	1.8
德國	Germany	18,029	17,644	-	2.1	213,802	226,594	+	6.0
澳洲	Australia	53,728	51,816	-	3.6	574,270	575,812	+	0.3
其他	Others	103,583	105,493	+	1.8	1,217,413	1,246,580	+	2.4
新市場	**New Markets**	**74,838**	**66,914**	-	**10.6**	**882,827**	**828,729**	-	**6.1**
印度	India	43,760	36,510	-	16.6	531,770	480,906	-	9.6
海灣合作地區國家	GCC Markets	5,622	4,011	-	28.7	49,023	49,954	+	1.9
俄羅斯	Russia	12,886	13,374	+	3.8	151,469	142,664	-	5.8
荷蘭	Netherlands	7,599	7,430	-	2.2	91,596	95,762	+	4.5
越南	Vietnam	4,971	5,589	+	12.4	58,969	59,443	+	0.8

FIGURE 2. Movement of imported African rodents to animal distributors and distribution of prairie dogs from an animal distributo associated with human cases of monkeypox — 11 states*, 2003†§



SELECTED EMERGING DISEASES OF INFECTION CONTROL IMPORTANCE, US

Disease (initial location)	Cases (United States)	Outcome	Person-to-person transmission	Patient-to-HCP transmission	Infection control risk	Year
Legionnaires' disease	Unknown (thousands)	Endemic and epidemic	No	No	High	1976-present
HIV (Africa)	Millions (thousands)	Ongoing epidemic	Yes (blood exposure, organ transplantation, vertical, sexual)	Yes (blood exposure)	Moderate	1978-present
vCJD	Hundreds	Controlled	Yes (blood, theoretically via contaminated medical instruments)	No	Low	1996
West Nile fever	(Thousands)	Endemic	Yes (blood transfusions, vertical, organ transplantation)	No*	Low	1999
SARS (China)	~8,000 (8)	Controlled	Yes (droplet, contact, airborne?)	Yes	High	2003-2004
Monkeypox (Africa)	(37 confirmed, 10 probable)	Eliminated in United States	Yes (droplet, contact)	Yes†	High	2003
MERS (Middle East)	Thousands (2)	Controlled	Yes (droplet, contact)	Yes	High	2014-present
Ebola (West Africa)	Thousands (4)	Controlled United States, reduced Africa	Yes (contact, sexual)	Yes	High	2014-present

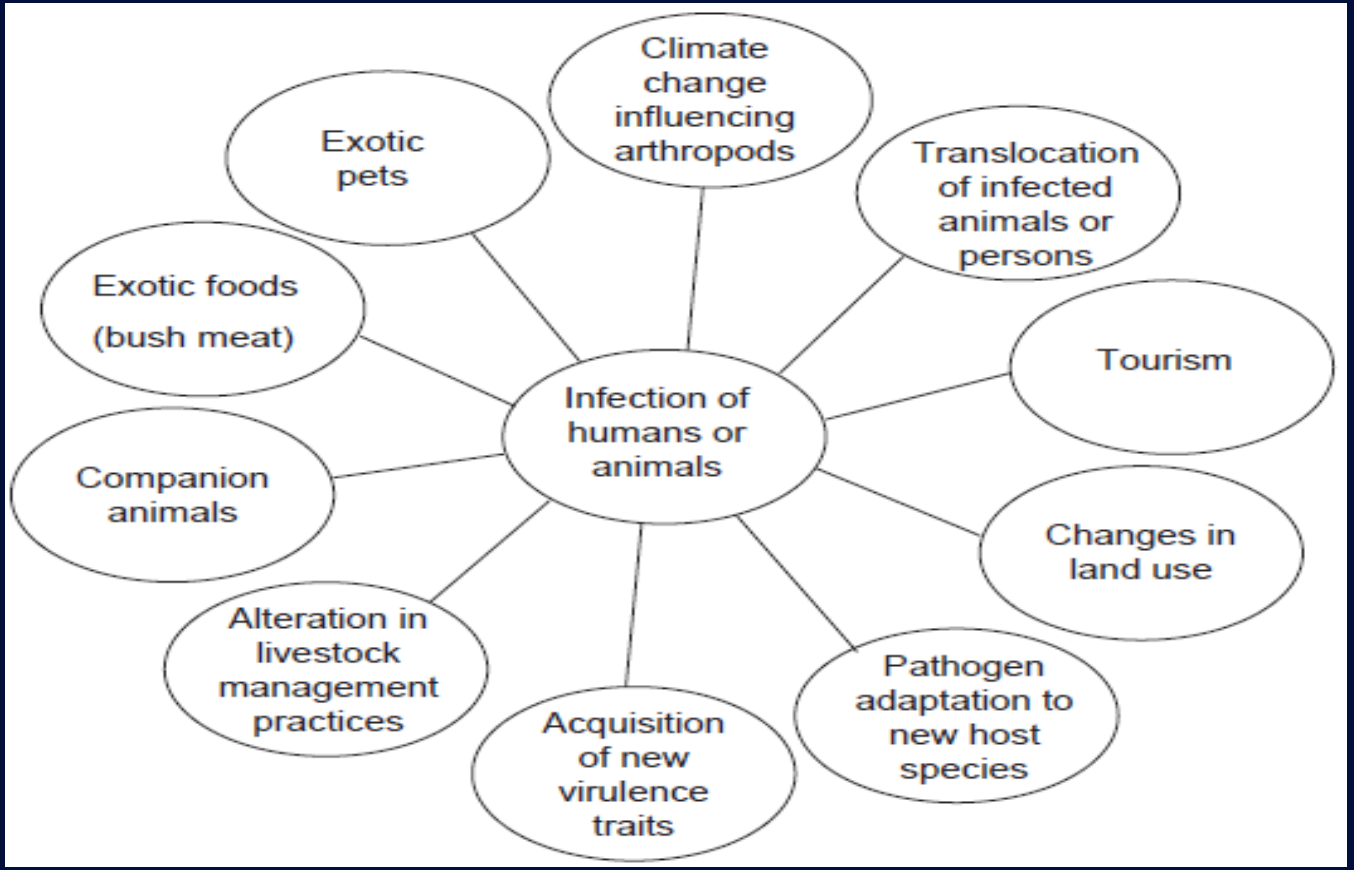
Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

BASIC CONCEPTS IN DISEASE EMERGENCE

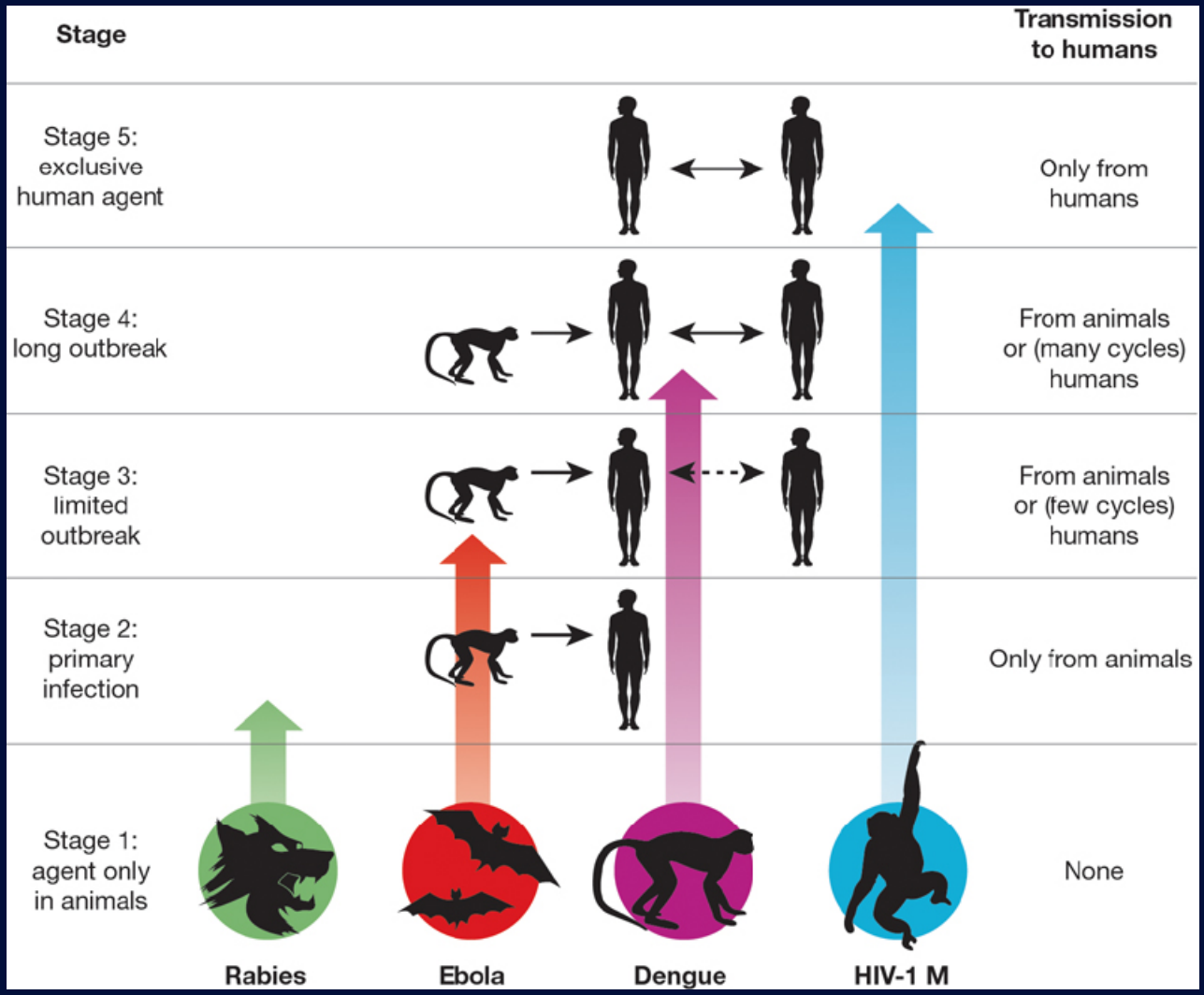
- Emergence of infectious diseases is complex
- Infectious diseases are dynamic
- Most new infections are not caused by genuinely new pathogens
- Agents involved in new and reemergent infections cross taxonomic lines
- The concept of the microbe as *the* cause of disease is inadequate and incomplete
- Human activities are the most potent factors driving disease emergence
- Social, economic, political, climatic, technologic, and environmental factors shape disease patterns and influence emergence
- Understanding and responding to disease emergence require a global prospective, conceptually and geographically
- The current global situation favors disease emergence

Wilson ME. Emerging Infectious Diseases 1995;1:39.

FACTORS INFLUENCING NEW AND REEMERGING ZOONOSES



Cutler SJ et al. Emerg Infect Dis 2010;16:1-7



http://web.stanford.edu/group/parasites/ParaSites2012/Lassa%20Libby%20Burch/LassaEbolaMarburg_LibbyBurch_3-8-2012.htm

KEY ISSUES FOR INFECTION CONTROL

- Pathogen
  - Taxonomy (provides clues regarding transmission routes, environmental stability, germicide susceptibility)
  - Hosts
- Epidemiology
  - Locations of endemicity (ie, locations in the world where sources or reservoirs reside)
  - Incubation period
  - Transmission routes
  - Infectivity (ie, communicability)
  - Duration of infectivity

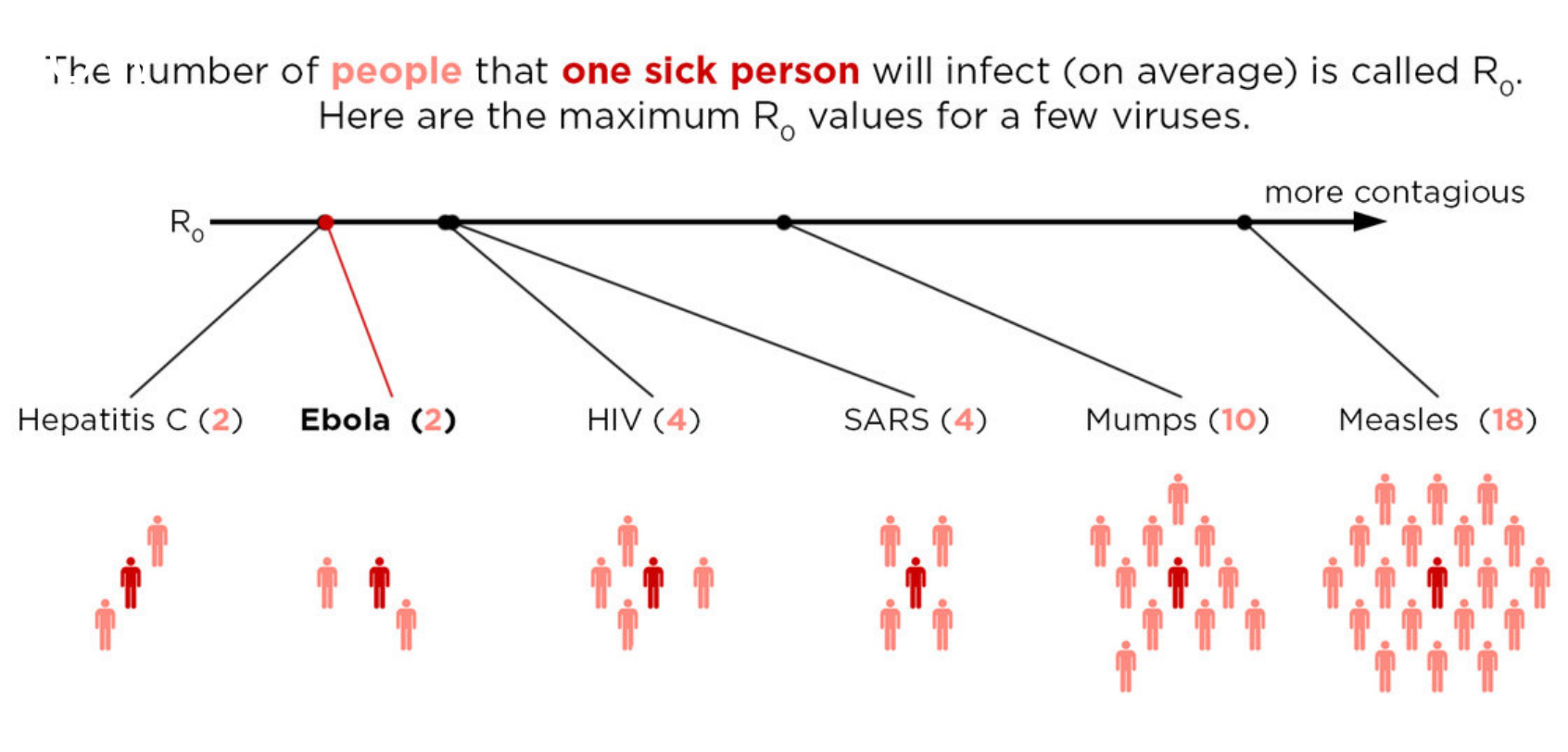
Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

KEY ISSUES FOR INFECTION CONTROL

- Clinical
  - Symptoms and signs
  - Risk factors for acquisition of infection
  - Morbidity and mortality (and risk factors for morbidity and mortality)
  - Diagnostic methods (sensitivity, specificity, positive and negative predictive values, biosafety)
  - Therapy (availability, efficacy, safety)
- Infection control
  - Environmental survival and germicide susceptibility
  - Isolation recommendations and recommended personal protective equipment
  - Pre-exposure prophylaxis (availability, efficacy, safety)
  - Post-exposure prophylaxis (availability, efficacy, safety) and vaccine availability
  - Recommended biosafety level in the laboratory
  - Recommended waste disposal (liquids and solids)

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

COMMUNICABILITY

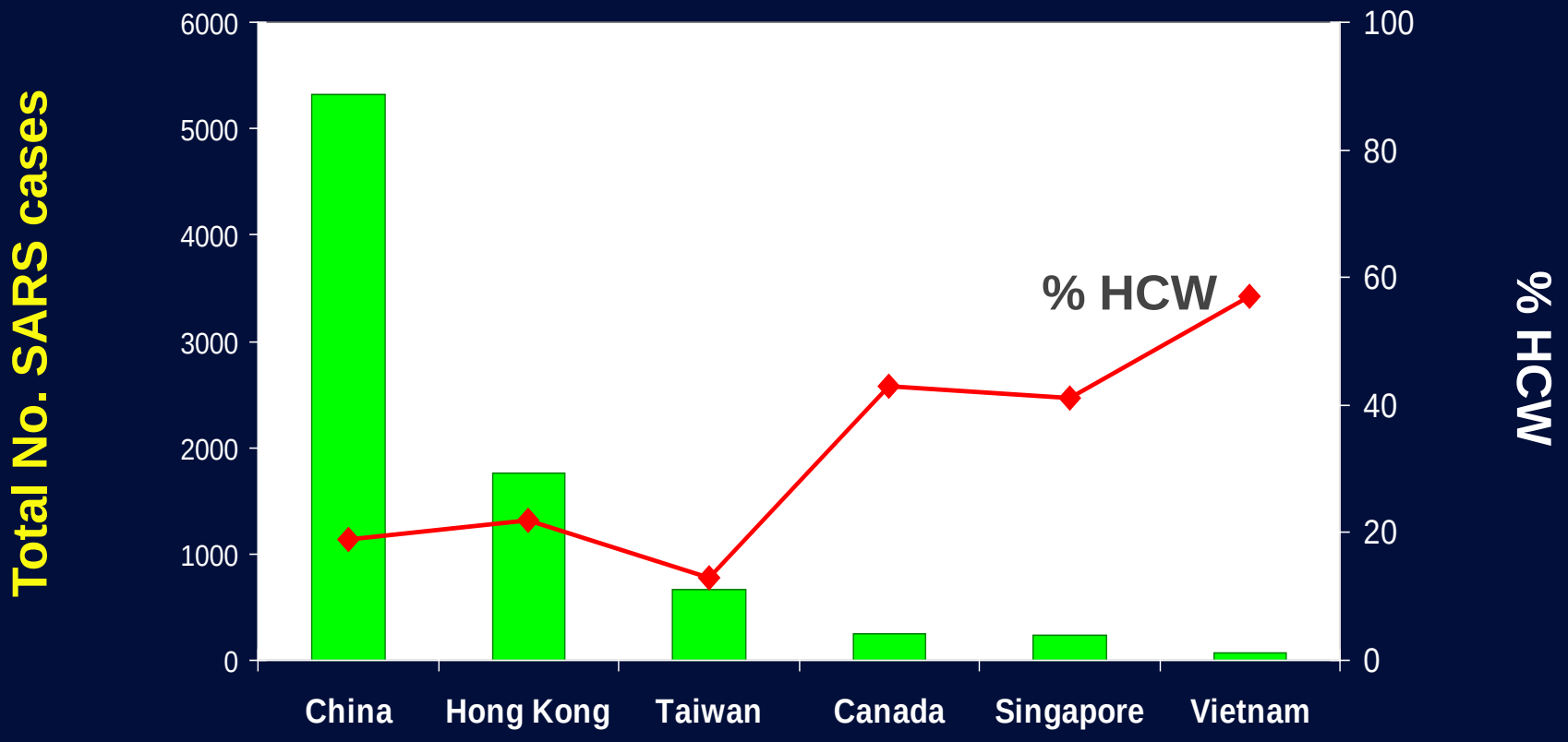


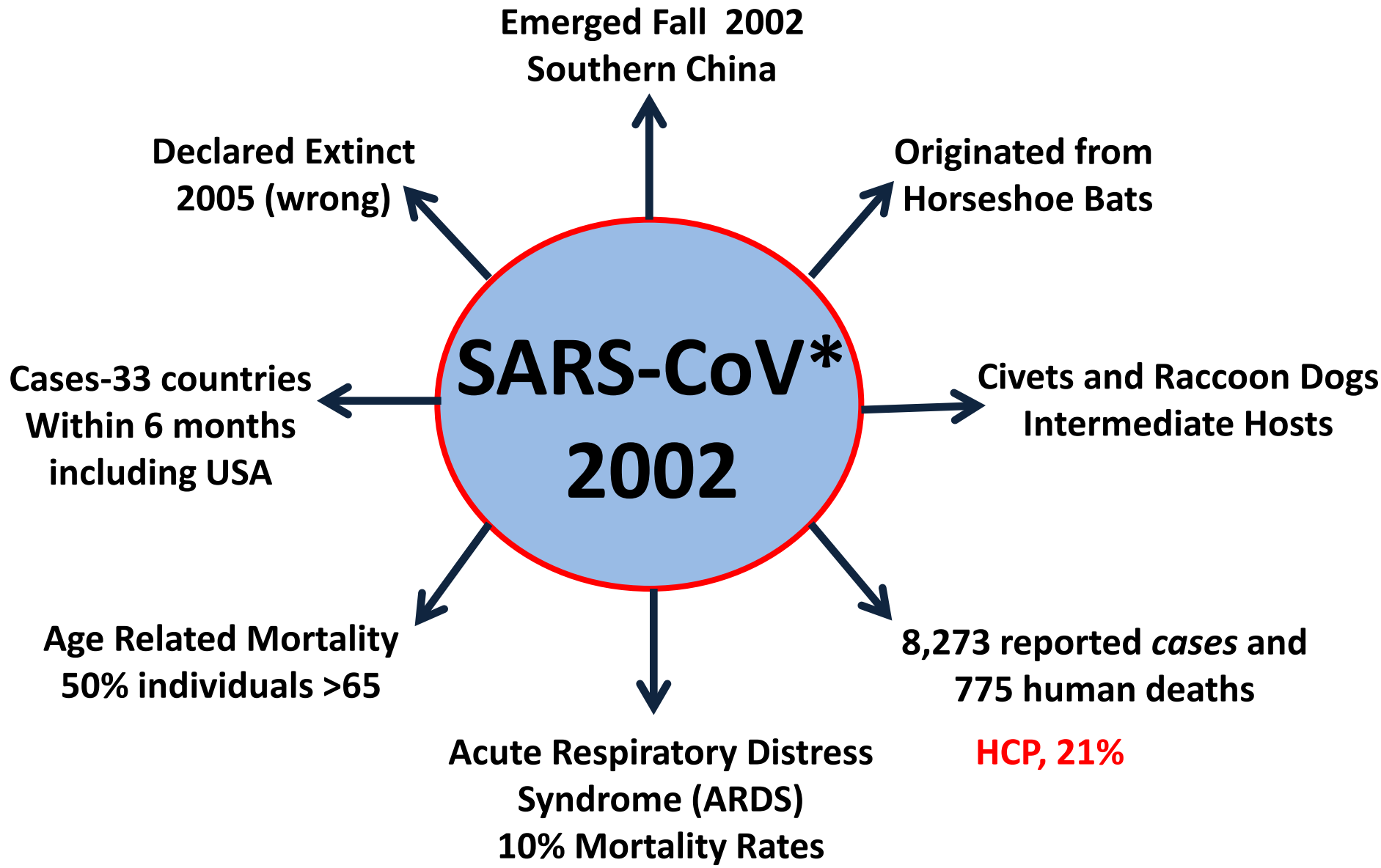
http://www.npr.org/blogs/health/2014/10/02/352983774/no-seriously-how-contagious-is-ebola

KEY VULNERABILITIES AND SOLUTIONS

- Failure to screen and recognize that a patient has a communicable disease (most important with highly transmissible and virulent pathogens) and/or failure to promptly institute proper isolation
  - Appropriate signage
  - Routinely obtain travel history with notation in EMR
  - Adequate isolation facilities (in ED, hospital) for highly communicable diseases
- Failure to have adequate PPE or failure of HCP to properly don and doff PPE
  - Adequate supply of PPE
  - Proper training of HCP in donning and doffing of appropriate PPE

Total SARS Cases and %HCP by Country: Worldwide ~8,000 Cases; ~20% HCP





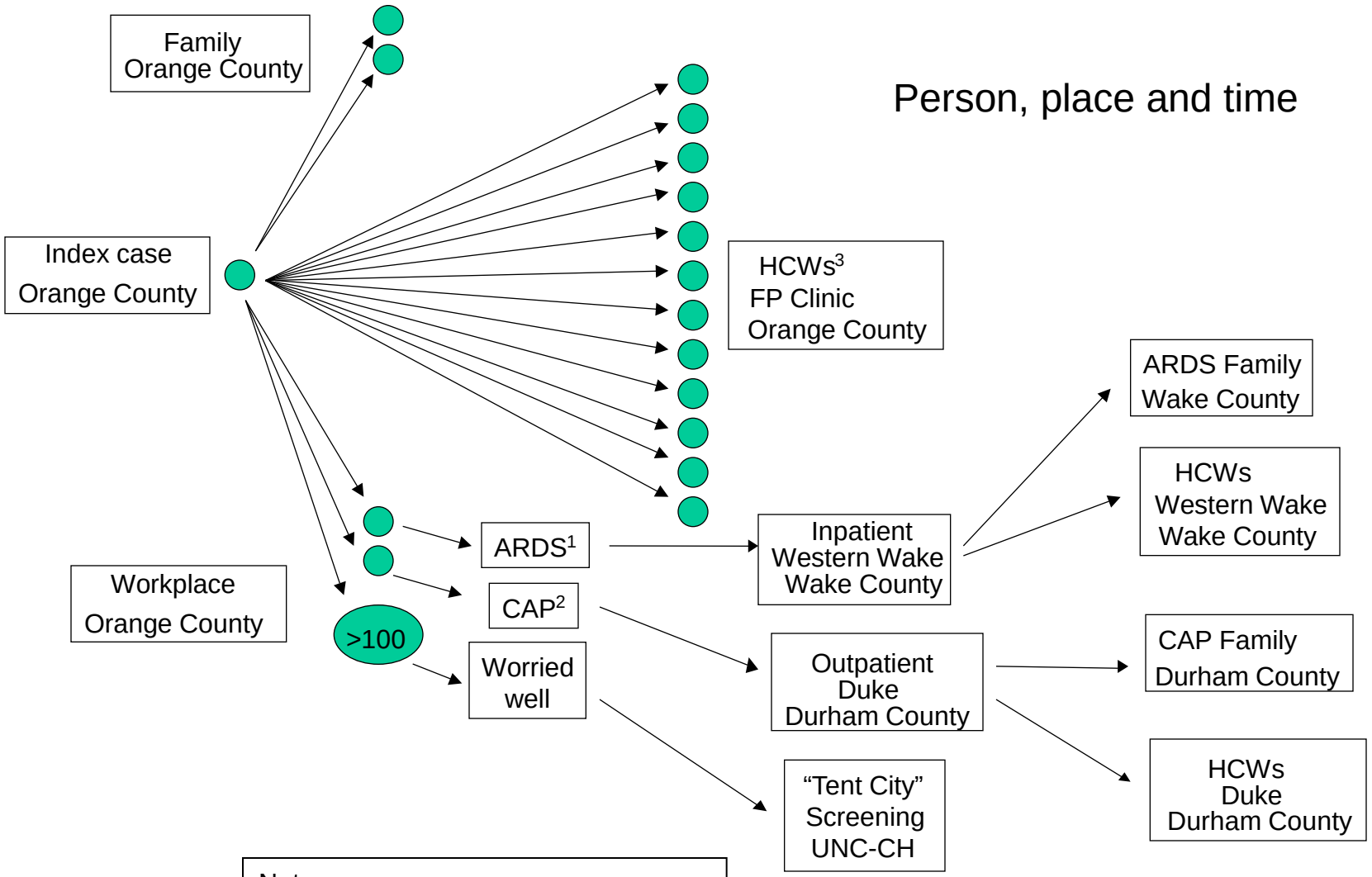
*No licensed vaccines or therapeutics; candidate hmAB, vaccines and drugs exist

SARS:
KEY ISSUES FOR INFECTION CONTROL

- Incubation period (days): 2-14 (occasionally up to 21)
- Transmission routes:
  - Animal-to-human; person-to-person (direct, indirect); aerosol (droplet, airborne?)
- Isolation:
  - Admit to AIIR; PPE = gown, gloves, N95, eye protection (consider PAPR for aerosol generating procedures)
- Communicability: 0.3-4.1 (occasional super spreaders)
- Environmental survival: 24hr (cotton gown, paper); 48hr (disposable gown)
- Susceptibility to germicides (based, in part, on surrogates): Quats, phenols, alcohol, CHG

CDC; Chan JFW, et al. Clin Microbiol Rev 2015;28:465; Lai MYY, et al. Clin Infect Dis 2005;41:e67

Contacts and social network of index and special interest cases



Notes:
1. Acute respiratory distress syndrome
2. Community acquired pneumonia
3. Healthcare workers

Temporary Screening Facilities-Semi Rural Location USA
SARS-CoV: Chapel Hill, NC June 11, 2003 (Giles Horney Building)

LESSONS LEARNED FROM SARS

- Initial detection via the astute observer (not via a surveillance system)
- New disease can involve multiple countries
- Continued threat from zoonotic agents jumping species boundaries
- Healthcare workers at high risk with highly communicable diseases
- Diagnostic methods key to control
- Epidemics can be contained using quarantine and infection control methods
- Need to nestle response to a highly communicable disease in hospital disaster plan
- Inadequate supplies of PPE (i.e., stockpile)
- Inadequate outpatient facilities to handle highly communicable diseases
- Need to screen for travel to endemic area at entry to hospital or clinic

COUNTRIES WITH LAB-CONFIRMED MERS CASES

- Countries in the Arabian Peninsula with Cases
  - Bahrain
  - Iran
  - Jordan
  - Kuwait
  - Lebanon
  - Oman
  - Qatar
  - Saudi Arabia
  - United Arab Emirates (UAE)
  - Yemen
- Countries with Travel-Associated Cases
  - United States
  - Europe: Austria, France, Germany, Greece, Italy, Netherlands, Turkey, United Kingdom (UK)
  - Africa: Tunisia, Egypt, Algeria
  - Asia: Malaysia, Philippines China, Thailiand, Republic of Korea
- Cases (as of Sept. 2012, WHO)
  - 1733 lab confirmed cases
  - At least 628 deaths

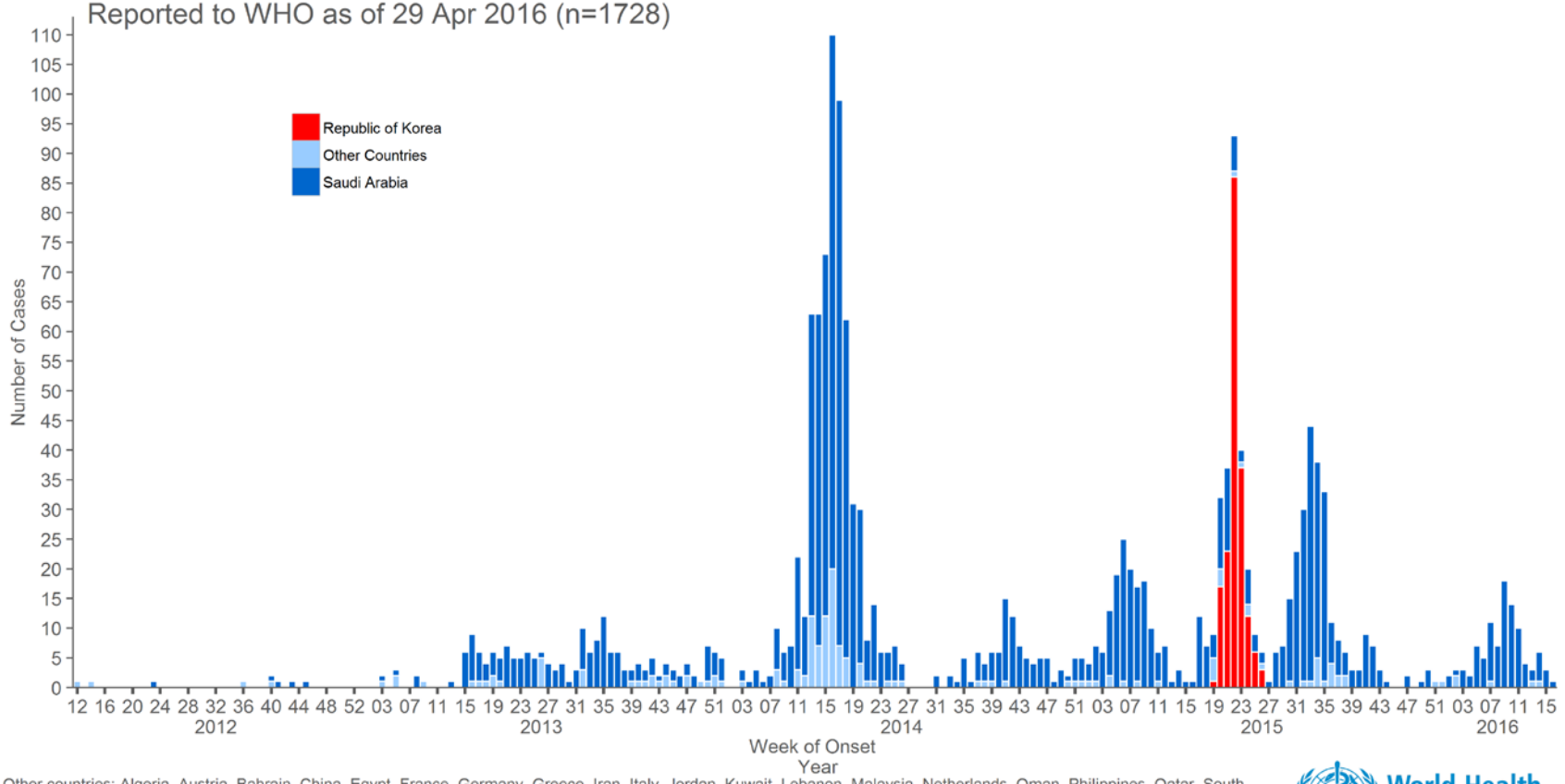
http://www.cdc.gov/coronavirus/mers/index.html

http://www.who.int/csr/don/2-december-2014-mers/en/

MERS-CoV, WHO, 20 MAY 2016

Confirmed global cases of MERS-CoV

Reported to WHO as of 29 Apr 2016 (n=1728)



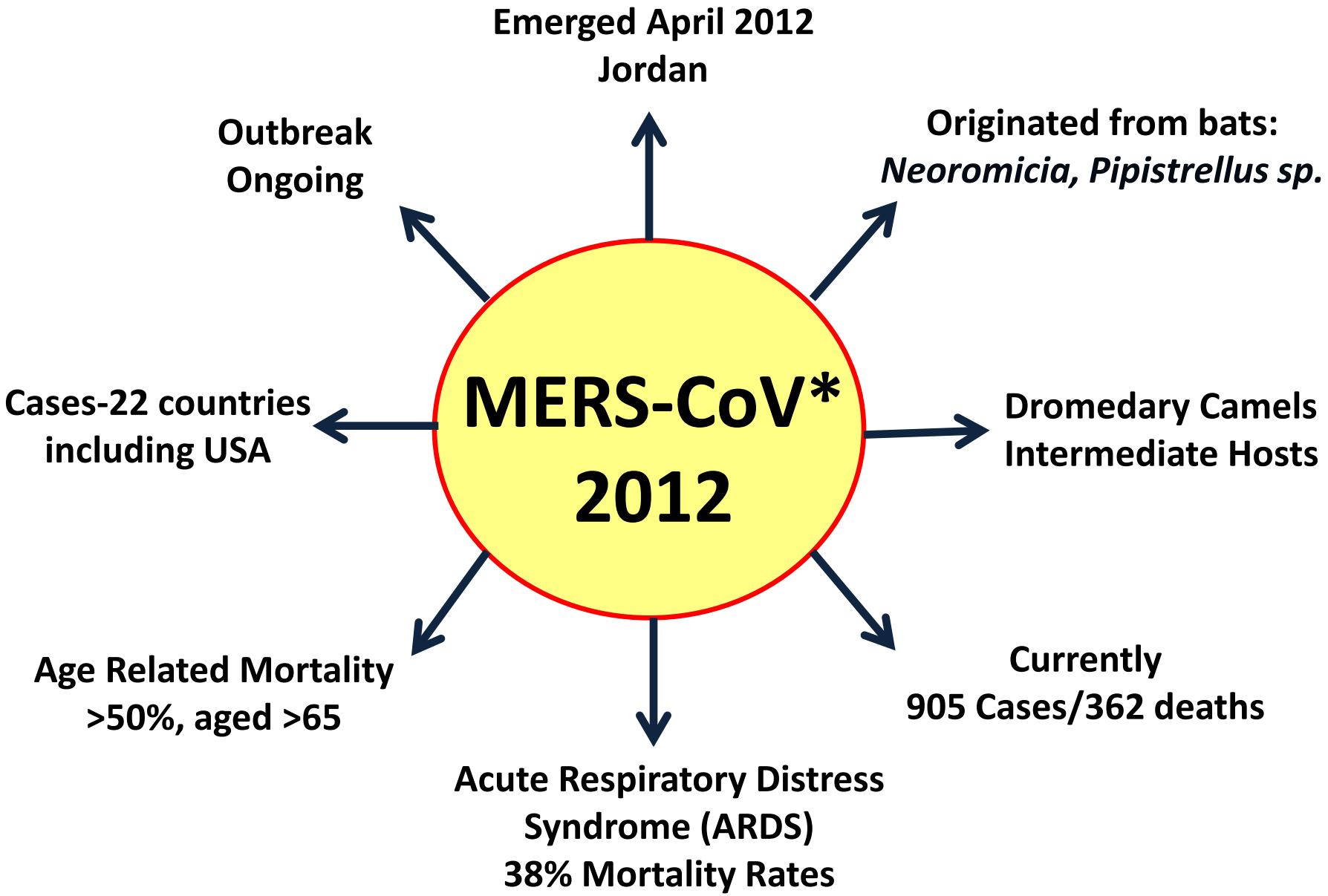
Other countries: Algeria, Austria, Bahrain, China, Egypt, France, Germany, Greece, Iran, Italy, Jordan, Kuwait, Lebanon, Malaysia, Netherlands, Oman, Philippines, Qatar, South Africa, Thailand, Tunisia, Turkey, United Arab Emirates, United Kingdom, United States of America, Yemen

Please note that the underlying data is subject to change as the investigations around cases are ongoing. Onset date estimated if not available.

World Health Organization

MERS IN SOUTH KOREA

- Index case; 68 year-old national with recent history of travel to 4 countries in Middle East (asymptomatic on return, 4 May)
  - Developed symptoms on May 11: sought care at 2 clinics and 2 hospitals
  - Confirmed as MERS 20 May
- As of 20 June, 172 lab-confirmed cases (27 deaths)
  - Cases include healthcare personnel, other patients, family members and visitors
  - Some patients who are cases were housed on the same ward (but not in the same room)
  - Exposures may have been as short as 5 minutes to a few hours
  - Evidence of superspreaders

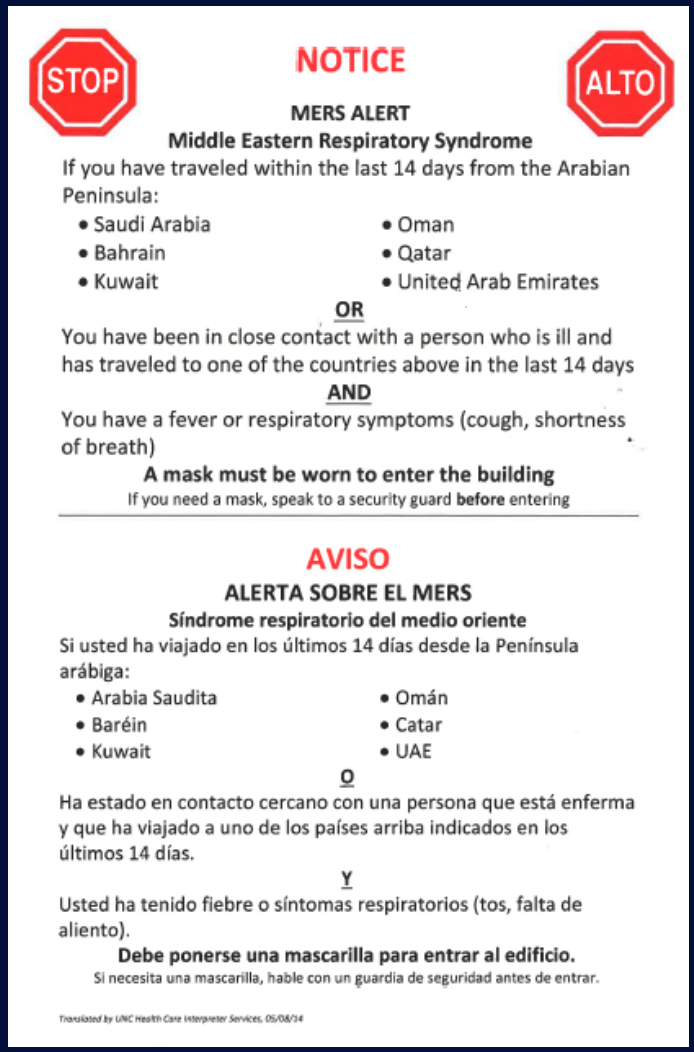

Emerged April 2012
Jordan
Originated from bats:
Neoromicia, Pipistrellus sp.
Outbreak
Ongoing
MERS-CoV*
2012
Cases-22 countries
including USA
Dromedary Camels
Intermediate Hosts
Age Related Mortality
>50%, aged >65
Currently
905 Cases/362 deaths
Acute Respiratory Distress
Syndrome (ARDS)
38% Mortality Rates

MERS:
KEY ISSUES FOR INFECTION CONTROL

- Incubation period (days): 2-15
- Transmission routes:
  - Animal-to-human; person-to-person (direct, indirect); aerosol (droplet, airborne?); ingestion?
- Isolation:
  - Admit to AIIR; PPE = gown, gloves, N95, eye protection (consider PAPR for aerosol generating procedures)
- Communicability: Ro = 0.3-1.3
- Environmental survival: >48hr at 20^{o}C 40% RH (surface)
- Susceptibility to germicides (based, in part, on surrogates): Quats, phenols, alcohol, CHG

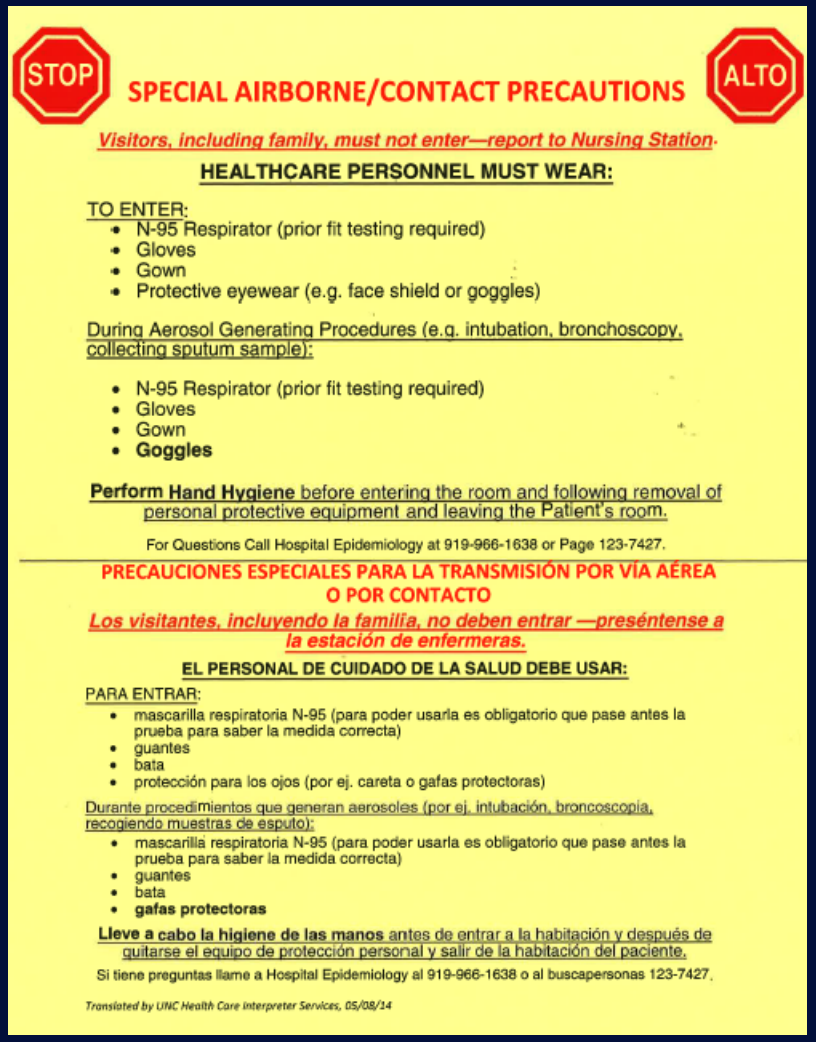
SIGNAGE FOR HEALTHCARE ENTRANCES

- Notifies patients and visitors to obtain mask if the meet CDC criteria for possible MERS
  - Signs/symptopms of MERS plus travel to Arabian Peninsula within 14 days
  - Signs/symptoms of MERS plus contact with an ill person with has traveled to Arabian Penisula within 14 days



SPECIAL AIRBORNE PRECAUTIONS

- Room type
  - Direct out exhausted air
  - Negative air pressure
  - ≥12 air exchanges per hour
- Personal protective equipment (PPE)
  - N-95 respirator
  - Gloves
  - Gowns
  - Protective eyeware (face shield)
    - Goggles for aerosol generating procedures



STOP

SPECIAL AIRBORNE/CONTACT PRECAUTIONS

ALTO

Visitors, including family, must not enter—report to Nursing Station.

HEALTHCARE PERSONNEL MUST WEAR:

TO ENTER:

- N-95 Respirator (prior fit testing required)
- Gloves
- Gown
- Protective eyewear (e.g. face shield or goggles)

During Aerosol Generating Procedures (e.g. intubation, bronchoscopy, collecting sputum sample):

- N-95 Respirator (prior fit testing required)
- Gloves
- Gown
- **Goggles**

Perform Hand Hygiene before entering the room and following removal of personal protective equipment and leaving the Patient's room.

For Questions Call Hospital Epidemiology at 919-966-1638 or Page 123-7427.

PRECAUCIONES ESPECIALES PARA LA TRANSMISIÓN POR VÍA AÉREA O POR CONTACTO

Los visitantes, incluyendo la familia, no deben entrar —preséntense a la estación de enfermeras.

EL PERSONAL DE CUIDADO DE LA SALUD DEBE USAR:

PARA ENTRAR:

- mascarilla respiratoria N-95 (para poder usarla es obligatorio que pase antes la prueba para saber la medida correcta)
- guantes
- bata
- protección para los ojos (por ej. careta o gafas protectoras)

Durante procedimientos que generan aerosoles (por ej. intubación, broncoscopia, recogiendo muestras de esputo):

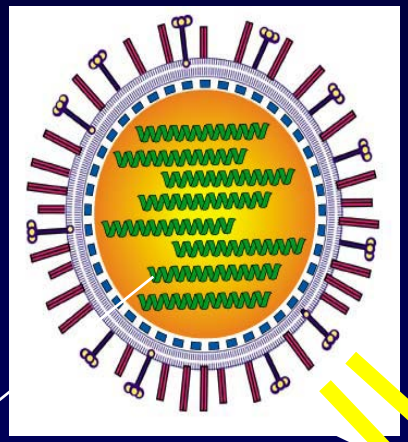
- mascarilla respiratoria N-95 (para poder usarla es obligatorio que pase antes la prueba para saber la medida correcta)
- guantes
- bata
- **gafas protectoras**

Lleve a cabo la higiene de las manos antes de entrar a la habitación y después de quitarse el equipo de protección personal y salir de la habitación del paciente.

Si tiene preguntas llame a Hospital Epidemiology al 919-966-1638 o al buscapersonas 123-7427.

Translated by UNC Health Care Interpreter Services, 05/08/14

Influenza Virus Nomenclature



18 different hemaglutinin subtypes
11 different neuraminidase subtypes

Type of Nuclear Material

Hemagglutinin

Neuraminidase

A / Sydney / 184 / 93 (H3N2)

Virus type

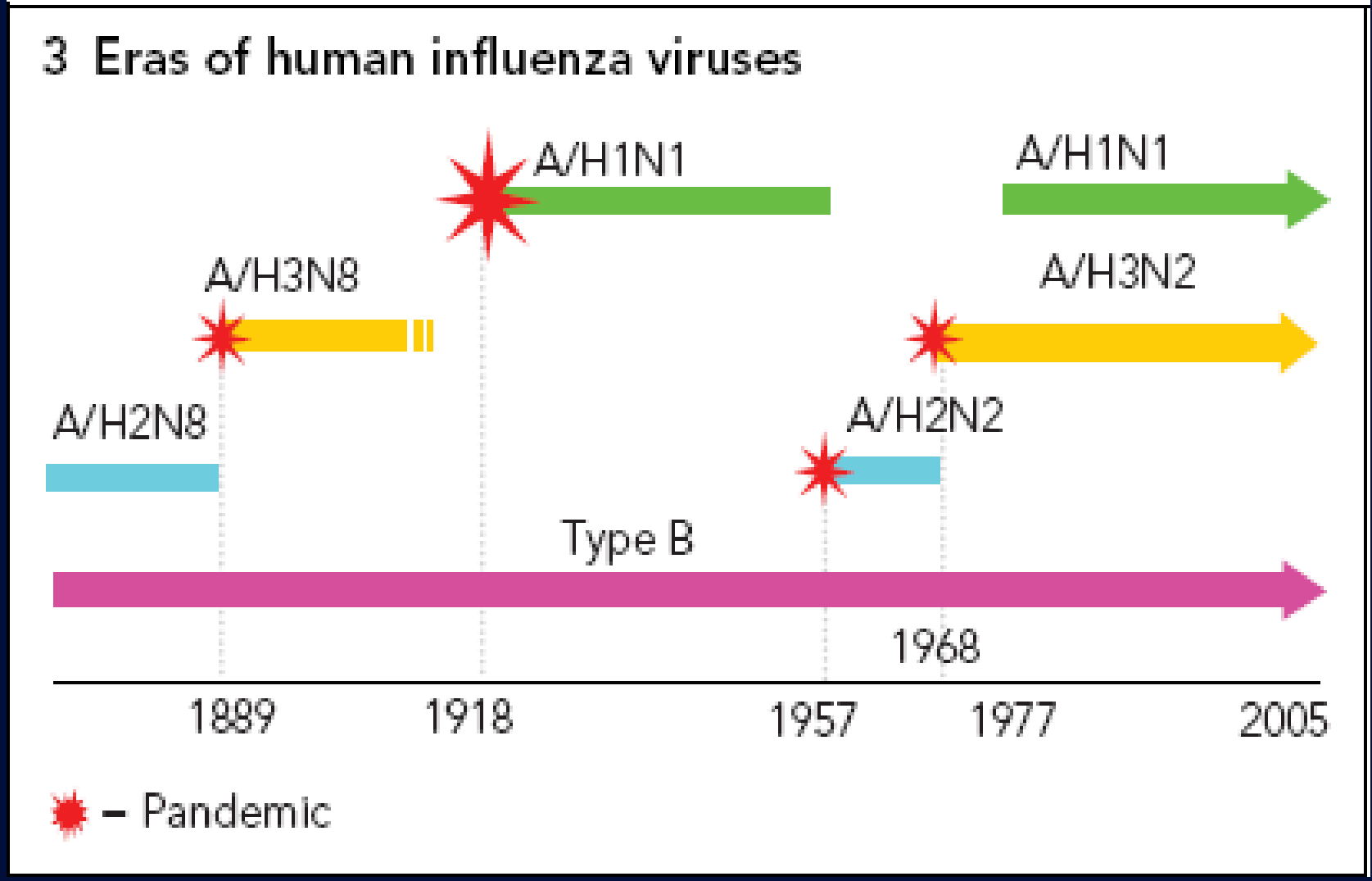
Geographic origin

Strain number

Year of isolation

Virus subtype

1. CDC. Atkinson W, et al. Chapter 13: Influenza. In: Epidemiology and Prevention of Vaccine-Preventable Diseases, 4th ed. Department of Health and Human Services, Public Health Service, 1998, 220



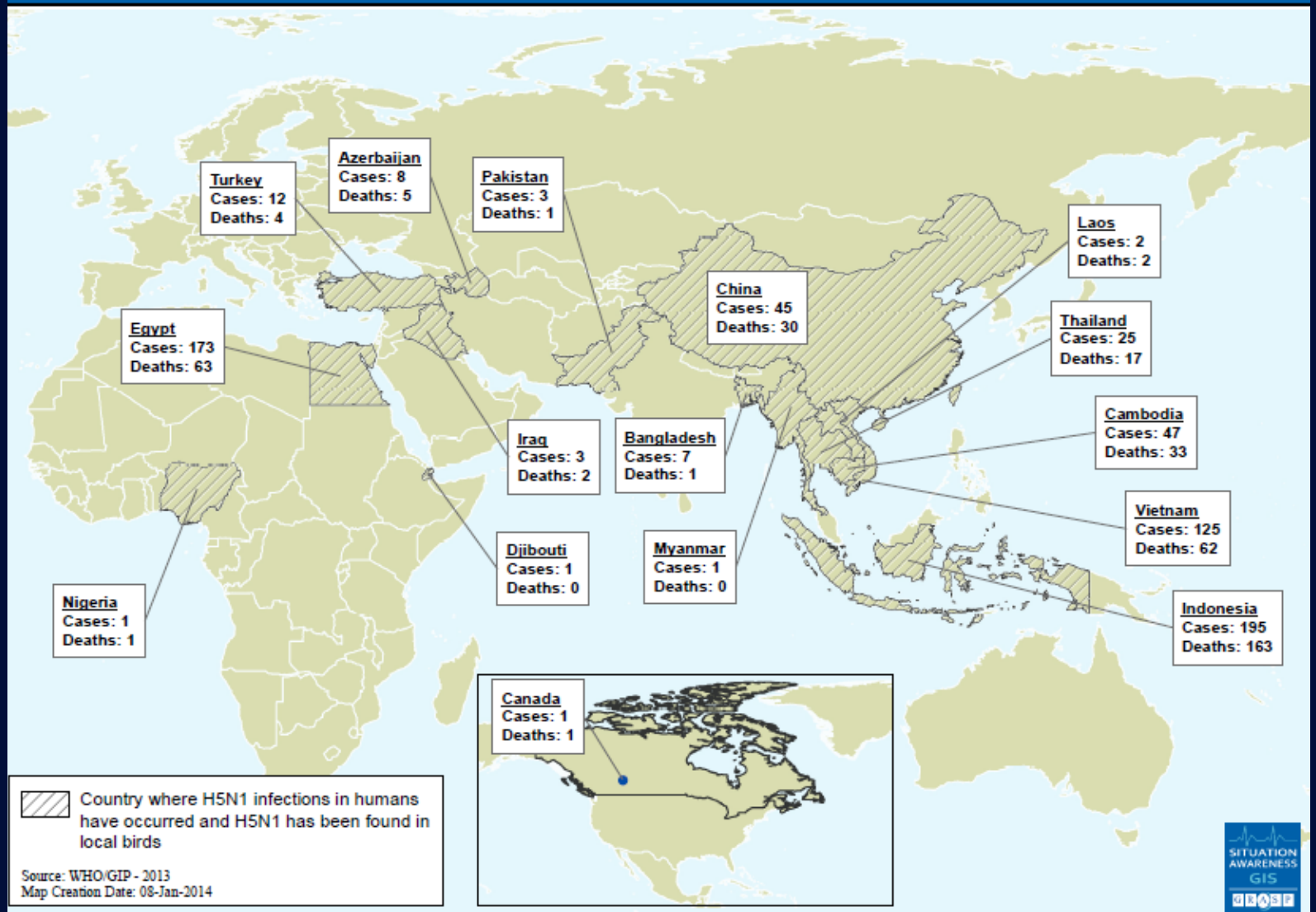
Hampson AW, Mackenzie JS. MJA 2006;185:S39-43

NOVEL INFLUENZA VIRUSES

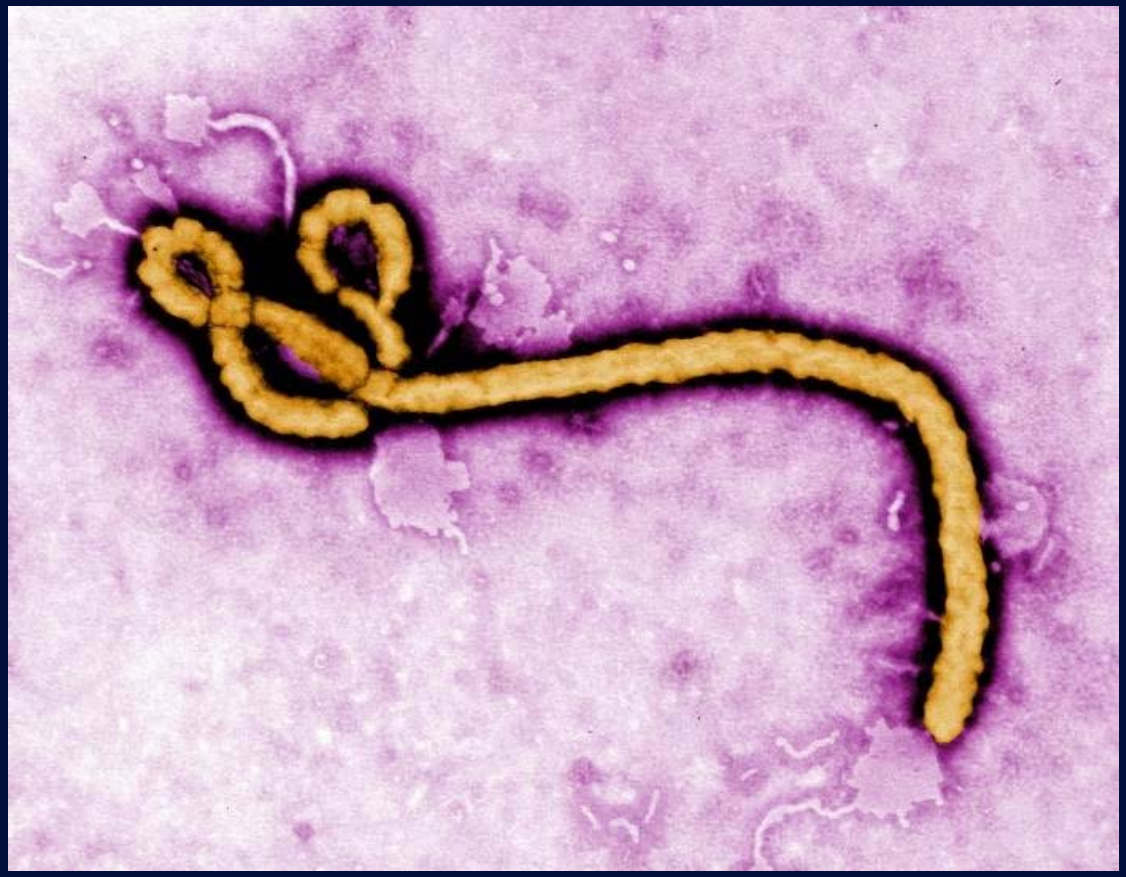
- Avian influenza A (H7N9)
  - First reported in China, March 2013; spread to Malaysia in February 2014
  - Source: Infected poultry or contaminated environment
  - Clinical illness: Severe respiratory illness; mortality ~33%
- Influenza A (H3N2v)
  - First detected in US pigs in 2010 and human in 2011
  - Source: Prolonged exposure to pigs at agricultural fairs
  - Similar to seasonal flu
- Influenza A (H5N2), (H5N8), (H5N1)
  - Multiple reports of birds in US infected with these viruses (Asian origin) in CA, ID, OR, UT, WA in backyard flocks, wild birds, and wild aquatic birds
- Influenza A (H5N1)
  - Ongoing poultry and human cases in Asia, Europe and North Africa

Highly Pathogenic Avian Influenza (H5N1) Human Cases and Deaths Since 2003

Status as of January 8, 2014
Latest available update



EBOLA



EBOLA OUTBREAK: 13 APRIL 2016

Summary

- Total cases 28,616, Total deaths: 11,227 (~40%), Lab confirmed cases: 15,227
- Healthcare personnel (HCP, Onset to 27 Sept.): 881 (deaths = 513)

Countries with former widespread transmission and current established control measures:

- Guinea: Total cases 3814, total deaths 2544, lab confirmed 3358
- Sierra Leone: Total cases 14,124, total deaths 3956, lab confirmed 8706
- Liberia: Total cases 10,678, total deaths 4810, lab confirmed 3163

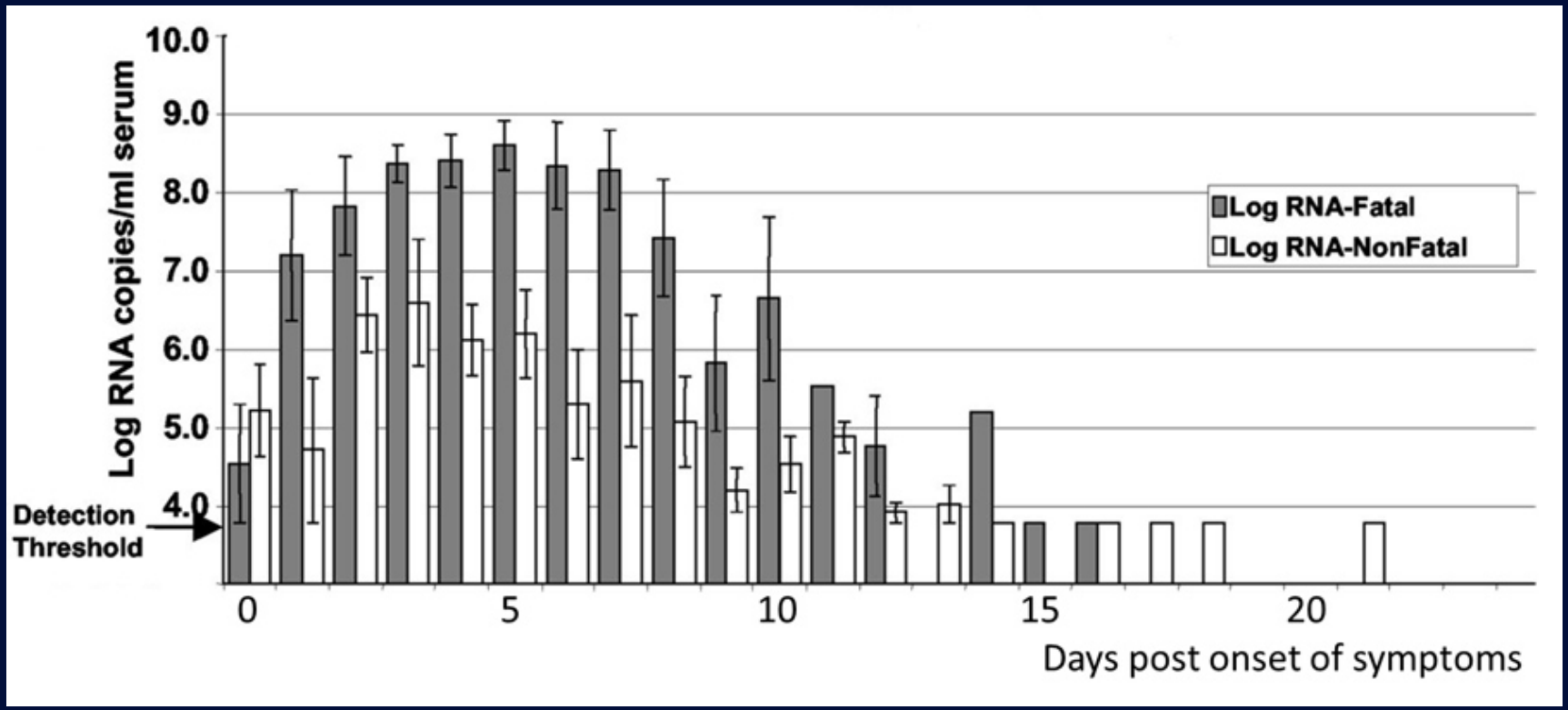
Previously Affected Countries:

- Nigeria: Total case count 20, total deaths 8, lab confirmed 19
- Senegal: Total cases 1, total deaths 0, lab confirmed 1
- Spain: Total cases 1, total deaths 0, lab confirmed 1 (case in a HCP)
- Mali: Total cases 8, total deaths 6, lab confirmed 7
- UK: Total cases 1, total deaths 0, lab confirmed 1
- Italy: Total cases 1, total deaths 0, lab confirmed 1
- US: Total cases 4, total deaths 1, lab confirmed 4, HCP 2, (11 evacuees)

INITIAL CHALLENGES IN EBOLA PREPAREDNESS

- Lack of funding
- Lack of agreement with CDC recommendations by some experts
  - N95 respirator versus PAPR
  - Liquid and solid waste disposal
  - Incubation period (21 days vs 30 or longer)
- Inadequate physical facilities for care of a patient
- Inadequate personnel to provide care
- Shortage of PPE
- Inability to acquire needed POC lab equipment

EBOLA VIRUS RNA COPY LEVELS IN SERA OVER TIME



http://www.cdc.gov/vhf/ebola/transmission/human-transmission.html

Table 3. Clinical Characteristics of Hemorrhagic Fever Viruses Noted in Past Case Series or Outbreaks

Virus	Distinctive Clinical Features	Person-to-Person Transmission	Incubation Period, d	Mortality, %	Treatment
Ebola[25,42-44,47,80,99]	High fever and severe prostration. A diffuse maculopapular rash may occur by day 5 of illness. Bleeding and disseminated intravascular coagulation are common.	Yes	2-21	50-90*	Supportive
Marburg[40,41,87,102]	High fever, myalgias. Nonpruritic maculopapular rash of the face, neck, trunk, and arms may develop. Bleeding and disseminated intravascular coagulation are common.	Yes	2-14	23-70†	Supportive
Lassa fever[52,88-91,100,101,110]	Gradual onset of fever, nausea, abdominal pain, severe sore throat, cough, conjunctivitis, ulceration of buccal mucosa, exudative pharyngitis, and cervical lymphadenopathy. Late signs include severe swelling of head and neck; pleural and pericardial effusions. Hemorrhagic complications less common.	Yes	5-16	15-20	Ribavirin, supportive
New World Arenaviruses[54,92,128]	Gradual onset of fever, myalgias, nausea, abdominal pain, conjunctivitis, flushing of face and trunk, and generalized lymphadenopathy. May develop petechiae, bleeding, and central nervous system dysfunction (tremors of the tongue and upper extremities, myoclonic movements, dysarthria, and generalized seizures).	Yes	7-14	15-30	Ribavirin, supportive
Rift Valley fever[61,93-96]	Fever, headache, retro-orbital pain, photophobia, and jaundice. Less than 1% develop hemorrhagic fever or encephalitis. Retinitis affects approximately 10%, which may occur at time of acute febrile illness or up to 4 weeks later.	No	2-6	<1	Ribavirin, supportive
Yellow fever[66,97]	Fever, myalgias, facial flushing, and conjunctival injection. Patients either recover or enter a short remission followed by fever, relative bradycardia, jaundice, renal failure, and hemorrhagic complications.	No	3-6	20	Supportive
Omsk hemorrhagic fever[59]‡	Fever, cough, conjunctivitis, papulovesicular eruption on the soft palate, marked hyperemia of the face and trunk (but no rash), generalized lymphadenopathy, and splenomegaly. Some patients may develop pneumonia and central nervous system dysfunction.	No	2-9	0.5-10	Supportive
Kyasanur Forest disease[59,98]	Similar to Omsk but biphasic illness: first phase lasts 6-11 days and is followed by an afebrile period of 9-21 days. Up to 50% of patients relapse and develop meningoencephalitis.	No	2-9	3-10	Supportive

*Reported Ebola data are for Sudan (50%) and Zaire (90%) subtypes. The Ivory Coast subtype has an indeterminate case-fatality rate, as there has been a single nonfatal human case. The Reston subtype causes subclinical infection in humans.
†Mortality ranges from 23% in the 1967 outbreak in Germany to 70% in the largest outbreak of 1999 in the Democratic Republic of the Congo.
‡Also Sergey Netesov, MD, written communication, February 27, 2002.

UNC HOSPITAL PREPAREDNESS: HIGHLY COMMUNICABLE DISEASES

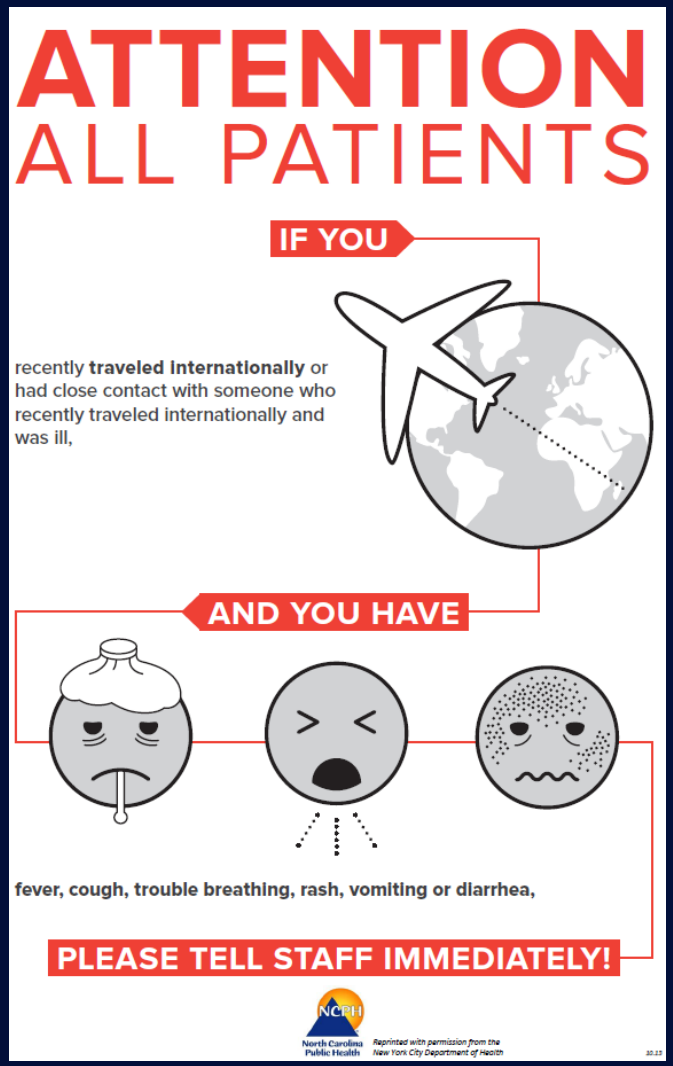
Critical issues

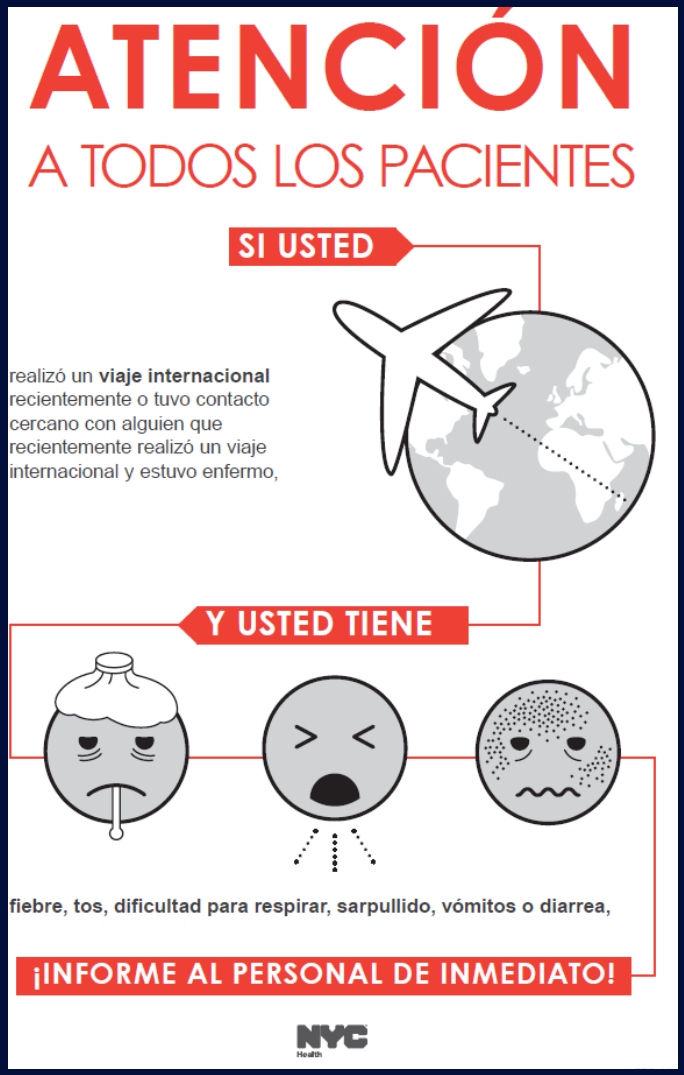
- Surge capacity
- Screening and recognition of cases
- Adequate training of HCP on donning and doffing PPE
- Adequate isolation facilities (sequestered or dedicate area)
- Maintaining adequate staffing
- Provision of essential services/supplies

Additional issues

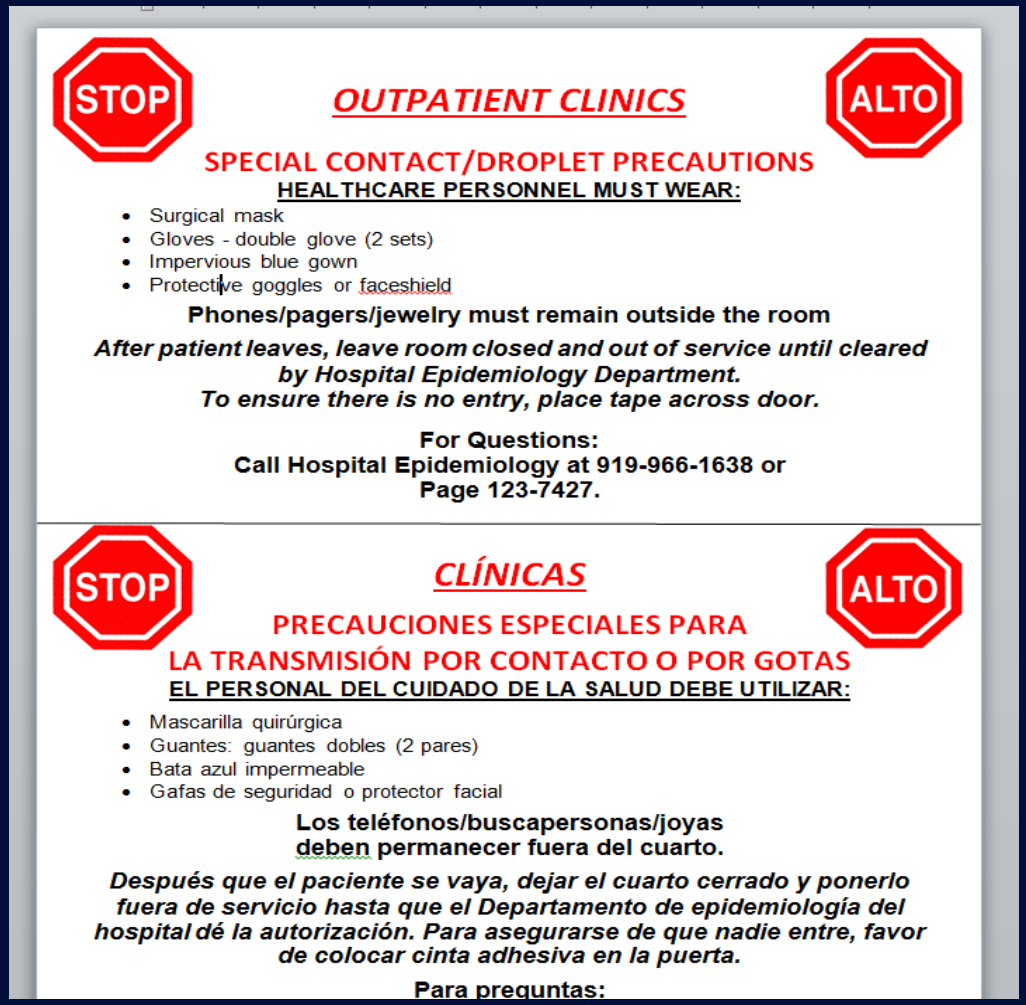
- Surveillance
- Diagnosis
- Protecting personnel
- Occupational health
- Stockpiling PPE
- Triage of limited supplies/beds
- Security
- Communications
- Transport

ED/CLINIC PATIENT NOTIFICATION SIGNS





OUTPATIENT EBOLA ISOLATION SIGN



STOP

OUTPATIENT CLINICS

ALTO

SPECIAL CONTACT/DROPLET PRECAUTIONS

HEALTHCARE PERSONNEL MUST WEAR:

- Surgical mask
- Gloves - double glove (2 sets)
- Impervious blue gown
- Protective goggles or faceshield

Phones/pagers/jewelry must remain outside the room

After patient leaves, leave room closed and out of service until cleared by Hospital Epidemiology Department.
To ensure there is no entry, place tape across door.

For Questions:
Call Hospital Epidemiology at 919-966-1638 or
Page 123-7427.

STOP

CLÍNICAS

ALTO

PRECAUCIONES ESPECIALES PARA
LA TRANSMISIÓN POR CONTACTO O POR GOTAS

EL PERSONAL DEL CUIDADO DE LA SALUD DEBE UTILIZAR:

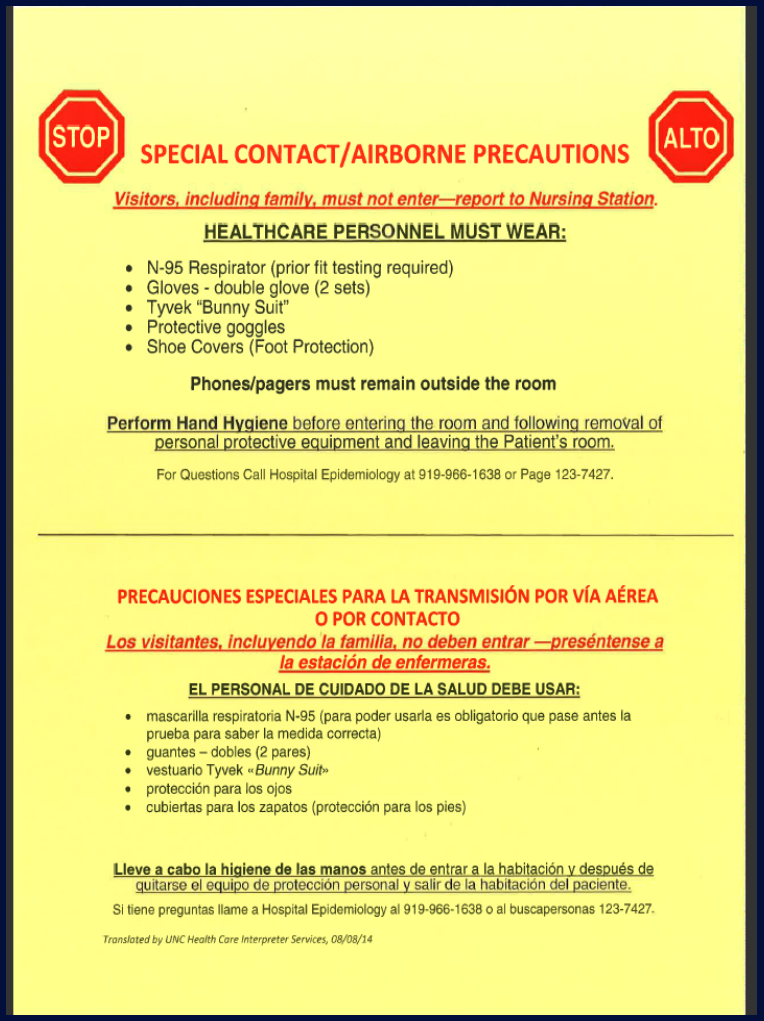
- Mascarilla quirúrgica
- Guantes: guantes dobles (2 pares)
- Bata azul impermeable
- Gafas de seguridad o protector facial

Los teléfonos/buscapersonas/joyas
deben permanecer fuera del cuarto.

Después que el paciente se vaya, dejar el cuarto cerrado y ponerlo fuera de servicio hasta que el Departamento de epidemiología del hospital dé la autorización. Para asegurarse de que nadie entre, favor de colocar cinta adhesiva en la puerta.

Para preguntas:

INPATIENT EBOLA ISOLATION SIGN



STOP

SPECIAL CONTACT/AIRBORNE PRECAUTIONS

ALTO

Visitors, including family, must not enter—report to Nursing Station.

HEALTHCARE PERSONNEL MUST WEAR:

- N-95 Respirator (prior fit testing required)
- Gloves - double glove (2 sets)
- Tyvek "Bunny Suit"
- Protective goggles
- Shoe Covers (Foot Protection)

Phones/pagers must remain outside the room

Perform Hand Hygiene before entering the room and following removal of personal protective equipment and leaving the Patient's room.

For Questions Call Hospital Epidemiology at 919-966-1638 or Page 123-7427.

PRECAUCIONES ESPECIALES PARA LA TRANSMISIÓN POR VÍA AÉREA O POR CONTACTO

Los visitantes, incluyendo la familia, no deben entrar —preséntense a la estación de enfermeras.

EL PERSONAL DE CUIDADO DE LA SALUD DEBE USAR:

- mascarilla respiratoria N-95 (para poder usarla es obligatorio que pase antes la prueba para saber la medida correcta)
- guantes – dobles (2 pares)
- vestuario Tyvek «*Bunny Suit*»
- protección para los ojos
- cubiertas para los zapatos (protección para los pies)

Lleve a cabo la higiene de las manos antes de entrar a la habitación y después de quitarse el equipo de protección personal y salir de la habitación del paciente.

Si tiene preguntas llame a Hospital Epidemiology al 919-966-1638 o al buscapersonas 123-7427.

Translated by UNC Health Care Interpreter Services, 08/08/14

UNC HEALTH CARE EBOLA PREPAREDNESS: KEY FEATURES

- Communication (ASK, ISOLATE, CALL): Information for students, alert signs in hospital, screening for travel/symptoms at all clinic encounters, scripting Health Link
- Dedicated space in UNC ED (2 rooms pre-stocked with PPE)
- Designated inpatient area with specifically designed unidirectional flow (designated hot and cold zones)
  - Pre-positioning of PPE supplies and lab equipment
  - Designated location for donning PPE
  - Designated location for doffing PPE
  - POC lab area
  - Equipment storage area (e.g., X-ray machine)
  - Showers for staff
  - Secure area

UNC HEALTH CARE EBOLA PREPAREDNESS: KEY FEATURES

- Ebola Care Team developed: Critical care physicians and nurses, lab technologists, respiratory care, radiology technologists
- Ancillary support staff identified: Infection Control, pharmacy, security, etc.
- HCP safety (PPE): Scrubs, Tyvek suits, Tyvek hood, 2 sets of extended cuff gloves, N95 respirator, face shield, impervious blue over gown, fluid impervious boots
  - PPE monitor 24/7 and safety officer 24/7
  - PPE stockpiled
- Training in donning and doffing PPE (defined donning and doffing protocol)
  - Phase I: Basic PPE including breach protocol and disinfection protocol for spills/surfaces
  - Phase II: PPE training in simulation lab individualized for HCP specialty
  - Phase III: PPE team training

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

1. General
   - Have a comprehensive facility plan for managing a highly communicable emerging infectious disease.
   - Nestle the plan for emerging infectious diseases within the general disaster plan.
   - Base the plan on the route(s) of transmission for the infectious agent.
   - Incorporate the incident command structure in the plan.
   - Periodically train key personnel on the plan.
   - The plan should include care of single patients (eg, Ebola) and managing large number of patients in an epidemic (eg, novel influenza).
   - Incorporate communications with local and state health department officials.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Screening and signage (when appropriate based on the threat of a highly communicable disease)
  - Place signs at every entrance to the hospital and clinics that includes the following: epidemiologic clues to possible disease exposure (ie, travel locations), signs and symptoms of infection, and who to notify if the patient or visitor has both exposure and appropriate signs or symptoms.
  - Include messaging about the signs and symptoms of the concerning disease in all telephone contacts with the patient (eg, reminders about appointments) and who to contact prior to arrival at the health care facility.
  - Screen all patients immediately at the time of all health care visits.
  - Include screening in the electronic medical record (also have alerts in the medical record that require screening)

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Screening and signage (when appropriate based on the threat of a highly communicable disease)
  - Place an appropriate isolation sign on the door of all patients being isolated because of the possibility of a highly communicate disease.
  - For diseases transmitted via the droplet or airborne routes emphasize respiratory hygiene (ie, immediate use of a mask and proper disposal of tissues).
  - Emphasize the need for proper hand hygiene.
  - All messaging should be in appropriate languages for the region.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Triage
  - Train frontline person in all clinics and the emergency department in appropriate use of personal protective equipment.
  - Have appropriate personal protective equipment available.
  - Have a designated location in the emergency department and all clinics in which to immediately place the patient (a private room; ideally with access to a sink and toilet, and if possible, one that meets standards for a disease transmitted by the airborne route (ie, negative pressure, out-exhausted air, >12 air exchanges per hour) if applicable.
  - For diseases transmitted by the airborne route and when an airborne isolation room is not available, ideally place a portable high-efficiency particulate air purifier in the room.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Triage
  - Have a well-defined process for alerting key health care facility officials about the presence of a patient with a possible highly communicative disease (eg, disaster manager, infection preventionist).
  - Avoid blood tests or other procedures that may place the laboratory staff or other health care personnel at risk.
  - Have a well-defined and safe method for transporting a patient either to a properly equipped emergency department or hospital facility able to safely care for a patient.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Inpatient care
  - Have a well-defined plan for the inpatient location that will provide care to a patient with a highly communicative disease (or a plan for transporting such a patient to facility that can provide such care).
  - In the inpatient care unit designate areas that are hot (ie, potentially contaminated) and cold (ie, areas that are not contaminated).
  - Have a well-trained medical care team. For highly communicable diseases (eg, Lassa, Ebola), ideally provide 3-step training: (1) basic individual training on personal protective equipment donning and doffing (and including how to manage contamination of the environment from a spill and breach of the personal protective equipment. Such training should be individualized to the specialty of the health care providers [ie, physician, nurse, respiratory therapist]); (2) team training using mannequins; and (3) team training in the designated containment unit.
  - Train team personnel on donning and doffing using an explicit written list of all donning and doffing steps.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

PREPAREDNESS FOR MANAGING A HIGHLY COMMUNICABLE EMERGING INFECTIOUS DISEASES

- Inpatient care
  - Screen and exclude health care personnel unable to wear the proper personal protective equipment. Consider excluding from the care team personnel at high risk for disease acquisition or more severe illness, such as persons with nonintact skin, pregnancy, and immunocompromised persons. Consider excluding trainees from providing care.
  - Store an adequate supply of personal protective equipment.
  - If needed, have dedicated point of care laboratory equipment
  - Develop a method to safely dispose of solid and liquid wastes.
  - Restrict visitors (if indicated) and maintain a log of all visitors.
  - Maintain a log of all health care personnel providing care.
  - Develop a plan for managing health care personnel with unprotected exposure to the infectious agent (eg, needlestick).
  - Assure that care team members receive proper rest.

Weber DJ, et al. Amer J Infect Control 2016;44:e91-e100

SUMMARY

- Expect new and emerging diseases in the future
- Develop and implement policies and procedures to minimize risk to healthcare facility and HCP
- Key vulnerabilities
  - Failure to recognize a patient infected with a highly communicable disease, and promptly institute proper isolation precautions
  - Failure to have proper PPE available and/or train HCP in donning and doffing of PPE
- Key public health control measures
  - Sensitive and specific diagnostic test
  - Worldwide cooperative response

THANK YOU