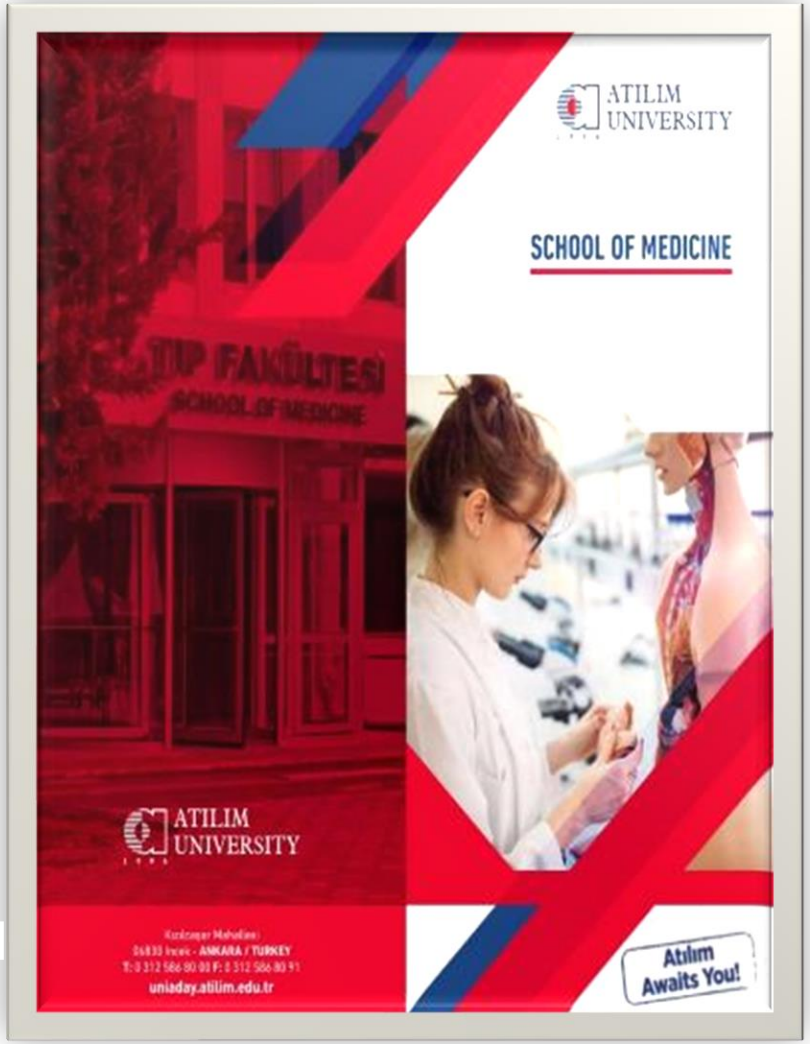

Management of Outbreaks, Epidemics & Pandemics *(OEP)*

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BA : Public Administration & Political Sciences

“These are not ordinary times where we play politics and juggle with the *safety of the society*. These are the times that demand prompt decisions and utter *responsibility* towards not just the self but our kind – the *humankind*.”

{ For supporting PBL sessions }

Phase 3 lecture, 2023 - 24 academic year, spring semester; was held as PBL, Ankara-TURKIYE

Learning objectives….

At the end of this lecture, students are basicly expected to :

- **Define** **OEP *(Outbreaks, Epidemics & Pandemics)***
- **Conceive** the importance of control of **OEP &** ***infection chain***
- **Understand** ***Epidemiological approach*** to **OEP**
- **Introduce** ***Epidemiological tools*** for controlling **OEP**
- **Gain** basic knowledge of national-international legal regulations on controlling **OEP**
- **Recognize** national & international dimensions of **OEP**; institutions & norms
- **Conceive** the importance of contagious diseases and **OEP** within the framework of "***One Medicine - One Health***" strategy of the WHO *(World Health Organisation)*

Definitions of important terms

- ✓ The amount of a particular disease that is usually present in a community is referred to as the baseline or **endemic level** of the disease.
- ✓ *This level is not necessarily the desired level, which may in fact be zero, but rather is the observed level.*
- ✓ In the absence of intervention and assuming that the level is not high enough to deplete the pool of susceptible persons, the disease may continue to occur at this level indefinitely.
- ✓ *Thus, the baseline level is often regarded as the expected level of the disease.*
- ✓ An **outbreak** simply means more disease than expected but not means *Epidemic*.

(https://search.cdc.gov/search/?query=what%20is%20outbreak&dpage=1)

Definitions of essential terms

- ✓ While some diseases are so **rare** in a given population that a single case warrants an epidemiologic investigation *(e.g., **rabies, plague, polio**)*, other diseases occur more commonly so that only deviations from the norm warrant investigation.
- ✓ ***Sporadic*** *refers to a disease that occurs infrequently and irregularly.*
- ✓ **Endemic** refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area.
- ✓ **Hyperendemic** refers to persistent, high levels of disease occurrence.

(https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html)

Definitions of basic terms

- ✓ Occasionally, the amount of disease in a community rises above the expected level.
- ✓ ***Epidemic*** *refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area.*
- ✓ **Outbreak** carries the same definition of epidemic, but is often used for a more limited geographic area.
- ✓ ***Cluster*** *refers to an aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.*

Pandemic refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people: Covid-19 Pandemic; ***inter-continental epidemic***!
(https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html)

Definitions of Epidemics-1

❖**Epidemics** *occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts.*

❖More specifically, an **epidemic** may result from :

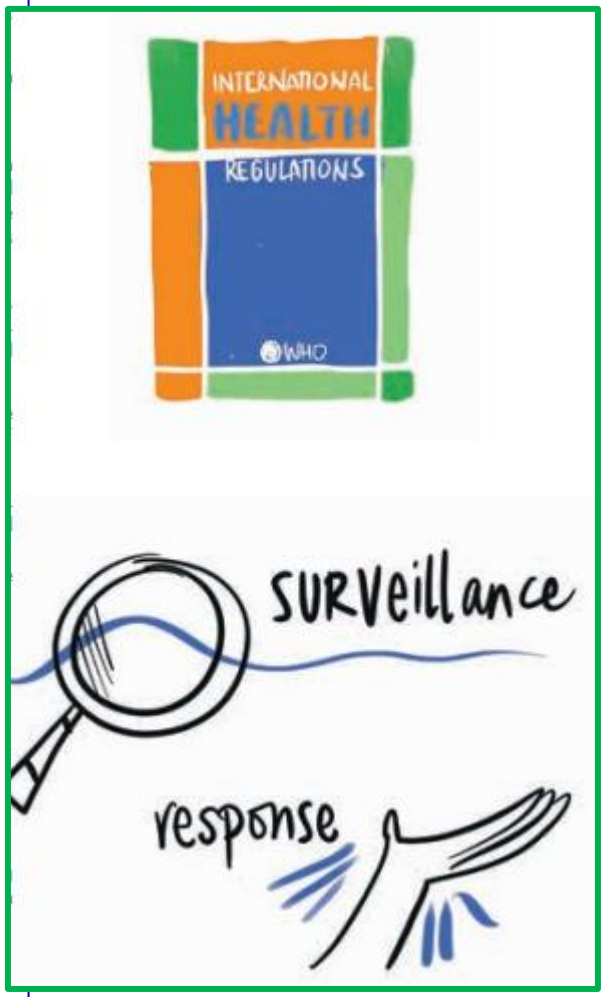
- *A recent increase in amount or virulence of the agent,*
- The recent introduction of the agent into a setting where it has not been before,
- *An enhanced mode of transmission so that more susceptible persons are exposed,*

(https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html)

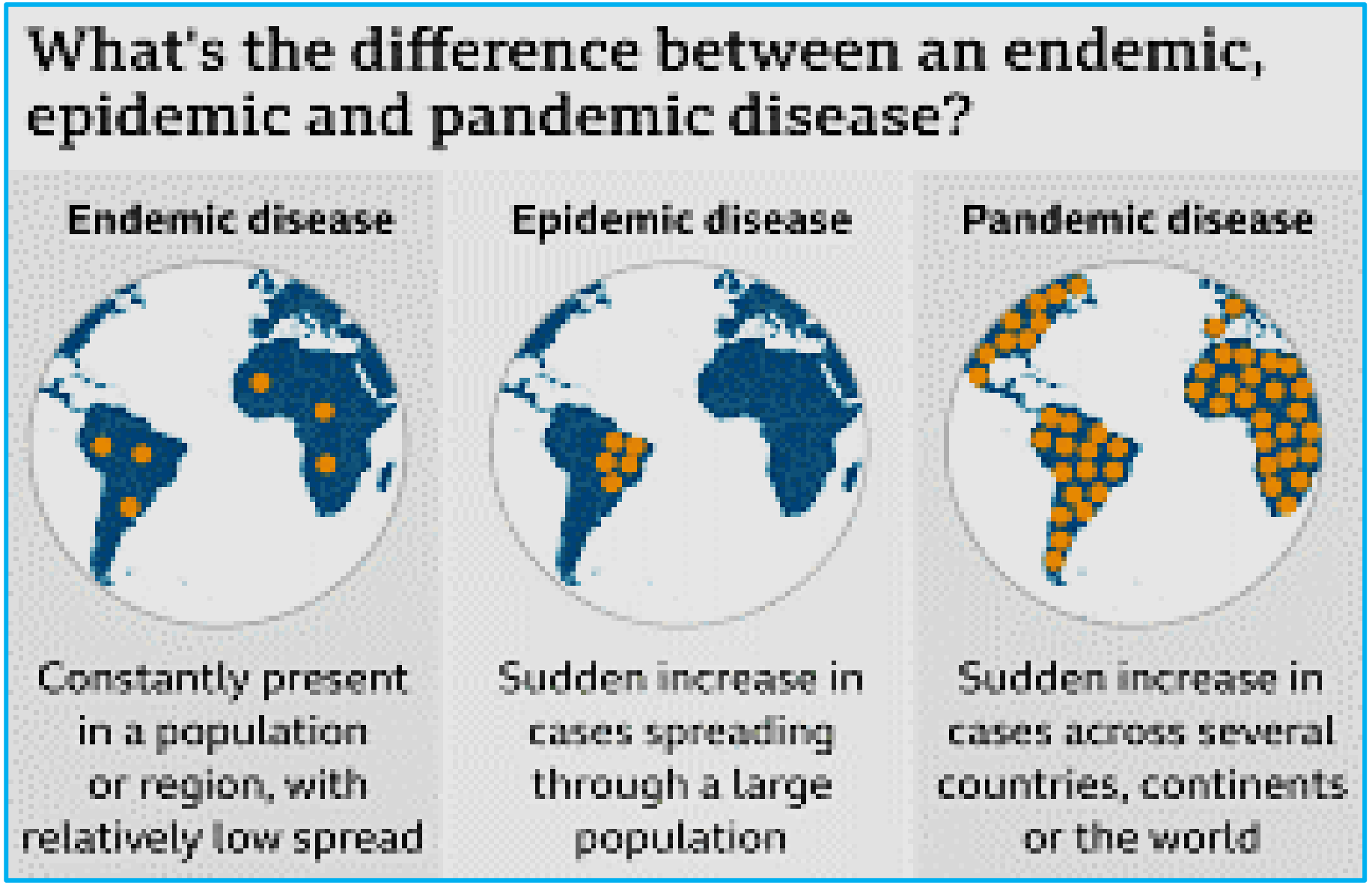
Definitions of Epidemics-2

❖**Epidemics** *occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts.*

- A change in the susceptibility of the host response to the agent, and/or factors that increase host exposure or involve introduction through new portals of entry.
- The previous description of **epidemics** *presumes only infectious agents, but non-infectious diseases such as diabetes and obesity exist in epidemic proportion in U.S.* *https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html*)



Endemic, Epidemic and Pandemic Spread



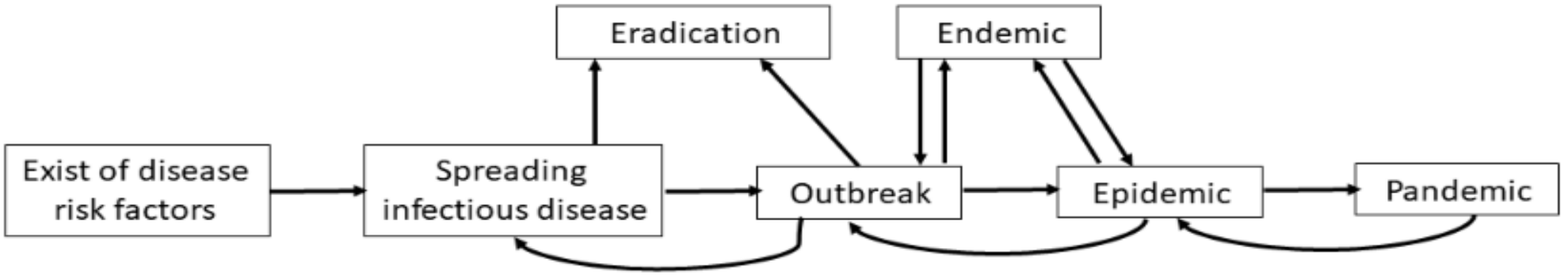
Ootbreak, Endemic, Epidemic and Pandemic Spread

Outbreak
sudden increase in occurrences of a disease in a particular time and place.

Endemic
constant maintained increase in occurrences of a disease in a geographic area.

Epidemic
rapid spread of disease to a large number of people in a given population within a short period of time.

Pandemic
spread across a large region, for instance multiple continents, or worldwide.



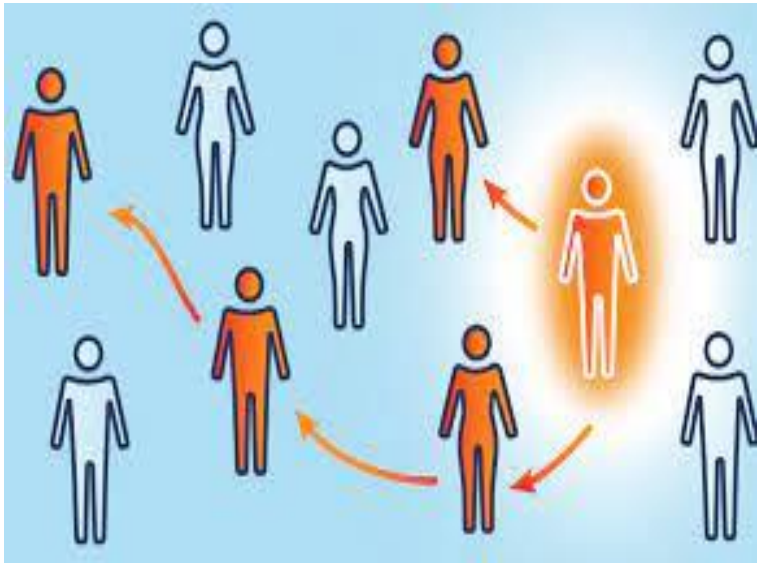
High likelihood of occurrence annually — Low likelihood of occurrence annually

Low likelihood of severe health and economic impact — High likelihood of severe health and economic impact

The Spread of Infectious Disease

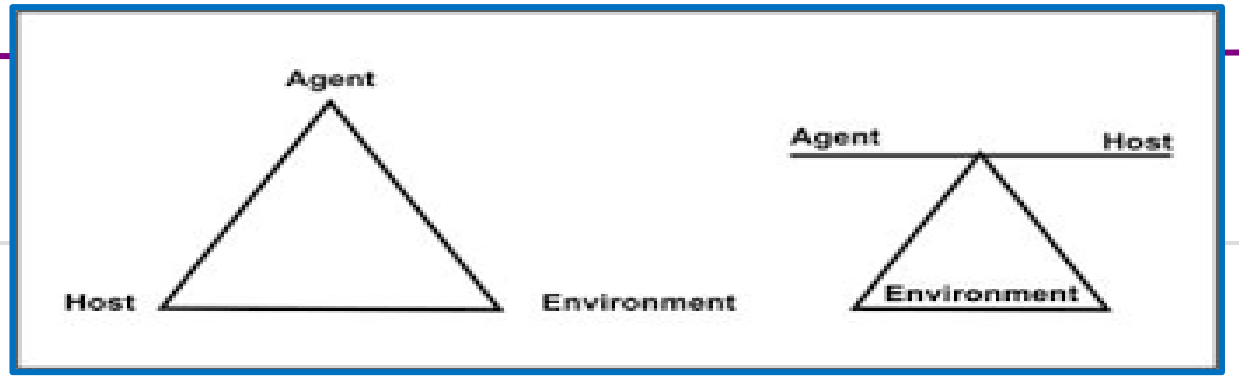
An infection is defined as the successful transmission of pathogenic microorganisms, such as bacteria, viruses, parasites or fungi that are spread:[4][5][6][7]

- Directly:
  - From person to person
  - Through respiratory droplets (for example, coughing or sneezing)
  - Through body fluids
  - Direct exposure to infectious agent in environment
  - During childbirth from mother to foetus (transplacental/perinatal)



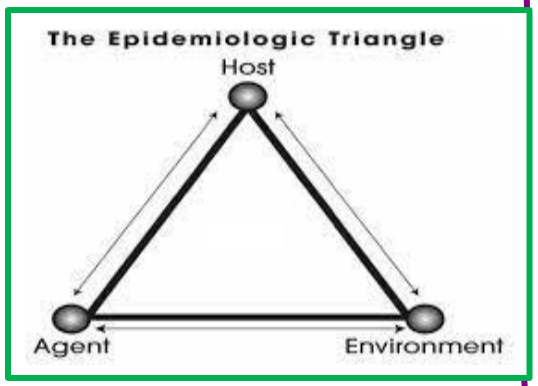
- Indirectly:
  - Biological - Vector or Intermediate host (for example; Zika Virus)
  - Mechanical - Vector or Vehicle (for example; Plague - transmission of *Yersinia Pestis* by fleas)
  - Airborne (for example, Tuberculosis)

Epidemiological Triad



In humans, infections occur when an infectious microorganism enters the body, multiplies, and leads to a reaction in the body and potential infectious disease. The spread of infectious disease requires three variables, known as the **epidemiological triad**[8]:

- The Agent - The microorganism that causes the infection and can be in the form of bacteria, viruses, parasites or fungi
- The Host - The target of the disease
- The Environment - The surroundings and conditions (these are external to the host)



Emerging and re-emerging infectious diseases

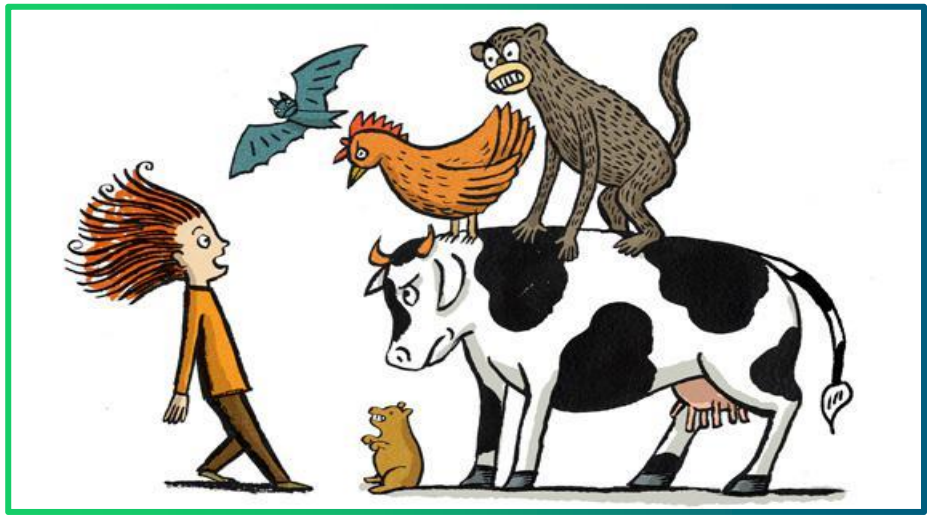
✓ Many new, emerging and re-emerging diseases of humans are caused by pathogens which originate from animals or products of animal origin; ***zoonotic diseases***... https://europepmc.org/article/med/11189723

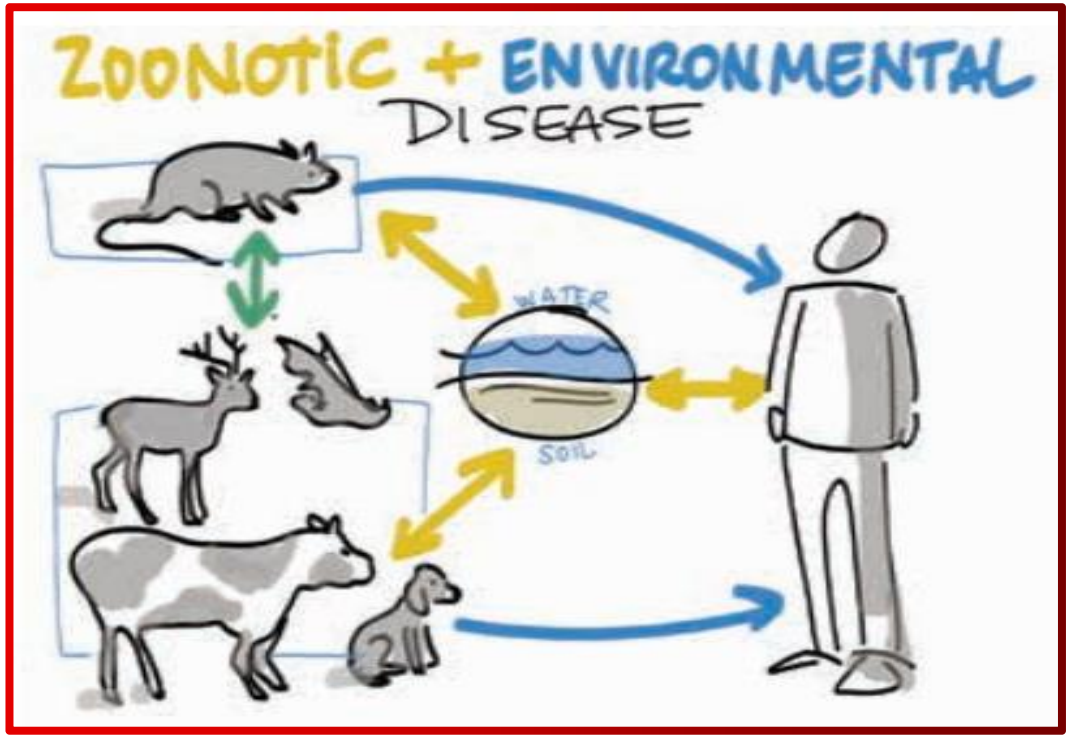
*Public health officials investigate **outbreaks** to control them, so, more people do not get sick in the **outbreak**, and to learn how to prevent similar **outbreaks** from happening in the future.*

https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html

Approximately 60% of emerging human pathogens are zoonoses

- ✓ The complex nature of the ***human-animal interface*** is constantly influenced by the effects of ***climate change***, anthropogenic and natural factors.
- ✓ Geoclimatic change most markedly affects **zoonotic diseases** transmitted by arthropod vectors. ***Travel, tourism and trade*** are the major human factors impacting the ***epidemiology of zoonotic diseases***.

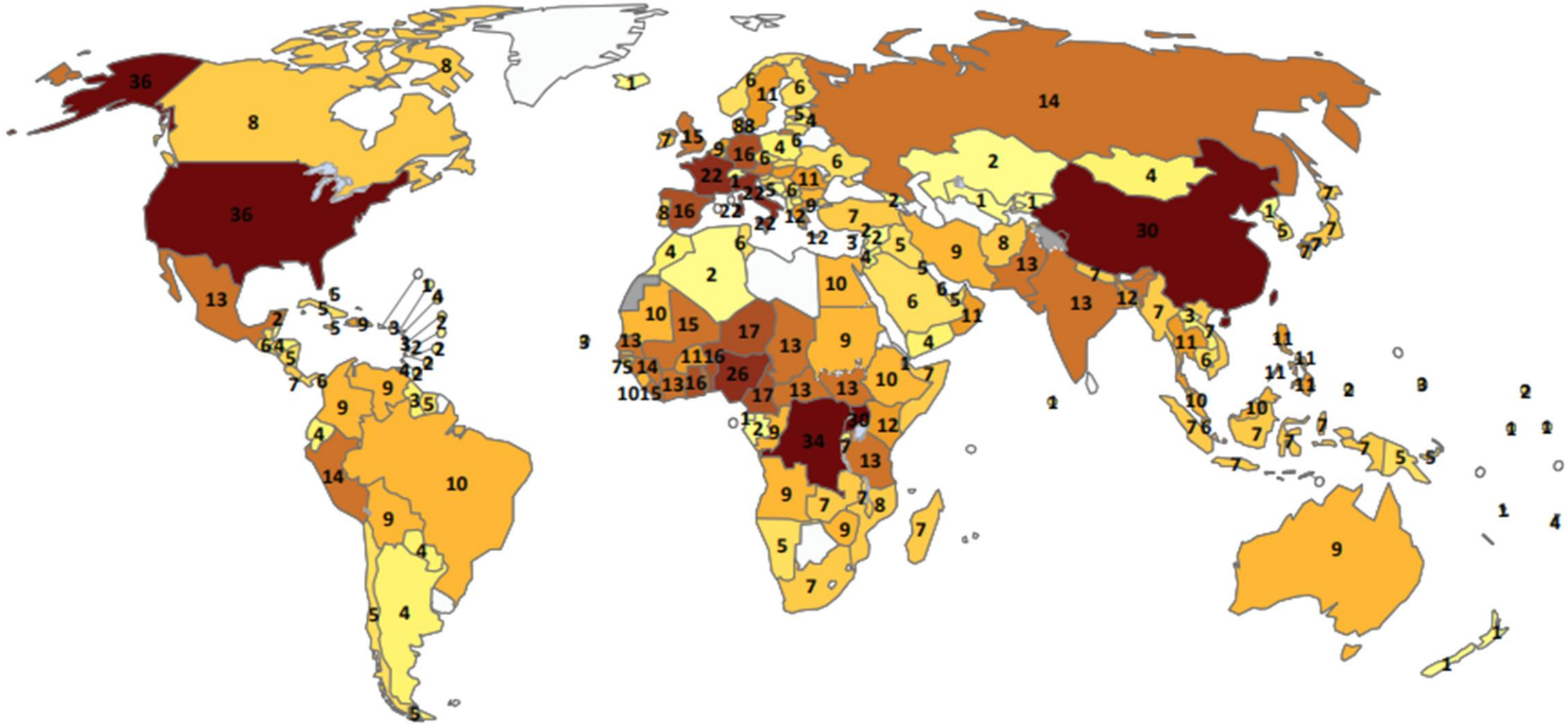




The impact of climate change and other factors on zoonotic diseases

Burden of epidemics: illustrations

Epidemic events* globally, 2011 – 2017**: A total of 1,307 epidemic events, in 172 countries



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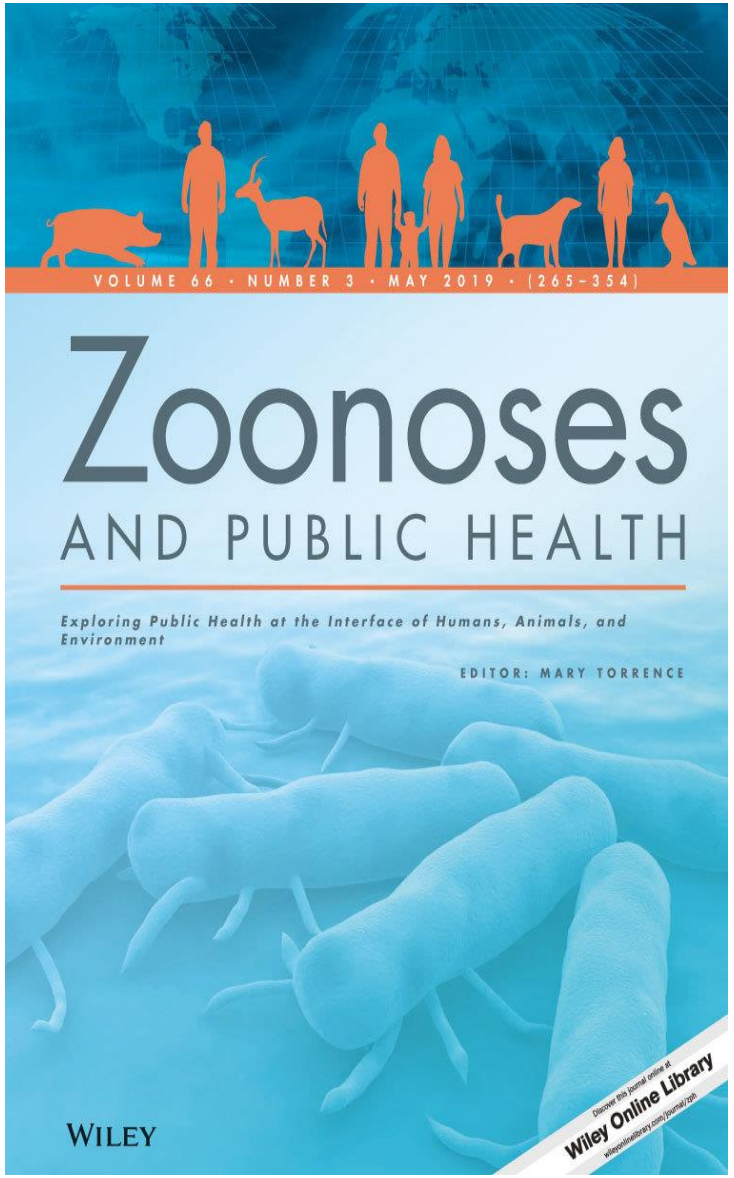
Approximately 60% of emerging human pathogens are zoonoses

- ✓ The **re-emergence** of zoonotic diseases is also driven by pathogen adaptation and *animal migration*. All these factors converge to make ***zoonotic diseases*** such as West Nile fever and Lyme disease of great ***public health*** concern in the developed world.
- ✓ However, the effects of ***climate change*** are predicted to be worse for the developing world where ***challenging socioeconomic and political environments*** are exacerbated by a lack of **epidemiological studies** on zoonotic diseases.



The impact of climate change and other factors on zoonotic diseases

Multidisciplinary approaches and a concerted global effort..

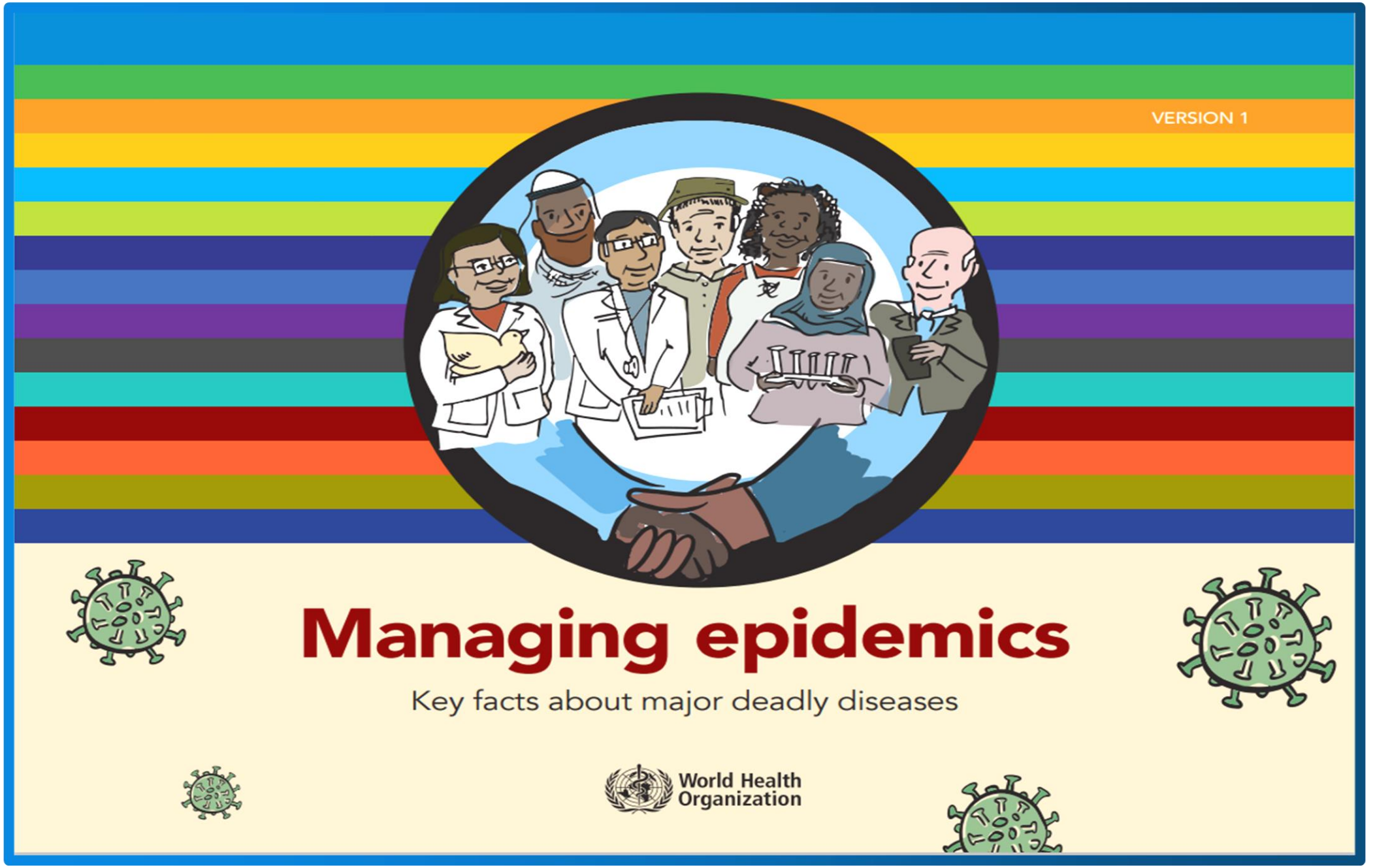
- ✓To mitigate the impact of climate change ***(Climate disaster!)*** on the world and especially on Africa, further studies on the epidemiology of ***zoonotic diseases*** are required with a focus on the effects in developing countries.
- ✓*The Centre for Diseases Control (**CDC**) has outlined 11 **priority actions** to address climate change, including identifying populations at greatest risk.*
- ✓The establishment of baseline data in the ***vulnerable developing countries*** is imperative to enable further tracking and predictive models.
- ✓*Multidisciplinary approaches and a concerted global effort are necessary to predict and prevent **outbreaks and emerging contagious diseases**.*

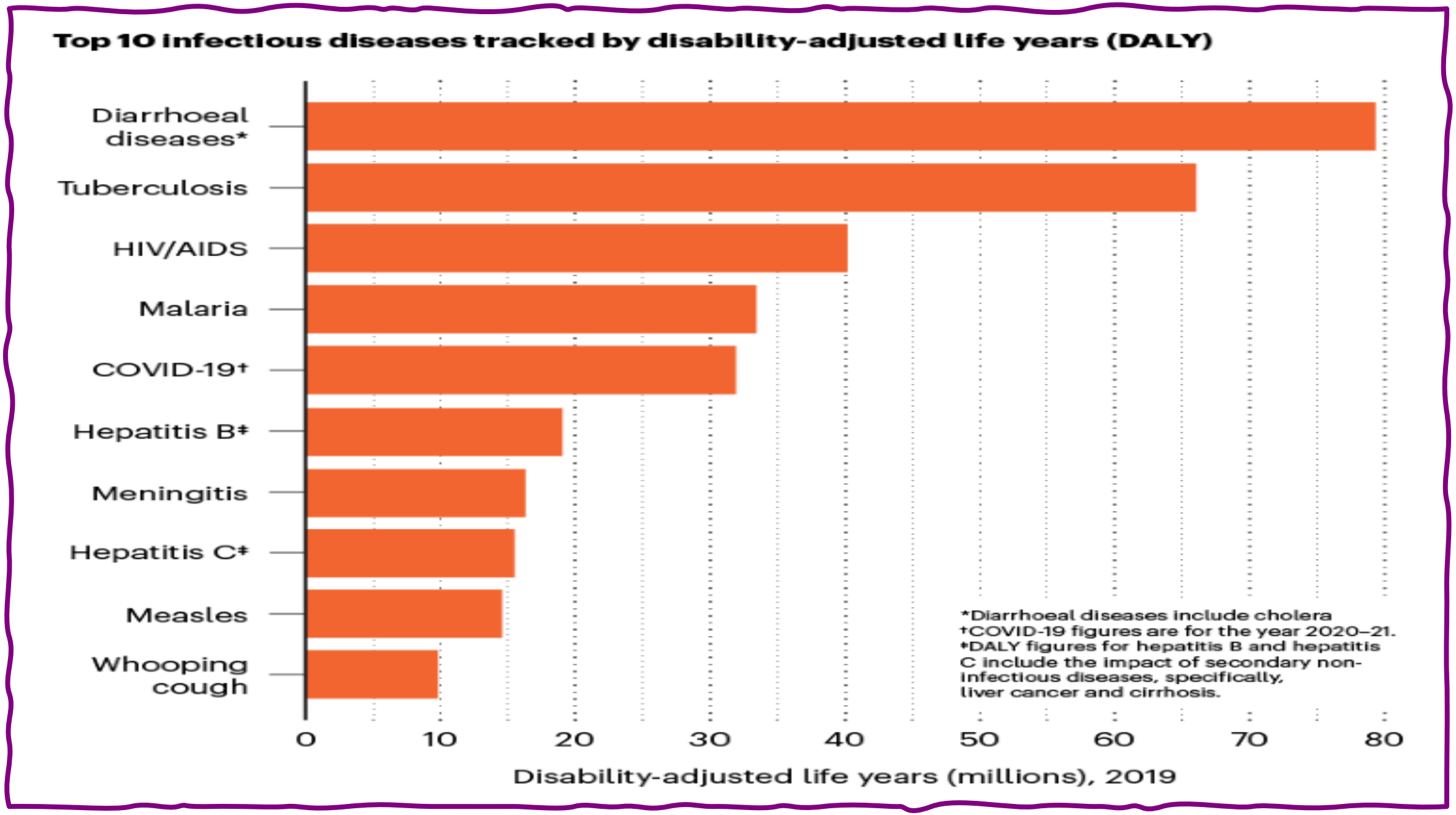
“Global Polio Eradication Initiative” (GPEI)-1

- **Polio** is an infectious disease, contracted predominantly by children, that can lead to the ***permanent paralysis*** of various body parts and can ultimately cause death by immobilizing the patient’s *breathing muscles*.
- *No cure exists for the symptoms, but in the 1950s effective vaccines were developed and have been used around the world since then.*
- This allowed some richer countries to ***eliminate the disease*** entirely in the 1960s and 70s. But large outbreaks continued around the world. In the early 1980s, there were an estimated 300,000 to 400,000 cases worldwide per year[1] and the disease was still prevalent in 125 countries.

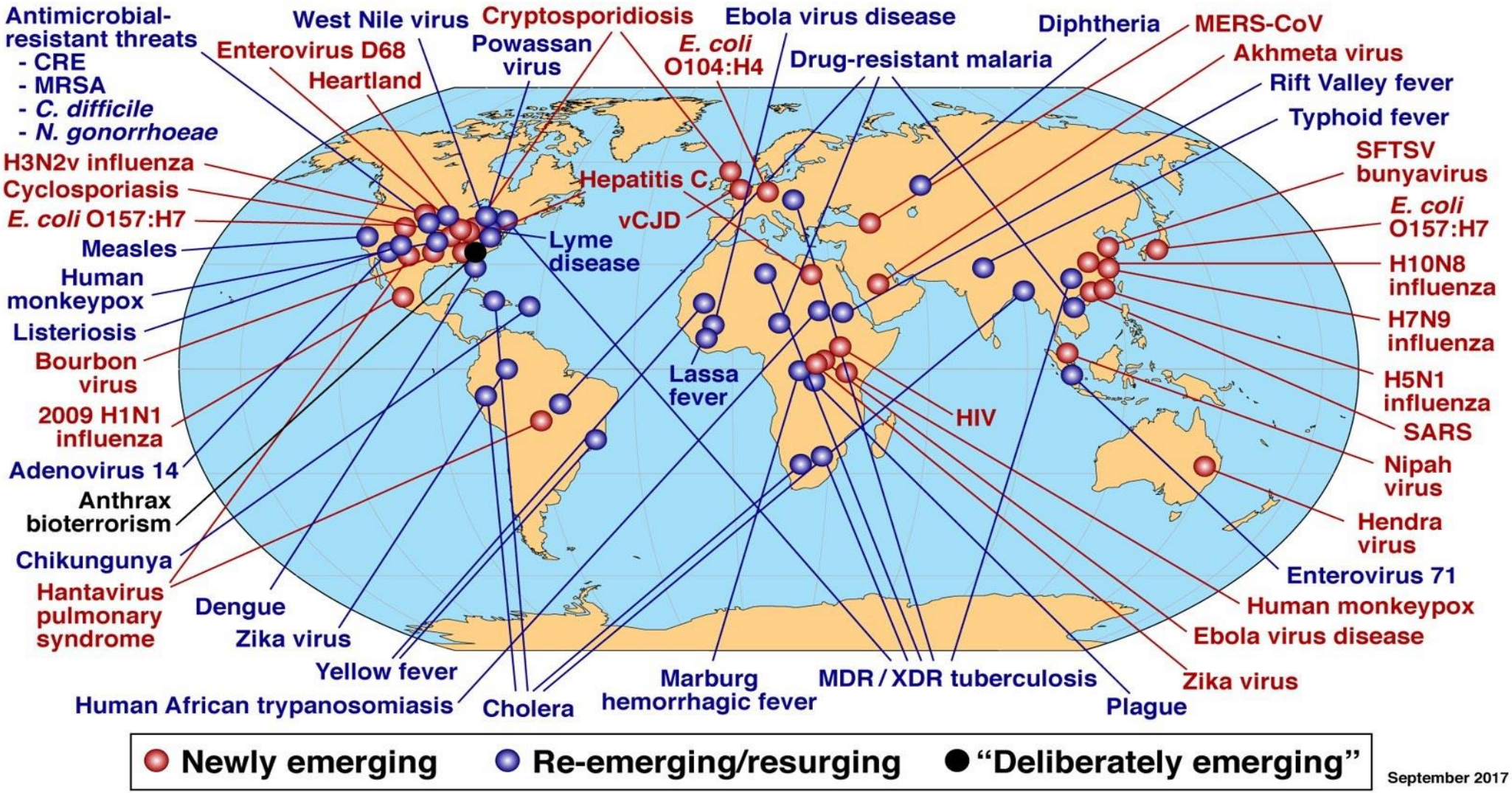
“Global Polio Eradication Initiative” (GPEI)-2

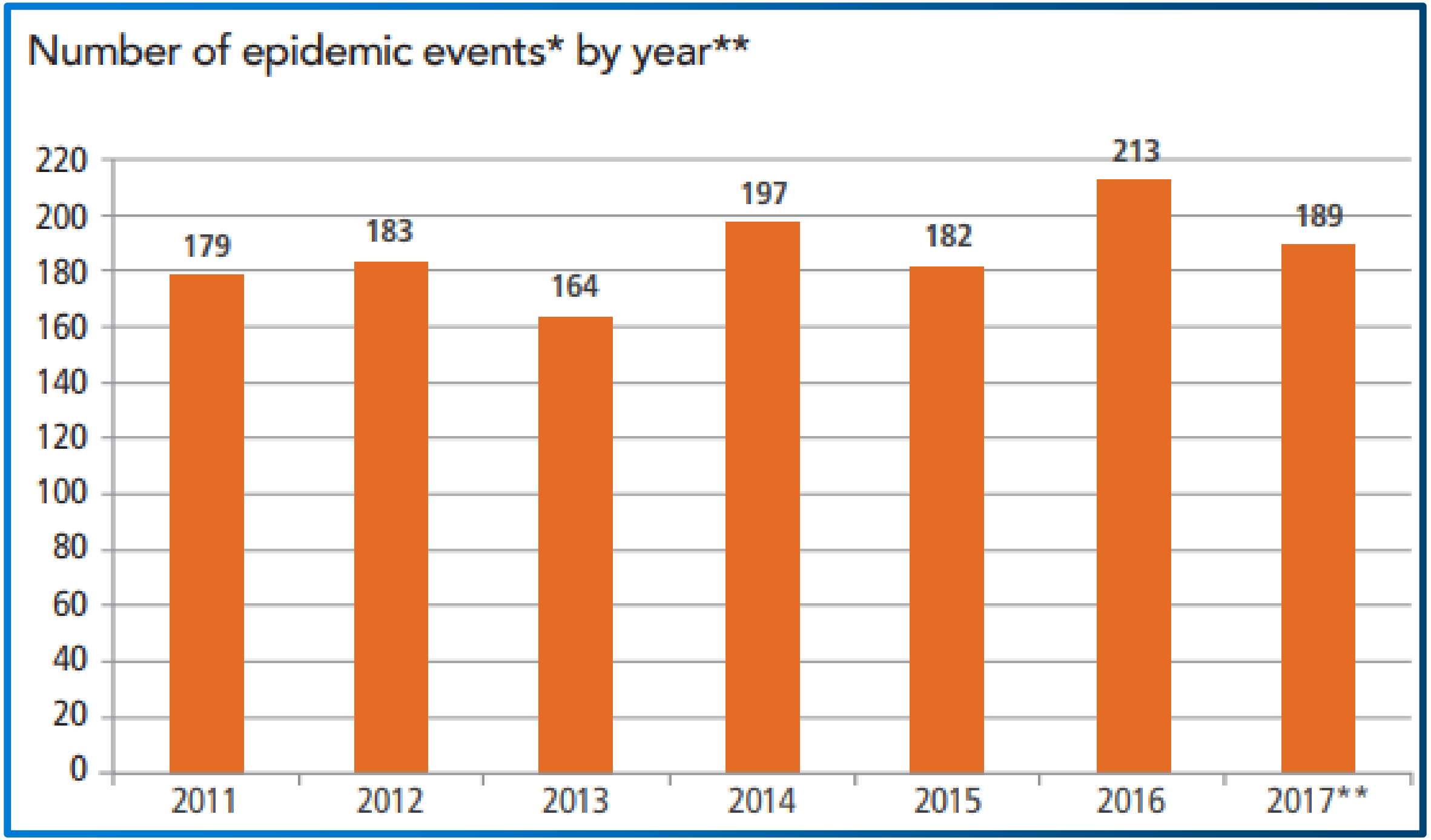
- As a response the “***Global Polio Eradication Initiative” (GPEI)*** was founded in 1988 to fight the virus’s spread and disease burden with a global vaccination campaign.
- *Since then the world has made rapid progress against the disease and until 2016 the number of paralytic cases was reduced by 99.99% with 42 cases in that year worldwide.*
- The latest data on the number of polio cases is always up-to-date here.
- *As of 2021 the virus has been found to circulate in only 2 countries in the world – **Afghanistan and Pakistan** – and it is hoped that the disease will soon be eradicated globally.*


VERSION 1
Managing epidemics
Key facts about major deadly diseases
World Health Organization


Top 10 infectious diseases tracked by disability-adjusted life years (DALY)
Diarrhoeal diseases*
Tuberculosis
HIV/AIDS
Malaria
COVID-19†
Hepatitis B‡
Meningitis
Hepatitis C‡
Measles
Whooping cough
0
10
20
30
40
50
60
70
80
Disability-adjusted life years (millions), 2019
*Diarrhoeal diseases include cholera
†COVID-19 figures are for the year 2020–21.
‡DALY figures for hepatitis B and hepatitis C include the impact of secondary non-infectious diseases, specifically, liver cancer and cirrhosis.

Global Examples of Emerging and Re-Emerging Infectious Diseases




Number of epidemic events* by year**
220
200
180
160
140
120
100
80
60
40
20
0
179
183
164
197
182
213
189
2011
2012
2013
2014
2015
2016
2017**

The re-emergence of infectious diseases

✓**The threat continues!..**

✓We are continuously learning about the unpredictable powers of nature.

✓*This is nowhere more true than in the continuous evolution of new infectious threats to human health that emerge -often without warning- from the natural environment.*

✓Already in these first two decades of the 21st century, the world has been sharply reminded time after time of the degree to which people in all countries and on all continents remain chronically vulnerable to infectious diseases, known and unknown.

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The re-emergence of infectious diseases

- ✓In the 1970s, and for years afterwards, this remarkable progress, including the development of new vaccines, antibiotics and other treatments and technologies, led to a proclamation of a victory of mankind over microbes. Many experts thought it was "the time to close the book on the problem of **infectious diseases**" *(Jesse Steinfeld, MD, US Surgeon General, 1969)*.
- ✓*Here lay the roots of a dangerous complacency.*
- ✓The microbes didn't go away. They just went out of sight. Instead, the focus turned to chronic, noncommunicable diseases, which came to receive much more attention. But nature was by no means in retreat.
- ✓*In fact, it seemed to return and took many health institutions and decision makers by surprise.*

The re-emergence of infectious diseases

- ✓Since 1970, more than 1,500 new pathogens were discovered, of which 70% proved to be of animal origin: a connection that deserves renewed scrutiny. Not all of them have had a public health impact but some of them have become famous. They included the Ebola virus, in 1976, and the human immunodeficiency virus (HIV), in 1983.
- ✓*Pause for a moment and reflect that HIV, a relatively new disease in human history, has infected about 70 million people in just 35 years, and killed an estimated 35 million people in the same period.*
- ✓Consider also that in the last 40 years, Ebola has surfaced in almost 25 separate and deadly outbreaks, often after long spells in which it has apparently lain dormant. *And now ask the question:*

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Will history repeat itself?

- ✓**<u>The answer must be:</u>** Yes, it will. A new HIV, a new Ebola, ***a new plague***, a new influenza pandemic are not mere probabilities.
- ✓*Whether transmitted by mosquitoes, other insects, contact with animals or person-to-person, the only major uncertainty is when they, or something equally lethal, will arrive.*
- ✓**<u>The obvious follow-up question is:</u>** ***So what are we doing about it?***
- ✓*This purpose of this lecture is to provide as many answers as possible. In doing so it examines a range of challenges and real or potential solutions, ranging from the medical and technological to the social and political.*

Ready and able to detect the next outbreak

- ✓ Given the effects of **globalization**, the intense mobility of human populations, and the relentless urbanization, it is likely that the next emerging virus will also spread fast and far.
- ✓ *It is impossible to predict the nature of this virus or its source, or where it will start spreading. (SARS-2)*
- ✓ But we can say, with a high degree of certainty, that when it comes, there will be
  (a) an initial delay in recognising it;
  (b) a serious impact on travel and trade;
  (c) a public reaction that includes anxiety, or even panic and confusion, and
  (d) this will be aided and abetted by media coverage.

SEVERE DISEASE WITH HIGH CASE FATALITY RATIO

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Known epidemics: Still a severe threat onfortunately

- ✓ **Control programmes** are already long-established and widely-applied for some known epidemic diseases, such as ***cholera, HIV infection, influenza, meningitis, malaria, tuberculosis and yellow fever.***
- ✓ However, even if medical countermeasures are available, these diseases remain a threat for many of the world's populations, either because of their rapidly evolving nature (e.g. influenza) or because equitable access to effective public health measures is difficult.
- ✓ *There are many reasons for limited access to vaccines: production capacity does not meet the demand (e.g. yellow fever, pandemic influenza), explosive outbreaks exhaust the available vaccines (e.g. meningitis), or the absence of markets prevents access to the intervention in case of emergencies (e.g. oral **cholera vaccine**).*
- ✓ In addition, in many affected countries, the weakness of the existing health care system prevents effective access to medical interventions (diagnostics and treatment).

Strengthening health systems: Essential in epidemics

- ✓In order to mitigate the impact of epidemics, protect the health workforce and ensure continuity of health services during and after them, stronger health systems are needed. Epidemics and pandemics put these systems under great pressure and stress.
- ✓*The sudden influx of large numbers of sick individuals to health facilities stretches the systems' capacity and resources, even more so and more noticeably where resources are already scarce.*
- ✓When an epidemic emerges and spreads, it inevitably draws most of health responders' attention and monopolizes most of the health system's human and financial resources, as well as medical products and technologies.

Known epidemics: *Still a severe threat unfortunately*

- ✓ Therefore, although it is reassuring that sound knowledge and a range of potential **control interventions** are available, expert guidance must be constantly updated to incorporate scientific and technological progress.
- ✓ *Equally important, **access to life-saving interventions** must be improved in all settings worldwide by **solidarity**.*
- ✓ The current global strategy is to reach elimination or eradication of these diseases through vaccination or investment in and implementation of other countermeasures.

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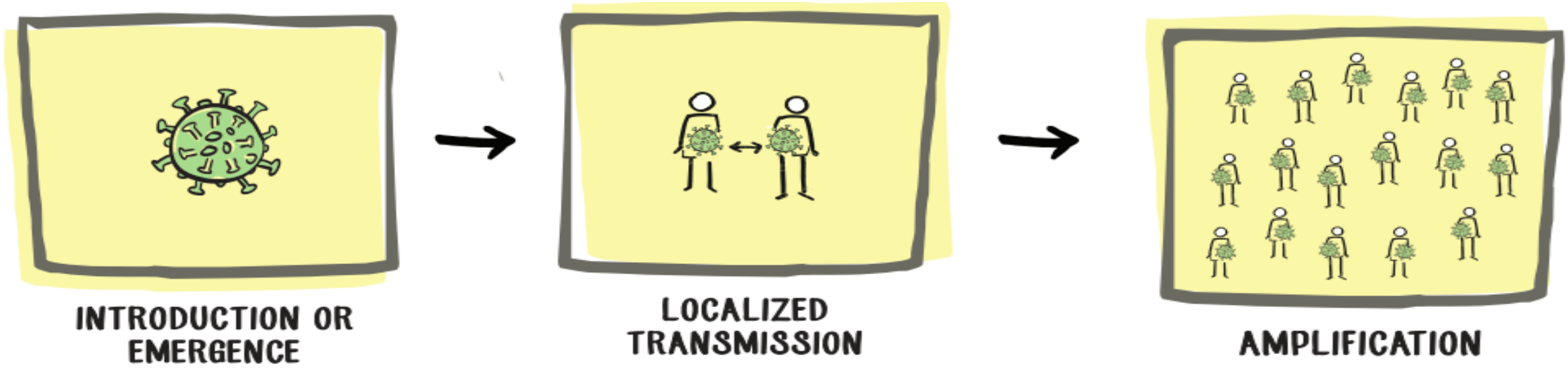
Challenges and risk factors for 21st century epidemics

- ✓ **New lifestyles spread diseases further..**
- ✓ New and more intense factors amplify the transmission of diseases, either because they increase contacts between people, or between animals and people.
- ✓ ***In an era of rapid global change, many of these factors are almost inevitable.***
- ✓ Among them are the fast and intense mobility of people, with increased transport and international travel, and greater inter-connectivity between megacities which are major transport hubs for aircraft, trains, road vehicles and ships.

Equity and solidarity

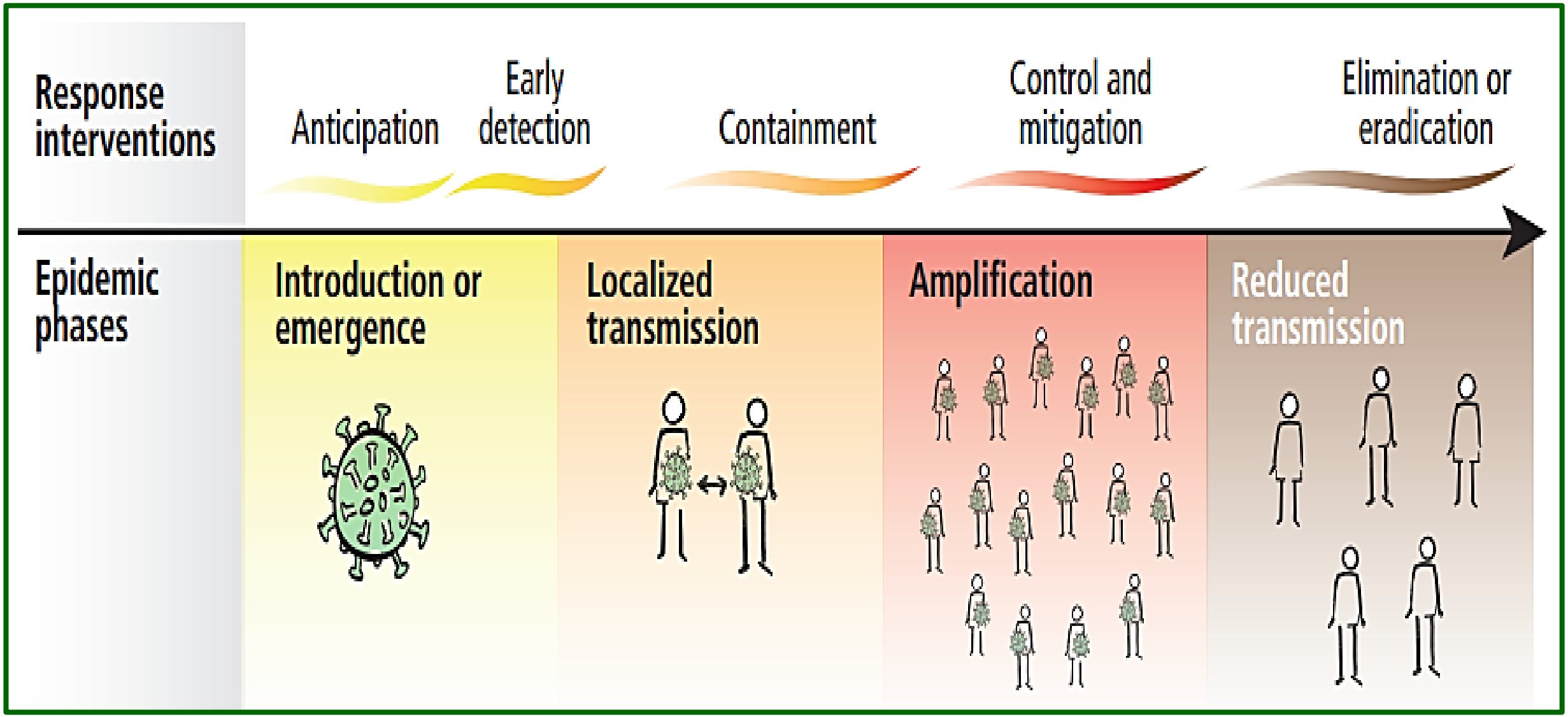
- ✓ **Epidemics are complex events :**
- ✓ Complex in their origins, their spread, their effects and their consequences – which can be at one and the same time medical, social, political and economic.
- ✓ *The global impact of a single pathogen may vary significantly between settings and there is no one-size-fits-all intervention strategy.*

Epidemic phases



- *Because new infectious disease threats usually start locally, it is important to understand their dynamics in order to deny them the opportunity to spread further among people and overwhelm health systems.*
- The dynamics of epidemic and pandemic diseases typically occur in **4 phases**, although not all epidemic diseases necessarily go through each phase.

4 Epidemic phases and response interventions



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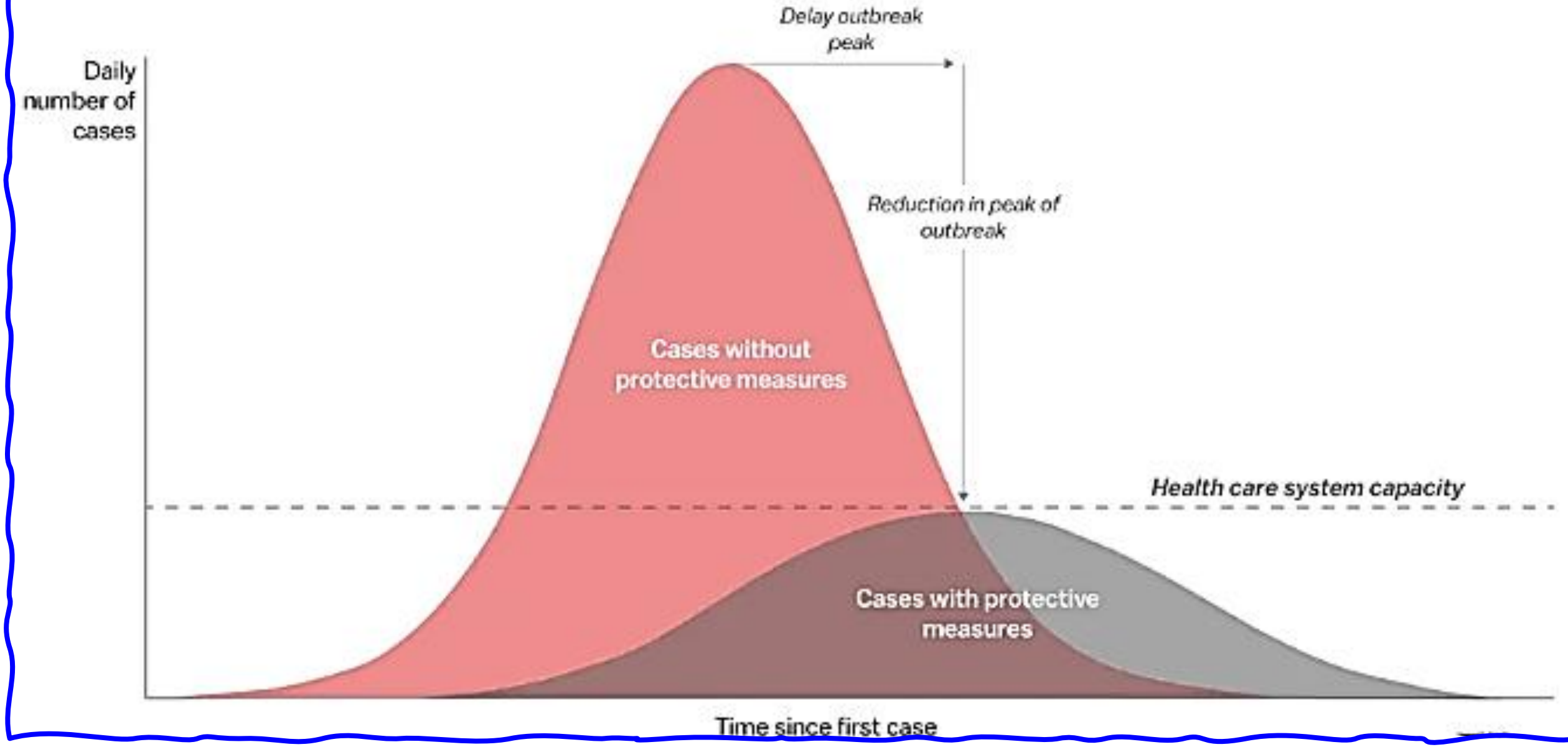
Flattening the curve



Anticipation Epidemic

- In this first stage of response, emergence cannot be predicted, but it can certainly be anticipated, and the anticipation of risks enables a focus on the most likely threats.
- *Anticipation encompasses forecasting the most likely diseases to emerge, and the quick identification of the drivers that will worsen the impact or facilitate the spread.*
- **Preparedness plans**, based on lessons learned from past experiences, should contain a variety of scenarios to allow for a reactive response to the unexpected.

Early detection of Epidemic-1

- Emerging and re-emerging diseases include new ones about which there is little scientific knowledge.
- These, therefore, often require investigation into their sources at the same time as the use of coordinated, *rapid-containment measures*.
- ***New diseases require new interventions.***
- And because they appear irregularly or rarely, there is a need for constant vigilance, ***proactive risk assessment*** and the development of new management tools.

Early detection of Epidemic-2

❖Early detection allows the rapid implementation of containment measures, which are the key to reducing the risk of amplification and potential international spread.

❖*Early detection begins at the health care setting, so health care workers must be trained to recognize potential epidemic disease, report quickly an unusual event (such as an unusual cluster of cases or deaths).*

❖Their role is also to reduce the risk of community transmission by isolating severely-ill patients; to prevent household transmission by protecting health care givers at home; and to reduce the **mortality rate**.

❖*Health care workers must also know how to protect themselves and employ **infection prevention and control measures** and how to avoid outbreaks amplified in health care facilities.*

Early detection of Epidemic-3

- Once a new disease is recognized by the health system, early laboratory confirmation is essential.
- *When this cannot be done at country level, the affected countries must be confident they can count on the support of a network of more sophisticated regional or global laboratories.*
- It is critically important for global health security that there is a system for safely taking samples and shipping specimens to relevant laboratories in full compliance with ***biosafety and biosecurity regulations***.

Containment

- **Effective and rapid containment** of emerging diseases is just as vital as **early detection** in order to **avoid a large scale epidemic**.
- ***Rapid containment*** *should start as soon as the first case is detected regardless of the etiology, which is most likely to be unknown.*
- It requires **skilled professionals** to safely implement the necessary countermeasures.
- *Pre-training of these professionals is essential to guarantee the safety and efficiency of the operation*

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Control and mitigation

- Once the infectious disease threat reaches an **epidemic** or **pandemic** level,
- The goal of the response is to mitigate its impact and reduce its incidence, ***morbidity and mortality*** as well as disruptions to economic, political, and social systems.

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Elimination or eradication-1

- **Control of a disease** may lead to its elimination, which means that is sufficiently controlled to prevent an epidemic from occurring in a defined geographical area.
- ***Elimination means*** *that the disease is no longer considered as a major public health issue.*
- However, intervention measures (***surveillance*** and control) should continue to prevent its re-emergence.

Elimination or eradication-2

- **Eradication of a disease** – much more difficult and rarely achieved - involves the permanent elimination of its incidence worldwide.
  There is no longer a need for interventions measures.

- **3 criteria** need to be met in order ***to eradicate a disease***:

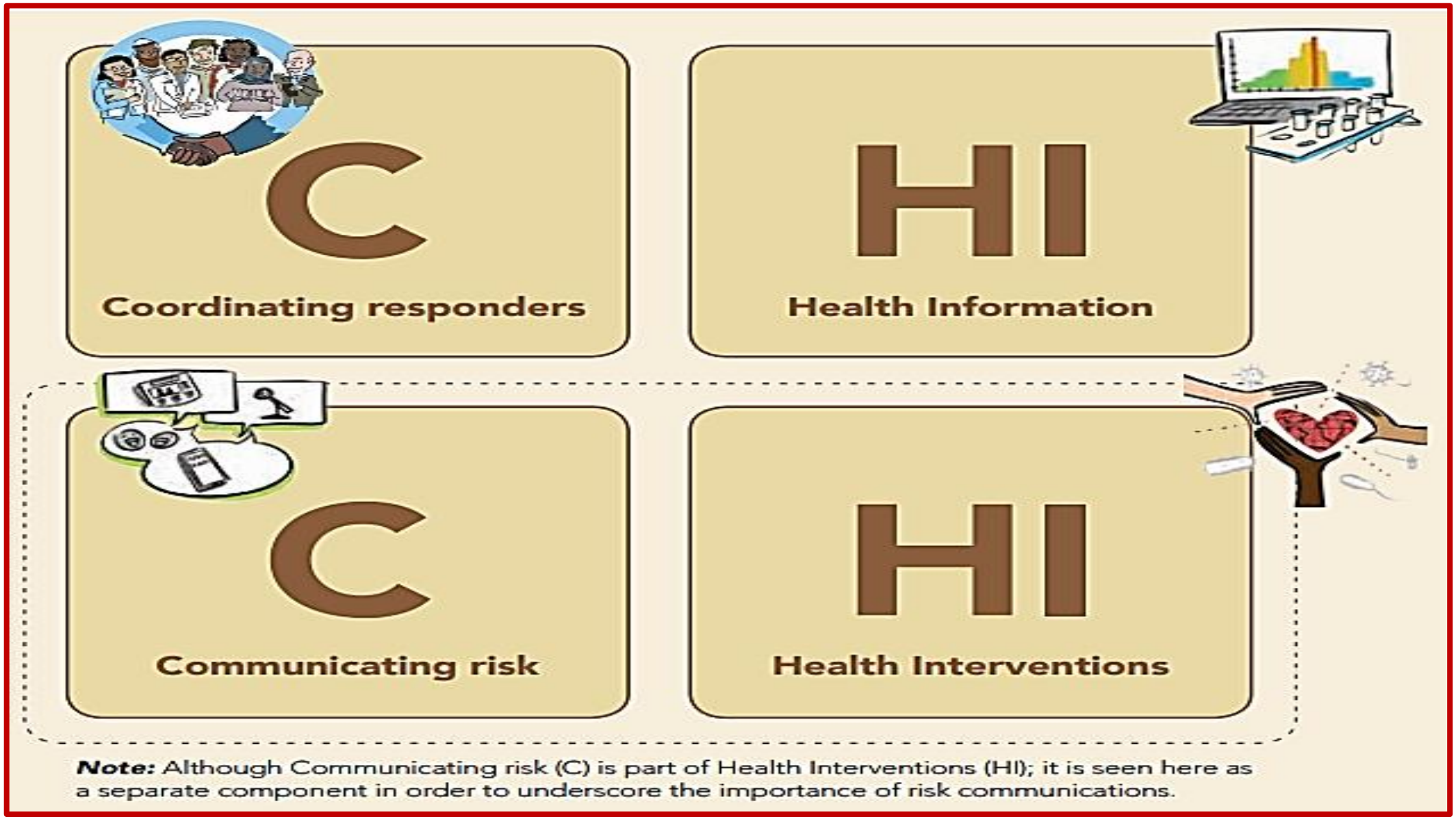
- 1- *There must be an available intervention to interrupt its transmission;*
  2- There must be available efficient diagnostic tools to detect cases that could lead to transmission;
  3- And humans must be the only reservoir.

Response tips and checklist-1

- A comprehensive outbreak response is always complex, comprising many elements that should be harmoniously coordinated.
- The following response tips are used to organize ideas and to make sure no important point is overlooked.
- They are organized into 4 main blocks:
  - *Coordinating responders (C)*
  - *Health Information (HI)*
  - *Communicating risk (C)*
  - *Health Interventions (HI)*

- ❑ The checklists will help you assess what is important and necessary for the response.
- ❑ The outbreak response varies depending on the disease.
- ❑ For some diseases treatment is essential; for other diseases, vaccination is vital.

Response tips and checklist-2




PREVENTION
Saving Lives & Money

Coordinating Responders checklist

Coordinating responders checklist

- ✔ What are the characteristics of the event that describe it as a crisis?
- ✔ Who are the people, groups and organizations who should work for the response?
- ✔ What should they do? (terms of reference, functions)
- ✔ Where can responders meet? (emergency operation centre)
- ✔ How do they share information? (share point, telephone numbers, generic email)

Health Information checklist

Health Information checklist

Surveillance

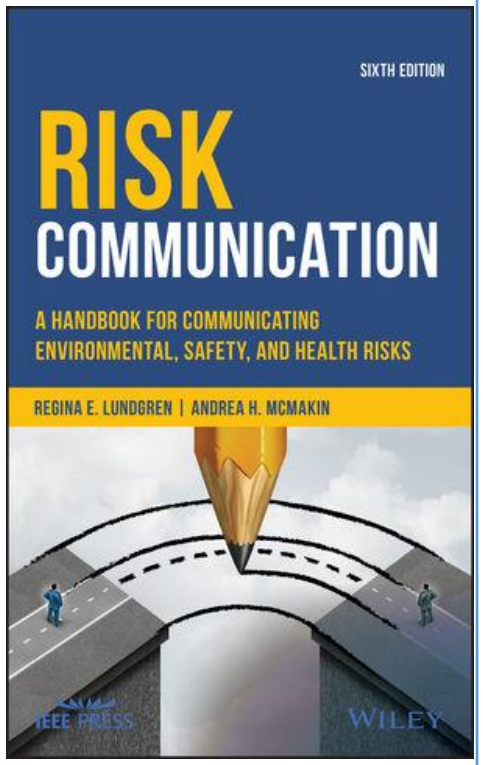
- ✔ Is there a case definition shared by all stakeholders?
- ✔ Which laboratories are involved in the testing /confirmation of cases and deaths, and where are they situated?
- ✔ Is there an updated epidemiological curve and mapping of cases and deaths?
- ✔ Which are the risk groups, by gender and age?

Interventions

- ✔ What is the target population?
- ✔ What material and human resources are needed and how much?
- ✔ What are the indicators of success? (e.g. vaccine coverage, house-holds targeted, number of people treated)

Communicating risk

- During the evolution of any major **outbreak**, cases and deaths will inevitably increase.
- *An **epidemic** is the rapid spread of infectious disease to a large number of people in a given population within a short period of time.*
- Similarly, there may well be another kind of epidemic; – the rapid spread of information of all kinds, including rumours, gossip and unreliable information.
- *We describe this phenomenon as an "**infodemic**".*
- **Infodemics**, like epidemics, can be managed.



Managing epidemics, Key facts about major deadly diseases, 2018

CALL FOR SOLIDARITY AGAINST COVID-19 PANDEMIC

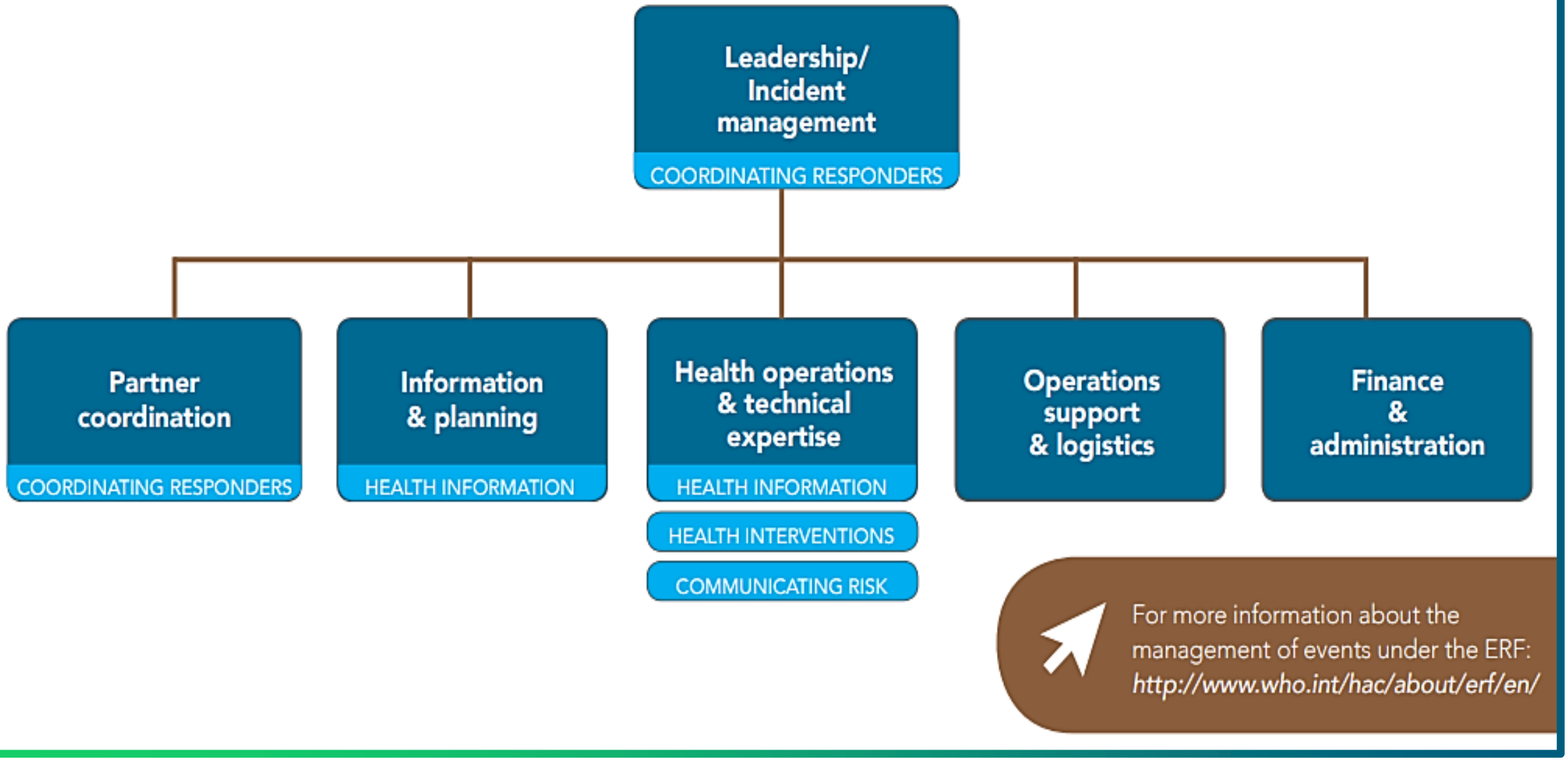
“

THIS IS A TIME FOR FACTS, NOT FEAR. THIS IS A TIME FOR RATIONALITY, NOT RUMOURS. THIS IS A TIME FOR SOLIDARITY, NOT STIGMA.

DR TEDROS ADHANOM GHEBREYESUS
WHO DIRECTOR-GENERAL

#ONEWORLDPROTECTED

6 critical functions of the Incident Management System



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Major modes of transmission and interventions per disease

DISEASE	MAJOR MODE OF TRANSMISSION	Clinical management: SPECIFIC	Clinical management: SUPPORTIVE	ENHANCED INFECTION PREVENTION & CONTROL	VACCINATION	SAFE & DIGNIFIED BURIALS	VECTOR CONTROL	WATER & SANITATION
Crimean-Congo haemorrhagic fever (CCHF)	Animals (mainly ticks) / contact	✔[1]	✔	✔		✔	✔	
http://www.who.int/csr/disease/crimean_congoHF/en/								
Chikungunya	Vector		✔				✔	
http://www.who.int/csr/disease/chikungunya/en/								
Cholera	Fecal oral / water	✔	✔	✔	✔[2]			✔
http://www.who.int/cholera/en/								
Dengue	Vector		✔		✔[3]		✔	
http://www.who.int/denguecontrol/en/								
Ebola virus disease	Animals / contact		✔	✔	✔	✔		
http://www.who.int/ebola/en/								
Hepatitis E	Fecal oral / water		✔		✔			✔
http://www.who.int/mediacentre/factsheets/fs280/en/								
Influenza	Respiratory	✔	✔	✔	✔[4]	✔[5]		
http://www.who.int/influenza/en/								
Lassa fever	Rodent / contact	✔	✔	✔			✔	
http://www.who.int/csr/disease/lassafever/en/								
Leptospirosis	Rodent	✔	✔				✔	
http://www.who.int/topics/leptospirosis/en/								
Malaria	Vector	✔	✔				✔	
http://www.who.int/malaria/en/								
Marburg virus disease	Animals / contact		✔	✔	✔			
http://www.who.int/csr/disease/marburg/en/								

[1] Ribavirin use currently under review by WHO;
[2] Oral vaccines;
[3] There is a vaccine (Dengvaxia®) currently under assessment;
[4] Intramuscular and intranasal vaccines;
[5] Safe and dignified burials for highly pathogenic non-human influenza;

Managing epidemics, Key facts about major deadly diseases, 2018

Major modes of transmission and interventions per disease

DISEASE	MAJOR MODE OF TRANSMISSION	Clinical management: SPECIFIC	Clinical management: SUPPORTIVE	ENHANCED INFECTION PREVENTION & CONTROL	VACCINATION	SAFE & DIGNIFIED BURIALS	VECTOR CONTROL	WATER & SANITATION
Measles	Respiratory		✔	✔	✔			
http://www.who.int/immunization/diseases/measles/en/								
Meningitis	Respiratory	✔	✔	✔				
http://www.who.int/csr/disease/meningococcal/en/								
MERS/SARS	Respiratory		✔	✔				
http://www.who.int/topics/coronavirus_infections/en/								
Monkeypox	Animals / contact		✔			✔		
http://www.who.int/mediacentre/factsheets/fs161/en/								
Plague (pneumonic)	Respiratory	✔	✔	✔		✔		
http://www.who.int/csr/disease/plague/en/								
Plague (bubonic)	Rodent	✔	✔	✔		✔	✔	
http://www.who.int/csr/disease/plague/en/								
Polio	Fecal oral		✔	✔	✔[6]			
http://www.who.int/topics/poliomyelitis/en/								
Rickettsia	Vector	✔	✔				✔	
Rift valley fever	Animals / vector		✔	✔			✔	
http://www.who.int/csr/disease/riftvalleyfev/en/								
Shigellosis	Fecal oral / food	✔	✔					✔
Smallpox	Respiratory		✔	✔	✔[7]			
http://www.who.int/csr/disease/smallpox/en/								
Typhoid fever	Food	✔	✔		✔			✔
http://www.who.int/immunization/diseases/typhoid/en/								
West Nile fever	Vector		✔				✔	
http://www.who.int/mediacentre/factsheets/fs354/en/								
Yellow fever	Vector		✔		✔[8]		✔	
http://www.who.int/csr/disease/yellowfev/en/								
Zika	Vector		✔				✔	
http://www.who.int/topics/zika/en/								

[6] Oral and intramuscular/subcutaneous polio vaccines; [7] Intramuscular and scarification vaccines; [8] Intramuscular/subcutaneous vaccines.

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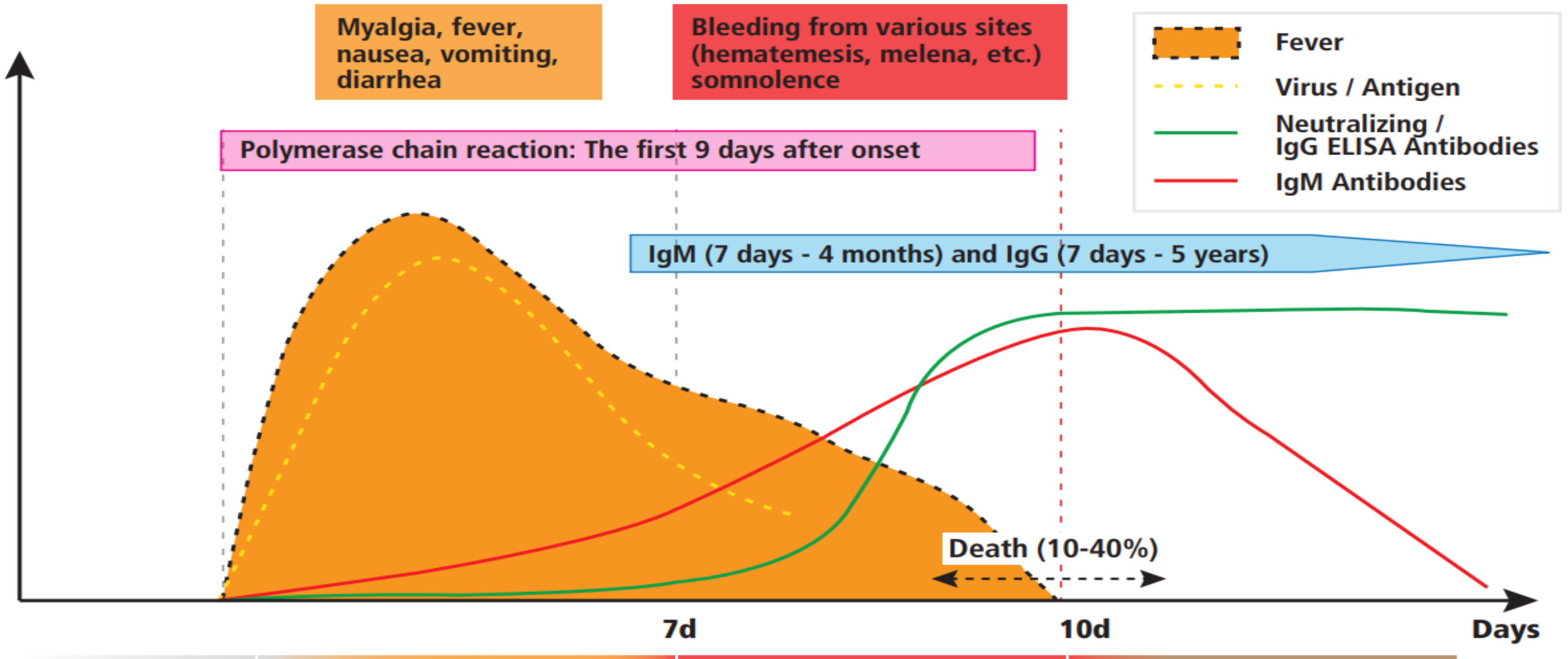
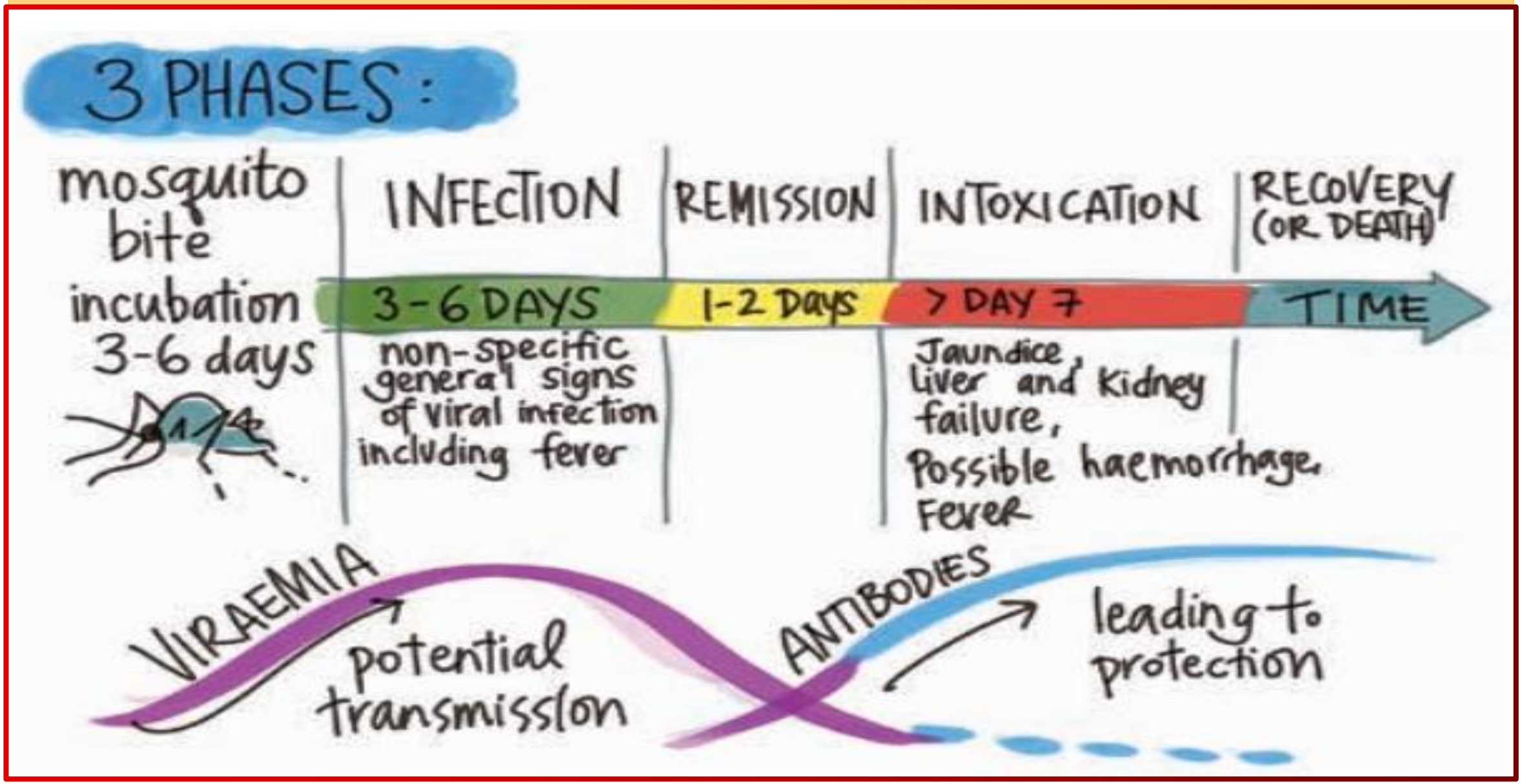
COURSE of CRIMEAN-CONGO HAEMORRHAGIC FEVER



CLINICAL COURSE of YELLOW FEVER



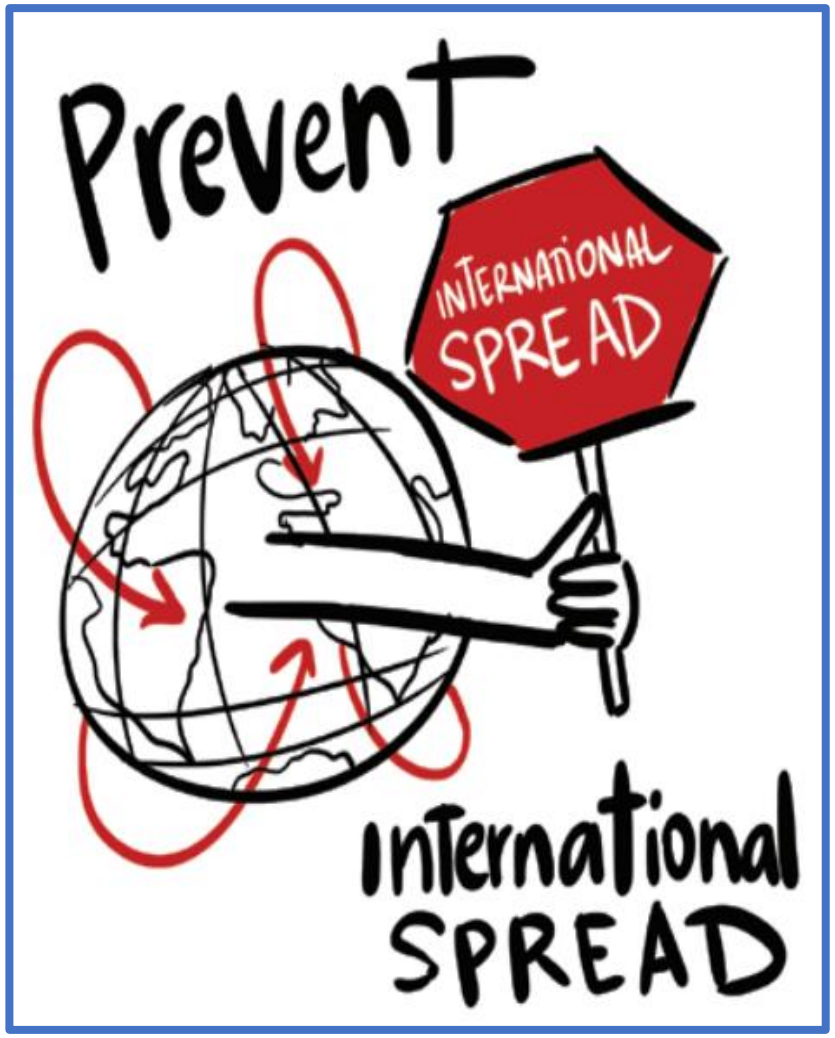
Characteristics of the past 4 influenza pandemics

Pandemic year of emergence and common name	Area of origin	Influenza A virus sub - type (type of animal genetic introduction/ recombination event)	Estimated reproductive number	Estimated case fatality	Estimated attributable excess mortality worldwide	Age group most affected
1918 "Spanish flu"	Unclear	H1N1 (unknown)	1.2–3.0	2–3%	20–50 million	Young adults
1957–1958 "Asian flu"	Southern China	H2N2 (avian)	1.5	<0.2%	1–4 million	All age groups
1968–1969 "Hong Kong flu"	Southern China	H3N2 (avian)	1.3–1.6	<0.2%	1–4 million	All age groups
2009–2010 "influenza A(H1N1) 2009"	North America	H1N1 (swine)	1.1–1.8	0.02%	100 000–400 000	Children and young adults

Source: Pandemics of the 20th–21st centuries. Stockholm, European Centre for Disease Prevention and Control.

Managing epidemics, Key facts about major deadly diseases, 2018

PREVENTATIVE MEASURES



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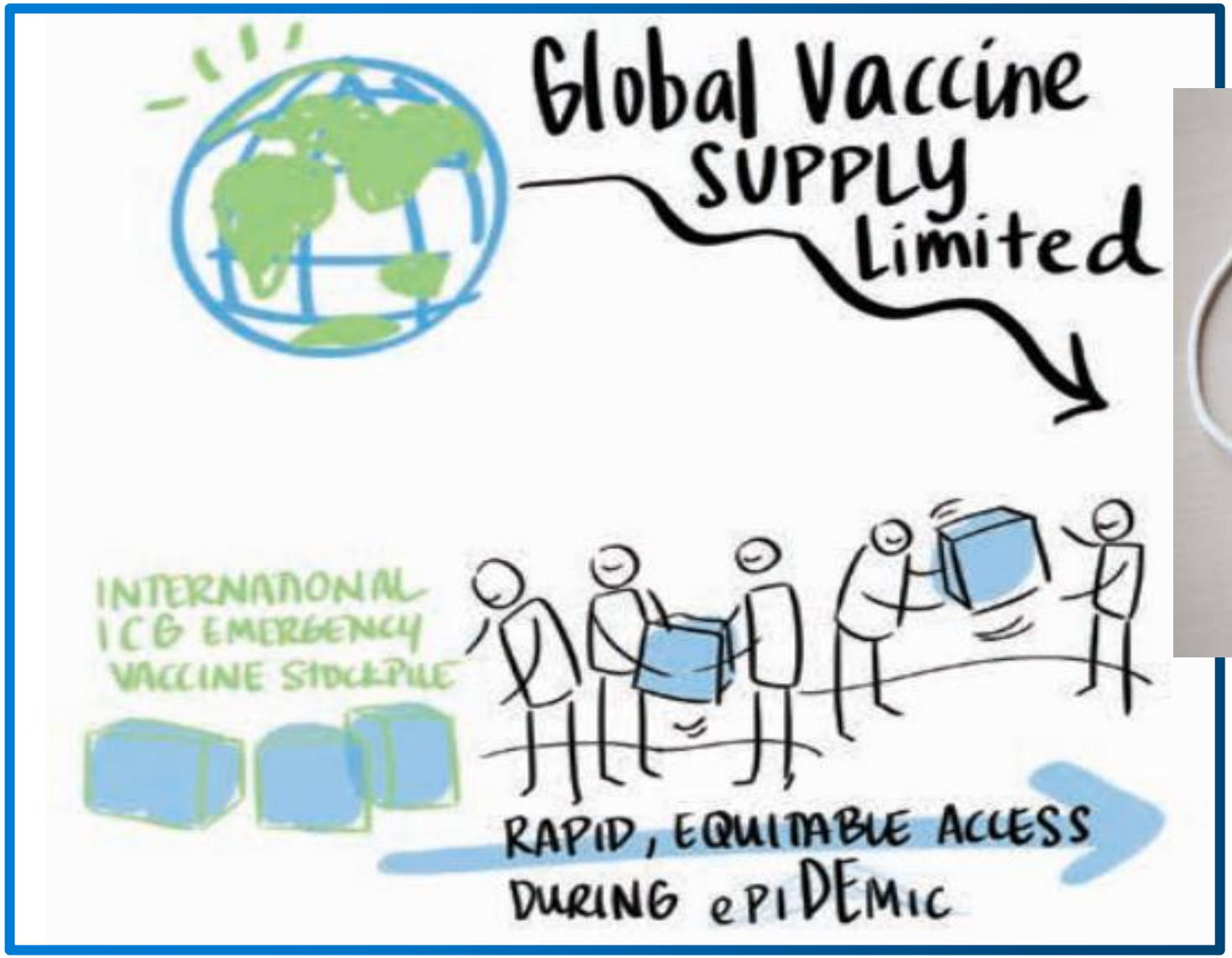
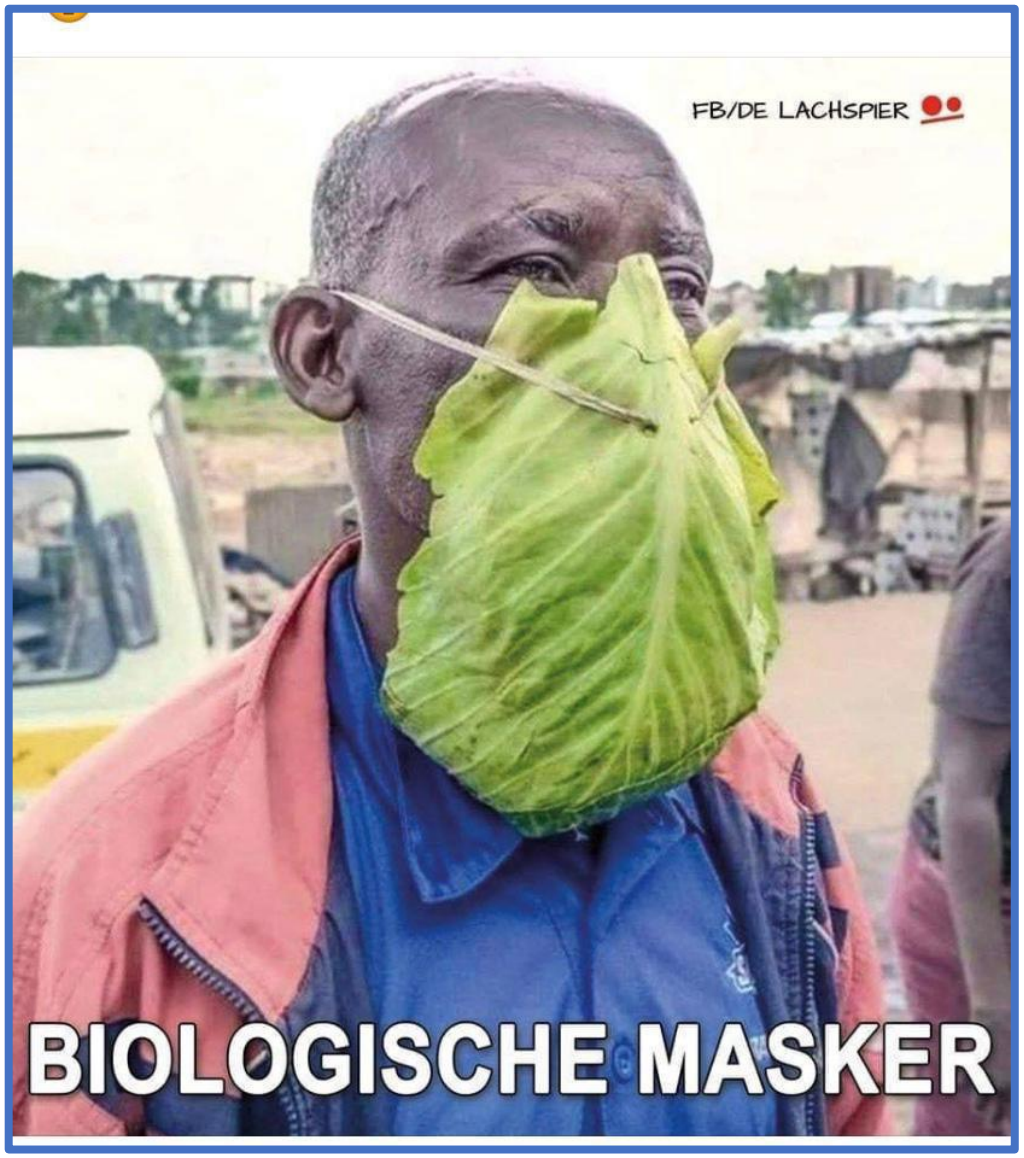
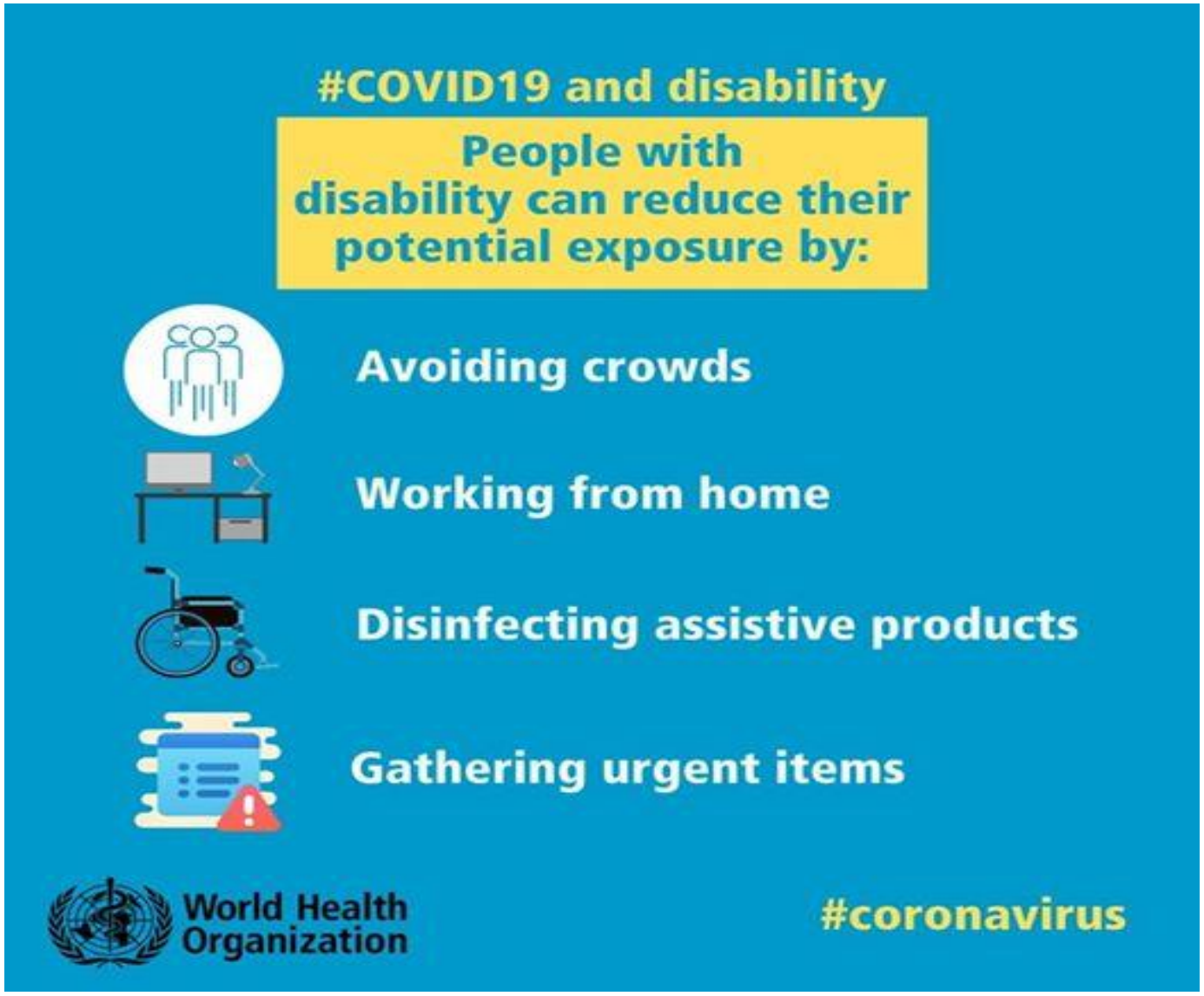
PREVENTIVE MEASURES



PREVENTATIVE MEASURES





PREVENTIVE MEASURES

Role of the WHO *(World Health Organisation)*

Example

- WHO is:

- Working with countries to increase and sustain access to prevention, treatment and care;

- Identifying priorities and setting strategies;

- Leading and coordinating the health response during emergencies.

- Through the International Health Regulations (2005), WHO helps the countries to strengthen their national core capacities for emergency risk management to prevent, prepare for, respond to and recover from health emergencies.

Role of WHO and The International Health Regulations

1. Providing leadership on matters critical to health and engaging in partnerships where joint action is needed;
2. *Shaping the research agenda and stimulating the generation, translation and dissemination of valuable knowledge;*
3. Setting norms and standards and promoting and monitoring their implementation
4. *Articulating ethical and evidence-based policy options;*
5. Providing technical support, catalysing change, and building sustainable institutional capacity;
6. **Monitoring the health situation and assessing health trends.**

- ❑WHO and the **International Health Regulations** (IHR) creation:
- ❑A need for global cooperation in public health
- ❑**The International Health Regulations** (2005) represent a ***binding international legal agreement*** involving 196 countries across the globe.
- ❑They aim to prevent, protect against, control and respond to the international spread of disease while avoiding unnecessary interference with international traffic and trade.

Legal basis of notification for communicable diseases in TR

❑ Struggling against contagious and epidemic diseases in Turkiye, article # 57 :

- Even the holders of *cholera, plague (Bubonic or pneumonia form), spotted fever, black fever (thyroid fever), even the holders of microbes that cause bacillus - paratyphoid fever or all kinds of food products, smallpox, diphtheria (bird acorn)) - even all cases of contagious brain fever (Inflammation of brain), sleeping sickness, dysentery (Bacilli and amoeba), puerperal fever, ruam, scarlet fever, anthrax, paralytic polio, measles, leprosy, Maltese fever diseases* occur or one of them is suspected, or death occurs from these diseases, or if it is suspected that the deceased is due to one of these diseases,
- The persons mentioned in the following articles are **obliged to notify the incident.**
- It is also obligatory to report that they are bitten by a rabid or suspected rabid animal, patients with **rabies**, or those who die from rabies.

Turkish act # 1593, General Public Health Law (Umumi Hıfzıssıhha Yasası)

Three ingredients for a pandemic

An infectious agent needs three conditions to cause a pandemic, says virologist Kirsty Short from the University of Queensland:

1.1. It needs to cause disease in humans

2.2. It needs to be highly transmissible

3.3. We need to have no pre-existing immunity to it

Historical perspective

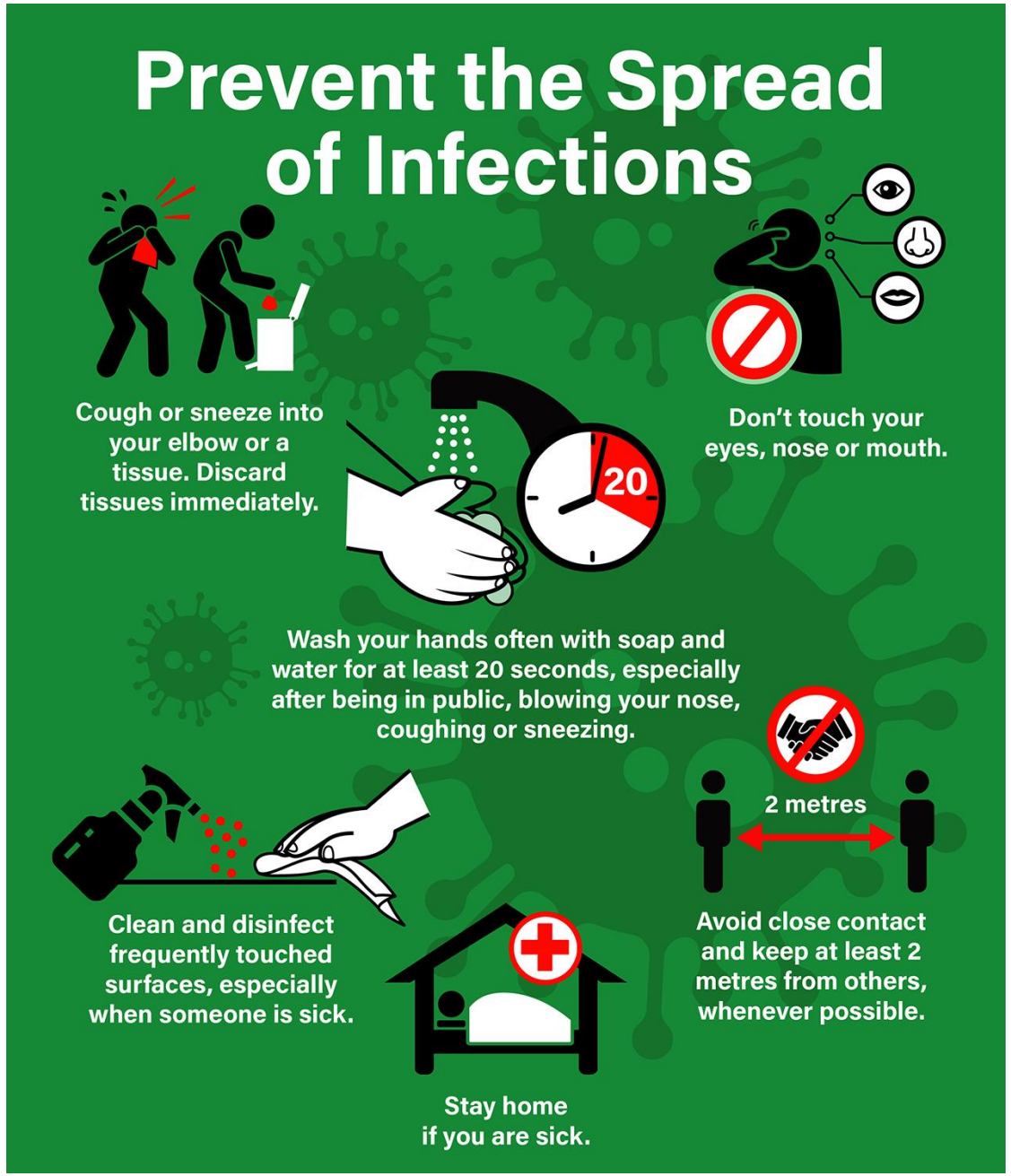
Throughout recorded history, there have been at least 15 large pandemic events with at least 100,000 deaths.

Event	Start	End	Deaths
Black Death	1331	1353	75,000,000
Italian Plague	1623	1632	280,000
Great Plague of Seville	1647	1652	2,000,000
Great Plague of London	1665	1666	100,000
Great Plague of Marseille	1720	1722	100,000
First Cholera Pandemic	1816	1826	100,000
Second Cholera Pandemic	1829	1851	100,000
Russia Cholera Pandemic	1852	1860	1,000,000
Global Flu Pandemic	1889	1890	1,000,000
Sixth Cholera Pandemic	1899	1923	800,000
Encephalitis Lethargica Pandemic	1915	1926	1,500,000
Spanish Flu	1918	1920	100,000,000
Asian Flu	1957	1958	2,000,000
Hong Kong Flu	1968	1969	1,000,000
H1N1 Pandemic	2009	2010	203,000

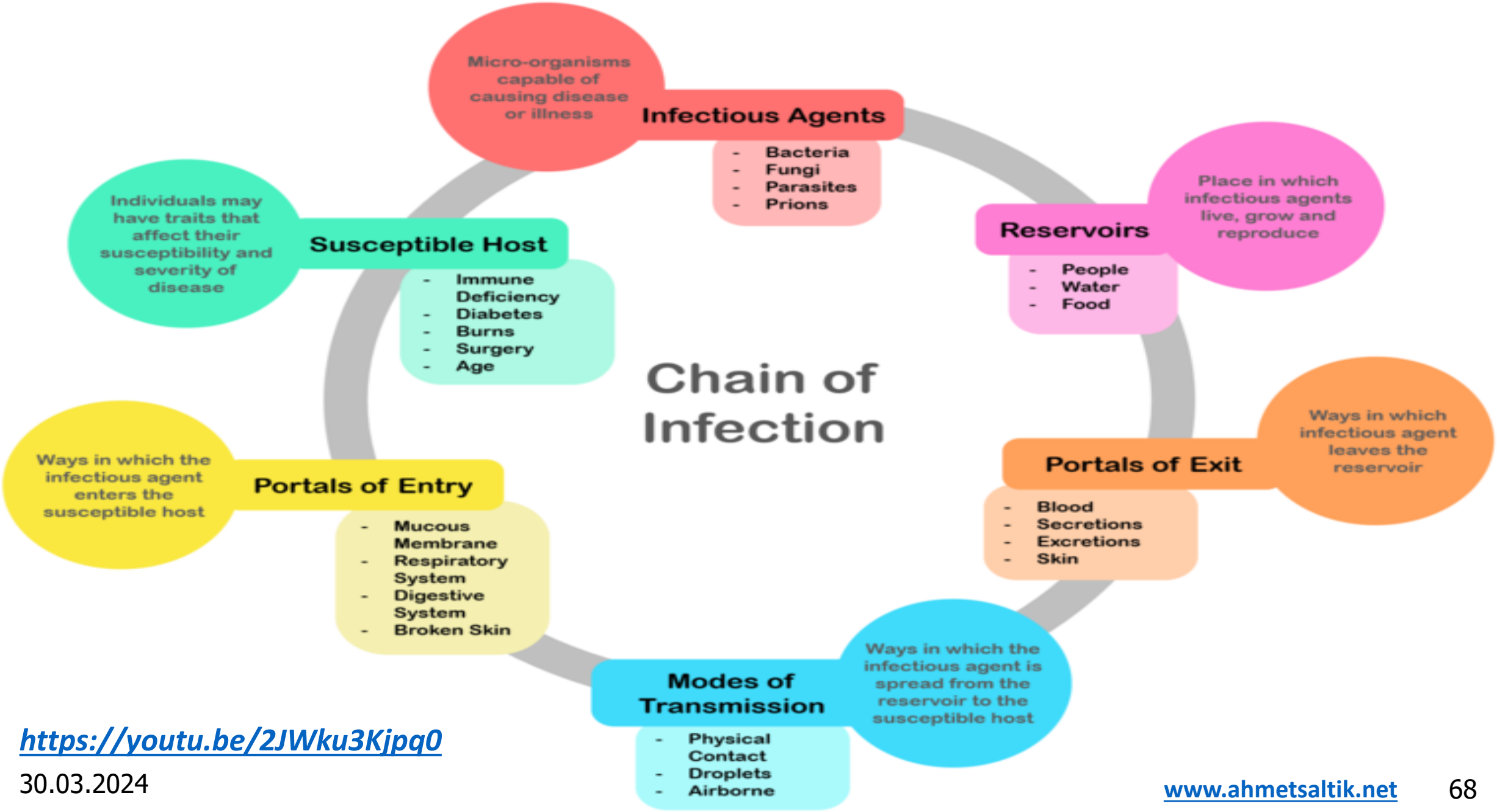
Sources: Alfani and Murphy (2017); Taleb and Cirillo (2020); and https://en.wikipedia.org/wiki/List_of_epidemics and references therein.

17th-century German "**plague** panel" depicting the ***triumph of death***. Panels of this kind were placed on the walls of houses to warn against the plague. A plague epidemic raged in Augsburg, Bavaria, between 1632 and 1635.

POOR COVID-19 VICTIMS in NEW-YORK STREETS



- A **communicable disease** is an illness caused by an infectious agent or its toxic product that can be transmitted in a workplace from person to person. Examples of communicable diseases that may circulate in a workplace include **COVID-19**, norovirus, and *seasonal influenza.*
- ***Communicable disease prevention*** focuses on *basic* ***risk reduction*** *principles to reduce the risk of workplace transmission of COVID-19 and other communicable diseases.*
- *The fundamental components of* ***communicable disease prevention*** include both ongoing measures to maintain at all times and additional measures to be implemented as advised by Public Health.



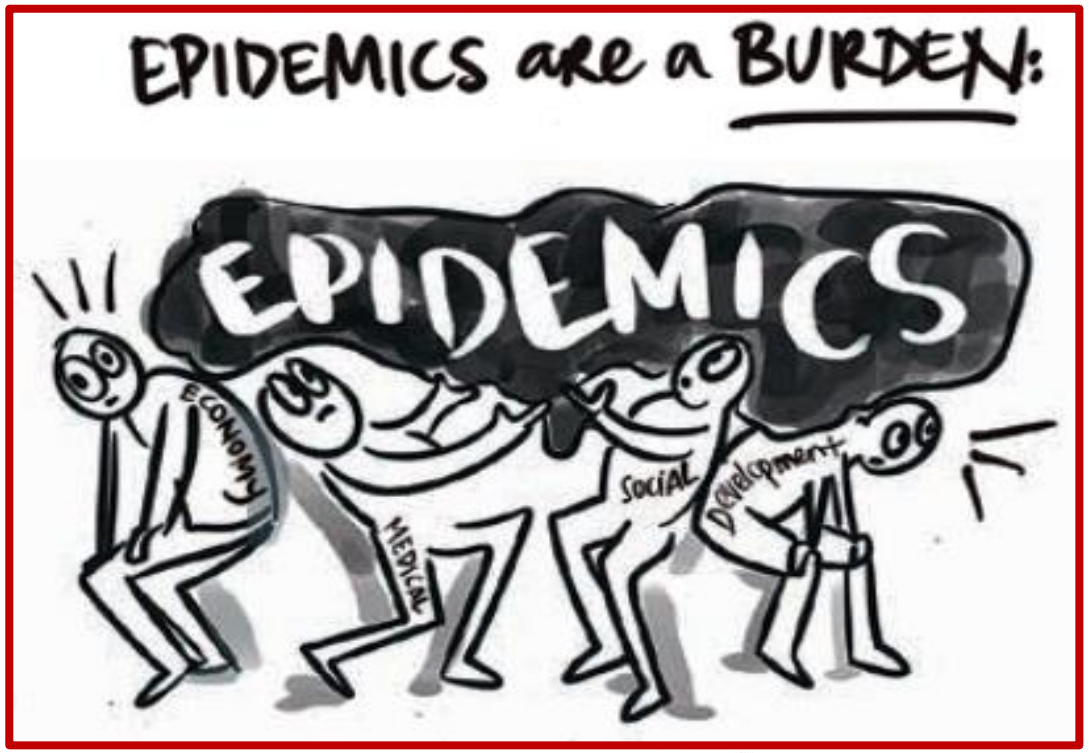
https://youtu.be/2JWku3Kjpq0

Controlling Infectious Diseases Within Communities

Infection control and prevention is a global issue and there are many protocols and guidelines that can be followed to minimise the spread of infection between people, within a population and globally[2]. Identifying at-risk groups such as children, older people and those with chronic conditions can also help guide relevant strategies to protect these vulnerable groups. The first step when looking at infection control can start at the community level by changing behaviour, including:

- Regular hand washing
- Appropriate use of Face-masks (protect from and prevent spread of respiratory infections)
- Using insect repellents
- Ensuring up-to-date routine vaccinations and participating in immunisation programmes
- Taking prescribed medications, such as antibiotics, as directed by health professionals
- Social distancing - avoiding contact with others
- Using condoms when having sex, especially with a new partner

Other steps that can be taken to control the spread within communities include environmental measures such



- *"Nature can help usderstand health crises, where they come from,*
- *And how the socio-economic fallout from such disasters can be mitigated."*