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SURVEILLANCE OF INFECTIOUS DISEASES; PANDEMIC PLANS

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Spring 2023

OVERVIEW

1. HISTORICAL OVERVIEW
2. SURVEILLANCE
3. CASE DEFINITION
4. PANDEMIC PREPAREDNESS

Epidemiology

*is the **study*** (scientific, systematic, data-driven)

*of the **distribution*** (frequency, pattern)

*and **determinants*** (causes, risk factors)

*of **health-related states or events*** (not just diseases)

*in **specified populations*** (patient is community, individuals viewed collectively),

*and the **application*** (since epidemiology is a discipline within public health)*of this study to the control of health problems.*

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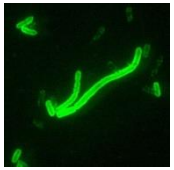
1. HISTORICAL OVERVIEW

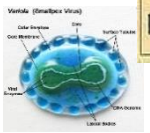
Historical overview

165 - 190 A.D. **ANTONINE SMALLPOX PLAQUE** — 5 mil. death

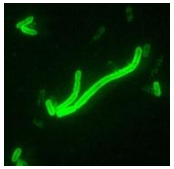


541 – 542 **PLAQUE OF JUSTINIAN** *Yersinia pestis* — 2 mil. death

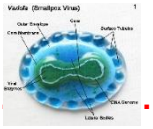
Pre-host rats, fleas



735 – 737 **JAPANESE SMALLPOX EPIDEMIC** *Variola major* virus — 2 mil. death



1347 – 1351 **BLACK DEATH** *Yersinia pestis* — 2 mil. death



1520 ---------- **1980 NEW WORLD OUTBREAK** *Variola major* virus — 56 mil. death

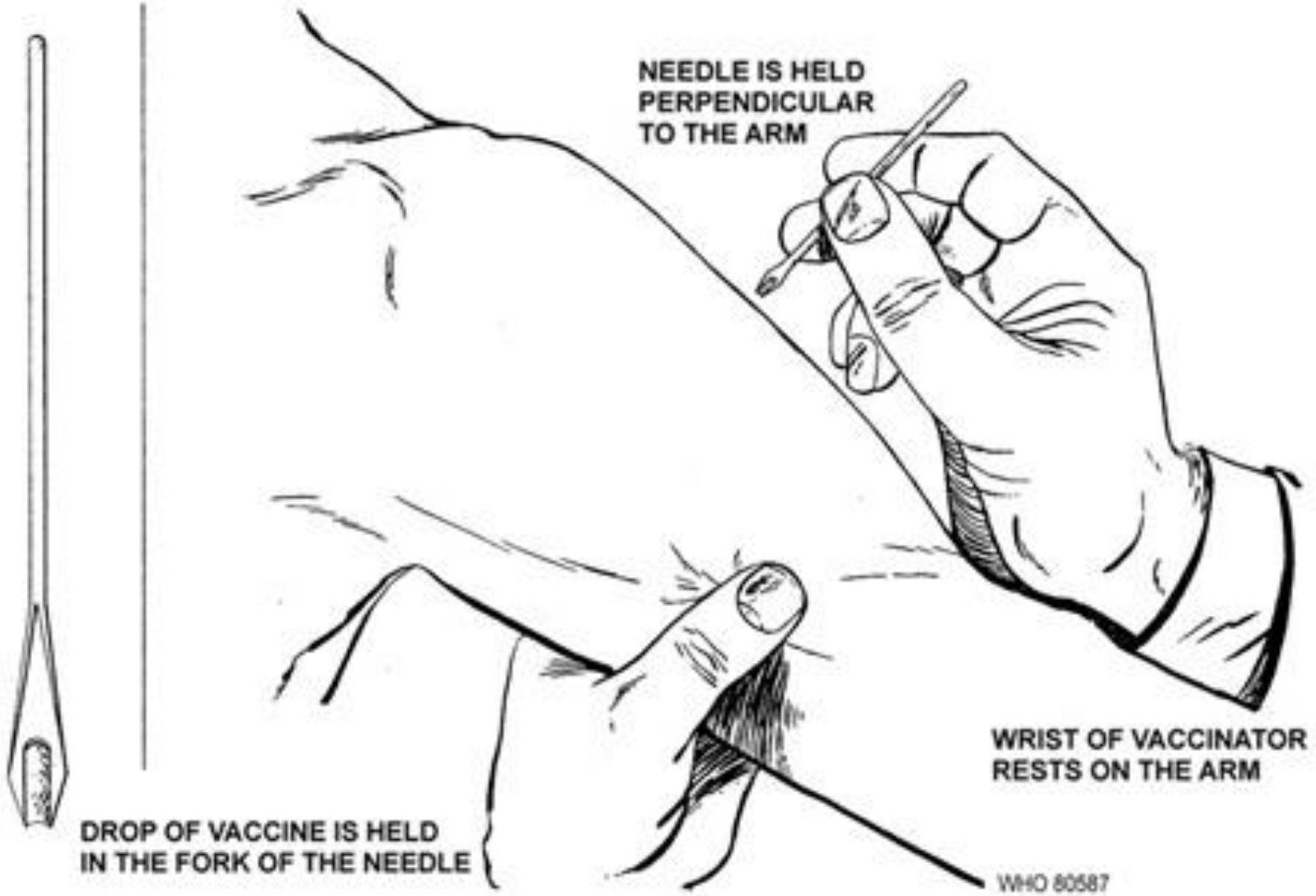
1980 ERADICATION OF SMALLPOX

Remembering an Old Disease

Smallpox - variola vera - pravé (černé)neštovice

Dr. Edward Jenner - 1796

MULTIPUNCTURE VACCINATION BY BIFURCATED NEEDLE



Rural vaccinator in United Provinces, British India, c.1930, private collection of Dr. Sanjoy Bhattacharya

Variola virus, which causes smallpox, was once the scourge of the world.

This virus passes from person to person through the air.

A smallpox infection results in fever, severe aches and pains, scarring sores that cover the body, blindness in many cases, and, often, death. There is no effective treatment.

Although vaccination and outbreak control eliminated smallpox in the United States by 1949, the disease still struck an estimated 50 million people worldwide each year during the 1950s.

In 1967, the World Health Organization (WHO) launched a massive vaccination campaign to rid the world of smallpox —and succeeded.

The last natural case of smallpox occurred in Somalia in 1977.

Ali Maow Maalin, cook twenty-three of the hospitals in the Somali Merce.

He contracted when he showed the path of the ambulance chauffeur who drove

two sick children to camp insulation.

In 1978 was ill photographer Medical School in Birmingham, England. She was killed

by a virus that escaped from a neighboring lab.

Mr. John Wickett, of the World Health Organization,
with **the last person** to have contracted – **and survived** –
naturally occurring smallpox in Somalia.

(1977), courtesy Mr. John Wickett.

Tuesday, March 8, 2011; 9:41 AM

Milestones in the eradication of smallpox

1789 Edward Jenner invents a smallpox vaccine.

1966 The World Health Organization (WHO) launches a massive global campaign to eradicate smallpox.

1972 Smallpox vaccinations are discontinued in the United States.

1975 and 1977 The last cases of the two known variants of smallpox occur in the world, in Bangladesh and Somalia.

1978 Two people are sickened in a lab accident in England; one dies.

1980 The WHO declares smallpox eradicated.

1991 Smallpox virus DNA is mapped.

1999 The WHO sets this deadline, by which remaining lab stocks of the virus are to be destroyed. The deadline will be postponed again and again.

2003 Millions of doses of vaccine are produced to hedge against a biological attack.

2011 WHO's decision-making body will meet in May to again vote on whether to kill the remaining live viruses.

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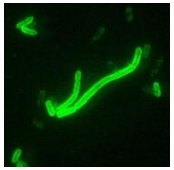
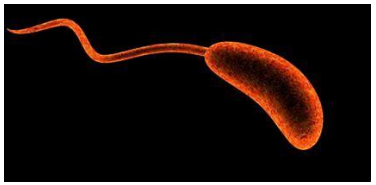
1629 -1631 **ITALIAN PLAQUE** *Yersinia pestis*



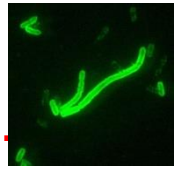
1 mil. death

1817 – 1824 **CHOLERA PANDEMICS** *Vibrio cholerae*



1 mil. death

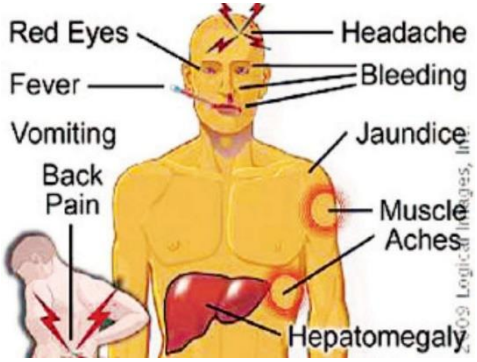
1885 **THIRD PLAQUE** *Yersinia pestis*



12 mil. death

Late 1800s **YELOW FEVER** *Yelow fever virus*

100 000 – 150 000 death



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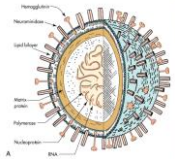
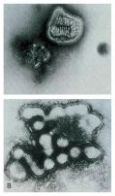
1889-1890 **RUSSIAN FLU** **H2N2**; Pre-host - avian origin





1 mil. death

1918 – 1919 **SPANISH FLU** **H1N1;** Pre-host -pigs

40 – 50 mil. death

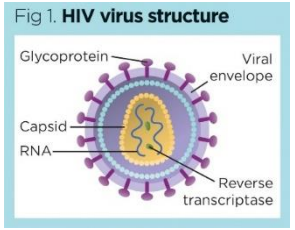
1957 -1958 **ASIAN FLU** **H2N2;** Pre-host – avian origin

1 – 2 mil. death

1968 - 1970 **HONG-KONG FLU** **H3N2**

1 mil. death

1980 ---------- present **HIV/AIDS**



36 mil. death

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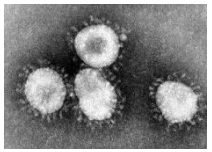
2002 – 2003 **SARS** (*Severe Acute Respiratory Syndrome*) *Coronavirus*



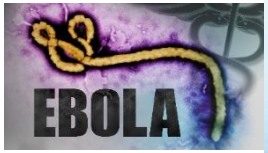
770 death

Pre-host bats, civests

2009 – 2010 **SWINE FLU**

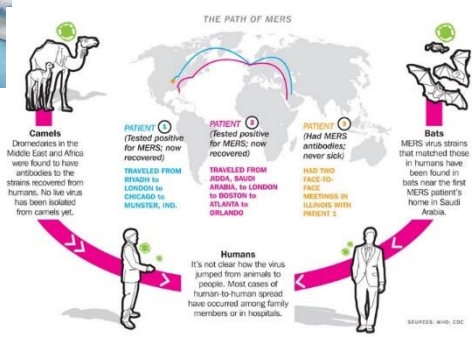
200 000 death

2014 -2016 **EBOLA**



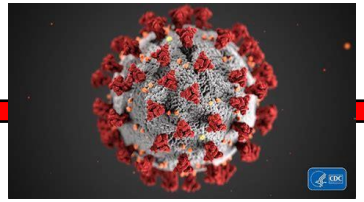
11 000 death

201 --- present **MERS** (***MERS***-*CoV – Middle East Respiratory Syndrome Coronavirus)*



866 death

20 --- present **COVID 19**



..... **674, 027,405 infections/ confirmed**

6,863,410 deaths

(update 23.2.2023)

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2. SURVEILLANCE OF INFECTIONS

Infectious disease surveillance

is an important epidemiological tool to monitor disease burden and epidemiology of disease and identify outbreaks and new pathogens.

Surveillance represents a number of long-term and complex programmes, in which experts of various medical fields participate together, for example:

* epidemiologists, * microbiologists, * hygienists, * clinicians etc.

Other non-medical personnel, such as * statisticians, * vets and * ecologists, may also participate alongside medical personnel.

The epidemiologist is usually the initiator and organiser of the program.

Founder of the modern Czechoslovak epidemiological school is

Professor Karel Raška (1909–1987).

He was the author of the method of epidemiological vigilance (surveillance),

"Surveillance means the epidemiological study of a disease as a dynamic process, including the ecology of the disease agent, host, reservoirs and vectors of the disease, as well as the study of the external conditions of the environment and all the mechanisms that are applied in the process of spreading the disease to the extent to which the disease occurs " K. Raška,

adopted by the WHO General Assembly in 1968 as the basis for modern epidemiology worldwide.

During his work at the SZÚ (National Institut of Public Heatlh), he pushed for the introduction of diagnostics of Rh factor and blood transfusions in fetal erythroblastosis.

After 1945, he was one of the leading organizers of Czechoslovak healthcare, he was a professor Faculty of Medicine, Charles University of Hygiene and in 1963–70 the director of the Prague Institute of Epidemiology and Microbiology.

He played a significant role in developing a strategy for the eradication of smallpox in the world.

2022 - He received the Order of Tomas G. Masaryk I. class (in memory) from President Zeman.

Surveillance

- The main role of infectious disease surveillance is:

➢ monitor disease incidence patterns –

anticipate, observe and minimize damage caused by epidemic, epidemic and pandemic situations;

Surveillance can detect sudden changes in the incidence of a disease, such as an outbreak, or identify long-term disease trends or new and emerging diseases.

➢ increase knowledge of which factors contribute to these circumstances,

➢ assess the health status of the population.

- This type of assessment is a fundamental function in the field of public health.

WHY WE DO
NOTIFIABLE DISEASE SURVEILLANCE

Detect Disease When and Where It Happens

Stop Disease Before It Spreads

Study Disease to Strengthen the Science

Improve How We Prevent and Control Disease

Keep People Healthy

Terminology and Definitions

- Chain of infection
- Host (source)
- Reservoir
- Transmission
  - Direct
  - Indirect
  - Biologic
  - Vertical
- Susceptible host
- Incidence and
- prevalence
- Case definition

- Sporadic disease
- Endemic disease
- Epidemic(outbreak)
- Pandemic disease
- Zoonosis, epizootic and enzootic
- Eradication
- Elimination
- Nosocomial infection
- Attack rate
- Opportunistic infection

- Immunity passive active
- Individual immunity
- Herd immunity
- Virulence
- Incubation period
- Infectivity period
- Latent period
- Probability ratio

Occurrence of Disease

- Incidence - the incidence rate refers to the number of new cases of a disease in a given population over a period of time.
- Prevalence - the prevalence rate refers to the number of total cases of a disease in a given population at a specific time.
- Sporadic disease — Disease that occurs occasionally in a population.
- Endemic disease — Disease constantly present in a population.
- Epidemic disease — is a sudden increase in occurrences of a disease in a particular time and place. It may affect asmall and localized group or impact upon thousands of people across an entire continent.
- Pandemic disease — Worldwide epidemic.

Chain of infections (epidemic proces)

- **THE CAUSATIVE AGENT OF INFECTION** (bacteria, viruses, fungi, prions, protozoa)

- 1. the **presence of rezervoir (source)** of infection
- man, animal at the ende of incubation period
- acute stage
- cariers

- 2. the way **of transmission** **A/ direct contact**
  touching, kissing or sexual intercourse (Staphylococcus spp., Gonococcus spp.,HIV …),
  - **vertical transmission –** from mother to fetus (VHB, VHC, HIV, listeria, rubella,
- cytomegalovirus…)
- **B/ indirect contact**
  - inhalation of droplets containing the infectious agents (TBC, measles, influenza…)
  - ingestion of food or water that is contaminated (salmonella, Norwalk virus, VHA….)
  - biological transmission by insects (malaria, borellia….)

- 3. the **susceptibility** of the population or its individual members to the organism concerned

Host factors : age, nutrition, genetics
immunity – natural (nonspecific),
- acquired

- **THE INFECTION**
= 1. **source of infection**
- ……

- If the epidemiology is know, we can interfere with transmission:

„**BREAKING THE CHAIN OF INFECTION**“

- Different infections have different epidemiologies and
  - thus require different methods of control

In the practical part it is preoccupied with

preventive measures
repressive measures
related to infectious diseases

“Eradication” versus “Elimination”

- The e*radication* of a disease is permanent and global, while the *elimination* of a disease is an achievement restricted to a specific geographic area.

- ***Eradication*** of a disease refers to a deliberate effort that leads to the permanent reduction to zero of the worldwide incidence of infection caused by a specific agent.
- Eradication means that intervention measures are no longer required, the agent, which previously caused the disease is no longer present.

- ***Elimination*** of a disease refers to the deliberate effort that leads to the reduction to zero of the incidence of infection caused by a specific agent in a defined geographic area.
- A disease can be eliminated from a specific region without being eradicated globally. Actions to prevent the disease from transmitting or re-emerging are still required once a disease is eliminated.

Eradication conditions

* exclusively human disease,
* may not have a reservoir in nature,
* there must be an effective vaccination against this disease.

- Examples of globally eradicated infectious diseases:
- the only infectious disease so far,which was eradicated is variola (October 26, 1979);

- Will most likely follow in the future poliomyelitis (estimates are 2012 ???).

The last 33 cases of poliomyelitis were in Czechoslovakia in 1960 –

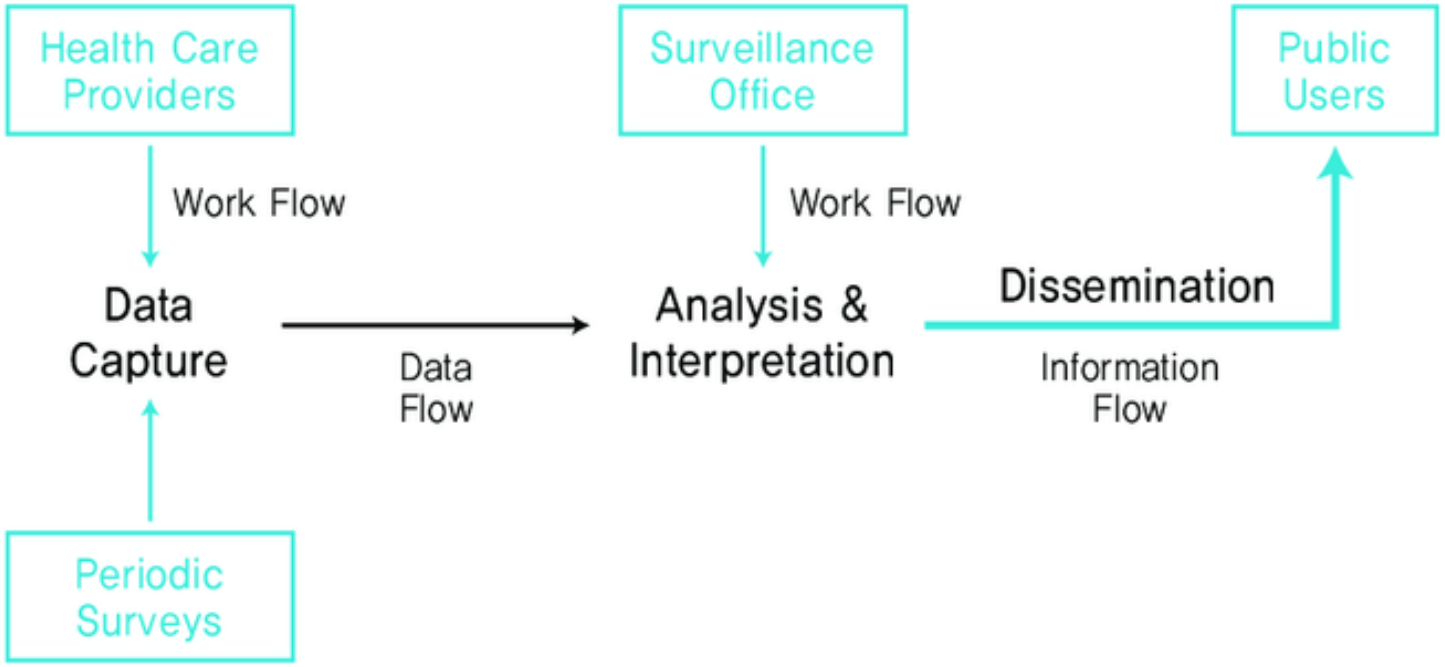
- - the first country in the world !!

Infectious disease surveillance can have different approaches based:

- on the epidemiology and
- clinical presentation of the disease,
- including many traditional forms of surveillance
- as well as innovative approaches.

Dissemination of surveillance data is a critical step toward public health action. It can take many forms from peer-reviewed journals to novel online platforms that decrease the time between data generation and action.

Immediately after diagnosis or suspected infectious disease patient **reports a doctor who examined him first** by sending a relevant form epidemiological department territorially competent health institute (by the law).
In case of highly contagious diseases or in case of epidemic outbreaks is reported by telephone **directly to the Ministry of Health.**



Surveillance:

- **is the systematic**

❖ collection - obtaining the necessary data such as the number of sick, the number of dead, data from microbiological laboratories on circulation and qualities of etiological agent, clinical information on symptomatology of individual diseases, monitoring of vaccination and collective immunity of population, monitoring of infections with animals, and data of natural sciences on vectors.

❖ analysis - of collected data, including evaluation of information and suggestion of measures. Long-term surveillance gives the possibility of making a prognosis of the occurrence of a given disease for the future.

❖ interpretation, and

❖ dissemination of health data on an ongoing basis- guaranteeing qualified information to all concerned people who can further use it for improvement of their own measures and theories.

- In order to gain knowledge of the pattern of disease occurrence and potential in a community, in order to control and prevent disease in the community.

Surveillance:

- **Active surveillance - disease tracing:**
- Active supervision occurs when the staff of the Public Health Authority (OOVZ) contacts:
- health care providers,
- labs,
- performs screening and requesting information about diseases.

- Although this method is more expensive and labor intensive, it tends to provide a more complete prognosis of the frequency of the disease and the setting of the necessary areal measures.

Surveillance:

- **Passive surveillance** – reporting cases of the disease.
- Reporting infections is required by law in most countries.
- In practice, it is difficult to enforce compliance by doctors, so the frequency of the disease is insufficiently reported.
- Despite significant under-reporting, this system has proven useful in identifying outbreaks of infections and trends over time.
- Healthcare providers report reporting diseases on a case-by-case basis.
- Passive supervision is advantageous because it is continuous and requires few resources.
- However, it is impossible to ensure compliance by healthcare providers; in addition, cases occurring in people without access to care will often not be reported. As a result, the frequency of the disease is underestimated when using passive surveillance.

Surveillance:

- Surveillance programmes can be carried out on a large scale such as for districts and regions.
- In the Czech Republic, surveillance programmes exist for poliomyelitis, pertussis, diphtheria, measles, viral hepatitis, alimentary infections and influenza.

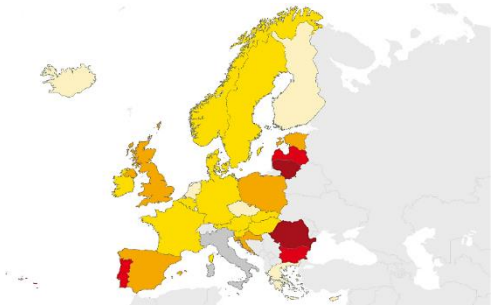
- Examples:
- Under the general guidelines released by WHO, surveillance of influenza, coronavirus and other is carried out on an international level.

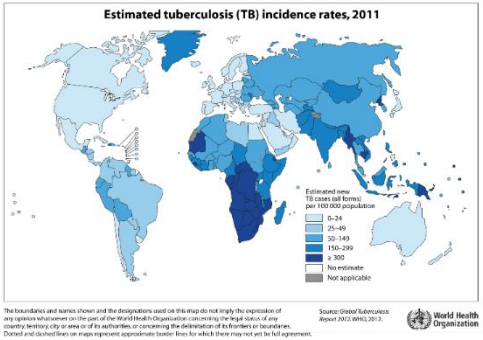
Surveillance:

- To study the influence of factors (lifestyle, environment, genetic factors) on human health, to understand the epidemiological characteristics of infectious diseases, they are the basis of epidemiological studies.
- **Descriptive epidemiological studies** generally present the mortality or incidence of a particular disease in a population, local stratification, and changes in the frequency of disease over time, and are key to formulating an epidemiological hypothesis.
- In recent decades, the so-called **geographic information system (GIS)** has been used to understand the epidemiology of infectious diseases, especially the relationship between the causative agent, host and environment. And it even helped eliminate cholera outbreaks in Bangladesh.
- **Analytical epidemiological studies** focus on the study of the causes of diseases in order to clarify the relationship between the studied factor and a certain disease, ie whether exposure to a certain risk factor leads to the disease or, conversely, whether the disease prevents it.

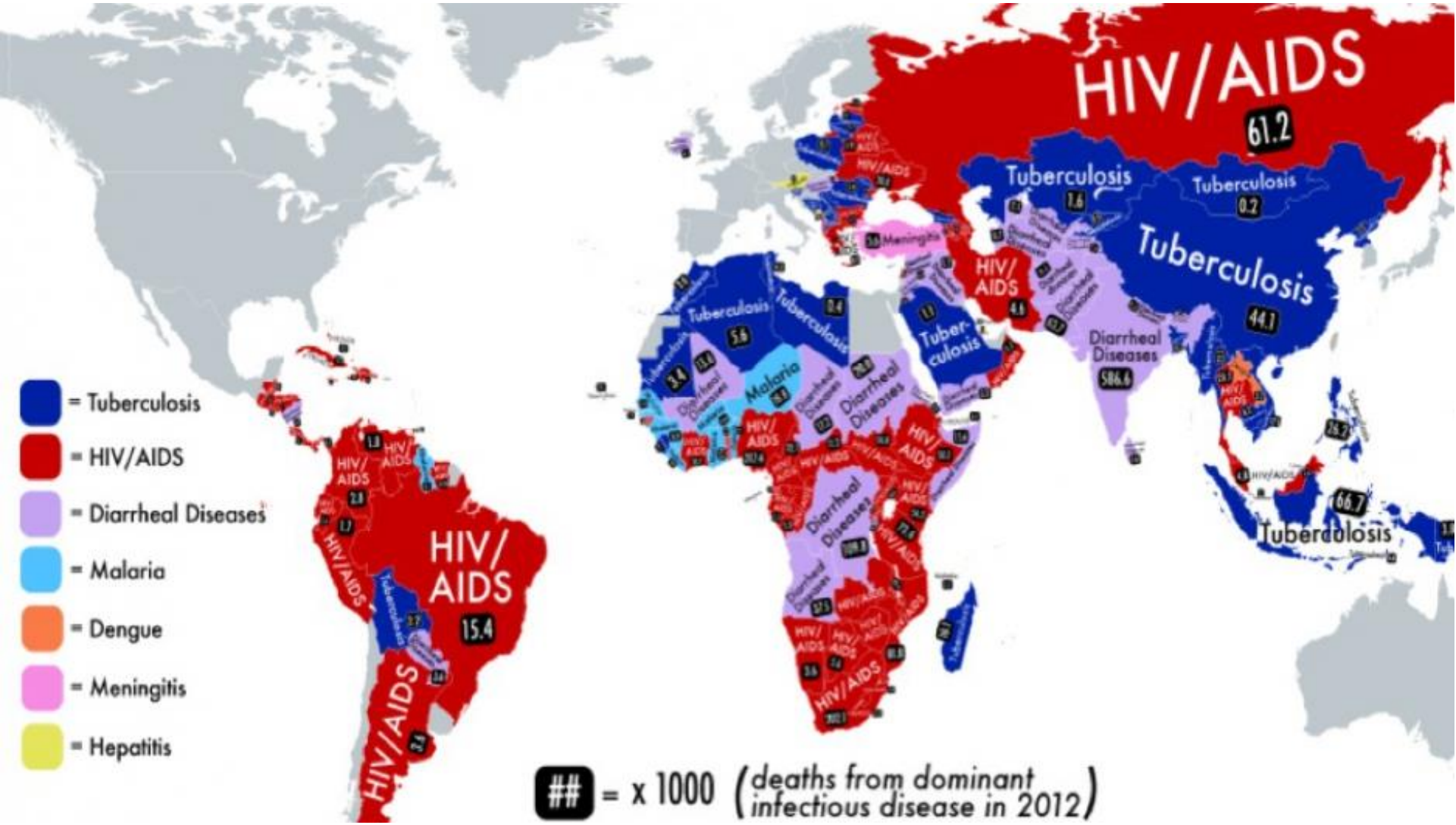
- In the future, new research methods will be needed, such as flexible analysis of irregular spatial and temporal clusters, adjustment of personal risk factors, and Bayesian approaches to disease mapping and better prediction.

European Tuberculosis Surveillance





- **The European Tuberculosis Surveillance Network** consists of TB surveillance experts from all 53 countries belonging to the World Health Organization's European Region, including 30 EU/EEA Member States.
- Under the joint coordination of ECDC and the World Health Organization's Regional Office for Europe, the network collects, validates, analyses and disseminates European TB surveillance data.
- The purpose of the network is to identify the epidemiological patterns of TB in the Region and monitor progress towards TB elimination, with key surveillance and monitoring findings published in an annual report.
- In addition, the network aims to further strengthen TB surveillance in Europe.


= Tuberculosis
= HIV/AIDS
= Diarrheal Diseases
= Malaria
= Dengue
= Meningitis
= Hepatitis
HIV/AIDS
61.2
Tuberculosis
Tuberculosis
Tuberculosis
44.1
HIV/AIDS
Diarrheal Diseases
586.6
Tuberculosis
66.7
HIV/AIDS
15.4
Malaria
Diarrheal Diseases
= x 1000 (deaths from dominant infectious disease in 2012)

Outbreak investigation

- When investigating disease outbreaks, the epidemiology profession has developed a number of widely accepted steps:
- Identify the existence of the outbreak (Is the group of ill persons normal for the time of year, geographic area, etc.?)
- Verify the diagnosis related to the outbreak
- Create a case definition to define who/what is included as a case
- Map the spread of the outbreak using
- Develop a hypothesis (What appears to be causing the outbreak?)
- Study hypotheses (collect data and perform analysis)
- Refine hypothesis and carry out further study
- Develop and implement control and prevention systems
- Release findings to greater communities

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3. Case definition

Case definition

- A key part of modern disease surveillance is the practice of reporting cases of the disease under „Case definition“:

Case definition, in **epidemiology**, is a set of **criteria** used in making a decision as to whether an individual has a **disease** or health event of interest.

Establishing a case definition is an **imperative** step in quantifying the magnitude of disease in a population.

Case definition

Case definitions are used in ongoing **public health** surveillance to track

- the occurrence and
- distribution of disease
- within a given area,

as well as during outbreak investigations in field epidemiology.

Focus of infection

Notification of the Sick and the Ones Suspected of Infection

- **Early and accurate diagnosis of the disease –**

is a fundamental prerequisite for initiating rapid and effective repressive measures.

- This includes:

* proper epidemiological history ,
* clinical examination and
* laboratory tests (microbiological, serological, biochemical etc.).

- As soon as the diagnosis is confirmed or when there is a suspicion of an infectious disease, the affected individuals are notified immediately.

Case definition

Case definitions of communicable diseases:

- Clinical criteria
- Laboratory criteria
- Epidemiological criteria and epidemiological link

The incubation periods
for diseases are given in the additional information to facilitate the assessment of the epidemiological link.

- **EXPLANATION OF THE SECTIONS USED IN THE DEFINITION AND CLASSIFICATION OF CASES:**

A) Clinical criteria

- Clinical criteria include common and relevant signs and symptoms of the disease which either individually or in combination constitutes a clear or indicative clinical picture of the disease.
- They give the general outline of the disease and do not necessarily indicate all the features needed for individual clinical diagnosis.
- .

- **EXPLANATION OF THE SECTIONS USED IN THE DEFINITION AND CLASSIFICATION OF CASES:**

B) Laboratory criteria

- Laboratory criteria are a list of laboratory methods that are used to confirm a case. Usually only one of the listed tests will be enough to confirm the case.
- If a combination of methods is needed to meet the laboratory confirmation, this is specified. The type of specimen to be collected for the laboratory tests is only specified when only certain specimen types are considered relevant for the confirmation of a diagnosis. Laboratory criteria for a probable case are included for some agreed exceptional cases.
- Those laboratory criteria consist of a list of laboratory methods which can be used to support the diagnosis of a case but which are not confirmatory.

- **EXPLANATION OF THE SECTIONS USED IN THE DEFINITION AND CLASSIFICATION OF CASES:**

Epidemiological criteria and epidemiological link 1.

Epidemiological criteria are deemed to have been met when an epidemiological link can be established.

Epidemiological link, during the incubation period, means one of the following six:

— **Human to human transmission**: the fact that a person has had contact with a laboratory confirmed human case in such a way as to have had the opportunity to acquire the infection

— **Animal to human transmission**: the fact that a person has had contact with an animal with a laboratory confirmed infection/colonisation in such a way as to have had the opportunity to acquire the infection

— **Exposure to a common source:** the fact that a person has been exposed to the same common source or vehicle of infection, as a confirmed human case

— **Exposure to contaminated food/drinking water**: the fact that a person has consumed food or drinking water with a laboratory confirmed contamination or has consumed potentially contaminated products from an animal with a laboratory confirmed infection/colonisation

— **Environmental exposure**: the fact that a person has bathed in water or has had contact with a contaminated environmental source that has been laboratory confirmed

— **Laboratory exposure**: the fact that a person has worked in a laboratory where there is a potential for exposure

EU definitions – case definitions for reporting communicable diseases

- Epidemiological criteria are deemed to have been met when an epidemiological link can be established.

Epidemiological criteria and epidemiological link 2.

- **Transmission** may occur by one or more of the following routes:
- **— Airborne**: by projection of aerosol from an infected person onto the mucous membranes while coughing, spitting, singing or talking, or when microbial aerosols dispersed into the atmosphere are inhaled by others
- **— Contact:** a) direct contact with an infected person (faecal-oral, respiratory droplets, skin or sexual exposure) or animal (e.g. biting, touching) or b) indirect contact to infected materials or objects (infected fomites, body fluids, blood)
- **— Vertical:** from mother to child, often in utero, or as a result of the incidental exchange of body fluids usually during the perinatal period
- **— Vector transmission:** indirect transmission by infected mosquitoes, mites, flies and other insects which transmit disease to humans through their bites
- **— Food or water**: consumption of potentially contaminated food or drinking water.

For reporting purposes are:

Possible case

Probable case

Confirmed case

EU definitions – case definitions for reporting communicable diseases

Possible case

A possible case means a case classified as possible for reporting purposes.

- It is usually a case meeting **the clinical criteria** as described in the case definition without epidemiological or laboratory evidence of the disease in question.

The definition of a case as possible has high sensitivity and low specificity.
It allows for detection of most cases but some false positives cases will be included into this category.

Probable case

A probable case means a case classified as probable for reporting purposes.

- It is usually a case with **clinical criteria** and **an epidemiological link** as described in the case definition.

Laboratory tests for probable cases are specified only for some diseases.

Confirmed case

A confirmed case means a case classified as confirmed for reporting purposes.

- Confirmed cases **fall in one of the three subcategories** listed below.
- A) Laboratory-confirmed case with clinical criteria.

The case meets * the laboratory criteria for case confirmation and

- the clinical criteria included in the case definition.

- B) Laboratory-confirmed case with unknown clinical criteria.

The case meets * the laboratory criteria for case confirmation but there is no information available regarding the clinical criteria (e.g. only laboratory report).

- C) Laboratory-confirmed case without clinical criteria.

The case meets the laboratory criteria for case confirmation but doesn't meet the clinical criteria in the case definition or is asymptomatic.

Viral hepatitis A (VHA)
Case definition

- **Clinical Criteria**

Any person with a discrete onset of symptoms (e.g. fatigue, abdominal pain, loss of appetite, intermittent nausea and vomiting)

- AND

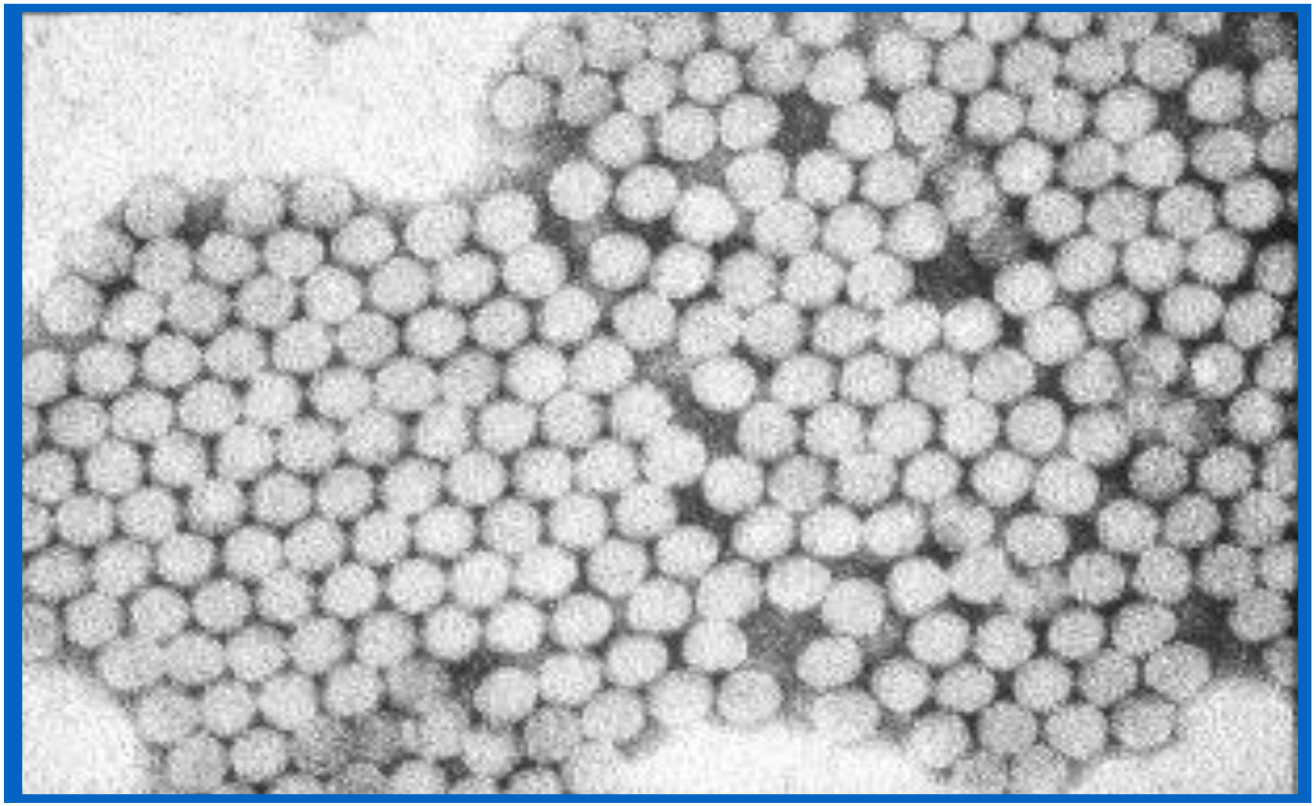
At least one of the following three: * — Fever
* — Jaundice
* — Elevated serum aminotransferase levels

- **Laboratory Criteria**
- At least one of the following three:
- — Detection of hepatitis A virus nucleic acid in serum or stool
- — Hepatitis A virus specific antibody response
- — Detection of hepatitis A virus antigen in stool

- **Epidemiological Criteria**
- At least one of the following four:
- — Human to human transmission
- — Exposure to a common source
- — Exposure to contaminated food/drinking water
- — Environmental exposure

- **Case Classification**
- A. **Possible case** NA
- B. **Probable case**
- Any person meeting the clinical criteria and with an epidemiological link
- C. **Confirmed case**
- Any person meeting the clinical and the laboratory criteria

HEPATITIS A VIRUS



Etiology:

- RNA Picornaviridae; Single serotype worldwide
- No chronic infection; protective antibodies develop in response to infection - confers lifelong immunity

VHA is durable; **survives in the external environment cca 10 days**

The source of infection

Incubation period (IP): 30 – max.50 days
Infectivity period: 2 weeks at the ende IP + 1 day after after the onset of illness

- the presence of high levels of virus in the faeces (10on 9 in 1 ml);
- around the onset is viremia

Route of transmission

Faecal-oral transmission - Close personal contact
(e.g., household contact, sex contact, child day-care centers)
Contaminated food, water (e.g., infected food handlers)
Blood exposure (rare), (e.g., injection drug use

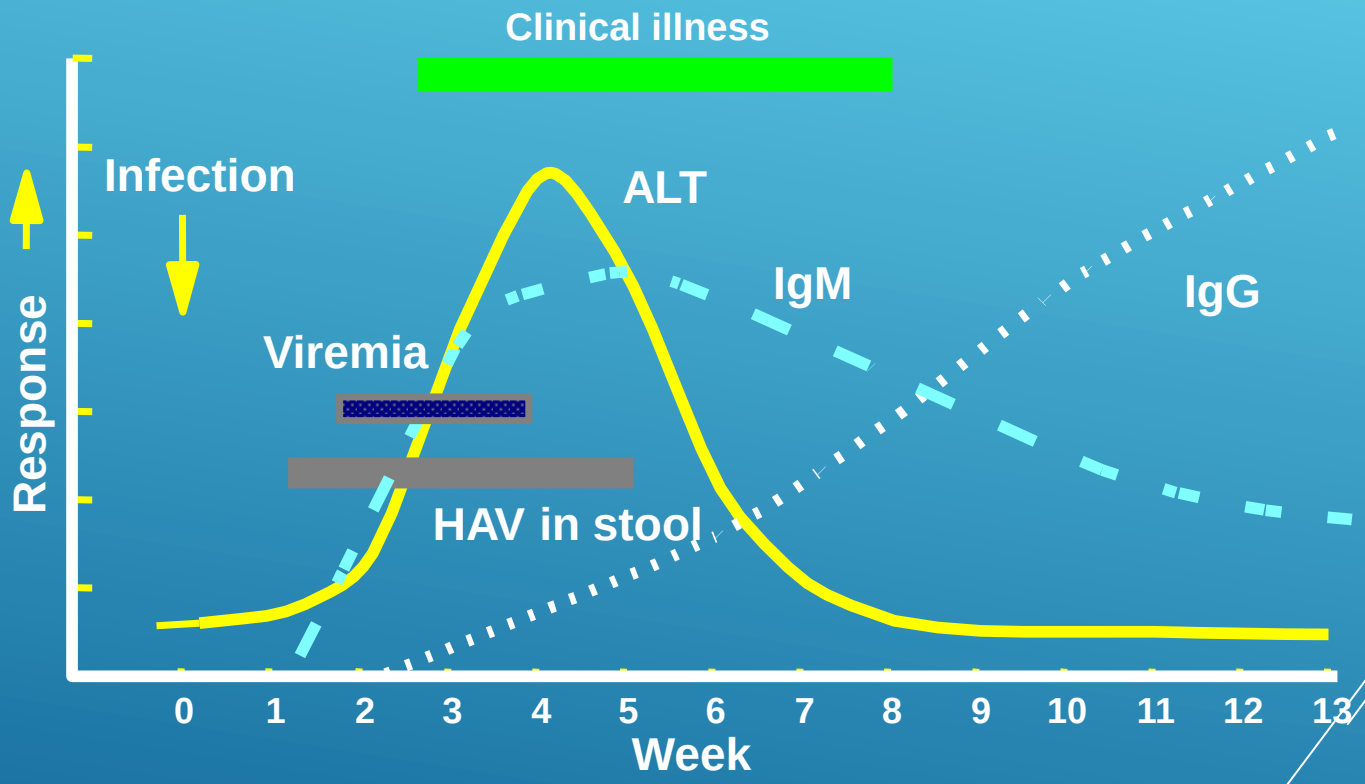
Susceptibility

General

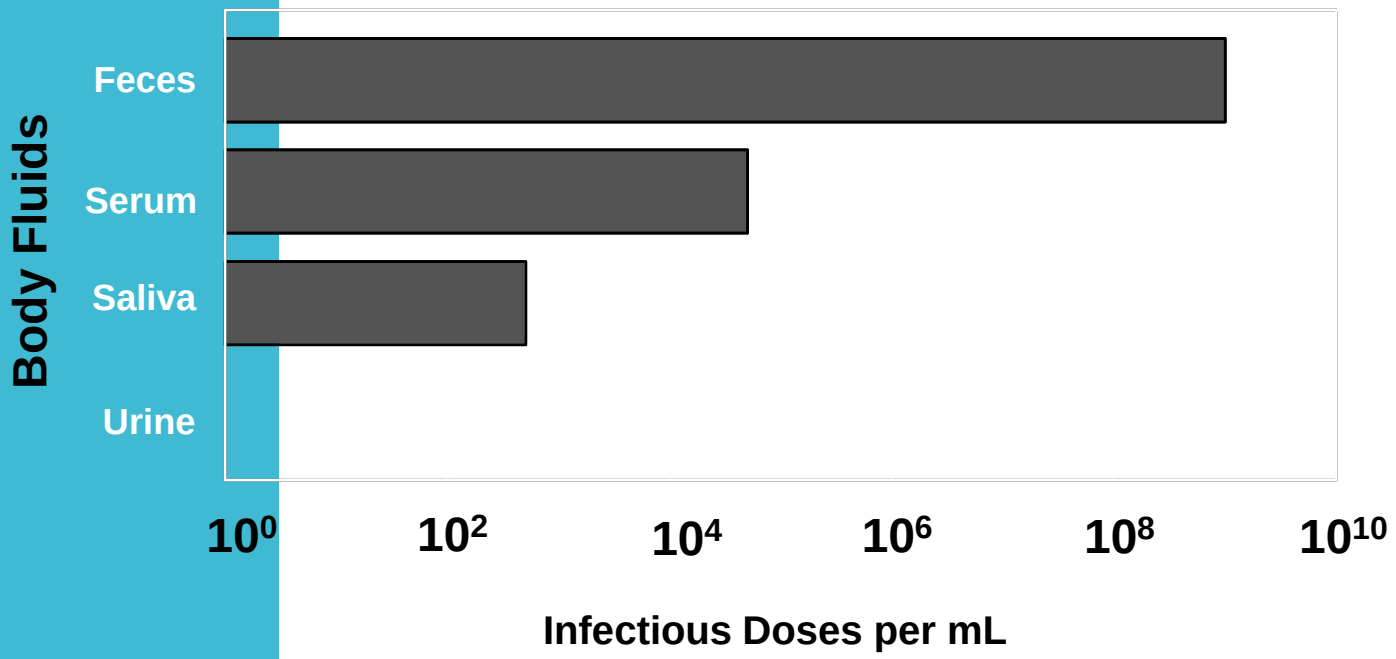
Preventive measures:

Hygiene (e.g., hand washing)
Sanitation (e.g., clean water sources)
Hepatitis A vaccine (pre-exposure)
Immune globulin (pre- and post-exposure)

EVENTS IN HEPATITIS A VIRUS INFECTION

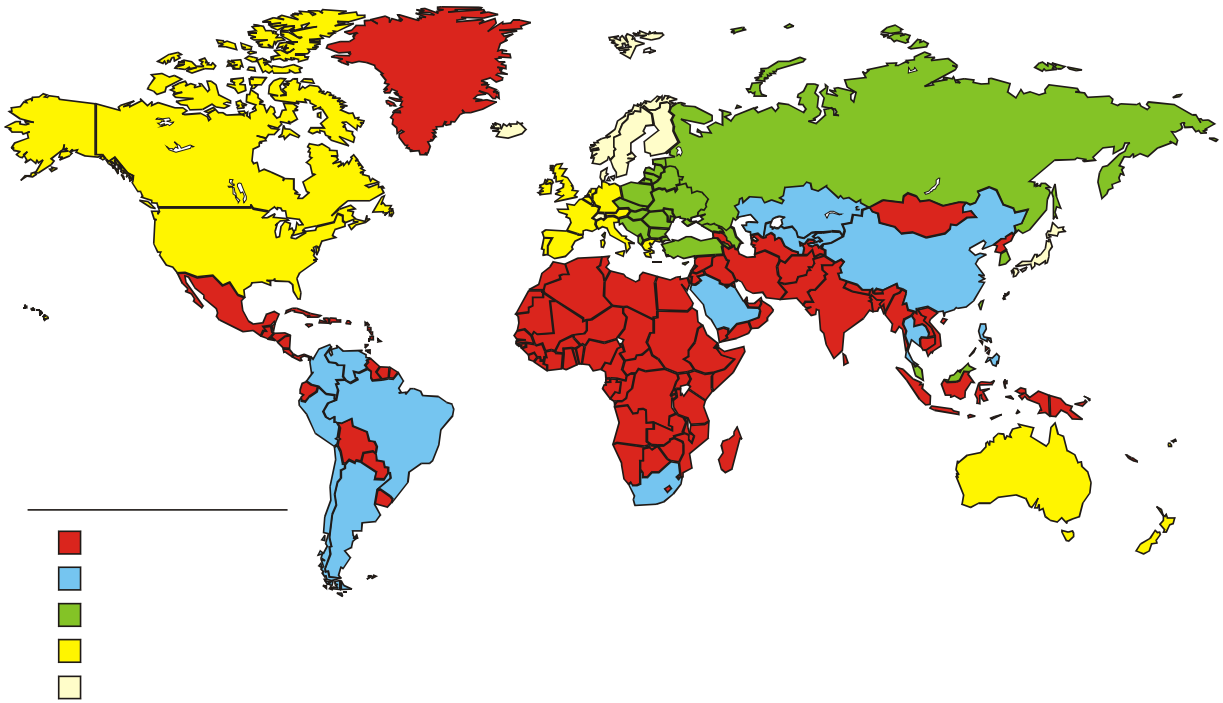


CONCENTRATION OF HEPATITIS A VIRUS IN VARIOUS BODY FLUIDS



Source: Viral Hepatitis and Liver Disease 1984;9-22
J Infect Dis 1989;160:887-890

GEOGRAPHIC DISTRIBUTION OF HEPATITIS A VIRUS INFECTION



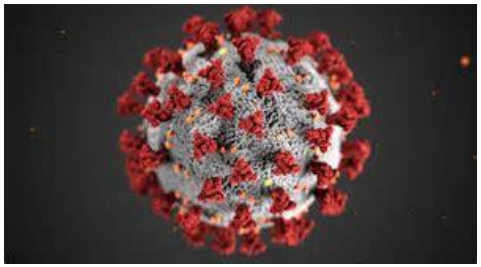
Coronaviruses (CoV) were identified as human pathogens in the 1960s. They are enveloped positive stranded RNA viruses in the order of *Nidovirales:*

Coronaviruses

Order: *Nidovirales*

Family: *Coronaviridae*

Sub-family	Genus	Sub-genus	Species	Sub-species
Orthocoronaviridae	*Alphacoronavirus*	*Duvinacoronavirus*	*HCoV-229*	
		Setracovirus	*HCoV-NL63*	
	Betacoronavirus	*Embecovirus*	*HCoV-HKU1*	
			Betacoronavirus 1	*HCoV-OC43*
		Merbecovirus	*MERS-CoV*	2012
		Sarbecovirus	*SARS-CoV*	2002
			SARS-CoV2	
	Deltacoronaviruus			
	Gammacoronaviruus			



WHO COVID-19: Case Definitions

Updated in Public health surveillance for COVID-19, 22 July 2022

World Health Organization | Case Definitions

Suspected case of SARS-CoV-2 infection (3 options)

A A person who meets the clinical **OR** epidemiological criteria:

Clinical criteria:

- acute onset of fever AND cough (ILI)

OR

- acute onset of **ANY THREE OR MORE** of the following signs or symptoms: fever, cough, general weakness/fatigue[1], headache, myalgia, sore throat, coryza, dyspnoea, nausea/diarrhoea/anorexia

OR

Epidemiological criteria [2]:

- contact of a probable or confirmed case, or linked to a **COVID-19 cluster.**[3]

B A patient with **severe acute respiratory illness**
(SARI: acute respiratory infection with history of fever or measured fever of ≥38 °C; and cough; with onset within the last 10 days; and requires hospitalization)

C A person with no clinical signs or symptoms **OR** meeting epidemiologic criteria with a **positive professional-use or self-test** SARS-CoV-2 Antigen-RDT.[4]

[1] Signs separated with slash (/) are to be counted as one sign.

[2] In light of the heightened transmissibility of emerging variants and the high likelihood that any close contact could be infected, epidemiological criteria alone are included in order to qualify asymptomatic contacts for testing, when possible, for the countries with the capacity to adapt more sensitive testing strategies; this is particularly relevant in high-risk populations and settings.

[3] A group of symptomatic individuals linked by time, geographic location and common exposures, containing at least **one NAAT-confirmed** case or at least **two** epidemiologically linked, symptomatic (meeting clinical criteria of Suspect case definition A or B) persons with **positive professional use OR self-test Ag-RDT** (based on ≥97% specificity of test and desired >99.9% probability of at least one positive result being a true positive)

Probable case of SARS-CoV-2 infection (2 options)

A A patient who meets **clinical criteria AND** is a **contact of a probable or confirmed case**, or linked to a **COVID-19 cluster**[3]

B **Death**, not otherwise explained, in an adult with **respiratory distress** preceding death AND who **was a contact of a probable or confirmed case** or linked to a **COVID-19 cluster**[3]

Confirmed case of SARS-CoV-2 infection (2 options)

A A person with a positive **Nucleic Acid Amplification Test (NAAT), regardless of** clinical criteria **OR** epidemiological criteria

B A person meeting clinical criteria **AND/OR** epidemiological criteria (suspect case A) with a **positive professional-use or self- test** SARS-CoV-2 Antigen-RDT.[4]

[4] **Ag RDT antigen-detection rapid diagnostic tests (Ag-RDT) are available for use by trained professionals or for self-testing by individuals:**

- **Professional-use SARS-CoV-2 antigen-RDT :** WHO EUL-approved Ag-RDT, in which sample collection, test performance and result interpretation are done by a trained operator

- **Self-test SARS-CoV-2 antigen-RDT :** WHO EUL-approved Ag-RDT in which sample collection, test performance and result interpretation are done by individuals by themselves.

Note: Clinical and public health judgment should be used to determine the need for further investigation in patients who do not strictly meet the clinical or epidemiological criteria. Surveillance case definitions should not be used as the sole basis for guiding clinical management.

WHO reference number: **WHO/2019-nCoV/Surveillance_Case_Definition/2022.1**

World Health Organization

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4. PANDEMIC PREPAREDNESS

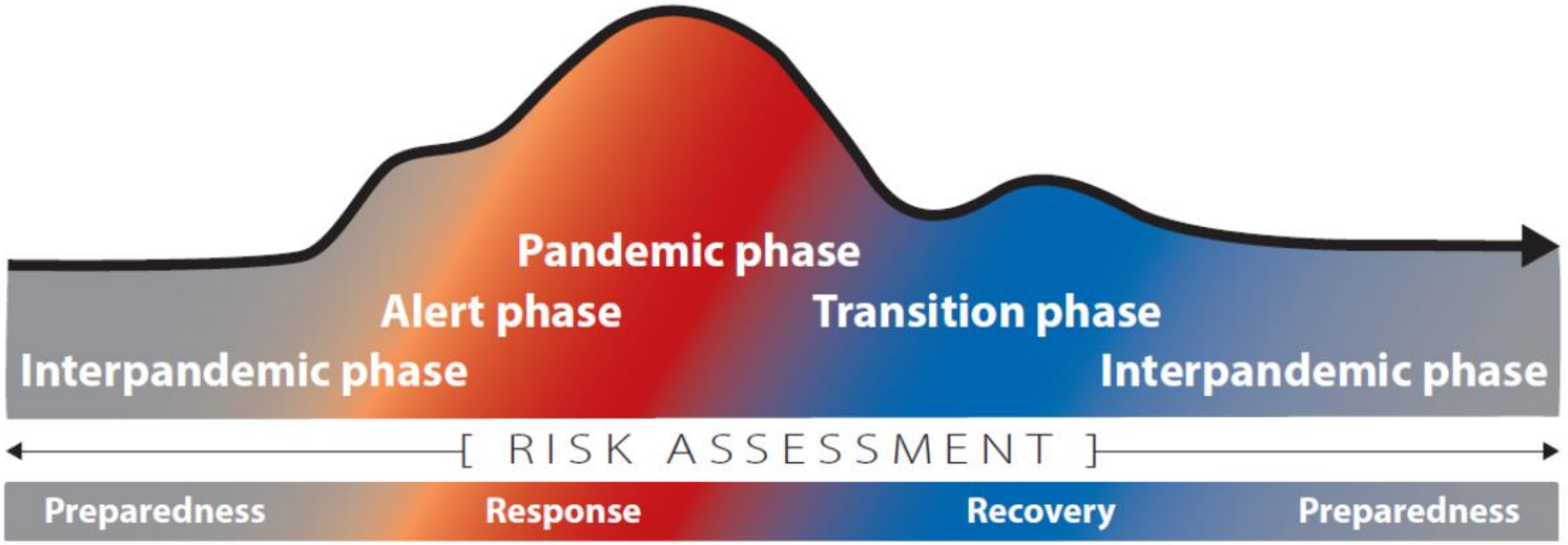
Pandemic preparedness

- Unpredictable situations must be foreseen. The need for global solidarity and cooperation has been evident since the surprising spread of Ebola and Zika. The current coronavirus pandemic is another warning sign. As for pandemics, the world is just as strong as its weakest link.
- Global solidarity is difficult to achieve because it is necessary to transcend national interests and identify with the different and diverse needs of others. Unlike solidarity relations within nation-states - which are based on shared language, history, ethnicity, and so on - global relations must accept the interconnectedness of diverse partners.
- Global preparedness must adapt to diversity, rather than relying on similarity.

- According to the so-called **Global Health Security Index (2019) (**= comprehensive assessment of global health security capabilities in 195 countries) in 2019 there were only 13 countries that were well prepared to fight the pandemic, including the United States, the United Kingdom, and Sweden. , France or Switzerland.

- At least 75% of countries had low scores on globally catastrophic indicators related to biological risks.
- The Czechia finished in 42nd place in the ranking of 195 countries with a gain of 52 points for a hundred possible ones and thus belongs to the group of "more prepared" countries.
- For comparison - the first United States has 83.5 points, the tenth Finland 68.7 points.

Developmental stages of a pandemic



Pandemic preparedness

- Pandemic preparedness should, as far as possible, focus on strengthening existing systems rather than developing new ones, in particular components of national infection prevention and control programs.
- New systems to be introduced during a pandemic should be tested during the interpandemic period.
- Adequate resources need to be allocated to all aspects of pandemic preparedness and response.
- Pandemic preparedness is most effective when it is built on the guiding principles that plan for preparedness for any acute threat to public health. The response to
- a pandemic must be based **on evidence-based evidence**, if available, and must respond to the threat.
- So far, there is experience with preparation for an influenza pandemic, ie a continuous process of planning, implementation, revision and implementation of national and transnational pandemic preparedness and response plans, so-called **pandemic plans.**

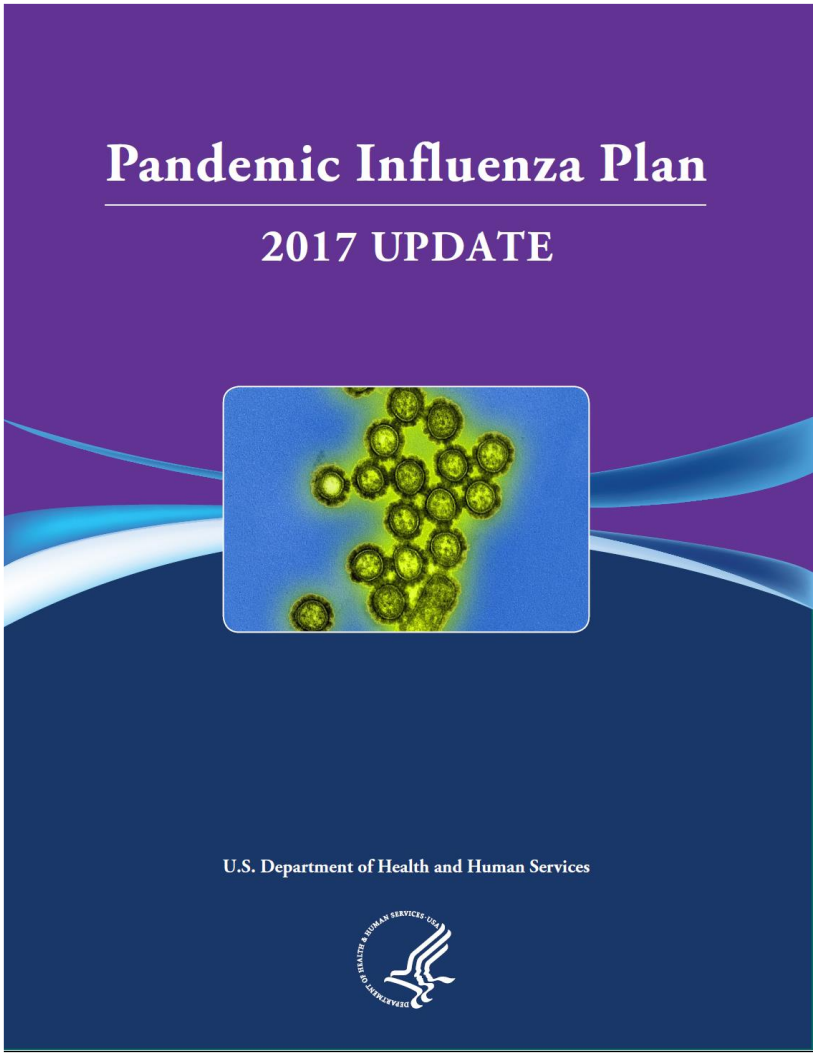
Pandemic preparedness

- **The pandemic plan** is thus a living document that is reviewed and revised at certain intervals if the global guidelines or the evidence base change; respects lessons learned from a pandemic, exercise or other relevant outbreak; or amendments to national or international legislation on the prevention and control of communicable diseases.
- **The Pandemic Plan** (PP) is based on the current WHO and European Union (EU) recommendations for national pandemic plans.
- The pandemic plans for covid19 from 2020 are based primarily on pandemic plans for influenza, as this is a new disease and influenza plans are closest to it.
- The Pandemic Plan of the Czech Republic is a document setting out the procedures and the basic system of the Czech Republic's response to an influenza pandemic caused by a new type of influenza virus.
- The main goal of the plan in the event of an influenza pandemic is to mitigate its expected health, social and economic consequences.

- Regional (country) plans identical measures at regional and local level.

Pandemic preparedness

Figure 1. Key elements of the pandemic preparedness planning cycle



Pandemic plan CZ

- latest version from 2012:
  https://www.vlada.cz/assets/ppov/brs/dokumenty/Pandemicky plan ČR.pdf