

Emerging and Re-emerging Infectious Diseases

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Disclosure

“I do not have any relevant financial relationships with any commercial interests for this presentation”

Learning Objectives

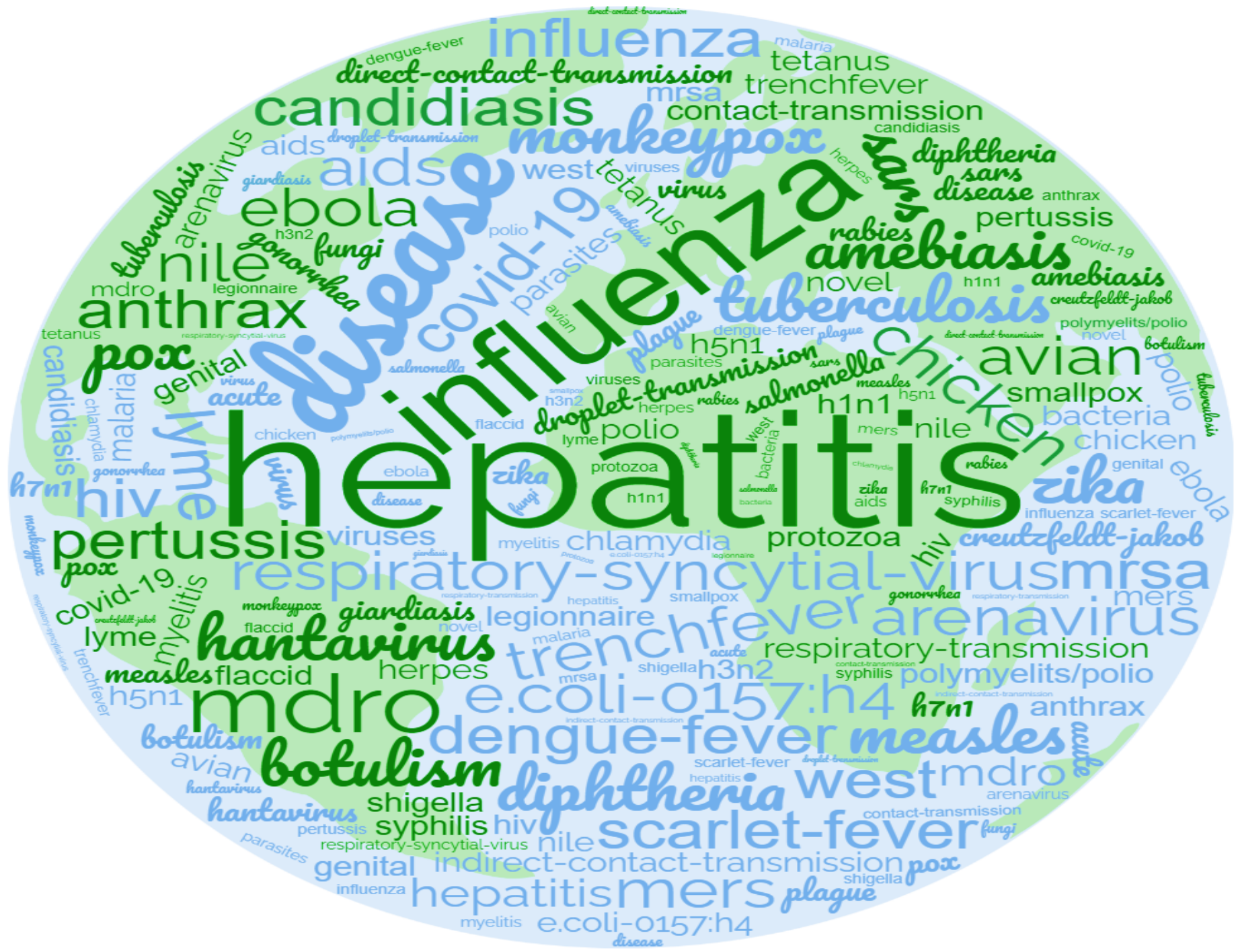
1. Identify the importance of historical causes and responses to infectious disease outbreaks, health crisis, and pandemics
2. infection prevention and control programs current and future roles
3. Review the roles and challenges of correctional infection prevention and control staff



Emerging vs Re-emerging Infectious Diseases

- Fifty years ago many people believed the age-old battle of humans against infectious disease was virtually over, with human kind the winners.
- We now know this was just the beginning





Emerging Infectious Diseases

Can involve known pathogens or new pathogens

Emerging diseases are commonly defined as:

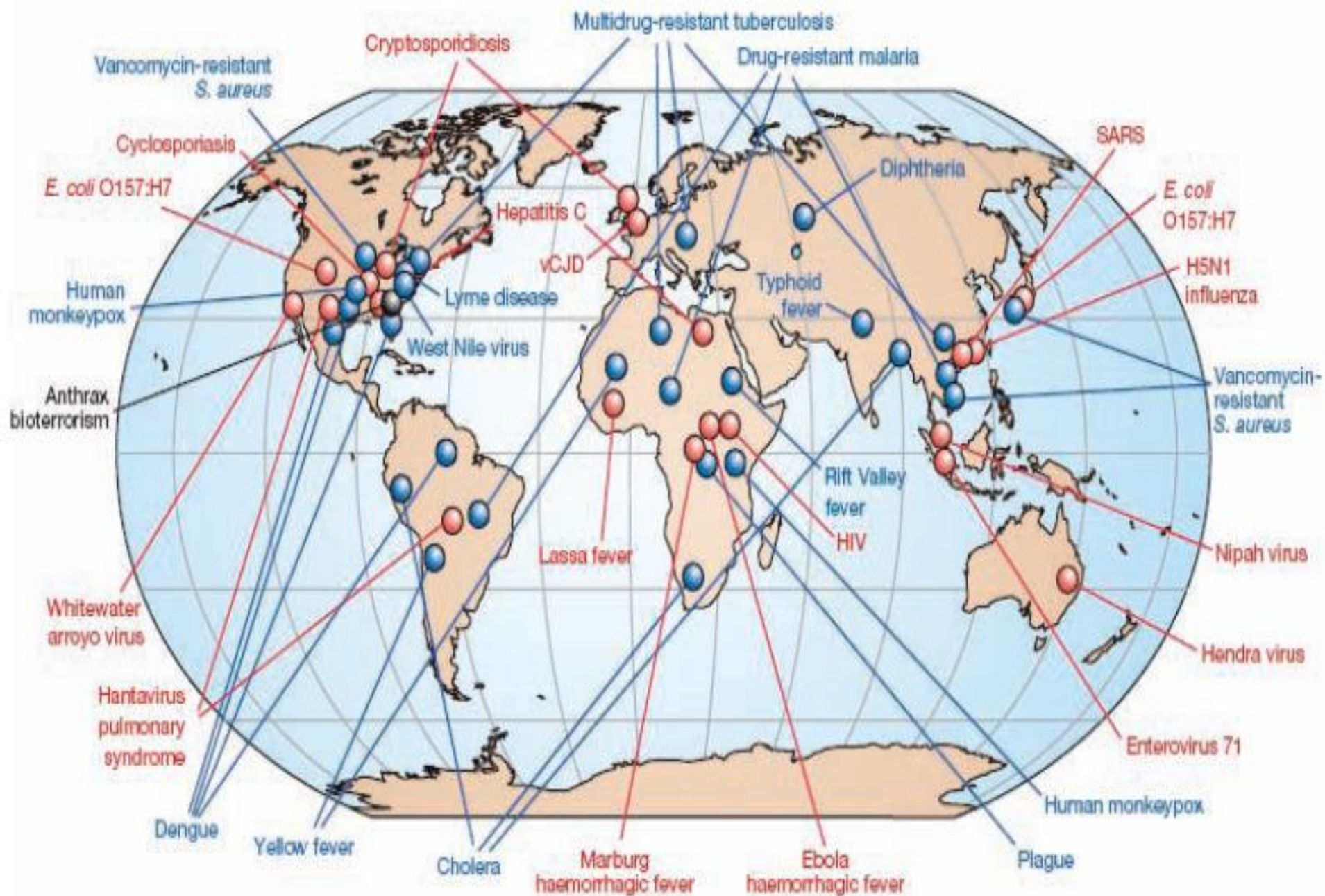
- Outbreaks of previously unknown diseases
- Known diseases that are rapidly increasing in incidence or geographic range in last 2 decades
- Persistence of infectious diseases that cannot be controlled
- Emerging zoonotic diseases new transmission to humans
- Emerging disease examples: HIV, SARS, MERS, Lyme disease, Escherichia coli O157:H7 (E. coli), hantavirus, dengue fever, Influenza, West Nile virus, Zika, COVID-19



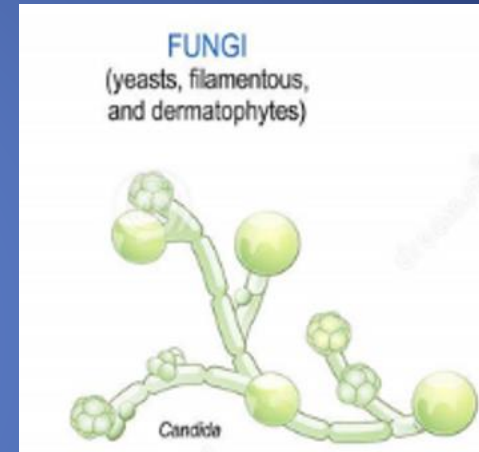
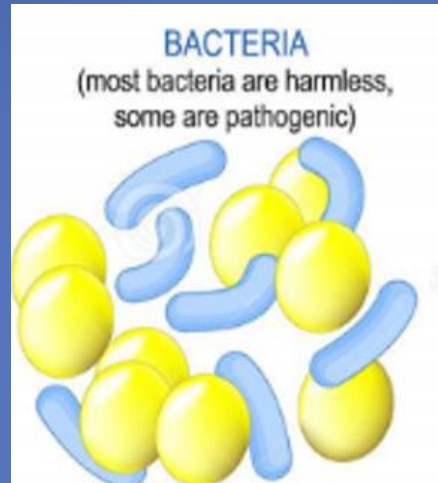
Re-Emerging Infectious Diseases

- Diseases once major health problems globally or in a particular country, and then declined dramatically
 - Reappears becoming health problems for significant proportion of a population (malaria and tuberculosis are examples)
- Many specialists in infectious diseases include re-emerging diseases as a subcategory of emerging diseases.





Microbes That Cause Infectious Diseases



Outbreaks, Epidemics, and Pandemics

Can occur at any time

- Outbreaks: sudden occurrence of disease cases in excess of normal expectancy. The number of cases varies according to the disease-causing agent, and size and type of previous and existing exposure to the agent
- Epidemic: a widespread occurrence of an infectious disease in a community at a particular time
- Pandemics: when a disease spreads across several countries or continents and usually affects a large number of people



History of Pandemics

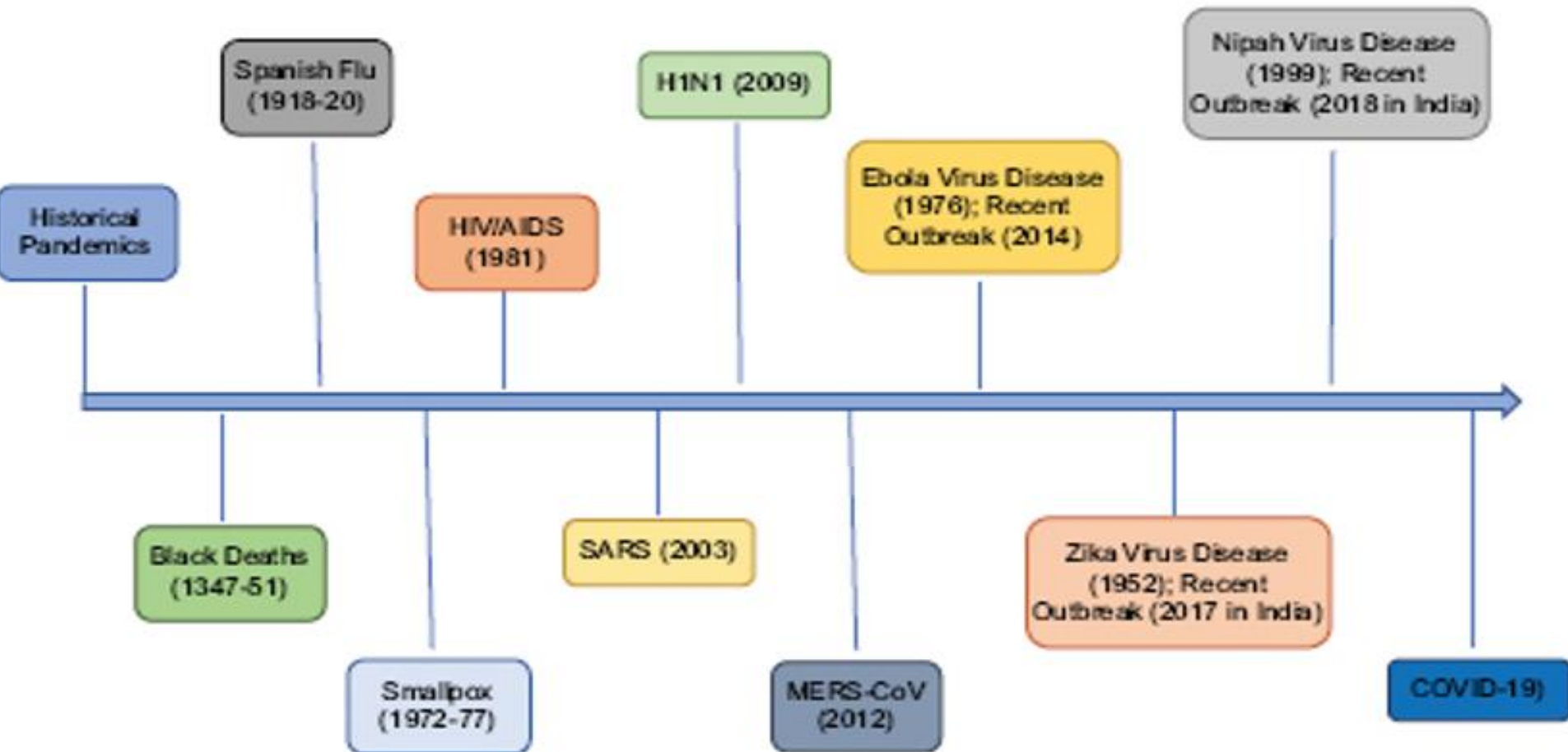
Year	Epidemic/Pandemic	Location	Deaths	% Pop (est)
165 - 190	The Antonine Plague	Mediterranean	5- 10 M	2.60%
541-544	Plague of Justinian	Med, Asia, N.Africa, Arabia	30-50 M	21%
1346 - 1352	The Black Death	Europe	200M	51%
1629 -1631	North Italian Plague	North Italy	2 M	30-60%
1665 - 1666	Plauege of London	London	68K - 100K	15%
1720 - 1721	Prevengal Peste (bubonic)	SE France	76 - 126k	20%
1796 - 1900's	Smallpox	The Americas	56M	12.10%
1918 - 1920	Spanish Flu	Global	45M	2.50%
1899 - 1947	The Third Plague	Europe	12M	1.00%
1981 - present	HIV /AIDS	Global-pandemic	30M	0.70%
11/19 - 5/21	COVID-19	Global - pandemic	3.5M	0.04%

Many death toll numbers are best estimates based on available research.
The deadliest pandemics were caused by a single bacterium

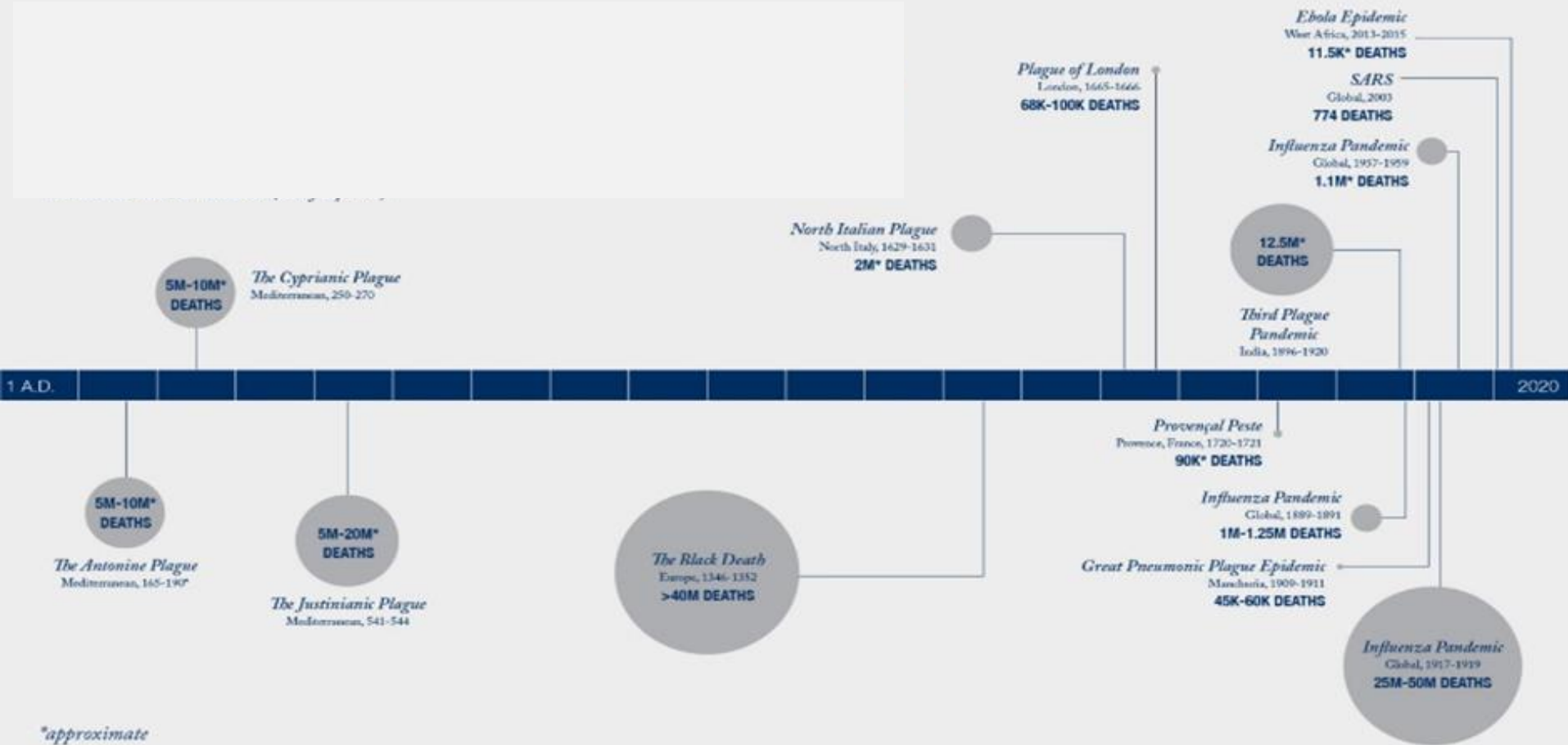
Sources: <https://www.visualcapitalist.com/worlds-deadliest-pandemics-by-population-impact/> & <https://www.history.com/news/pandemics-end-plague-cholera-black-death-smallpox>



Timeline of Outbreaks, Epidemics, and Pandemics



History of Pandemics



Research on Cause for Epidemics & Pandemics

Varies by Disease and Multiple Contributing Factors

- Transit society
- Unstable Housing
- Misinformation
- Myths
- Science Disregarded
- Vaccine Hesitancy
- Increase Zoonotic Diseases
- Environmental
- Drug Resistance
- Healthcare Inequities
- Social Inequities
- Human Behavior
- Population growth
- Crowding
- Public Health Breakdown
- Imbalances of ecosystems (between humans, animals, pathogens and the environment)



Global Surveillance

- Responses: Each time there is a outbreak response is important as we expand our knowledge
- Learning from response to last outbreak
- Missions : Eliminate the diseases that have plagued humankind for centuries and build systems necessary to protect health of entire populations



Global Surveillance Programs

Global Surveillance Programs include but not limited to:

- Task Force for Global Health
- World Health Organization (194 UN member states)
- Countries departments of public health (different titles)
- Center For Disease Control and Prevention
- US HHS-Health and Human Resources (Medicare/Medicaid oversight)
- Departments of health (Center for State, Tribal, Local and Territorial-CSTLTS)
- CDC Emerging Infectious Disease division



Global Surveillance Programs

- NIAID: National Institute of Allergy and Infectious Diseases
- Monitors emergent threat of infectious diseases and pathogens (including biodefense research)
- Classifies them in categories based on criteria of risk to national security and public health
 - A – Highest
 - B – Second Highest
 - C – Third Highest



Infection Prevention and Control

1800 - 1970

1846 - Handwashing
1853 - Environmental theory
1895-1954 TB in America
1946 – CDC Formed
1950 – WHO formed
1961 – mRNA discovered
1964 – ACIP founded
1970 – HIV (global)
1970 – Commission on
Correctional Services

1970 - 1980

1973 - AMA/ABA study results
1975 – Jail program
1976 – Nosocomial Inf. Cntr.
1977 - 16 pilot jails accredited
1978 – First Pandemic Plan
1979 – CDC publication on
health
1980 – Discovery pathogen
subset

Infection Prevention and Control Correctional History

1980 - 1995

- 1982 – Accreditation change
- 1983 – NCCHC formed
- 1985 – Universal Precautions
- 1987 – mRNA further research
- 1989 – Additional standards
- 1992 – Surveillance (NNIS)
- 1995 – CDC Emerging Infection Program

1995 - 2000

- 1995 – Genome sequencing
- 1996 – Isolation guidelines updated
- 1997 – Correctional IPC programs (estimate)
- 2000 – 2010 Updated guidelines and response to global concerns

Infection Prevention and Control

Correctional History

2000 to Present (multiple changes and updates for experts)

- National Center for Emerging and Zoonotic Infectious diseases (NCEZID)
- Multiple resources and guidelines (Medical groups, associations, experts, researchers)
- Correctional workgroups and guidelines
- Updated Education (multiple sources)
- Data tracking (vaccines, infections, outbreaks)
- Infographics
- Publications
- Research



Advancement of Infection Prevention and Control

- Transition from inmates to patients continuum of improving medical and mental health care
- Science improvements
- Research with access to research
- Technology
- Electron microscopes and powerful
- Genotyping, sequencing
- Improved infection control practices
- Improved treatments new medications
- Training / specialties



Infection Prevention and Control

Programs developed with needs and standards

- Policies and procedures
- Importance and purpose of everyday surveillance
- Education and monitoring
- Every outbreak, every pandemic has been a learning opportunity
- Understanding transmission
- Understanding precautions
- Not just collecting numbers
- Consulting



Outbreaks, Epidemics, and Pandemics

- Correctional IPC programs routinely handle outbreaks
- Better prepared than most
- What we have to remember “Every outbreak, every pandemic has been a learning opportunity”
- Each outbreak and pandemic are not the same, But infection control processes remain the same
 - Identify pathogen
 - Understand transmission
 - Understanding precautions



Planning

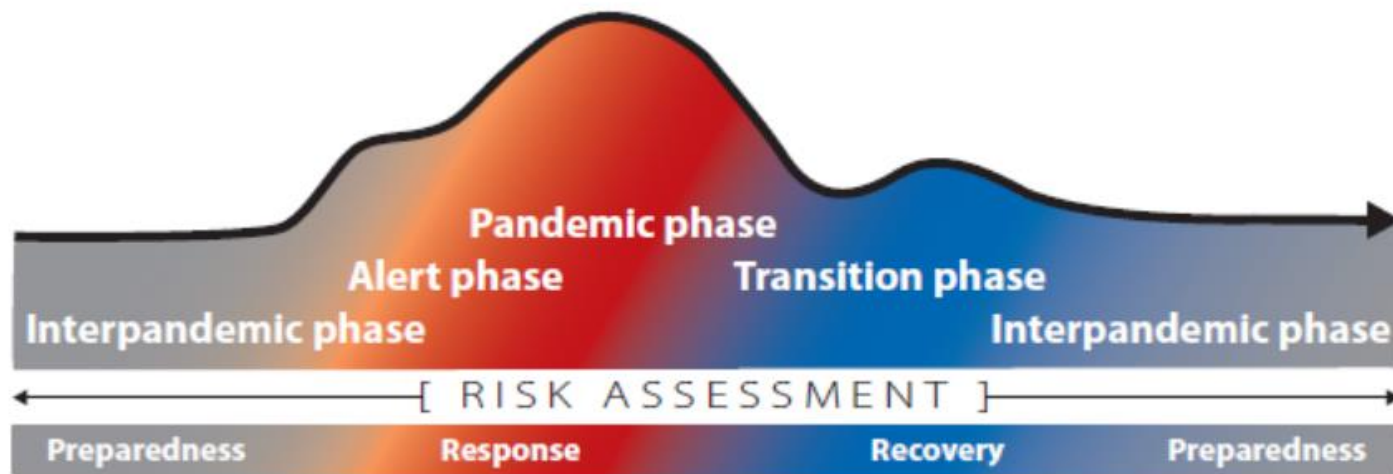
- Starts before any outbreak, epidemic or pandemic
- Pandemic plan – NOT JUST FOR FLU
- Infection control principles remain same
- Lessons from past



Planning

- All outbreaks, epidemics and pandemics go through stages
- Phases for pandemic Influenza developed In 1999, and updated in 2005, 2010, 2016, and more to come

Figure 1. The continuum of pandemic phases^a



^a This continuum is according to a "global average" of cases, over time, based on continued risk assessment and consistent with the broader emergency risk management continuum.

Planning

- Basic plan
 - Follow knowledge from past
 - Plan for each phase
 - Pandemic plan evolves for specific identified pathogen
 - Each outbreak, epidemic and pandemic are different
 - But infection control processes remain the same
 - Unknown - start with most protection (example HIV, COVID)



Alert Phase

- Monitor alerts
 - Trends in facilities
 - Local
 - National
 - Global
- News (more research)
- Social media (source of information)
- In news or social media – you will be asked



Pandemic Phase

- Research takes time both science and medical care
- Treatments based on what we know of past similar pathogens
- Prepare for changes as they occur
 - Pathogen identified
 - Transmission
 - Replication
 - Treatment changes
- Education for all



Transition/ Recovery Phases

- Determined by population immunity or decrease of circulating pathogen
- Determination may be difficult
- Pandemic fatigue sets in, and decrease mitigation or new variants may cause surges
- Pathogen may become endemic
- World experts usually determine end or transition phase



Infection Prevention and Control

- What is our role and how has it changed
- In the beginning:
 - Started with Red and Pink Book
 - Concerned with control of Tuberculosis
 - Evolved to other diseases including infectious diseases identified as of community concern
 - HIV, MRSA, STD's/STI's, respiratory illnesses
 - Chronic diseases
 - Improved medical care
 - Inmates / security driven
 - Information easily accessible



Infection Prevention and Control In Correctional Settings

- The 5 C's
 - Coordination
 - Communication
 - Collaboration new partners
 - Cooperation, delegating and working to maximize staffing
 - Competency - keeping up to date



Infection Prevention and Control In Correctional Settings

- Daily surveillance
- Monitoring Trends
- Reporting challenges in outbreaks
- Evaluate responses to local outbreaks, epidemics, pandemics



What We Have learned

- An outbreak can start anywhere
- Par levels and limited supplies
- Staffing
- Ability to adapt (thinking outside the box)
- Perseverance of staff and their strength
- Importance of mental health (stress, depression, loss)
- Importance of support
- Importance of consistent scientific information



What Have You Learned



Challenges We Faced

- Social media
- Media hype
- Anti anything
- Rapid spread of misinformation
- Incident command – did it work, who was in charge
- Denial
- Experience
- Fear and stress
- Personal beliefs
- Personal experiences
- Distrust
- Inability to provide quick response for routine medical needs
- Backlogs
- Massive data tracking
- Burn out



Challenges Met By Dedicated Innovation

- Communication with Security and DOH improved more to be done
- Working as teams
- Developed partnerships
- Many helping in to provide services
- Long hours
- Many stayed, some left for other reasons
- Adapted and worked to make the guidelines work
- Data information tracking
- Every challenge met with a can do attitude



This Pandemic

- IT has changed our lives forever
- We will take away lessons learned
- Be willing to look beyond what we know and understand the challenges that we face everyday may be intensified by an outbreak, epidemic, pandemic



Summary

- Be prepared
- Know your policies and procedures
- Know your basic infection control principles
- Work as a team
- Understand previous challenges

Next pandemic may not be a virus or influenza

What will it be?

Summary

Next pandemic may not be a virus, or influenza

Will it be known or new?

Currently monitoring known infectious diseases
and pathogens

Class A - 10

Class B - 40

Class C - 22

- *“It’s going to take scientists, physicians, historians and more to study the occurrences of past and more recent outbreaks. To figure them out, we must all work together.”*
 - Dr. Timothy Newfield,
 - Assistant Professor of history and biology
 - ,Georgetown University
- To this I would add All nurses and healthcare workers for they are the backbone of care in our facilities



Resources

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Emerging and Reemerging Infectious Diseases: Global Overview

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<https://www.cdc.gov/about/history/index.html>

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CDC Pandemic Influenza Plans

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History of infection prevention and control

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<https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens>

Resources

Updated HHS updated pandemic Influenza

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CDC: Emerging Infections Program Sites

<https://www.cdc.gov/ncezid/dpei/eip/eip-sites.html>

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