

SURVEILLANCE DISEASES; PANDEMIC PLANS

aVLOZ0642p Public health II - lecture

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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 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, 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.

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.

Surveillance:

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.

Surveillance was initially started in the field of infectious diseases.

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:

The condition is a comprehensive approach:

- ❖ Systematic data acquisition through national electronic surveillance systems

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

- a) confirmed disease,**
- b) probable case,**
- c) possible case**

- ❖ Analysis of the obtained data
- ❖ Interpretation and presentation
- ❖ A system of effective measures to reduce or eradicate this disease

Surveillance:

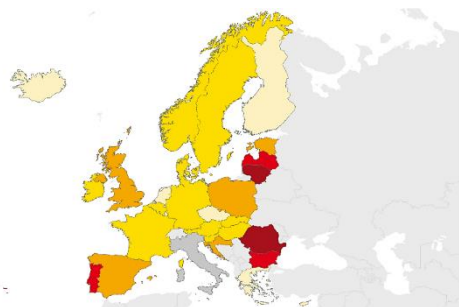
Surveillance programmes can be carried out on a large scale such as for districts and regions.

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.

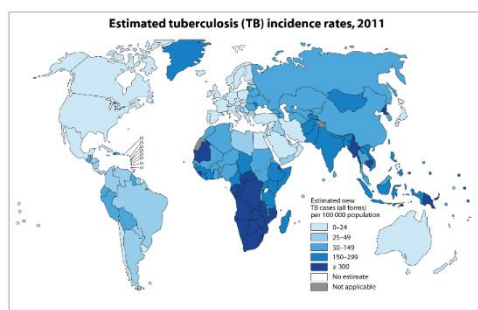
European Tuberculosis Surveillance Network



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.



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Source: Global Tuberculosis Report 2012, WHO, 2012.



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

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:

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.

Currently eg. - in Czech Republic:

Proti(anti)-**E**pidemic**S**ystem

- search for previously unrecognized sources of infection through entrance testing employees
- management of vaccination of citizens according to the evaluated level of health risk
- border protection
- methodical instructions for deciding on the order of quarantine measures to persons who were in close contact with a person in whom COVID-19 disease was proven by laboratory examination
-

Surveillance:

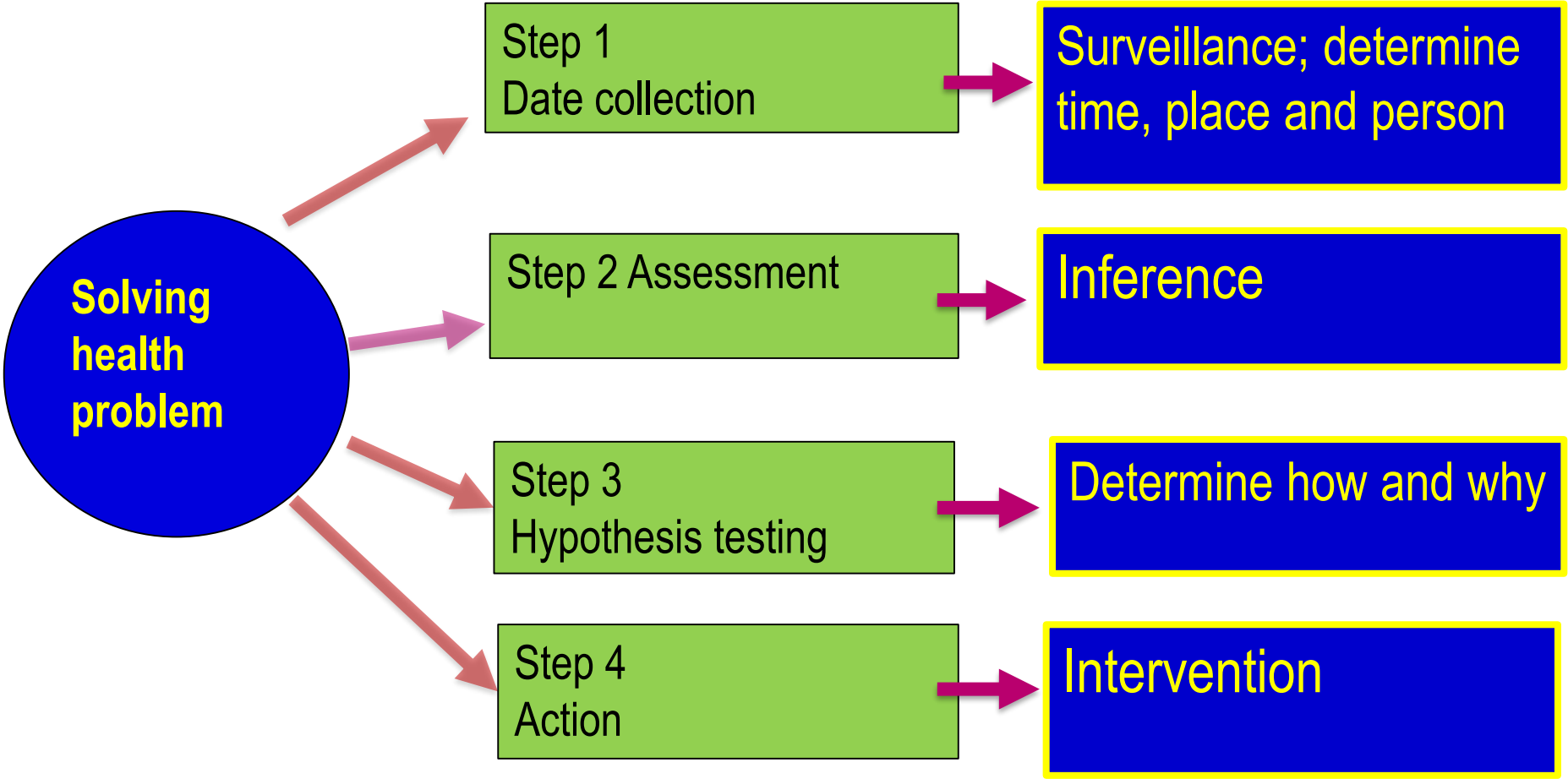
To study the influence of factors (lifestyle, environment, genetic factors) on human health, to understand the epidemiological characteristics of infectious diseases, they are the basis of epidemiological studies.

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.



Pandemic preparedness

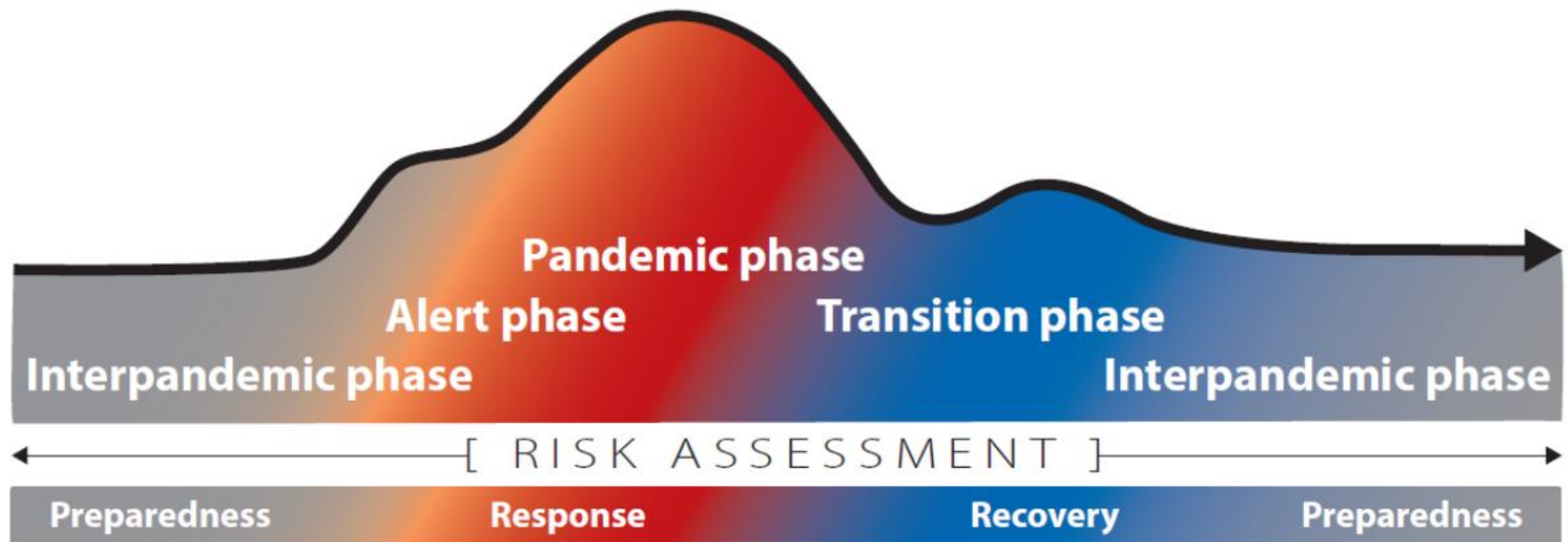
Unpredictable situations must be foreseen. The need for global solidarity and cooperation has been evident since the surprising spread of Ebola and Zika. The current coronavirus pandemic is another warning sign. As for pandemics, the world is just as strong as its weakest link. Global solidarity is difficult 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

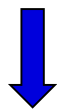
The pandemic plan is thus a living document that is reviewed and revised at certain intervals if the global guidelines or the evidence base change; respects lessons learned from a pandemic, exercise or other relevant outbreak; or amendments to national or international legislation on the prevention and 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.

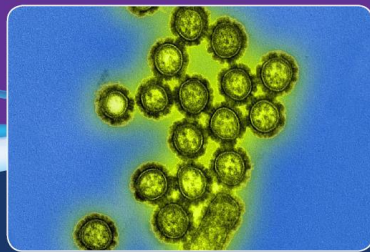
Figure 1. Key elements of the pandemic preparedness planning cycle



Pandemic preparedness

Pandemic Influenza Plan

2017 UPDATE



U.S. Department of Health and Human Services



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Pandemic plan ČR

latest version from 2012:

[https://www.vlada.cz/assets/ppov/brs/dokumenty/Pandemicky plan ČR.pdf](https://www.vlada.cz/assets/ppov/brs/dokumenty/Pandemicky_plan_CR.pdf)